Public Works and
Government Services Canada

Requisition No. EZ899-180659/A

DRAWINGS & SPECIFICATIONS
for

William Head Institution
Fire Pump Replacement

R.071314.001

APPROVED BY:

S/AERM — Jun 11/2017
Regional Manager, AES — Date

Construction Safety Coordinator — 2017.06.30
Date

TENDER:

Patrick Yung — 2017-07-07
Project Manager — Date

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CONSULTANTS – SEAL & SIGNATURE

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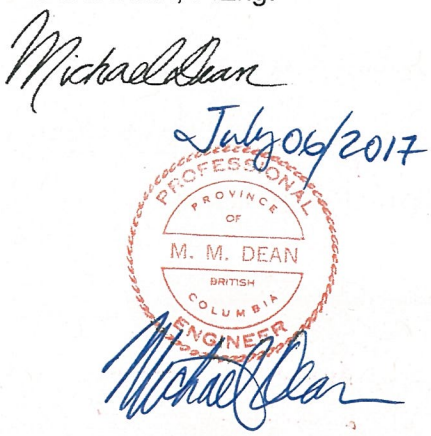
Mechanical (Prime)	Michael Dean, P.Eng. 

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PART 1 GENERAL

1.1 SUMMARY OF WORK

.1 Work covered by Contract Documents:

.1 This Contract covers the following work at the William Head Institution, Victoria B.C.

.1 The project scope includes replacement of two fire pumps, one electric drive and the other diesel engine drive, one jockey pump, the addition of a test line complete with Venturi flow meter and reconfiguration of suction piping to conform to NFPA 20 requirements.

.2 Pump House110 which houses the fire pumps is to have the addition of a wet fire suppression system to cover the area as per NFPA 13 requirements for a fire pump house.

.2 Work to be performed under this Contract includes, but not limited to, the following items covered further in the Contract documents:

.1 Provide a detailed work plan including a project schedule and phasing. This detailed work plan shall be submitted to the Departmental Representative for review to verify that there will be no interruption of service.

.2 Do not start work until all essential equipment is delivered to the site and the work can proceed without delays.

.3 Provide as-built drawings and closeout submittals.

.3 Contractor's Use of Premises:

.1 Contractor has limited use of site for work of this contract until Substantial Completion:

.1 Contractor use of premises for storage and access, as approved by the Departmental representative.

.2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.2 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.

1.2 WORK RESTRICTIONS

.1 Notify Departmental Representative of intended interruption of power, communication and water services and provide schedule of interruption times.

.2 Where Work involves breaking into or connecting to existing services, give departmental Representative 48 hours of notice for necessary interruption of services throughout course of work. Keep duration of interruptions to a minimum. Coordinate interruptions with local authority having jurisdiction and local residences and businesses affected by the disruption.

.3 Provide for access by pedestrian and vehicular traffic on and around site where work is in progress.

.4 Construct barriers in accordance with Section Temporary Barriers and Enclosures.

.5 Security Requirements: refer to Section 01 14 10 - Security Requirements.

.6 Hours of work:

.1 Perform work during normal working hours of the Institution 0730 to 1600, Monday through Friday except holidays.

.2 When it is necessary, arrange in advance with Departmental Representative to work outside of normal working hours.

1.3 CONSTRUCTION WORK SCHEDULE

.1 Commence work immediately upon official notification of acceptance of offer and complete the work within **34** 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 10 working days of Award of Contract, a Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of construction progress.

.2 Identify each trade or operation.

.3 Show dates for delivery of items requiring long lead time.

.4 Departmental Representative will review schedule and return one copy.

.5 Re-submit two (2) copies of finalized schedule to Departmental Representative within five (5) working days after return of reviewed preliminary copy.

.4 Project Scheduling Reporting:

.1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

.5 Project Meetings:

.1 Discuss Project Schedule at bi-weekly site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

.3 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price. After approval by Departmental Representative cost breakdown will be used as basis for progress payments. Only PWGSC paper work is acceptable.

1.4 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.

.2 Shop Drawings:

.1 Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate sections.

.3 Product Data:

.1 Certain specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings, provided that the product concerned is clearly identified. Submit in sets, not as individual submissions.

.4 Samples:

.1 Submit samples in sizes and quantities specified.

.2 Where colour is criterion, submit full range of colours.

.3 Submit all samples as soon as possible after the contract is awarded, to facilitate production of complete colour scheme by the Departmental Representative.

.5 Progress Photographs:

.1 Provide construction photographs in accordance with procedures and submission requirements specified in this clause.

.2 Progress Photographs:

.1 Provide digital photographs with images of minimum 3.1 mega pixel resolution and stored in Jpeg format with minimal compression.

.2 Number of viewpoints: four (4), locations of viewpoints directed by Departmental Representative.

.3 Frequency: monthly, submitted on disk with monthly progress statement, sent via e-mail or as directed by Departmental Representative.

.4 Identify photos by location, date and sequential numbering system.

.3 Final Photographs:

.1 Provide digital photographs with images of minimum 3.1 mega pixel resolution and stored in Jpeg format with minimal compression. Where photos are e-mailed compression can be increased.

.2 Number of viewpoints:

.1 Each side of building for a total of 4.

.2 Interior of rooms and finishes for a total of 8.

.3 Locations of viewpoints determined by Departmental Representative.

.3 Submit final photographs in digital format on CD, before final acceptance of building.

.4 Label disks and identify with name and project number of project. Indicate exposure dates and viewpoints of each photo and photo number.

.6 Submission Requirements:

.1 Schedule submissions at least ten days before dates reviewed submissions will be needed.

.2 Submit number of copies of product data, shop drawings which Contractor requires for distribution plus four (4) copies which will be retained by Departmental Representative.

.3 Accompany submissions with transmittal letter in duplicate.

.4 Submit bond copies (hard copy) as directed by Departmental Representative.

.7 Coordination of Submissions:

.1 Review shop drawings, product data and samples prior to submission.

.2 Coordinate with field construction criteria.

.3 Verify catalogue numbers and similar data.

.4 Coordinate each submittal with requirements of the work of all trades and contract documents.

.5 Responsibility for errors and omissions in submittal is not relieved by Departmental Representative's review of submittal.

.6 Responsibility for deviations in submittal from requirements of Contract documents is not relieved by Departmental Representative's review of submittal,

unless Departmental Representative gives written acceptance of specified deviations.

.7 Notify Departmental Representative, in writing at time of submission, of deviations in submittal from requirements of Contract documents.

.8 Make any changes in submissions which Departmental Representative may require consistent with Contract Documents and re-submit as directed by Departmental Representative.

.9 After Departmental Representative's review, distribute copies.

.10 Shop Drawings Review:

.1 Review of shop drawings by Public Works and Government Services Canada (PWGSC) is for the sole purpose of ascertaining conformance with the general concept.

.2 The Departmental Representative's review does not mean that PWGSC approves the detail design inherent in the shop drawings, responsibility remains with the contractor submitting same, and such review will not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents.

.3 Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for co-ordination of the work of all subtrades.

1.5 HEALTH AND SAFETY

.1 Specified in Section 01 35 33.

1.6 ENVIRONMENTAL PROCEDURES

.1 Fires and burning of rubbish on site not permitted.

.2 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.

.3 Do not dispose of waste or volatile materials such as oil, paint thinner or mineral spirits into waterways, storm or sanitary systems.

.4 Provide temporary drainage and pumping as necessary to keep excavations and site free from water during excavation and grading activities.

.5 Control disposal of run-off of water containing suspended materials or other harmful substances in accordance with local authority requirements. Construct settlement ponds and silt fences as required by the Provincial Environmental authority.

.6 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

.7 Under no circumstances dispose of rubbish or waste materials on adjoining property.

1.7 REGULATORY REQUIREMENTS

.1 References and Codes:

.1 Perform Work in accordance with National Building Code of Canada (NBCC2015) and where applicable British Columbia Building Code (BCBC2012) 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.

1.8 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 Procedures:

.1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

.3 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.

.4 Reports:

.1 Submit (4) four copies of inspection and test reports to Departmental Representative.

.5 Tests and Mix Designs:

.1 Furnish test results and mix designs as may be requested.

.6 Mill Tests:

.1 Submit mill test certificates as requested and as required of specification Sections.

.7 Equipment and Systems:

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

.2 Refer to specific Section for definitive requirements.

1.9 TEMPORARY UTILITIES

.1 Installation and Removal:

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

.2 Dewatering:

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

.3 Water Supply:

.1 Arrange, pay for and maintain temporary water supply in accordance with local authority, governing regulations and ordinances.

.2 Permanent water supply system installed under this contract may be used for construction requirements provided that guarantees are not affected thereby. Replace damaged components.

.4 Heating and Ventilation:

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.5 Temporary Power and Light:

.1 Arrange, pay for and maintain temporary electric power supply in accordance with local power authority governing regulations and ordinances.

.2 Electrical power and lighting installed under this contract may be used for construction purposes at no extra cost, provided that guarantees are not affected thereby and electrical components used for temporary power are replaced when damaged.

.3 Replace lighting bulbs/tubes and clean reflectors and lenses used for more than three months.

.6 Temporary Communication Facilities:

.1 Provide and pay for temporary telephone and fax hook up, line(s) necessary for own use.

.7 Fire Protection:

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

.2 Phasing of this project is described on drawing FP-001 and is to be performed in 3 phases to allow fire protection coverage of the facility through at least one fire pump at a time. Phase work such that at least one fire pump is active at all possible times. Where both pumps are off line shut down times are to be to a minimum and no more than 8 hours in duration.

1.10 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 Scaffolding:

.1 Design, construct and maintain scaffolding in rigid, secure and safe manner, in accordance with WorkSafeBC regulations and Section 01 35 33.

.2 Erect scaffolding independent of walls. Remove promptly when no longer required.

.3 Hoisting:

.1 Provide, operate and maintain hoists required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Hoists to be operated by qualified operator.

.4 Site Storage/Loading:

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

.5 Construction Parking:

.1 Make good damage to existing roads used for access to project site.

.2 Build and maintain temporary access where required and provide snow removal during period of Work.

.3 Park vehicles outside perimeter fence in designated parking areas.

.6 Contractor's Site Office and enclosure:

.1 Provide office of size to accommodate site meetings and Contractor's operations.

.2 Provide a clearly marked and fully stocked first-aid case in a readily available location.

.3 Provide temporary fenced area to enclose site and operations.

.7 Equipment, Tools and Material Storage:

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

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

.8 Sanitary Facilities:

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures. Permanent facilities may be used on approval of Departmental Representative.

1.11 TEMPORARY BARRIERS AND ENCLOSURES

.1 Hoarding:

.1 Erect temporary site enclosure using new 1.8 m high temporary construction fencing. Provide lockable truck gate. Maintain fence in good repair.

.2 Access to Site:

.1 Maintain immediate local access roads in clean condition used during work of this contract.

.3 Protection for Off-Site and CSC Property:

.1 Protect surrounding CSC property from damage during performance of Work.

.2 Be responsible for damage incurred.

.4 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 hoardings.

.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.

1.12 COMMON PRODUCT REQUIREMENTS

.1 Reference Standards:

.1 If there is 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.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

.6 The use of asbestos containing materials is prohibited in this project. Contractor shall provide a letter to the Departmental Representative prior to Substantial Completion confirming that asbestos containing materials are not used in this project.

.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 sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 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.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

.4 Transportation:

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Departmental Representative will be paid for by Departmental Representative. Unload, handle and store such products.

.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. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

.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 neither to damage nor to 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 exterior 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 for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

.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.

.14 Existing Utilities:

.1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.

.2 Before commencing work, establish location and extent of service lines in areas of work and notify Departmental Representative of findings.

.3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.

.4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.5 Record locations of maintained, capped and re-routed services lines.

.15 Contractors Options for Selection of Products:

.1 Products specified by **"Prescriptive" specifications**: select any product meeting or exceeding specifications.

.2 Products specified under "**Acceptable Products**" (used for complex Mechanical or Electrical Systems): select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.

.3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.

.4 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with "Instructions to Bidders".

.5 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent laboratory report showing that the product meets or exceeds the specified requirements.

.16 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

.3 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.

.4 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.

.5 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.

1.13 EXAMINATION AND PREPARATION

.1 Existing Services:

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

.2 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.

1.14 EXECUTION REQUIREMENTS

.1 Preparation:

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

.2 Execution:

.1 Execute cutting, fitting, and patching including excavation and fill, 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 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using purpose made saw or core drill. Pneumatic or impact tools not allowed on brittle materials without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the construction element.

.12 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

.13

1.15 CLEANING

.1 Project Cleanliness:

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.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 Clear snow and ice from access to building.

.4 Provide on-site containers for collection of waste materials and debris.

.5 Provide and use clearly marked separate bins for recycling. Refer to-Construction/Demolition Waste Management And Disposal.

.6 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

.2 Final Cleaning:

.1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review, remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.5 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

.6 Clean lighting reflectors, lenses, and other lighting surfaces.

.7 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.8 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.9 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.10 Remove dirt and other disfiguration from exterior surfaces.

.11 Sweep and wash clean paved areas.

.12 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.13 Clean roofs, downspouts, and drainage systems.

.14 Remove snow and ice from access to building.

1.16 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.

1.17 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 Substantial 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 Fire alarm verification report per CAN/ULC-S537,

.5 Certificates required by Authority Having Jurisdictions for fire protection systems.

.6 Certificates required by Authority Having Jurisdictions for seismic restraints. Arrange and pay for the services of a structural professional engineer registered in British Columbia referred to here as the Seismic Engineer. The Seismic Engineer shall review, seal and sign all submittals required for all components, assemblies, attachments and installation procedures for the seismic restraint of all piping, ductwork and equipment installed under this Section. The Seismic Engineer shall provide all necessary direction to the contractor during installation of the seismic restraint installation and submit a statutory declaration that the final seismic restraint installation conforms to the submittal documents sealed by the Seismic Engineer and satisfies all regulatory requirements. The Seismic Engineer shall submit Letters of Assurance Schedules S-B and S-C for the seismic restraint to the Consultant.

.7 Operation of systems have been demonstrated to Departments personnel.

.8 Work is complete and ready for Final Inspection.

.9 Asbestos containing materials are not used in this project.

.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 re-inspection.

1.18 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 as changes occur. At completion supply:

.1 Four (4) sets of CD's in AutoCad file format (version: 2010) and PDF format with all as-built information on the diskettes.

.2 Four (4) sets of printed as-built drawings.

.3 Submit one copy of check plots to Departmental Representative prior to final printing of as-built drawings.

.4 Departmental Representative will supply copies of the original AutoCad files.

.5 Retain original logo and title block on the as-built drawings. Contractor may place on the upper right-hand title block area a small company logo, the text "AS-BUILT" and the date.

.2 Costs for transferring as-built information from marked up working set of drawings to electronic format using ACAD and plotting service is included in the Contract.

.2 Operation and Maintenance Manuals:

.1 On completion of project submit to Departmental Representative four (4) CD R/ disk copies and four (4) paper copies (in loose leaf type binder) of Operation and Maintenance Manual, made up as follows:

.1 Provide maintenance manual on CDs using pdf, or other approved format for descriptive writing, page size images and page size drawings. Organize manuals into industry standard maintenance manual tabs with links in index to each descriptive section describing the component or maintenance procedure etc.

.2 Organize files into CSI Masterformat numbering system or other approved descriptive titles.

.3 Label disk "Operation and Maintenance Data", project name, date, names of Contractor, subcontractors, consultants and subconsultants.

.4 Include scanned guarantees, diagrams and drawings.

.5 Organize contents into applicable sections of work to parallel project specification break-down. Mark each section by labeled tabs (navigational buttons).

.6 Drawings, diagrams and manufacturer's literature must be legible.

.7 Refer to Mechanical and Electrical Divisions for specific details for Mechanical and Electrical data.

.3 Maintenance Materials, Special Tools and Spare Parts:

.1 Specific requirements for maintenance materials, tools and spare parts are specified in individual sections.

.2 Deliver maintenance materials, special tools and spare parts to Departmental Representative and store in designated area as directed by Departmental Representative.

.3 Prepare lists of maintenance materials, special tools and spare parts for inclusion in Manual specified in Clause 18.2.

.4 Maintenance materials:

.1 Deliver wrapped, identify on carton or package, colour, room number, system or area as applicable where item is used.

.5 Special tools:

.1 Assemble as specified;

.2 Include identifications and instructions on intended use of tools.

.6 Spare parts:

.1 Assemble parts as specified;

.2 Include part number, identification of equipment or system for which parts are applicable;

.3 Installation instructions;

.4 Name and address of nearest supplier.

.4 Warranties and Bonds:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing in maintenance manual.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

.4 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until the Date of Interim Completion is determined.

.5 Verify that documents are in proper form, contain full information, and are notarized.

.6 Retain warranties and bonds until time specified for submittal.

1.19 DEMONSTRATION AND TRAINING

.1 Demonstration and Training:

.1 Demonstrate operation and maintenance of equipment and systems to maintenance personnel following interim Completion and prior to date of final certificate of completion

.2 Departmental Representative will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

1.20 GENERAL COMMISSIONING

.1 Commission installed systems prior to Demonstration and Training.

END OF SECTION

PART 1 GENERAL

1.1 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.

1.2 Purpose

.1 "Contraband" means:

.1 an intoxicant, including alcoholic beverages, drugs and narcotics

.2 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,

.3 an explosive or a bomb or a component thereof,

.4 currency over any applicable prescribed limit, $25.00, and

.5 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.

.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.

1.3 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' 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.

1.4 Construction Employees

.1 Submit CPIC form and scanned copy of government issued ID for each employee to the Departmental Representative.

.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.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 Work Hours

.1 Work hours within the Institution are: conform to Division.

.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 waved by the Director.

1.10 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.

1.11 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.

1.12 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.

1.13 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.

1.14 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.

1.15 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.

1.16 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.

1.17 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.

1.18 Access and Removal from Institution Property

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

1.19 Movement 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.

1.20 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.

1.21 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.

1.22 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.

1.23 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.

1.24 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

PART 1 - GENERAL

PSPCC Update on Asbestos Use
Effective April 1, 2016, all Public Works and Government Services Canada (PWGSC) contracts for new construction and major rehabilitation will prohibit the use of asbestos-containing materials. Further information can be found at http://www.tpsgc-pwgsc.gc.ca/comm/vedette-features/2016-04-19-00-eng.html

1.1 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 The Canadian Electric Code (as amended)

.4 Canadian Standards Association (CSA) as amended:

- .1 CSA Z797-2009 Code of Practice for Access Scaffold
- .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes
- .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
- .4 CSA Z1006-10 Management of Work in Confined Spaces.
- .5 CSA Z462- Workplace Electrical Safety Standard

.5 National Fire Code of Canada 2010 (as amended)

- .1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.

.6 American National Standards Institute (ANSI):

- .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.7 Province of British Columbia::

- .1 Workers Compensation Act Part 3-Occupational Health and Safety.
- .2 Occupational Health and Safety Regulation

1.2 Related Sections

.1 Refer to the following current NMS sections as required:

- .1 Section 01 01 50 General Instructions

1.3 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.

1.4 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.

1.5 Submittals

.1 Submit to Departmental Representative submittals listed for review 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 10 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.

1.6 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.

1.7 Health and Safety Coordinator

.1 The Health and Safety Coordinator (Registered Occupational Hygienist, Certified Industrial Specified Hygienist) 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.

1.8 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.

1.9 Project/Site Conditions

.1 Work at site will involve contact with:

.1 Multi-employer work site.

.2 Federal employees and general public.

.3 Energized electrical services.

.4 Working from heights

.5 Persons incarcerated in the federal institutional system

1.10 Utility Clearances

.1 The Contractor is solely responsible for all utility detection and clearances prior to starting the work.

.2 The Contractor will not rely solely upon the Reference Drawings or other information provided for utility locations.

1.11 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.

1.12 Work Permits

.1 Obtain specialty permit related to project before start of work.

1.13 Filing of Notice

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

.2 Provide copies of all notices to the Departmental Representative.

1.14 Site Specific 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 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.

1.15 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.

.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.

.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.

1.16 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 in accordance with Section 01 01 50.

.4 The contractor shall ensure that the product is applied as per manufacturers recommendations.

.5 The contractor shall ensure that only pre-approved products are brought onto the work site in an adequate quantity to complete the work.

1.17 Asbestos Hazard

.1 Carry out any activities involving asbestos in accordance with applicable Provincial Regulations.

.2 Removal and handling of asbestos will be performed as indicated in Division 2 specifications.

1.18 PCB Removals

.1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.

.2 Remove, handle, transport and dispose of as indicated in Division 2 specifications.

1.19 Removal of Lead-Containing Paint

.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 regulations.

.3 Work with lead containing paints shall be completed as per provincial and federal regulations.

1.20 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 on site.

1.21 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.

1.22 Overloading

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

1.23 Falsework

.1 Design and construct falsework in accordance with CSA S269.1-1975 (R2003).

1.24 Scaffolding

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 Code of Practice for Access Scaffold and BC Occupational Health and Safety Regulations.

1.25 Confined Spaces

.1 Carry out work in confined spaces in compliance with Provincial regulations.

1.26 Power-Actuated Devices

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

1.27 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.

1.28 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.

.3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the Departmental Representative is required prior to any gas or diesel tank being brought onto the work site.

1.29 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.

1.30 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.

1.31 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 marshalling station, and the emergency transportation provisions.

.5 Notice of Project.

.6 Floor plans or site plans. Must be posted in a non-inmate access are and locked up when not being used.

.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.

1.32 Meetings

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

1.33 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".

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Not Used

END OF SECTION

PART 1 GENERAL

1.1 Summary

.1 Section Includes:

.1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.

.2 Acronyms:

AFD - Alternate Forms of Delivery, service provider.

BMM - Building Management Manual.

Cx - Commissioning.

EMCS - Energy Monitoring and Control Systems.

O&M - Operation and Maintenance.

PI - Product Information.

PV - Performance Verification.

TAB - Testing, Adjusting and Balancing.

.3 Provide third party commissioning agent(s) for mechanical and electrical systems. Provide costs of commissioning in tender price.

.4 Refer to sections of Fire Protection disciplines for specific requirements

1.2 General

.1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:

.1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.

.2 Ensure appropriate documentation is compiled into the BMM.

.3 Effectively train O&M staff.

.2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.

.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.

.2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

1.3 Commissioning Overview

.1 Cx Agent:

.1 Hired and paid for by the Contractor.

.2 Responsibilities:

.1 Plan, coordinate, and carry out the Cx process.

.2 Develop Cx plan and Cx check forms (component, system and integrated system verification).

.3 Undertakes the component, system and integrated system performance verification testing and commissioning.

.4 Plans and carry out equipment demonstration and acceptance tests.

.5 Complete all Cx verification documentations.

.6 Chair Cx meetings.

.3 Cx to be a line item of Contractor's cost breakdown.

.4 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.5 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.

.6 Commissioning work to be completed prior Contractor's request for Substantial Performance:

.1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.

.2 Equipment, components and systems have been commissioned.

.3 O&M training has been completed.

1.4 Non-Conformance to Performance Verification Requirements

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the non-functional system(s), including related systems as deemed required by Departmental Representative, to ensure effective performance.

.2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.5 Pre-Cx Review

.1 Before Construction:

.1 Review contract documents, confirm by writing to Departmental Representative.

.1 Adequacy of provisions for Cx.

.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:

.1 Coordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:

.1 Have completed Cx Plan up-to-date.

.2 Ensure installation of related components, equipment, sub-systems, systems is complete.

.3 Fully understand Cx requirements and procedures.

.4 Have Cx documentation shelf-ready.

.5 Understand completely design criteria and intent and special features.

.6 Submit complete start-up documentation to Departmental Representative.

.7 Have Cx schedules up-to-date.

.8 Ensure systems have been cleaned thoroughly.

.9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.

.10 Ensure "As-Built" system schematics are available.

.4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 Conflicts

.1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 Action and Informational Submittals

.1 Submittals: in accordance with Section 01 01 50 – General Instructions.

.2 Submit immediately after award of Contract:

.1 Name of Contractor's Cx Agent.

.3 Submit no later than 4 weeks after award of Contract:

.1 Draft Cx documentation.

.2 Preliminary Cx schedule.

.4 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 2 weeks prior to start of Cx.

.5 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 2 weeks prior to start of Cx.

.6 Provide additional documentation relating to Cx process required by Departmental Representative.

1.8 Commissioning Documentation

.1 Provide the following verification check sheets.

.1 Installation Check Lists and Product Information (PI) forms.

.2 Performance Verification (PV) forms.

.2 Departmental Representative to review and approve Cx documentation.

.3 Provide completed and approved Cx documentation to Departmental Representative.

1.9 Commissioning Schedule

.1 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:

.1 Approval of Cx reports.

.2 Verification of reported results.

.3 Repairs, retesting, re-commissioning, re-verification.

.4 Training.

1.10 Commissioning Meetings

.1 Convene Cx meetings following project meetings.

.2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.

.3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.

.4 At [60]% construction completion stage. Departmental Representative to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:

.1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.

.2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.

.5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.

.6 Meeting will be chaired by Cx Agent who will record and distribute minutes.

1.3 Quality Assurance

.1 Testing organization: current member in good standing of AABC certified to perform specified services.

.2 Comply with applicable procedures and standards of the certification sponsoring association.

.3 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

1.4 References

.1 Associated Air Balance Council (AABC): National Standards for Field Measurement and Instrumentation, Total Systems Balance, Air Distribution-Hydronics Systems.

1.5 Submittals

.1 Prior to start of Work, submit name of organization proposed to perform services. Designate who has managerial responsibilities for coordination of entire testing, adjusting and balancing.

.1 Submit documentation to confirm organization compliance with quality assurance provision.

.2 Submit 3 preliminary specimen copies of each of report forms proposed for use.

.3 Ten (10) days prior to Substantial Performance, submit 3 copies of final reports on applicable forms.

.4 Submit reports of testing, adjusting and balancing postponed due to seasonal, climatic, occupancy, or other reasons beyond Contractor's control, promptly after execution of those services.

1.6 Procedures

.1 Comply with procedural standards of certifying association under whose standard services will be performed.

.2 Notify Departmental Representative 3 days prior to beginning of operations.

.3 Accurately record data for each step.

.4 Report to Departmental Representative any deficiencies or defects noted during performance of services.

1.7 Contractor's Responsibilities

.1 Prepare each system for testing and balancing.

.2 Cooperate with testing organization and provide access to equipment and systems.

.3 Provide personnel and operate systems at designated times, and under conditions required for proper testing, adjusting, and balancing.

.4 Notify testing organization 7 days prior to time project will be ready for testing, adjusting, and balancing.

.5 Commission cost to be borne by Contractor.

1.8 Preparation

.1 Provide instruments required for testing, adjusting, and balancing operations.

.2 Make instruments available to Departmental Representative to facilitate spot checks during testing.

.3 Retain possession of instruments and remove at completion of services.

.4 Verify systems installation is complete and in continuous operation.

.5 Verify lighting is turned on when lighting is included in cooling load.

.6 Verify equipment such as computers, laboratory and electronic equipment are in full operation.

1.9 Final Reports

.1 Organization having managerial responsibility shall make reports.

.2 Ensure each form bears signature of recorder, and that of supervisor of reporting organization.

.3 Identify each instrument used, and latest date of calibration of each.

1.10 Completion of Commissioning

.1 Upon completion of Cx leave systems in normal operating mode.

.2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx deliverables have been submitted and accepted by Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

.1 Section 01 01 50 — General Instructions

.2 Section 01 35 33 — Health and Safety Requirements

1.2 References

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 WorksafeBC

.1 Safe Handling of Asbestos, A Manual of Standard Practices.

1.3 Health and Safety

.1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

1.4 Waste Management and Disposal

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

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.5 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan

.6 Fold up metal banding, flatten and place in designated area for recycling.

.7 Do not dispose of waste or volatile materials such as mineral spirits, oil petroleum based lubricant, or toxic cleaning solutions into storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

.8 Mercury containing thermostats shall be disposed in accordance with safety regulations (see Recycling Council of British Columbia, http://rcbc.bc.ca/education/faqs/mercury4)

1.5 Environmental Protection

.1 Do not dispose of waste or volatile materials into watercourses, storm or sanitary sewers.

.2 Prevent extraneous materials from contaminating air beyond deconstruction area, by providing temporary enclosures during Work.

.3 Employ reasonable means necessary to protect salvaged materials from vandalism, theft, adverse weather, or inadvertent damage.

.4 Organize site and workers in matter which promotes efficient flow of materials through disassembly, processing, stockpiling, and removal.

.5 Remove and transport toxic or dangerous materials from site in accordance with authority having jurisdiction.

1.6 Site Condition

.1 The existing site and buildings will be in use by Institution during work of this Contract. Maintain building access at all doorways and corridors.

.2 Investigate site and building to determine dismantling, processing and storage logistics required prior to beginning of Work.

.3 Develop strategy for deconstruction to facilitate optimum salvage of reusable and recyclable materials.

.4 Notify Departmental Representative before disrupting building access or services.

.5 Locate any existing conduit, rebar, etc. within floor or walls prior to drilling and/or coring. Contractor is responsible for repairing any such conduit, rebar, etc. that is damaged in the course of construction.

.6 Take preventative measures during demolition process and do not disturb pipe elbow insulation, duct mastic or other suspicious substance which may contain hazardous materials. Exercise caution when cutting existing duct insulation.

1.7 Hazardous Materials

.1 Contractors shall expect to encounter Asbestos Containing Materials (ACM) and other hazardous building materials throughout the course of work. Appendix contains Hazmat Reports relevant to this site and these reports identify ACM and hazardous materials that the Contractors will encountered. If even one surveyed sample of a material at a particular location is identified to be ACM and/or hazardous material, Contractors shall treat this material throughout the rest of the site as "identified" ACM and/or hazardous material. Removal of these identified ACM and hazardous materials that the Contractors will encounter shall be the responsibility of the Contractors.

.2 Contractor shall prepare and submit a Site Specific Asbestos and Lead Exposure Control Plan to Departmental Representative within ten (10) working days of Award of Contract for review and approval, prior to start of construction. The Site Specific Asbestos and Lead Exposure Control Plan (ECP) shall be prepared by a specialist or a third party company with experience in preparing ECP's, and the Contractors shall implement the approved Site Specific Asbestos and Lead Exposure ECP.

.3 Submit "Contractor Notification and Acknowledgement" for hazardous materials on site.

.4 Should other suspected hazardous building substances not identified in the Contract Document be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.

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

.2 Removal of ACM and hazardous materials not identified in the Contract Document and Hazmat Reports will be under the control of the Departmental Representative and may be a change order to the contract price in accordance with General Conditions, or removed under a separate contract by the Departmental Representative.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 EXECUTION

3.1 Preparation

.1 Inspect site and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

3.2 Protection

.1 Prevent movement, settlement, or damage to adjacent structures, utilities and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Do Work in accordance with Section 01 35 33 - Health and Safety Requirements.

.6 Prevent debris from blocking drainage which must remain in operation.

.7 Take precaution during demolition to protect all adjacent finished surfaces. Make good any damage to adjacent surfaces.

3.3 Salvage

.1 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.2 Remove items to be reused and protect items from damage.

3.4 Disposal

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

.2 The Owner reserves the option to request some or all existing equipment being removed and not required to be relocated to remain the property of the Owner. When directed by the Departmental Representative, remove such equipment and turn over to the Owner. Provide receipt verifying disposition of such equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 01 50 – General Instructions

.2 Section 01 35 33 – Health and Safety

1.2 REFERENCES

.1 Reports:

.1 "Hazardous Building Materials Assessment, building 110 – Pump House, William Head Institution", issued February 14, 2017, prepared by Stantec for Public Works Government Services Canada (further referred to herein as the "Assessment Report") – attached in the Appendix of the Project Specifications.

.2 Definitions:

.1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.4 Hazardous Building Material: component of a building or structure that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when altered, disturbed or removed during maintenance, renovation or demolition.

.3 Reference Standards:

.1 Canadian Environmental Protection Act,1999 (CEPA 1999)

.1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).

.2 Department of Justice Canada (Jus)

.1 Transportation of Dangerous Goods Act, 1992 (TDG Act) [1992], (c. 34).

.2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada Institute for Research in Construction (NRC-IRC)

.1 National Fire Code of Canada (2010).

.5 WorkSafe BC

.1 British Columbia's Occupational Health and Safety Regulation (BC Reg. 296/97, including amendments to date of work)

.2 "Lead-Containing Paints and Coatings; Preventing Exposure in the Construction Industry", 2011

.3 "Safe Work Practices for Handling Asbestos" (2012)

.6 British Columbia Hazardous Waste Regulation (BC Reg. 63/88)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data for hazardous materials to be used by the Contractor to complete the Work:

.1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 33 - Health and Safety to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.

.3 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.

.4 Construction/Demolition Waste Management:

.1 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating percentage of construction/demolition wastes were recycled or salvaged

.5 Low-Emitting Materials: submit listing of adhesives and sealants used, comply with VOC and chemical component limits or restrictions requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle hazardous materials to be used by the Contractor to complete the Workin accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver hazardous materials to be used by the Contractor to site in original factory packaging, labelled with manufacturer's name and address.

.3 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.4 Storage and Handling Requirements:

.1 Co-ordinate storage of hazardous materials to be used by the Contractor to complete the Work with Departmental Representative and abide by internal requirements for labelling and storage of materials and wastes.

.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.

.1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.

.2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.

.5 Transfer of flammable and combustible liquids is prohibited within buildings.

.6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.

.7 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.

.8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

.10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.

.6 Store hazardous materials and wastes in secure storage area with controlled access.

.7 Maintain clear egress from storage area.

.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.

.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

.10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.11 When hazardous waste is generated on site:

.1 Co-ordinate transportation and disposal with Departmental Representative.

.2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.

.3 Use licensed carrier authorized by provincial authorities to accept subject material.

.4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material.

.5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.

.6 Only trained personnel handle, offer for transport, or transport dangerous goods.

.7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.

.8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.

.9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

.12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.13 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 24 hours of incident.

Part 2 Products

2.1 MATERIALS

.1 Description:

.1 Bring on site only quantities hazardous material required to perform Work.

.2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 HAZARDOUS MATERIALS ABATEMENT

.1 Scope of Abatement Activities.

.1 Abatement shall be conducted to handle, alter, remove and/or dispose of hazardous building materials as identified in the Assessment Report in accordance with applicable regulations, guidelines, standards and/or best practices for such work, where such identified hazardous building materials will be impacted (handled, altered, damaged, removed) by the Work.

.2 Contractor is responsible for reviewing plans, specifications and reports such that they understand the locations and amounts of hazardous materials that will be impacted by the Work of this contract, and such that appropriate abatement plans and budgets can be included in their overall bids.

.3 The listing below is a summary of the identified hazardous building material categories and associated removal and disposal regulations, guidelines and/or standards.

.1 Asbestos-Containing Materials (ACMs)

.1 According to the Assessment Report, the following ACMs are present:

.1 Pipe flange gaskets (approximately 12" diameter) in process equipment

.2 Woven motor unit vibration protection pads

.3 Insulation materials inside fire-rated doors (presumed ACM)

.2 Removal of ACMs, where required by the Work, is to be conducted in accordance with the requirements of the 2012 WorkSafe BC publication "Safe Work Practices for Handling Asbestos". Where asbestos abatement is to be conducted, Contractor must:

.1 Submit Provincial and/or local requirements for Notice of Project Form.

.2 Submit proof of Contractor's Asbestos Liability Insurance.

.3 Submit to Departmental Representative necessary permits for transportation and disposal of asbestos containing waste and proof that asbestos containing waste has been received and properly disposed.

.4 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing. Instruction and training related to respirators is to include, at a minimum:

.1 Fitting of equipment.

.2 Inspection and maintenance of equipment.

.3 Disinfecting of equipment.

.4 Limitations of equipment.

.3 If required based on the duration of work and tasks to be performed, Contractor is responsible to arrange and pay for independent, qualified 3rd party consultant to conduct air monitoring, where required during abatement per the 2012 WorkSafe BC publication "Safe Work Practices for Handling Asbestos".

.1 Air sampling results to be provided to Contractor and Departmental Representative for review within 24-hours of sample collection.

.4 Waste transportation to be conducted in accordance with BC Reg. 63/88 and the Federal Transportation of Dangerous Goods Regulation.

.5 Waste disposal to be conducted in accordance with BC Reg. 63/88.

.6 Notify Departmental Representative of suspected ACM discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from DCC Representative.

.2 Lead and Lead-Containing Paints (LCPs)

.1 Refer to the Assessment Report for identities and locations of LCPs that may require disturbance during the Work.

.2 Actions that will disturb materials coated with LCPs are to be conducted in accordance with the requirements of the 2011 WorkSafe BC publication "Lead-Containing Paint and Coatings: Preventing Exposure in the Construction Industry", keeping airborne exposure to lead dust to less than the 8-hour Occupational Exposure Limit (OEL) for lead of 0.05 milligram per cubic metre (mg/m^3).

.3 Although LCPs and items coated with LCPs will be disturbed and/or removed for disposal during the Work, unless deemed necessary through risk assessment or cost analysis conducted by the Contractor, comprehensive removal of LCPs from items or surfaces is not expected to be required during the Work.

.1 Refer to the provisions of the 2012 WorkSafe BC publication "Lead-Containing Paint and Coatings: Preventing Exposure in the Construction Industry" for removal of LCPs from surfaces before any welding and torch-cutting, should the Contractor plan to use such methods to complete the Work.

.1 Contractor will be responsible for verification testing of surfaces where LCPs have been removed. Confirmation of acceptable results is to be provided to the Departmental Representative for review before proceeding with any welding or torch-cutting on surfaces where LCPs were present.

.4 Waste transportation to be conducted in accordance with BC Reg. 63/88 and the Federal Transportation of Dangerous Goods Regulation.

.5 Waste disposal to be conducted in accordance with BC Reg. 63/88.

.3 Polychlorinated Biphenyls (PCBs)

.1 Removal, alteration and/or disposal of PCB-containing equipment is not anticipated to be required during the Work.

.4 Mould

.1 Removal, alteration and/or disposal of mould-impacted materials is not anticipated to be required during the Work.

.5 Mercury

.1 According to the Assessment Report mercury vapuor is expected to be present in the light tubes within the six fluorescent light fixtures.

.2 If mercury-containing items (fluorescent light tubes) are removed as part of the Work, ensure all mercury waste is handled, stored and disposed of in accordance with the requirements the following:

.1 The transportation and disposal requirements of BC Reg. 63/88.

.2 The transportation requirements of the Federal Transportation of Dangerous Goods Regulation.

.3 Precautions should be taken if workers may potentially be exposed to mercury or mercury vapours to ensure that workers exposure levels do not exceed the occupational exposure limit of 0.025 mg/m^3 as per the BC Reg. 296/97. This can be achieved by providing respiratory and skin protection applicable to the hazard and task to be completed.

.6 Ozone-Depleting Substances (ODSs)

.1 Removal, alteration and/or disposal of refrigeration or air conditioning equipment with ODS refrigerants is not anticipated to be required during the Work.

.7 Silica

.1 According to the Assessment Report, silica is expected to be present in concrete floors (foundation) curbs and walls.

.2 When silica-containing materials are to be disturbed and/or removed, ensure dust control measures are employed such that airborne silica dust concentrations do not exceed the exposure limit as stipulated by BC Reg. 296/97 (Cristobalite and Quartz – each 0.025 mg/m^3). This would include, but not be limited to, the following:

.1 Providing workers with respiratory protection

.2 Wetting the surface of the materials, use of water or dust suppressing agents to prevent dust emissions

.3 Providing workers with facilities to properly wash prior to exiting the work area.

3.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 01 50 – General Instructions

.2 . Leave Work area clean at end of each day.

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 01 50 – General Instructions .

.4 Waste Management: separate waste materials for reuse and recycling.

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

.3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in timely fashion in accordance with applicable federal and provincial regulations.

.7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:

.1 Hazardous wastes recycled in manner constituting disposal.

.2 Hazardous waste burned for energy recovery.

.3 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Provide means supply and install.

.2 Work means material and labour.

1.2 SUMMARY

.1 Section includes common work results for fire suppression systems - Division 21.

1.3 RELATED SECTIONS

.1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

.2 All Div 1 and Div 2 Sections.

.3 Section 02 41 99 – Demolition for Minor Work

.4 Section 02 81 01 – Hazardous Materials Use and Abatement - Environmental

1.4 DESCRIPTION OF WORK

.1 This Section pertains to the fire protection systems from the point of connection to the water main inside the fire pump building including the backflow prevention unit and the fire pump and fire pump distribution system within the Pump House building 110 associated with the water reservoir.

.2 The project scope includes replacement of two fire pumps, one electric drive and the other diesel engine drive, one jockey pump, the addition of a test header complete with venture flow meter, protection of electrical equipment and reconfiguration of suction piping to conform to NFPA 20 requirements. Pump House110 which houses the fire pumps is to have the addition of a wet fire suppression system to cover the area as per NFPA 13 requirements for a fire pump house.

.3 The General Sequence of Work description on drawing FP-001 is our best estimation of the work process and is to be used as a guide only for tendering purposes. The actual schedule will be as described in the awarded contractors schedule as per submittals. Acceptance of the bid will be dependent upon completing the work in the timeline stated and ensuring that all impediments to the fire protection system are under 8 hours and only for the minimum of work related shutdowns.

.4 The contractor is to ensure that the fire pump system is not off line at any time for more than 8 hours. Isolation of all the components in this project is possible to allow at least one fire pump to be active at all times. It is expected that the contractor may require site verification of fire alarms up to three consecutive times and have several shutdowns of the fire water reservoir of no more than an 8 hour work period. Both fire pumps are to be kept on line for as long as possible to provide the maximum possible level of fire protection to the facility.

.5 All equipment, elbows, fittings, nipples, drains, test connections and all accessory pipework for a complete and operational fire protection system is included in this Section of the work within the basic Tender price.

.6 No extra cost will be considered based on failure of Contractor to allow for all required equipment, piping and fittings. This shall include extra fittings and pipework as required during construction to avoid existing structure, ductwork or other obstacles whether shown on drawings or not.

1.5 SYSTEM DESIGN

.1 Arrange and pay for the services of a BC registered Professional Engineer. This Engineer shall provide all required engineering services related to the fire protection systems as indicated below.

.2 The Fire Protection Engineer shall:

.1 Produce the fire protection working shop drawings in CAD format. Drawings shall be of the same size as the Contract Drawings.

.2 Perform hydraulic calculations. Software shall meet NFPA calculation requirements.

.3 Seal all documents submitted for construction and permits.

.4 Assume full responsibility for the detailed fire protection system design, and submit Schedules B-1, and B-2, and C-B (for Detailed Design) to the Municipality.

.5 Provide assistance to the Fire Protection Contractor as required.

.6 Witness sprinkler testing.

.7 Inspect the completed installation.

.8 On project completion, submit a sealed statutory declaration to the Departmental Representative stating that the fire protection system is installed in accordance with the fire protection engineer drawings, instructions and the regulatory requirements.

1.6 SUBMITTALS

.1 Shop Drawings:

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

.2 Shop drawings shall indicate all the information required by NFPA, and the Authority Having Jurisdiction.

.3 Indicate essential building construction features such as direction and size of concrete beams, partitions and lighting.

.4 Bring to the attention of the Design Representative any sprinkler head, pipe, valve or system component in a location different from where specifically shown on the project Fire Protection Drawings. These alternate locations shall be reviewed during the shop drawing review.

.5 Indicate piping and sprinkler head elevations, the sprinkler temperature rating, the spacing and types of hangers; seismic bracing details; drain test and flushing connections; type of sprinkler alarm; location and type of sprinkler control valve; and all other essential features of the piping system.

.6 Submit shop drawings to the Departmental Representative , which have been approved and stamped by the Authority Having Jurisdiction and sealed by the Fire Protection Engineer. Allow a minimum of three weeks for review by Departmental Representative . Submit a minimum of six [6] copies. Allow for

resubmission(s) of drawings to reflect the Departmental Representative 's review comments.

.7 Submit a copy of the sprinkler shop drawings for review to the Owner's insurance agency.

.8 Submit shop drawings for the following items:

.1 General:

.1 Fire protection sprinkler system.

.2 Flow switches.

.3 Pressure switches.

.4 Supervisory switches.

.5 Valves, fittings and couplings.

.2 Wet sprinklers:

.1 Sprinkler heads and escutcheon plates.

.2 Riser manifolds.

.2 Record Drawings

.1 Section 01 01 50 – General Instructions.

.2 Provide "Record Drawings", Record Drawings shall include revised CAD drawings files on disk.

.3 Provide a CAD disk to the Departmental Representative for his records.

.3 Closeout Submittals

.1 Provide maintenance data for incorporation into Operational and Maintenance manual specified in Section 01 01 50 – General Instructions

1.7 SEISMIC PROTECTION

.1 Supply and install sway-bracing hangers on fire protection systems in accordance with NFPA requirements. Generally this shall apply to:

.1 All cross mains 50 mm [2"] and larger.

.2 All feed mains.

.3 All standpipe risers.

.4 Horizontal piping shall be 2-way bracing and vertical piping shall include 4-way bracing at the tops of all risers.

.5 On floor loops, sway-braces are also required at the corners of all loops.

Part 2 Products

2.1 HANGERS AND SUPPORTS

.1 All hangers and supports shall conform to the appropriate NFPA standards.

.2 Toggle hangers are unacceptable.

2.2 MISCELLANEOUS METALS RELATED TO FIRE PROTECTION SYSTEM

.1 All miscellaneous metal related to the fire protection systems including all metal back up plates and supports for all ceiling or wall supported equipment is part of this section of the work.

2.3 BACKFLOW PREVENTION STATIONS

.1 Backflow prevention stations for fire service shall be listed by Underwriters' Laboratories Canada (ULC).

.2 Double check valve (DCV) assembly complete with OS&Y Inlet and outlet valves. Standard of Acceptance:

.1 75 mm [3"] to 300 mm [12"]: Ames Model SS2000

.3 Acceptable Products: Watts, Febco, Ames.

2.4 ALTITUDE PRESSURE SUSTAINING CONTROL VALVE

.1 Pressure sustaining control valve station for automatic pressure controlled filling of water reservoir.

.2 LEVEL CONTROL VALVE

.3 Supply a 100mm [4"] One-Way Flow Altitude Control Valve.

.4 The valve shall be equipped with the following available options:

.1 Minimum inlet pressure to open valve for fill of reservoir.

.5 Refer to valve schematic drawing 3/ FP-300.

.6 Function: The valve shall be a non-modulating one-way flow altitude control valve which shall maintain a preset maximum reservoir level.

.7 Operation: The control valve pilot system consists of a 3-way pilot that hydrostatically senses the reservoir head and reacts to changes in reservoir level. When reservoir level drops sufficiently below the maximum reservoir level the pilot acts to open and vent the main valve bonnet to atmosphere, opening the main valve and allowing water into the reservoir. When the reservoir reaches the preset maximum level, as sensed by the altitude pilot, the pilot acts to close, which closes the main valve. The valve shall close at an adjustable rate.

.1 Main Valve

.1 The main valve shall be a single chamber, diaphragm actuated full port model.

.2 The main valve, bonnet and removable stem cap shall be constructed of ASTM A536 (Grade 65/45/12) ductile iron.

.3 Main valves of 2.5" (65mm) and larger shall have a removable stem cap for access to the main valve stem for alignment check, spring installation and ease of service and assembly.

.4 The main valve bonnet shall be located using two or more locating guide pins to maintain the inner valve assembly alignment and for ease of maintenance.

.5 The main valve trim, consisting of seat ring and stem shall be constructed of AISI 316 stainless steel. The valve stem shall have wrench flats for ease of maintenance.

.6 The main valve shall provide a drip-tight seal using a mechanically retained resilient disc, having a rectangular cross section, against the stationary AISI 316 stainless steel seat ring.

.7 The stationary AISI 316 stainless steel seat ring of main valves 2.5" (65mm) and larger shall be held in place using self-locking screws and seat ring retainers.

.8 All internal and external ferrous components, including all mating surfaces, shall be coated with an NSF-61 approved fusion bonded epoxy to a minimum of 10 mils DFT-Dry Film Thickness.

.9 The main valve elastomers: diaphragm, resilient disc and seals, shall be of EPDM or Buna-N.

.10 All main valve fasteners (bolts, nuts, studs, cap screws) shall be supplied as AISI 18-8 or 304 stainless steel. All bonnet bolts shall be fitted with stainless steel washers to prevent damage to the bonnet coating.

.11 Valve shall have flanged, threaded or grooved end connections. Flanged connections shall be ANSI/ASME B16.42 Class 300# flange drilled, faced and rated. Threaded connections shall be NPT.

.12 The valve manufacturer shall be able to supply cavitation control trim which shall be engineered to be optimized to the actual operating parameters of the control valve application and warranted to perform correctly and prevent main valve cavitation damage under the stated conditions. Orifice plates or other non-engineered cavitation control devices shall not be used to prevent or minimize valve cavitation.

.2 Pilot Controls

.1 Pilot shall be a 3-way altitude control pilot with a spring to adjust the reservoir maximum level setting. The altitude pilot body shall be serviceable without removing the pilot from the valve.

.2 The pilot trim, consisting of a replaceable inner valve shall be constructed of AISI 316 stainless steel. The pilot body and diaphragm casing shall be constructed of ASTM A536 ductile iron with fusion bonded epoxy coating.

.3 The pilot elastomers: diaphragm and seals shall be of EPDM or Buna-N.

.4 The adjustable pilot spring range shall be supplied as specify 4 to 20 feet (1.2-6m) or 10 to 60 feet (3-18m) or 40 to 125 feet (12-38m) or 60 to 225 feet (18-69m). The pilot shall be preset at specify feet (m).

.5 The pilot tubing shall be supplied as specify material ASTM B280 seamless copper or AISI 316 stainless steel or PTFE lined flexible braided stainless steel.

.6 A closing speed control shall be provided. An adjustable needle valve closing speed control shall be constructed of 316 stainless steel with handle operator.

.7 Pilot isolation ball valves shall be supplied as standard. Pilot isolation ball valves shall be constructed of 316 stainless steel with stainless steel handle operator.

.8 A pilot strainer shall be supplied as standard. Strainer material to be ASTM A351 CF8M stainless steel with a 40-mesh or 80-mesh 316 stainless steel screen. The external pilot strainer shall have a removable plug for easy maintenance access to the pilot screen and have provision for installation of a ball valve for pilot screen flushing.

.9 The control valve shall be supplied with a Position Indicator as standard. The valve position indicator shall provide a visual reference to the main valve open position. The indicator stem rod shall be AISI 316 stainless

steel, threaded or pinned to the main valve stem. The indicator rod shall move within a 303 stainless steel hexagonal housing having a clear Pyrex sight glass. A cap and bleed valve shall be provided to purge any air that may become trapped within the main valve bonnet and stem cap.

.3 Provide Altitude Valve assembly with pressure sustain function, solenoid and Manual override, complete with flanged inlet and outlet.

.8 Standard of Acceptance: Singer Model 106-A-R

.1 100 mm [4"]: Main Valve: Singer Model S106-PG

.2 Speed Control: Singer Model 360

.3 Pressure Sustaining Pilot: Singer Model 81-RP

.4 Pilot Normally Open: Singer Model 82-PR

.5 Altitude Pilot: Singer Model 301-4.

.9 Acceptable Products: Watts, CLA-VAL, Tyco Raphael

Part 3 Execution

3.1 GRADING AND DRAINING OF PIPING

.1 Grade all fire protection piping so that it can be drained through drain cocks.

.2 All main drains shall be directed to the outside of the building wherever possible.

3.2 PIPING EXPANSION

.1 All piping systems, including all take-offs shall be so installed within the building that the piping and connected equipment will in no way be distorted by expansion, contraction or settling.

.2 If circumstances on the job require additional changes in direction from those shown on the drawings, the configuration shall be adjusted to suit at no extra cost.

.3 Anchors shall be installed where necessary to control expansion.

3.3 BACKFLOW PREVENTION STATIONS

.1 Installation shall comply with CSA B64.10.

.2 Test all backflow prevention devices and submit signed declarations to that effect prior to Substantial Completion.

3.4 ALTITUDE VALVE ASSEMBLY

.1 Remove existing altitude valve assembly and replace with new flanged assembly reusing existing solenoid valve, and pressure sensing line connections.

.2 Installation shall comply with CSA B64.10.

.3 Test all altitude assembly devices and submit signed declarations to that effect prior to Substantial Completion.

.4

3.5 PRESSURE GAUGES

.1 Provide pressure gauges at the following locations:

.1 Pump suctions and discharges.

3.6 MISCELLANEOUS METALS RELATING TO FIRE PROTECTION SYSTEMS

.1 Prime coat after fabrication with two coats of red primer.

.2 See separate division of specification for finish painting requirements.

3.7 TESTS AND INSPECTION

.1 Furnish all labour, materials, instruments, etc. necessary for all required tests. All work shall be subject to inspection by the local plumbing inspector or design authority. At least forty-eight (48) hours of notice shall be given in advance of making the required tests.

.2 Tests on Fire Protection systems shall consist of pressure tests and shall conform to standards of Inspection Authority as listed in separate clauses of this section of specification. Test connections for fire pumps and siamese connection lines shall also be hydrostatically tested.

.3 Responsibility for completing "Contractor's Materials and Test Certificate" in accordance with inspection authority test procedure is included in this section.

END OF SECTION

PART 1 GENERAL

1.1 DEFINITIONS

.1 Provide means supply and install.

.2 Work means material and labour.

1.2 SUMMARY

.1 Section includes materials and installation for wet pipe fire protection and sprinkler systems for heated areas including all piping and piping components associated with the Fire Pump system (excluding the fire pumps themselves – refer to section 21 30 30 Fire Pumps).

.2 This is a performance specification clarified in this Section and on the Project sprinkler drawings to establish a minimum standard of equipment, design and installation.

.3 The specification describes the basic system and design required but not all of the details or components.

.4 This Trade shall have the experience to design the sprinkler system. Materials and work necessary to achieve the specification requirements will not be considered an extra to the Contract.

.5 The system design shall meet the requirements of the building, based on the Contract Drawings and Specifications.

.6 Provide hydraulically calculated suppression systems for the entire building project to NFPA 13.

1.3 RELATED SECTIONS

.1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

.2 Section 21 30 30 – Fire Pumps

1.4 ENGINEERING DESIGN CRITERIA

.1 The design criteria for the building shall be:

.1 Make water distribution uniform throughout the area in which sprinkler heads will open.

.2 Ordinary Hazard Group 1 occupancy with a density of 6.1 (L/min)/m2 [0.15 gpm/ft2] for the most remote 139 m2 [1500 ft2] in the Mechanical Room.

.3 Include allowance in hydraulic calculations for outside hose streams.

.2 Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use.

.3 Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed shop drawings. Locate sprinkler heads in consistent pattern with ceiling grid, lights, and air supply diffusers.

PART 2 PRODUCTS

2.1 GENERAL

.1 Devices and equipment for fire protection service shall be to NFPA 13, ULC listed, FM approved for use in wet pipe sprinkler systems.

.2 All piping shall be to NFPA 13.

.3 All fittings shall be class 125 rated at 250psi.

.4 All new piping, unions and valves shall be flanged to match existing when installed on the reconfigured fire pump distribution system.

2.2 PIPE

.1 Black steel pipe to ASTM A53 and ANSI Standard B36.10:

.1 Schedule 40 standard wall pipe for pressure to 2070 kPa [300 psi].

.2 "Light wall" pipe for welded or roll grooved pipe only shall conform to the following wall thicknesses:

.1 Up to 125 mm [5"] - Schedule 10.

.2 150 mm [6"] - 3.40 mm [0.134"].

2.3 FITTINGS AND JOINTS

.1 Compatible with piping material.

.2 Suitable for maximum pressures in system but not less than 1210 kPa [175 psi] working pressure.

.3 Welding fittings shall comply with the latest edition of the following standards: ANSI B16.9 and B16.25 and ASTM A234.

.4 All grooved end fittings shall be of one manufacturer.

.5 Flexible connections shall be ULC listed.

2.4 VALVES

.1 Gate - 1210 kPa [175 psi]: Open by counter-clockwise rotation.

.2 Butterfly - 1210 kPa [175 psi]:

.1 12 mm [1/2"] - 50 mm [2"]: Slow closing with indicator and integral supervisory switch.

.2 50 mm [2"] - 75 mm [3"]: Groove end with integral supervisory switch.

.3 100 mm [4"] - 200 mm [8"]: Groove end with integral supervisory switch.

.4 100 mm [4"] - 300 mm [12"]:

.1 Tapped lug end design.

.2 Gear operated and indicator.

.3 Check - 1210 kPa [175 psi]:

.1 Provide spool piece to ensure full check valve opening where adjacent an alarm or gate valve.

.4 Drain Valve: 25 mm [1"] complete with hose end adaptor, cap and chain.

.5 Groove end valves shall be used wherever groove end pipe is employed. All groove end valves shall be of one manufacturer.

2.5 SPRINKLER HEADS

.1 Sprinkler heads shall be ULC listed for use in occupancies and hazard type for which they are installed.

.2 Temperature rating on fusible links shall suit the specific hazard they serve.

.3 Provide wire guards on sprinkler heads in Mechanical and Electrical Rooms and in areas susceptible to mechanical damage or vandalism.

.4 Provide sheet metal sheets, to prevent cold soldering of sprinkler head, as indicated on drawings and as required by NFPA 13. Colour of shields as per Architects direction. Size and install as per NFPA 13 requirements.

.5 Sprinkler deflector elevations shall be within 12 mm [1/2"] of each other in the same room.

.6 All sprinklers except where noted shall be in satin chrome finish with polished chrome escutcheons except natural bronze finish may be used in the following areas:

.1 Mechanical rooms.

.2 Electrical rooms.

.3 Concealed spaces.

.4 Service spaces.

.5 Crawl spaces.

.7 Wet System sprinkler head finishes:

.1 Upright - Glass bulb, brass finish.

2.6 SUPERVISORY SWITCHES

.1 Mechanically attached to valve body.

.2 24V DC contact rating unless noted otherwise.

.3 Two sets of SPDT contacts or one set normally open and one set normally closed contacts.

.4 Looped cable devices are not acceptable

.5 Approved valves with integral supervisors are acceptable alternatives.

2.7 FLOW SWITCHES

.1 ULC listed for mounting pipe size in sprinkler system.

.2 24V DC contact rating unless noted otherwise.

.3 Two sets of SPDT contacts or one set normally open and one set normally closed contacts.

.4 Time delay feature and paddle indicator.

.5 Provide a sight glass in accordance with NFPA with drain connection.

2.8 PRESSURE SWITCHES

.1 24V DC contact rating unless noted otherwise.

.2 Two sets of SPDT contacts or one set normally open and one set normally closed contacts.

2.9 FIRE DEPARTMENT CONNECTION (SIAMESE CONNECTION)

.1 Not required for small system.

2.10 PIPE HANGERS

.1 All hangers and supports shall be ULC listed for fire protection services.

.2 Toggle hangers are unacceptable.

2.11 PRESSURE GAUGES

.1 Section 23 05 21, Thermometers and Pressure Gauges - Piping Systems.

.2 Maximum limit of not less than twice normal working pressure at point where installed.

2.12 SPARE SPRINKLERS AND PARTS CABINET

.1 Provide metal cabinet with extra sprinkler heads and sprinkler head wrench in the Mechanical Room.

.2 Spare Sprinkler Heads

.1 Number and types of extra sprinkler heads as specified in NFPA 13 (minimum 6 heads).

.2 Provide a minimum of two spare sprinklers for each type installed.

.3 Provide a special sprinkler wrench to be kept in the cabinet for maintenance use in the removal and installation of sprinklers.

2.13 SIGNS

.1 Attach properly lettered and approved metal signs to each valve and alarm device to ANSI/NFPA 13.

.2 Permanently fix hydraulic design data nameplates to riser of each system.

PART 3 EXECUTION

3.1 DESIGN

.1 Perform on site flow tests to obtain required water data.

.2 Hydraulically calculate the sprinkler systems in accordance with this specification and NFPA 13 requirements.

.3 Hydraulic calculations shall be based upon the flow test data, which has been reduced by 10%.

.4 Hydraulic calculations shall not be based on the largest room area as indicated in NFPA 13.

.5 Confirm with the Departmental Representative any interpretive aspects of the listed Codes, Standards or approvals that differ from the Contract Documents. Such interpretations shall not be used without the Departmental Representative's approval.

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 INSTALLATION

.1 Install, inspect and test to acceptance in accordance with NFPA 13 and NFPA 25.

.2 All grooved end valves, fittings and couplings etc. shall be of one manufacturer.

.3 Pipe Installation:

.1 Install piping straight and true to bear evenly on hangers and supports.

.2 Keep interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter.

.3 Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter.

.4 Inspect piping before placing into position.

.5 All welding shall be performed off site using welding fittings. Field welding is not permitted.

.6 Adjust sprinkler piping up or down if conflicts occur between structure, lighting, electrical, plumbing piping or ductwork.

.7 Arrange piping routing to provide sufficient access to mechanical and electrical equipment.

.8 A wrap around hanger or other approved means shall be provided at the end of each branch sprinkler line to prevent excessive movement.

.4 Flow Switches:

.1 Install flow switches with a tight pipe drain connection to open discharge outside the building at grade level or other acceptable discharge point as approved by the Departmental Representative .

.2 Install a 25 mm [1"] flow switch test drain valve with a 25 mm [1"] brass ball plug. Immediately downstream of flow switch for each flow switch. This is in addition to the normal inspector's test connections required by NFPA.

.3 Locate flow switches where shown.

.5 Supervisory Switches - Valves:

.1 Install supervisory switches on all valves supplying the sprinkler and standpipe system inside the building. Switches shall be compatible with the valve supervised.

.6 Sprinkler Heads:

.1 Locate heads in relation to ceiling and spacing of sprinkler heads not to exceed that permitted by NFPA 13.

.2 All sprinkler head locations shall be coordinated with existing site conditions.

.3 Do not install any sprinkler heads until all piping systems have been flushed of all contaminants.

.7 Flanged fittings shall be used at valve stations and at fire department connections.

.8 Install monitored valves and flow switches for all zones for connection by others.

.9 Valve flows and tamper switches to be shall wire monitored valves and flow switches to the central fire alarm system by others. Identify which portion of the system each valve controls.

.10 Provide fire alarm verification, by a Certified Fire Alarm company, of all fire alarm systems to include both fire pumps, jockey pump and new fire pump room wet sprinkler system.

.11 Protection of Electrical Equipment from Water:

.1 Responsibility for water damage to electrical equipment from the sprinkler system installation whether due to testing or leakage shall be the responsibility of this section.

.2 Provide and install in this section of the work minimum 20 gauge metal protective hoods, individually located over all electrical equipment susceptible to water damage upon release of sprinkler heads in electrical areas. Such electrical equipment shall include all transformers and all equipment with ventilation grilles that will allow water entry into the electrical equipment. Protective hoods shall be sloped to allow shedding for water, shall project horizontally beyond the equipment perimeter and shall not be mounted on the equipment unless prior approval is obtained from the electrical authorities. Holes through protective hoods shall be sealed watertight.

3.4 FLUSHING

.1 Provide flushing connections on all sprinkler systems.

.2 Flush all pipelines so effluent is clear and free of debris.

.3 Rate of flushing flows shall be as per NFPA 13 requirements.

.4 Provide proper drainage for this flushing operation.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Provide means supply and install.

.2 Work means material and labour.

1.2 SUMMARY

.1 Section includes all materials and installation for the replacement of both an electric and a diesel engine powered fire pump each components of a 100% capacity back up fire pump system and replacement of the corresponding existing jockey pump.

.2 The section includes the addition of a test header assembly and the re-arrangement of piping configuration associated with the connections to each suction side of the fire pumps to conform to NFPA 20 installation requirements.

1.3 RELATED SECTIONS

.1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

.2 Section 21 05 05 - Common Work Results For Fire Suppression

.3 Section 21 13 13 – Wet Pipe Sprinkler Systems

1.4 SUBMITTALS

.1 Shop Drawings:

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

.2 Submit shop drawings for all pumps and accessories.

.3 Indicate, at minimum, the following:

.1 Equipment, including connections, fittings, control assemblies and ancillaries. Identify whether factory or field assembled.

.2 Wiring and schematic diagrams.

.3 Dimensions and recommended installation.

.4 Pump performance and efficiency curves showing point of operation.

.2 Closeout Submittals:

.1 Provide maintenance data for incorporation into Operational and Maintenance manual specified in Section 01 01 50 – General Instructions

1.5 SEISMIC RESTRAINT

.1 Provide seismic restraints for the piping and exhaust systems and all equipment specified in this Section to meet the requirements of the B.C. Building Code, to be in general conformance to SMACNA Guidelines, to keep the equipment in place during a seismic event, to minimize damage to the systems and equipment from a seismic event, to prevent systems and equipment from causing personal injury during a seismic event.

.2 Arrange and pay for the services of a structural professional engineer registered in British Columbia referred to here as the Seismic Engineer. The Seismic Engineer shall review,

seal and sign all submittals required for all components, assemblies, attachments and installation procedures for the seismic restraint of all piping, ductwork and equipment installed under this Section. The Seismic Engineer shall provide all necessary direction to the contractor during installation of the seismic restraint installation and submit a statutory declaration that the final seismic restraint installation conforms to the submittal documents sealed by the Seismic Engineer and satisfies all regulatory requirements.

.3 The Seismic Engineer shall submit Letters of Assurance Schedules S-B and S-C for the seismic restraint to the Consultant.

.4 The Seismic Engineer shall coordinate attachment to the equipment with the equipment manufacturer to ensure the method and location of attachment of the seismic restraint to the equipment does not compromise the structural integrity of the equipment.

.5 It is the entire responsibility of equipment manufacturers to design their equipment so that the strength and anchorage of the mounting points and internal components of the equipment exceeds the force level used to restrain and anchor the unit itself to the supporting structure during a seismic event of code design magnitude.

1.6 SYSTEM DESCRIPTION

.1 Design Requirements:

.1 Select fire pump to satisfy fire protection system requirements and ANSI/NFPA 20.

.2 Water supply: Conduct flow and pressure test of water supply in vicinity of project to obtain criteria for basis of design including NPSH available, and in accordance with ANSI/NFPA 20.

Part 2 Products

2.1 FIRE PUMP - ELECTRIC DRIVE

.1 Design: Peerless Pump, horizontal type.

.2 Minimum Requirements:

.1 Underwriters Laboratories Canada (ULC) labelled, factory tested and certified.

.2 Horizontally split, cast iron bronze fitted single stage pump with bronze casing wearing rings.

.3 Open, drip-proof, ball bearings, squirrel case induction type, horizontal motor.

.4 Pump and motor driver mounted on an extended cast iron or fabricated steel drip rim base connected by means of an approved flexible coupling.

.5 Automatic air release valve.

.6 Casing relief valve piped to drain.

.7 Compound suction and discharge gauge, 1380 kPa 200 psi range.

.8 Provide approved flexible connectors at pump suction and discharge.

.9 Capable of supplying 150% of rated capacity when operating at 65% of rated pressure.

.10 Coupling shall be equipped with a removable coupling guard attached to the steel base.

.3 Schedule:

Unit:	Fire Pump – Electric Drive
Location:	Bldg 110 - Pumphouse NW corner.
Pump Model No.:	Peerless Model 5AEF11G HSC
Driver Model No.:	WEG 100Hp, ODP, Energy Eff
Capacity:	3785 L/s [1000 USgpm]
Total Dynamic Head:	689 kPa [100 psi]
Motor HP / rpm:	100 HP / [3600 rpm]
Electrical Service:	575 volt / 3 phase / 60H

.4 Acceptable Products: Aurora, Darling, Plad.

.5 Main Fire Pump Controller

.1 Existing to remain and to be reconnected to new pump system.

.2 Water line hookup to pressure switch in controller in this section.

.6 Fire Pump Control Sequence

.1 Each electric fire pump shall start automatically on pressure drop in the fire system initiated through each fire pump controller pressure switch. During normal power operating conditions one electric drive pump shall start initially during a fire demand. If the downstream pressure continues to drop, the second diesel drive unit shall then start automatically in parallel with the first electric drive under normal power conditions and both shall continue to run until manually shut down.

2.2 MAIN FIRE PUMP - DIESEL DRIVE

.1 Design: Peerless Pump, horizontal type engine driven.

.1 Minimum Requirements:

.1 Underwriters Laboratories Canada (ULC) labelled.

.2 Horizontally split, bronze fitted single stage pump.

.3 Diesel drive.

.4 Pump and driver mounted on an extended cast iron or fabricated steel base connection by means of an approved flexible coupling.

.5 Automatic air release valve.

.6 Compound suction and discharge gauge, 1380 kPa [200 psi] range.

.7 Provide approved flexible connectors at pump suction and discharge.

.8 ULC labelled main relief valve and enclosed discharge cone.

.2 Accessories:

.1 Dual batteries .

.2 Engine heat exchanger piping to be preassembled to NFPA #20-1990.

.3 Schedule 40 steel exhaust piping through outside wall.

.4 Solenoid valve on cooling water to engine.

.2 Schedule:

Unit:	Fire Pump – Diesel Drive
Location:	Bldg 110 - Pumphouse NE corner.
PumpModel No.:	Peerless 5AEF11 HSC
DriverModel No.:	Clarke JU4H-24
Capacity:	3785 L/s [1000 USgpm]
Total Dynamic Head:	689 kPa [100 psi]
Motor HP / rpm:	83 HP / [3000 rpm]
Electrical Service:	12Volt Negative Ground

.3 Acceptable Products: Aurora, Detroit, Cummins.

.4 Fuel Oil Piping

.1 Connect existing equipment and service lines from existing system.

.5 Diesel Fuel Tank

.1 Connect existing equipment and service lines from existing system.

.6 Fire Pump Controller

.1 Existing to remain and to be reconnected to new pump system.

.7 Fire Pump Control Sequence

.1 Refer to 2.1.6.

2.3 PRESSURE MAINTENANCE (JOCKEY) PUMP

.1 Existing jockey pump is to be replaced with new and reconnected to existing controls and piping.

.2 The jockey pump shall be Model Grundfos Model CR3 vertical inline pumptype with 316 stainless steel AISIcasing and impeller having a capacity of __20_USgpm for a pressure boost of _120_psig. (Pressure boost should exceed fire pump boost by approximately 10 psi).

.3 The jockey pump shall be driven by a 3 hp, 3600 RPM, 575 Volt, 3Phase, 60 Cycle standard open drip-proof horizontal motor.

.4 Controller: The jockey pump shall be controlled by an existing automatic jockey pump controller. Provide all necessary wiring adjustments at JP connection.

.5 Functions:

.1 The jockey pump shall start on a pressure drop in the system. The jockey pump will stay in operation for a minimum period of time.

.2 The fire pump shall automatically start on a further pressure drop or on a jockey pump failure.

.6 Mounting and Testing: The jockey pump will be factory mounted with its electric motor on a common structural base plate and shall be shop tested prior to shipment.

.7 Acceptable Products: PLAD, Baldor, Armstrong, Peerless Pumps, Taco.

2.4 TEST CONNECTION

.1 Flow will be directed back into existing reservoir.

2.5 FLOW METER

.1 In-line flow meter in the test connection shall be a ULC approved flow meter for fire flow application complete with stainless steel 316 Gauge minimum 150diameter readout and interconnecting stainless steel braided tubing. Install in easily readable position from floor level as recommended by the manufacturer.

.2 Standard of acceptance: Preso Model PPFVGB2AB2 K

.3 Acceptable Products: Victaulic Style 735, Eagle Eye. GVI

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install in accordance with ULC listing, ANSI/NFPA 20, manufacturer's instructions and reviewed shop drawings.

.3 Insulate exhaust system, cooling system muffler in accordance with standard manufactures installation recommendations and current BCBC 2012 regarding Thermal Insulation for Piping.

.4 Align pump and motor shafts to within manufacturer's recommended clearances prior to start-up.

3.3 ELECTRICAL CONNECTIONS

.1 Wiring to perform in accordance with manufacturer's instructions and applicable codes.

.2 Mechanical Contractor shall provide:

.1 Reconnection of all electrical power and control connections between fire pump and fire pump controller.

.2 Reconnection of all electrical connections between diesel tank and fire pump controller.

.3 Reconnection of all electrical connections between Jockey pump and fire pump controller.

.4 All wiring as required to complete the package pump installation.

.5 Verify all wiring requirements on site.

.3 Electrical Contractor shall provide:

.1 Reconnection of all electrical power connections to fire pump controller and signal connection between fire pump controller and annunciator.

3.4 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.2 Site Tests:

.1 Field test each fire pump, driver and controllers in accordance with ANSI/NFPA 20. Testing shall include:

.1 Verification of proper installation, system initiation, adjustment and fine tuning.

.2 Verification of the sequence of operations and alarm systems.

.2 Testing to be witnessed by the Fire Protection Engineer of Record.

END OF SECTION

Hazardous Building Materials Assessment
Building 110—Pump House

William Head Institution, Victoria, BC

Stantec

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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Public Works and Government Services Canada (PWGSC) on behalf of Correctional Service Canada (CSC) to conduct a hazardous building materials assessment within Building 110—Pump House (subject building) at William Head Institution, Victoria, British Columbia (subject facility).

The purpose of the project was to assess for the presence (or absence) and estimated extent of hazardous building materials within the subject building in accordance with the requirements of the Canada Labour Code, Part II (Canada Labour Code) and the current version of British Columbia's Occupational Health and Safety Regulation (BC Reg. 296/97), for continued operations and maintenance, and to assist in future renovation planning.

The hazardous building materials considered during this assessment included asbestos-containing materials (ACMs), lead, including lead-containing paints (LCPs), polychlorinated biphenyls (PCBs) in equipment and paint, mould and moisture affected building materials, mercury, ozone depleting substances (ODSs), and silica.

Based on Stantec's visual assessment, the laboratory analyses performed on samples collected, and review of previous reports, hazardous building materials were identified within the subject building.

A summary of our findings and recommendations is presented below. Recommendations pertaining to the handling, removal, transportation and disposal of identified hazardous materials are provided in Section 6.0 of this report.

It should be noted that this summary is subject to the same restrictions and limitations as presented in Section 4.0 (Assessment Limitations) and Section 7.0 (Closure). The information provided is to be read in conjunction with the remainder of this report.

Summary of Findings
ACMs The following ACMs were identified: • Pipe flange gaskets (approximately 12 in. diameter) in process equipment • Woven motor unit vibration protection pads • Insulation materials inside fire rated doors (presumed ACM)
Lead The following LCPs were identified: • Red paint on the main entrance door and frame • Bright red paint on process pipes and equipment • Black paint on concrete curbs, metal process equipment and metal framing • Grey paint on roof structural members and underside of q-deck ceiling • Navy blue paint on process pipes and metal equipment Where the above noted LCPs were identified they were observed to be in good condition. Lead is also expected to be present in the following: • Lead acid batteries used in emergency lighting • Solder used in bell fittings for cast iron pipes and in electrical equipment • Roof drain pipe flashings (two observed)
Polychlorinated Biphenyls No PCB-containing electrical items were identified.
Mould and Moisture Impacted Materials No mould and/or moisture impacted building materials were observed.
Mercury Mercury vapour is expected to be present in the light tubes within the six fluorescent light fixtures observed. Mercury may also be present in paints and adhesives.
Ozone-Depleting Substances No building-related cooling or refrigeration equipment suspected to contain ODSs was observed.
Silica Silica is expected to be present in the concrete floors (foundation), curbs and walls.

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Public Works and Government Services Canada (PWGSC) on behalf of Correctional Service Canada (CSC) to conduct a project specific hazardous building materials assessment within Building 110—Pump House (subject building) at William Head Institution, Victoria, British Columbia (subject facility).

The purpose of the project was to assess for the presence (or absence) and estimated extent of hazardous building materials within the subject building in accordance with the requirements of the Canada Labour Code, Part II (Canada Labour Code) and the current version of British Columbia's Occupational Health and Safety Regulation (BC Reg. 296/97), for continued operations and maintenance, and to assist in future renovation planning.

The hazardous building materials considered during this assessment included asbestos-containing materials (ACMs), lead, including lead-containing paints (LCPs), polychlorinated biphenyls (PCBs) in equipment and paint, mould and moisture affected building materials, mercury, ozone depleting substances (ODSs), and silica.

Site work was completed within the subject building on January 24, 2017.

2.0 BACKGROUND

The subject building is located outside of the main gates of the subject facility and is a one storey structure. The typical structural components and finishes associated with this building consists of exterior and interior concrete walls, concrete floor/foundation, and asphalt sheet roofing supported by a steel roof framing system and corrugated metal "q-decking".

According to information provided by PWGSC, the subject building was originally constructed in 1985. This construction time period is consistent with those dates when hazardous building materials were commonly used and/or may be present including, but not limited to ACMs, LCPs, PCBs, mould, mercury, ODSs, and silica.

Limited hazardous building materials have been identified within the subject building through the completion of various project-specific assessments, including those detailed in the following reports, which were prepared by Stantec:

- Stantec Consulting Ltd. Report No. 123220729 entitled *Pre-Renovation Hazardous Building Materials Assessments, William Head Institution Pump House (110) Exterior Door Replacement,* dated December 9, 2016, prepared for Public Works and Government Services Canada (Exterior Door Replacement Assessment)

- Stantec Consulting Ltd. Report No. 123220504 entitled *Project-Specific Hazardous Building Materials Assessment, William Head Institution Fire Alarm Replacement*, dated April 12, 2016, prepared for Public Works Government Services Canada (Fire Alarm Assessment)

Subsequent to the completion of the above-noted project-specific assessments, another renovation project was planned for the subject building (fire pump replacement). As a measure of diligence in meeting the requirements of the Canada Labour Code and BC Reg. 296/97 as they pertain to identifying hazards associated with hazardous building materials during that project, as well as to create a more comprehensive record of hazardous building materials within the subject building such that additional incremental assessments should not be required for each subsequent renovation project, PWGSC (on behalf of CSC) commissioned this assessment.

3.0 SCOPE AND METHODOLOGY

Sean Brigden of Stantec conducted a visual assessment within the subject building on January 24, 2017. Site work was conducted in general compliance with the requirements of the Canada Labour Code, BC Reg. 296/97 and Stantec's Safe Work Practices.

Mechanical systems, structures and finishes of the subject building were visually examined to determine the suspected presence of ACMs, lead including LCPs, PCBs, mould, mercury, ODSs, and silica. Where building materials were suspected but not confirmed to contain asbestos and lead in paint, samples were collected for analysis to confirm or deny the presence of these hazardous materials. Based on analytical results, visually similar materials were referenced to specific analyzed samples to reduce the number of samples collected.

Additional background information and the methodology used for the determination of presence or absence of each specific hazardous material considered in this assessment are outlined in the following sections.

3.1 ASBESTOS

The common use of friable (materials which, when dry, can be easily crumbled or powdered by hand pressure) ACMs in construction generally ceased voluntarily in the mid-1970s but was only banned through legislation by the late 1980s. Friable asbestos was used in many building products, primarily high temperature insulations, spray-applied structural fireproofing, and a material known as vermiculite that was commonly used as block wall insulation and may be contaminated with asbestos fibres. Asbestos was also used in many non-friable manufactured products such as floor tiles, ceiling tiles, Transite cement products, and various other construction materials. Some cement products currently used in the construction of buildings may still contain asbestos.

The presence of asbestos in federal workplaces, and pertaining to federally regulated workers is governed by the Canada Labour Code. The presence of asbestos in the workplace in British Columbia pertaining to provincially regulated workers is governed by BC Reg. 296/97. As both federally regulated workers and provincially regulated workers (e.g., contractors) are expected to carry out work activities within the subject building, and as the provincial regulations are generally more prescriptive pertaining to asbestos (and generally include the requirements noted in the Canada Labour Code), this assessment was conducted to meet the requirements of BC Reg. 296/97.

According to the current version of BC Reg. 296/97, ACM means any material containing at least 0.5% asbestos, or vermiculite insulation with any asbestos.

Based on these criteria, multiple samples were collected from each "homogenous application" of an observed suspected ACM (materials suspected to contain asbestos that are uniform in material type, colour, texture application and estimated installation date) and submitted to EMSL Canada Inc. (EMSL) in Vancouver, British Columbia for analysis of asbestos content using Polarized Light Microscopy with dispersion staining, in accordance with the US Environmental Protection Agency 600/R-93/116 *Method for the Determination of Asbestos in Bulk Building Materials*. The number of samples to be collected for each homogenous application of a suspected ACM was based on the recommendations provided in the WorkSafeBC publication *Safe Work Practices for Handling Asbestos* (2012), along with the assessor's experience and understanding of the consistency of that building material's application.

EMSL's analytical laboratory is accredited by the National Voluntary Laboratory Accreditation Program.

3.1.1 Sample Results Interpretation

When asbestos is detected in concentrations greater than 0.5% in one of the samples within a set that was collected to represent a "homogenous application" of a particular material (or detected in any concentration, in a set of samples collected for applications of vermiculite), the entire sample set and the entire application of that material was then considered to be an ACM.

In addition to the above, a "positive stop" option was used during the laboratory analysis of the building material samples submitted for asbestos analysis. The "positive stop" option is utilized by the laboratory when asbestos is detected at a concentration of greater than 0.5% in one of the samples within a set that was collected to represent a "homogenous application" of that material (or in any concentration, for vermiculite). At this point, further analysis of subsequent samples within the set is deemed to be unnecessary (as the entire set will be considered an ACM, per above), and the remainder of the samples within the set are not analyzed.

3.1.2 Potential Asbestos-Containing Vermiculite Insulation

As part of the assessment, Stantec assessed the subject building for areas where vermiculite insulation, a potential ACM, would likely be present. This included making note of and assessing attic spaces, floor cavities and masonry or brick walls, which are typical areas where vermiculite is found. Where masonry or brick walls were observed, destructive assessment (drilling) was not conducted to assess the cavity for the presence of vermiculite.

3.1.3 Asbestos Sampling Quality Assurance/Quality Control

Sampling activities pertaining to asbestos were conducted in accordance with Stantec's Safe Work Practices, which take into account current provincial regulations pertaining to such work (i.e., sampling procedures, required number of samples, and laboratory analytical procedures).

Representative bulk samples were collected of accessible suspect ACMs in sufficient quantities for laboratory analyses. Suspect ACM samples were sealed in polyethylene zip-lock bags labeled with the sample number, suspect material description, and sample location. As part of sampling procedures, sampling tools were cleaned between sample collection events to avoid the potential for cross-contamination of samples.

Sample bags were compiled in order and placed into a single container accompanied with a Chain of Custody form outlining the project information, date, building location, number of samples, and sample description. Samples were submitted to the analytical laboratory in a sealed container via courier.

3.2 LEAD

Lead may be used in its pure metallic form or combined chemically with other elements to form lead compounds. Metallic lead is used to make products such as electric storage batteries, ammunition, lead solder, radiation shields, pipes, and sheaths for electric cables. Metallic lead is sometimes combined with other metals such as copper, tin, and antimony as lead alloys for use in the manufacture of a variety of metal products. Lead is commonly found in buildings in the solder used on copper domestic pipes, in the caulking on bell fittings of cast iron drainage pipes and in electrical equipment.

The presence of lead-containing materials (other than paint) was assessed through visual means.

With respect to paint, the lead content of interior paint was limited to 0.5% by weight (equivalent to 5,000 mg/kg or ppm) in 1976 under the Federal *Hazardous Products Act,* which governs the import, export and distribution of hazardous products in Canada. In 2005, the *Hazardous Products Act* had reduced the criteria for surface coatings (including paint) to 600 mg/kg

(600 ppm) to define them as "lead-containing". This criterion has since (2010) been reduced to 90 ppm.

However, with respect to potential lead exposures associated with disturbance to surfaces coated with lead-containing products, WorkSafeBC has compiled a manual titled *Lead-Containing Paint and Coatings: Preventing Exposure in the Construction Industry*, (Lead Guideline) which defines a "lead-containing surface coating material" and indicates that "...the improper removal of lead paint containing 600 mg/kg lead results in airborne lead concentrations that exceed half of the exposure limit". As such, Stantec will reference this value (600 ppm) in defining paints as "lead-containing".

Samples of suspected LCPs were collected from major paint applications, and were collected to substrate, where possible, in sufficient quantity to conduct analyses for total lead content. Samples collected were placed into separate, sealed, and labeled polyethylene bags, and submitted to EMSL for analyses of total lead content using Flame Atomic Absorption Spectrometry AAS (SW 846 3050B*/7000B).

EMSL's analytical laboratory is also accredited by the American Industrial Hygiene Association Environmental Lead Laboratory Approval Program.

3.3 POLYCHLORINATED BIPHENYLS

PCBs were used widely as coolants and lubricants in transformers, capacitors, and other electrical equipment. In fluorescent fixtures, PCBs were usually found within the small capacitors inside the ballast that controls the lamp. The Federal Chlorobiphenyls Regulation, SOR/91-152, prohibited the use of PCBs in electrical equipment manufactured after July 1, 1980.

The presence of PCB-containing equipment was assessed through visual means.

With respect to fluorescent lamp ballasts, due to the risk of electrical shock associated with dismantling operating fixtures, fluorescent lamp ballasts were not removed to view identification numbers/information. The visible labels of ballasts in several fixtures were inspected for comparison to the Environment Canada reference guide entitled *Identification of Lamp Ballasts Containing PCBs, Report EPS 2/CC/2*, dated August 1991 (PCB Guide).

The total number of fluorescent lamp ballasts that may contain PCBs within the subject building was approximated.

3.4 MOULD AND MOISTURE IMPACTED MATERIALS

Moist building materials may provide suitable conditions for mould growth, and the removal of building materials impacted by mould growth may require workers with specific training and experience using work procedures that have been developed to protect workers and work areas from exposure to elevated concentrations of airborne mould.

The presence of suspect visible mould was assessed through visual means. Material observed with dark-colored staining and/or a textured and discolored appearance is described as "suspect mould". Mould identified visually is defined as "suspect mould" unless it is confirmed as mould by laboratory analysis.

3.4.1 Mould Reference Guidelines

The visual assessment procedures utilized and abatement scope of work developed during this project were based on the recommendations provided in the documents listed below:

- Standard Construction Document CCA 82 *Mould Guidelines for the Canadian Construction Industry*, Canadian Construction Association, 2004 (referred to as CCA 82)
- *Guidelines on Assessment and Remediation of Fungi in Indoor Environment*, New York City Department of Health, Bureau of Environmental and Occupational Disease Epidemiology, April 2000 (referred to as the NYC Guidelines)
- *Fungal Contamination in Public Buildings: Heath Effects and Investigation Methods*, Federal-Provincial Committee on Environmental and Occupational Health, 2004 (referred to as the Health Canada Guide)
- *Indoor Air Quality in Office Buildings: A Technical Guide*, Report of the Federal-Provincial Advisory Committee on Environmental and Occupational Health, 1995 (referred to as the IAQ Guide)
- *Bioaerosols: Assessment and Control*, American Conference of Governmental Industrial Hygienists (ACGIH), 1999 (referred to as the ACGIH Report)

3.5 MERCURY

Mercury is commonly found in buildings as mercury vapour lighting, thermostats/thermometers with mercury-containing glass ampoules, electrical switches and can also be found in minor amounts in fluorescent lamp tubes and vapour bulbs and may be present in stable forms in adhesives. Exposure to mercury in federal workplaces is governed by the Canada Labour Code, while provincially it is governed by BC Reg. 296/97.

The presence of mercury and mercury-containing equipment was assessed through visual means.

3.6 OZONE-DEPLETING SUBSTANCES

Chlorofluorocarbons and other ODSs are often found in refrigeration units associated with air-conditioning or other refrigeration equipment. In September 1987, 47 countries agreed to the Montreal Protocol on Substances that Deplete the Ozone Layer. ODSs are regulated in British Columbia by the *British Columbia Waste Management Act*—Ozone Depleting Substances and Other Halocarbons Regulation (BC Reg. 387/99 as amended by BC Reg. 109/2002) and the Federal Halocarbon Regulations, 2003 (FHR 2003).

The presence of ODSs and equipment containing these materials was assessed through visual means.

3.7 SILICA

Silica, also referred to as free crystalline silica, is found in concrete, cement, mortar, ceramic wall and floor tiles, stucco finishes and acoustic ceiling tiles. Prolonged exposure to, and inhalation of free crystalline silica, may result in respiratory disease known as silicosis, which is characterized by progressive fibrosis of the inner lung tissue and marked shortness of breath or impaired lung function.

Exposure to silica dust is governed most strictly by BC Reg. 296/97. According this regulation, the time-weighted average exposure limit for respirable crystalline silica (quartz and cristobalite forms) is 0.025 mg/m^3.

The presence of silica was assessed through visual means.

4.0 ASSESSMENT LIMITATIONS

In preparation of this report, Stantec used professional judgment based on experience. The work was conducted in accordance with generally accepted professional standards. Stantec relied on information gathered during the site investigation and laboratory analytical reports.

This report reflects the observations made within accessible and accessed areas of the subject building, and the results of analyses performed on the specific material sampled during the assessment. Analytical results reflect the sampled material at the specific sample locations.

This report has been prepared for the exclusive use of the PWGSC/CSC for the purpose of assessing general conditions in the subject building. Any use that a third party makes of this report, or reliance on, or decisions to be made on it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The limitations of this assessment pertaining to each of the considered hazardous materials are outlined in the following sub-sections.

4.1 ASBESTOS

Due to the limitations of sampling techniques, the asbestos content of some materials within the subject building could neither be confirmed nor denied. Suspected ACMs that were not sampled include, but are not limited to, the following:

- Roofing materials concealed beneath exposed layers (if any)
- Heating, ventilation and air conditioning (HVAC) units mechanical inner linings and/or insulation on the interior side of ducts
- Heat protection materials or other items inside mechanical installations or process equipment/pipes
- Gaskets inside pipe flanges, where not accessible without disconnecting pipes/equipment
- Sub-grade materials (e.g., asbestos cement drainage pipe)

If encountered during renovation, demolition or other activities, any suspected ACMs not identified within this report should be presumed to contain asbestos and handled as such until otherwise proven, through analytical testing.

4.2 LEAD

Assessment for the presence of lead or lead-containing materials was visual in nature, and was conducted pertaining to readily visible surfaces within accessible spaces of the subject building only. Additional lead or lead-containing materials may be present in inaccessible areas not assessed including, but not limited to: ceiling spaces above hard ceilings, sealed wall cavities, crawlspaces, and buried materials.

With respect to paint, samples of suspected LCPs were collected within the subject building only from surfaces of major paint applications where visually different paint colours and/or types were identified. Although the surfaces where samples were collected may be covered with more than one coat of paint, the paint samples are described by the surface (visible) colour only.

Attempts were made to represent all layers of paint in the samples collected. As analytical results are referenced to the surface paint colour only, the lead content of all painted surfaces similar to that represented by the surface paint colour will be presumed to be the same, regardless of differing sub surface paints, if any.

4.3 POLYCHLORINATED BIPHENYLS

Due to height restrictions and the risk of electrical shock in handling operational light fixtures, the ballasts present in the fixtures observed within the subject building were not removed for comparison to the PCB Guide.

Conclusions and recommendations regarding the presence of PCBs within the subject building are based on Stantec's limited observations in combination with information provided by staff regarding lighting renovations (where requested by Stantec based on observations) and is presented to provide guidance regarding the likelihood that PCB-containing equipment is or is not present within the subject building. The exact extent and/or number of fluorescent lamp ballasts containing PCBs, if any, within the subject building will not be commented on.

4.4 MOULD AND MOISTURE IMPACTED MATERIALS

Visual assessment for the presence of suspected visible mould and/or suitable conditions for mould growth (e.g., moist and/or water-stained building materials) was conducted in accessed portions of the subject building only. The assessment was not intrusive in nature and included visual assessment of exposed surfaces and closer inspection of known problem areas.

The conclusions made in this report provide description(s) of the potential source(s) of moisture within the subject building that may have led to suitable conditions for mould growth, only in those cases where potential source(s) of moisture were identified. These conclusions will not necessarily identify all sources of moisture leading to suitable conditions for mould growth within the subject building or within the impacted area(s).

This assessment does not constitute a building envelope/building systems assessment, which would include an intrusive investigation to assess the internal condition, potential moisture sources, and expected remaining service life of the various components and systems comprising the envelope of a building.

4.5 MERCURY

Visual assessment for the presence of mercury-containing equipment within the subject building was conducted in accessible areas only. Additional mercury or mercury-containing equipment may be present in inaccessible areas not assessed including, but not limited to: components of process pipes or equipment.

4.6 OZONE-DEPLETING SUBSTANCES

Visual assessment for the presence of ODSs within the subject building was conducted in accessible areas only. Additional ODS-containing equipment may be present in inaccessible areas not assessed including, but not limited to: components of process pipes or equipment.

4.7 SILICA

Visual assessment for the presence of silica-containing materials within the subject building was conducted in accessible areas only. Additional silica-containing materials may be present in inaccessible areas not assessed including, but not limited: components of process pipes or equipment, or sub-grade areas/materials.

5.0 RESULTS

Floor plans showing bulk sample locations and locations of identified hazardous materials (where practical) are provided in Appendix A.

The results of the assessment for each of the considered hazardous materials are provided in the following sub-sections.

5.1 ASBESTOS

Stantec identified and sampled various suspected ACMs. The materials sampled by Stantec included the following:

- Pipe flange gaskets (approximately 12 in. diameter) in process equipment
- Various sealants and mastics
- Cementitious exhaust insulation
- Woven motor unit vibration protection pads
- Foil-wrapped fabric on insulation ends
- Asphalt roof sheeting

Twenty-seven samples of the above-noted suspected ACMs were collected within the subject building and submitted to EMSL for analysis of asbestos content and nature. A summary of the sample types, locations and analytical results is presented in Appendix B. Copies of the certificates of analysis provided by EMSL for the suspected ACM samples submitted are included in Appendix C.

Based on our observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on our interpretations of the results of suspected ACM samples collected during this assessment, as well as the information indicated in the previous reports outlined herein, the materials presented in Table 5-1, below were identified as ACMs and presumed ACMs (PACMs) within the subject building.

Table 5-1 Summary of Identified ACMs Building 110—Pump House, William Head Institution

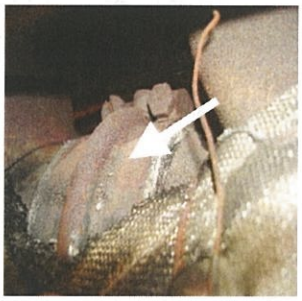
Identified ACM Description		Photo
12 in. pipe flange gaskets between units and piping (three observed)		
Condition	Good	
% Type	28.1% Chrysotile	
Friability	Non-friable	
Woven vibration protection pad in motor unit (one observed)		 Material located beneath wrap pictured above  Close-up view of vibration protection pad
Condition	Good	
% Type	35% Chrysotile	
Friability	Non-friable	

Table 5-1 Summary of Identified ACMs
Building 110—Pump House, William Head Institution

Identified ACM Description		Photo
Insulation materials within fire rated doors (see Section 5.1.1)		
Condition	Good	
% Type	Presumed	
Friability	Presumed friable	

5.1.1 Insulation Materials Inside Fire-Rated Doors

ACM insulation was historically used inside fire rated doors. Destructive work required to sample materials inside doors was NOT conducted as part of this assessment. As indicated in the Exterior Door Replacement Assessment, insulation inside fire doors should be presumed to be ACM unless records pertaining to the insulation type within the doors can be obtained, or unless destructive assessment and analytical testing proves otherwise.

5.1.2 Assessment for Vermiculite Insulation

As part of the assessment, Stantec assessed the subject building for areas where vermiculite insulation, a potential ACM, would likely be present. This included making note of and assessing attic spaces, floor cavities and masonry block or brick walls, which are typical areas where vermiculite is found. No vermiculite or locations that may potentially contain vermiculite (that could not otherwise be assessed) were observed.

5.2 LEAD

Lead is expected to be present in the following within the subject building:

- Lead acid batteries in emergency lighting
- Solder used in bell fittings for cast iron pipes and in electrical equipment
- Roof drain pipe flashings (two observed)

With respect to paint, eight paint chip samples were obtained from the predominant suspected LCP applications within the subject building through the current assessment, and four paint chip samples were collected through previous assessments outlined herein. Samples were submitted to ESML for analysis of total lead content.

A summary of the sample types, locations and analytical results is presented in Appendix D. The samples collected both through this assessment as well as the other assessments outlined herein (previously completed by Stantec) have been included, such that available information is tabulated in one place.

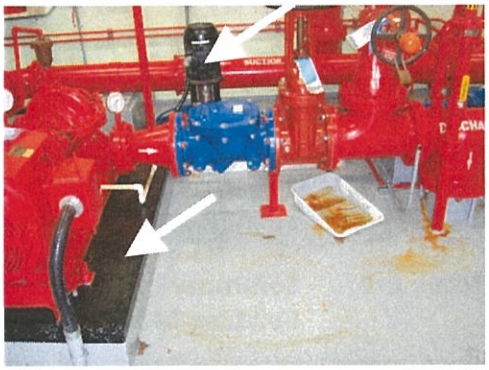
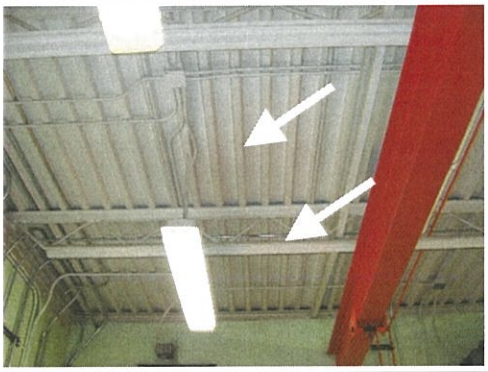
Copies of the certificates of analysis provided by EMSL for the suspected LCP samples submitted as part of this and previous assessments are included in Appendix E.

Based on our observations and on our interpretations of suspected LCP sample analytical results, as well as the lab results and information indicated in the previous reports outlined herein, the materials presented in Table 5-2, below were identified as LCPs within the subject building.

Table 5-2 Summary of Identified LCPs
Building 110—Pump House, William Head Institution

Identified LCP Description		Photo
Paint colour	Red	
Substrate	Metal	
Location/approx. extent	Main entrance door and frame	
Lead content	29,000–32,000 ppm	
Condition	Good	
Paint colour	Bright red	
Substrate	Metal	
Location/approx. extent	Process pipes and equipment	
Lead content	1,400 ppm	
Condition	Good	

Table 5-2 Summary of Identified LCPs
Building 110—Pump House, William Head Institution

Identified LCP Description		Photo
Paint colour	Black	
Substrate	Concrete and metal	
Location/approx. extent	Curbs, processing equipment, and framing	
Lead content	800 ppm	
Condition	Good	
Paint colour	Grey	
Substrate	Metal	
Location/approx. extent	Structural roof members and underside of q-deck ceiling	
Lead content	1,600 ppm	
Condition	Good	
Paint colour	Navy blue	
Substrate	Metal	
Location/approx. extent	Process pipes and equipment	
Lead content	12,000 ppm	
Condition	Good	

5.2.1 Painted Building Materials—Leachable Lead Content

According to the British Columbia Hazardous Waste Regulation (BC Reg. 63/88), lead waste destined for landfill may be considered a toxic leachate (and require special disposal) if lead is in a dispersible form and its leachate contains greater than 5.0 milligrams per litre (mg/L) lead.

Building materials coated with identified LCPs in the subject building are comprised of concrete and metal—both of which are expected to be recycled (not shipped for landfill disposal), if removed from the building as part of the currently planned fire pump replacement project or as part of other potential renovation projects. As such, sampling and testing of painted materials for leachable lead content was not necessary or conducted.

5.3 POLYCHLORINATED BIPHENYLS

The fluorescent light ballasts were inspected at the time of the assessment and were observed to have high-efficiency light tubes.

One non-PCB dry type transformer was observed on the south wall (in the west corner).

No other suspected PCB-containing electrical equipment was observed.

5.4 MOULD AND MOISTURE IMPACTED MATERIALS

No mould and/or moisture impacted building materials were observed at the time of the assessment.

5.5 MERCURY

Mercury vapour is expected to be present in the light tubes within the six fluorescent light fixtures observed. Mercury may also be present in paints and adhesives.

5.6 OZONE-DEPLETING SUBSTANCES

No building-related cooling or refrigeration equipment suspected to contain ODSs was observed.

5.7 SILICA

Silica is expected to be present in the concrete floors (foundation), curbs and walls.

6.0 RECOMMENDATIONS

The recommendations pertaining to the requirements for each of the hazardous materials included in this assessment are presented in the sub-sections below.

6.1 ASBESTOS

Based on the identification of ACMs within the subject building, Stantec recommends the following with regards to meeting the requirements of the Canada Labour Code and BC Reg. 296/97 as they pertain to managing asbestos in the workplace:

- Asbestos-containing materials that may be impacted during upcoming renovations (fire pump replacement project), during future renovations and/or during demolition activities should be removed by appropriately trained personnel (e.g. asbestos abatement contractor personnel), in accordance with the requirements of BC Reg. 296/97 and the Asbestos Guide, and prior to the initiation of project work that will disturb them.
- Prior to renovation and/or demolition activities that would disturb them, undertake testing of PACMs that may be impacted to determine their asbestos content. Confirmed asbestos materials should be handled accordingly.
- Due to the confirmed presence of asbestos within the subject building, and in accordance with the requirements of the Canada Labour Code, the Asbestos Guide and BC Reg. 296/97 an asbestos exposure control plan (also known as an "asbestos management plan" (AMP) or "asbestos operations and management plan") must be developed and implemented for the subject building. The AMP would serve to compile the available data, results and reports regarding the presence, extent, handling, removal, and disposal of ACMs within the subject building. The AMP would also provide sections for information regarding future sampling and analysis of suspected ACMs, if required, asbestos-abatement projects, if undertaken, and other information regarding the management of asbestos within the subject building.
- Identified ACMs in good condition can be managed in place, upon development and implementation of an AMP.
- Should a material suspected to contain asbestos fibres become uncovered during renovation and/or demolition activities, all work in the areas that may disturb the material should be stopped. Samples of the suspect material should be submitted for laboratory analysis to determine if asbestos fibres are present. Confirmed asbestos materials should be handled in accordance with applicable guidelines and regulations.
- Suspected ACMs deemed visually similar to the ACMs identified in this report, if discovered in additional locations, should be considered asbestos-containing and handled as such, unless proven otherwise, through analytical testing.
- Asbestos-containing cement pipe may be present below ground – caution should be used at any time when excavation is required.
- Ensure asbestos containing waste is handled, stored, and disposed of in accordance with the requirements of the Federal Transportation of Dangerous Goods Regulation and BC Reg. 63/88.
- This report should be added to the AMP and referred to as the current ACM record.

6.2 LEAD

Lead-containing materials, including paints, can be managed in place, where in good condition, and where not being impacted by renovation work.

When LCPs or other lead-containing equipment/materials within the subject building are to be disturbed and/or removed, ensure compliance with the following:

- Occupational exposure control requirements of the Canada Labour Code and BC Reg. 296/97, including the provisions of the Lead Guideline
- Transportation and disposal requirements of BC Reg. 63/88
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation

Corrective action or remedial work on paint applications containing any concentration of lead should be undertaken in a manner so as to avoid generating fine particulate matter or dust (i.e., avoid sanding). Airborne lead dust or fumes should not exceed BC Reg. 296/97 8-hour Occupational Exposure Limit (OEL) of 0.05 milligram per cubic metre (mg/m^3) during the removal of paints and products containing any concentration of lead. The use of personal protective equipment is recommended to reduce the potential for over-exposure to lead dust. This can be achieved by:

- Providing workers with protective clothing and PPE or devices as necessary to protect the worker against the hazards to which the worker may be exposed
- Providing workers with adequate and training in the care and use of clothing, equipment or device before wearing or using it
- Wetting the surface of the materials to prevent dust emissions
- Providing workers with washing facilities with clean water, soap and individual towels to properly wash prior to exiting the work area

To avoid the inhalation of lead, it is essential to have the following control methods in place:

- Engineering controls
- Work practices and hygiene practices
- Respirators and personal protective equipment
- Training

The work tasks required and the ways in which lead-containing materials (including paints) will be impacted will determine the appropriate respirators, measures and procedures that should be followed to protect workers from lead exposure.

6.3 POLYCHLORINATED BIPHENYLS

Should a material suspected to contain PCBs become uncovered during renovation activities (i.e., dielectric fluids, hydraulic fluids), all work in the areas that may disturb the material should be stopped. Samples of the suspect material should be submitted for laboratory analysis to determine if PCBs are present.

PCB-containing items identified for removal and disposal should be handled, transported, stored and disposed of in accordance with the following:

- Transportation and disposal requirements of BC Reg. 63/88
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation
- Requirements of the Federal PCB Regulations (SOR/2008-273)

6.4 MOULD AND MOISTURE IMPACTED MATERIALS

As no suspect mould and/or moisture impacted building materials were observed, no recommendations have been provided.

6.5 MERCURY

Identified mercury-containing items can be managed in place, therefore no further action is recommended at this time. Mercury vapour within light tubes poses no risk to workers or occupants provided the mercury containers remain intact and undisturbed.

Complete removal of mercury-containing equipment is required prior to any renovation or demolition activities that may disturb the equipment. When mercury-containing items (e.g., fluorescent light bulbs/tubes) are removed, ensure all mercury waste is handled, stored and disposed of in accordance with the requirements of the disposal requirements of the following:

- Transportation and disposal requirements of BC Reg. 63/88
- Transportation requirements of the Federal Transportation of Dangerous Goods Regulation

Precautions should be taken if workers may potentially be exposed to mercury or mercury vapours to ensure that workers exposure levels do not exceed the occupational exposure limit of 0.025 mg/m^3 as per BC Reg. 296/97 This can be achieved by providing respiratory and skin protection applicable to the hazard and task to be completed.

6.6 OZONE-DEPLETING SUBSTANCES

As no equipment suspected to contain ODSs was identified within the subject building, no recommendations have been provided.

6.7 SILICA

Silica-containing materials can be managed in place, therefore no further action is recommended at this time.

When silica-containing materials are to be impacted by renovation and/or demolition activities, ensure dust control measures are employed such that airborne silica dust concentrations do not exceed the exposure limit as stipulated by BC Reg. 296/97 (0.025 mg/m^3). This would include, but not be limited to, the following:

- Providing workers with respiratory protection
- Wetting the surface of the materials to prevent dust emissions
- Providing workers with facilities to properly wash prior to exiting the work area
- Providing dust control to mitigate the potential for dust to escape from the work area into public and/or adjacent areas

7.0 CLOSURE

This report has been prepared by Stantec for the sole benefit of Public Works and Government Services Canada on behalf of Correctional Service Canada. Any use that a third party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The conclusions presented represent the best judgment of the assessor based on current environmental, health and safety standards and the site conditions observed on the date cited within this report. This report is based on, and limited by, circumstances and conditions stated herein, and on information available at the time of preparation of the report. Due to the limited nature of the investigation and the limited data available, Stantec cannot warrant against undiscovered environmental liabilities. It is possible that additional, concealed hazardous materials may become evident during renovation and/or demolition activities within the subject building.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

Closure
February 14, 2017

We trust that the report meets your current requirements. Should you have any questions or concerns regarding the above, please do not hesitate to contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Amanda Bell, B.Sc., EPt
Environmental Technologist
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Reviewed by:

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Project Manager
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Sean Brigden, B.Sc., P.B.Dipl., CRSP
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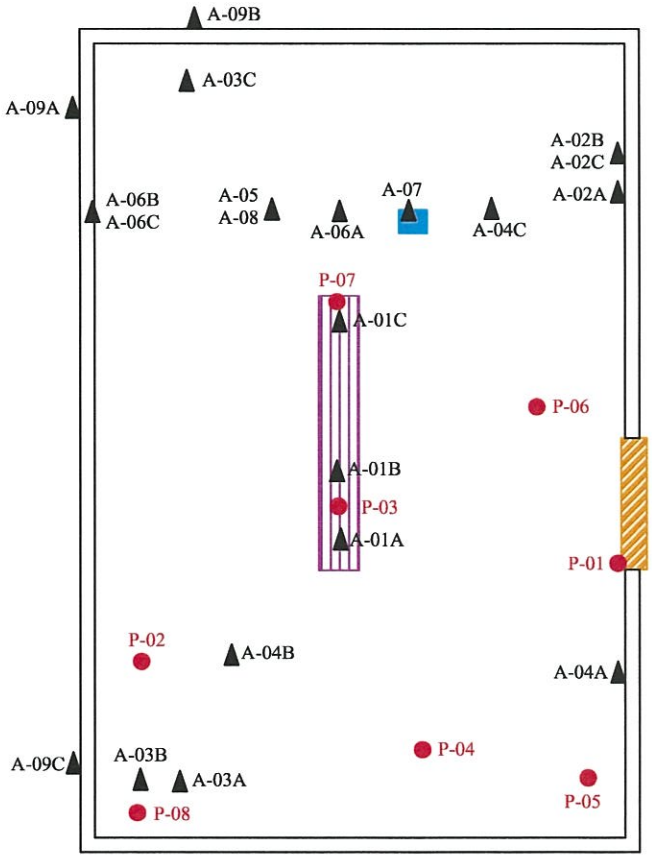
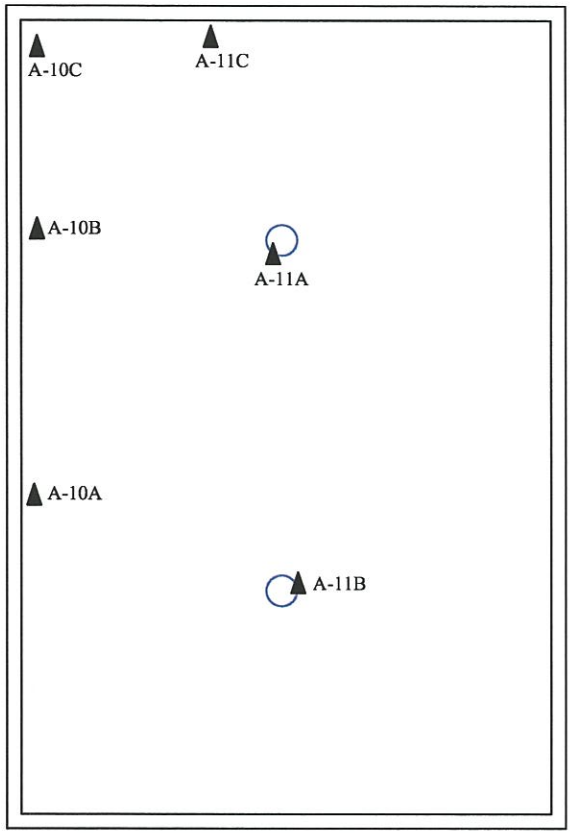
Sean.Brigden@stantec.com

APPENDIX A
FLOOR PLANS



MAIN FLOOR



ROOF

LEGEND

- BULK SAMPLE
- PAINT CHIP SAMPLE
- LEAD ROOF DRAIN PIPE FLASHING
- ASBESTOS-CONTAINING ACM 12" PIPE FLANGE GASKETS
- ASBESTOS-CONTAINING WOVEN VIBRATION PROTECTION PAD ON MOTOR UNIT
- PRESUMED ASBESTOS-CONTAINING INSULATION IN FIRE-RATED DOORS

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS

PUMP HOUSE (110) - WILLIAM HEAD INSTITUTION
6000 WILLIAM HEAD ROAD, VICTORIA, BC

Client: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

Project No.:	123220791
Scale:	N.T.S.
Date:	17/02/09
Dwn. By:	CD DM SL2017020092
App'd By:	TW

Dwg. No.: 1

Stantec

APPENDIX B
SUMMARY OF SUSPECTED ACM BULK SAMPLES

Appendix B SUMMARY OF SUSPECTED ACM BULK SAMPLES

Material/Homogenous Application Description	Sample Number	Sample Location	Result (% Asbestos)
Process equipment/pipe flange gaskets (approx. 12")	A-01A	West flange – between blue unit and red piping	None Detected
	A-01B	Central flange – between blue unit and red piping	28.1% Chrysotile
	A-01C	East flange – between blue unit and red piping	Positive Stop (Not Analyzed)
Red perimeter wall penetration sealant	A-02A	South wall – 1st lower conduit, east of door	None Detected
	A-02B	South wall – 2nd lower conduit, east of door	None Detected
	A-02C	South wall – mid-height conduit	None Detected
Green mastic on metal vent ducting	A-03A	Vent ducting in northwest corner	None Detected
	A-03B	Vent ducting in northwest corner	None Detected
	A-03C	Vent ducting in northeast corner	None Detected
Sealant around base of interior concrete walls and curbs	A-04A	South wall, adjacent to floor penetration	None Detected
	A-04B	West concrete pad for equipment	None Detected
	A-04C	East concrete pad for equipment	None Detected
Exhaust fitting insulation – canvas-wrapped cementitious material (chalky)	A-05 (wrap)	Single central (east) fitting	None Detected
	A-05 (insulation)	Single central (east) fitting	None Detected
Exhaust straight insulation – metal clad cementitious material (chalky)	A-06A	Lower straight at junction with motor unit	None Detected
	A-06B	Upper straight at north wall penetration	None Detected
	A-06C	Upper straight at north wall penetration	None Detected
Motor unit vibration protection pad (woven)	A-07	Central (east) motor unit	35% Chrysotile
Foil-wrapped fabric on insulation ends	A-08	Central (east) vertical straight	None Detected
Grey exterior penetration sealant	A-09A	East duct penetration in north wall	None Detected
	A-09B	North vent/grate in east wall	None Detected
	A-09C	West duct penetration in north wall	None Detected
Roof seam sealant (on asphalt roof sheeting)	A-10A	Near north edge of roof – west	None Detected
	A-10B	Near north edge of roof – central	None Detected
	A-10C	Near north edge of roof - east	None Detected

Appendix B Summary of Suspected ACM Bulk Samples
February 2017

Material/Homogenous Application Description	Sample Number	Sample Location	Result (% Asbestos)
Asphalt roof sheeting (red)	A-11A	At east roof drain	None Detected
	A-11B	At west roof drain	None Detected
	A-11C	Near east roof edge	None Detected
NOTE: Bold, highlighted text indicates confirmed ACM			

APPENDIX C
CERTIFICATE OF ANALYSIS—
SUSPECTED ACM SAMPLES

EMSL Canada Inc.

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http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 551700852
Customer ID: 55JACQ30NN
Customer PO: 123220791
Project ID:

Attn: Sean Brigden
Stantec Consulting Ltd.
400 - 655 Tyee Road
Victoria, BC V9A 6X5

Proj: 123220791

Phone: (250) 389-2346
Fax:
Collected:
Received: 1/26/2017
Analyzed: 2/02/2017

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: A-01A **Lab Sample ID:** 551700852-0001

Sample Description: West flange- between blue unit and red piping/Process equipment/pipe flange gaskets (approx.12")

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray	0.0%	100%	None Detected	

Client Sample ID: A-01B **Lab Sample ID:** 551700852-0002

Sample Description: Central flange - between blue unit and red piping/Process equipment/pipe flange gaskets (approx.12")

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray	0.0%	71.9%	**28.1% Chrysotile**	

Client Sample ID: A-01C **Lab Sample ID:** 551700852-0003

Sample Description: East flange- between blue unit and red piping/Process equipment/pipe flange gaskets (approx.12")

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017				Positive Stop (Not Analyzed)	

Client Sample ID: A-02A **Lab Sample ID:** 551700852-0004

Sample Description: South wall- 1st lower conduit, east of door/Red perimeter wall penetration sealant

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Red	0.0%	100%	None Detected	

Client Sample ID: A-02B **Lab Sample ID:** 551700852-0005

Sample Description: South wall- 2nd lower conduit, east of door/Red perimeter wall penetration sealant

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Red	0.0%	100%	None Detected	

Client Sample ID: A-02C **Lab Sample ID:** 551700852-0006

Sample Description: South wall - mid-height conduit/Red perimeter wall penetration sealant

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Red	0.0%	100%	None Detected	

Client Sample ID: A-03A **Lab Sample ID:** 551700852-0007

Sample Description: Vent ducting in northwest corner/Green mastic on metal vent ducting

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray/Various	0.0%	100%	None Detected	

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EMSL Canada Order 551700852
Customer ID: 55JACQ30NN
Customer PO: 123220791
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: A-03B **Lab Sample ID:** 551700852-0008
Sample Description: Vent ducting in northwest corner/Green mastic on metal vent ducting

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray/Various	0.0%	100%	None Detected	

Client Sample ID: A-03C **Lab Sample ID:** 551700852-0009
Sample Description: Vent ducting in northeast corner/Green mastic on metal vent ducting

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray/Various	0.0%	100%	None Detected	

Client Sample ID: A-04A **Lab Sample ID:** 551700852-0010
Sample Description: South wall, adjacent to floor penetration/Sealant around base of interior concrete walls and curbs

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray	0.0%	100%	None Detected	

Client Sample ID: A-04B **Lab Sample ID:** 551700852-0011
Sample Description: West concrete pad for equipment/Sealant around base of interior concrete walls and curbs

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray	0.0%	100%	None Detected	

Client Sample ID: A-04C **Lab Sample ID:** 551700852-0012
Sample Description: East concrete pad for equipment/Sealant around base of interior concrete walls and curbs

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray	0.0%	100%	None Detected	

Client Sample ID: A-05 (wrap) **Lab Sample ID:** 551700852-0013
Sample Description: Single central (east) fitting I/Exhaust fitting insulation - canvas-wrapped cementitious material (chalky)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	2/02/2017	White	10%	90%	None Detected	

Client Sample ID: A-05 (insulation) **Lab Sample ID:** 551700852-0014
Sample Description: Single central (east) fitting/Exhaust fitting insulation - canvas-wrapped cementitious material (chalky)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	2/02/2017	White	0%	100%	None Detected	

Client Sample ID: A-06A **Lab Sample ID:** 551700852-0015
Sample Description: Lower straight at junction with motor unit/Exhaust straight insulation - metal clad cementitious material (chalky)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	2/02/2017	Gray	3%	97%	None Detected	

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EMSL Canada Order 551700852
Customer ID: 55JACQ30NN
Customer PO: 123220791
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: A-06B **Lab Sample ID:** 551700852-0016

Sample Description: Upper straight at north wall penetration/Exhaust straight insulation - metal clad cementitious material (chalky)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/02/2017	White	5%	95%	None Detected	

Client Sample ID: A-06C **Lab Sample ID:** 551700852-0017

Sample Description: Upper straight at north wall penetration/Exhaust straight insulation - metal clad cementitious material (chalky)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/02/2017	Gray/White	8%	92%	None Detected	

Client Sample ID: A-07 **Lab Sample ID:** 551700852-0018

Sample Description: Central (east) motor unit/Motor unit vibration protection pad (woven)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/02/2017	Gray	0%	65%	**35% Chrysotile**	

Client Sample ID: A-08 **Lab Sample ID:** 551700852-0019

Sample Description: Central (east) vertical straight/Foil-wrapped fabric on insulation ends

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	2/02/2017	White	90%	10%	None Detected	

Client Sample ID: A-09A **Lab Sample ID:** 551700852-0020

Sample Description: East duct penetration in north wall/Grey exterior penetration sealant

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray/White	0.0%	100%	None Detected	

Client Sample ID: A-09B **Lab Sample ID:** 551700852-0021

Sample Description: North vent/grate in east wall/Grey exterior penetration sealant

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray/White	0.0%	100%	None Detected	

Client Sample ID: A-09C **Lab Sample ID:** 551700852-0022

Sample Description: West duct penetration in north wall/Grey exterior penetration sealant

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Gray/White	0.0%	100%	None Detected	

Client Sample ID: A-10A **Lab Sample ID:** 551700852-0023

Sample Description: Near north edge of roof- west/Roof seam sealant (on asphalt roof sheeting)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Black	0.0%	100%	None Detected	

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EMSL Canada Order 551700852
Customer ID: 55JACQ30NN
Customer PO: 123220791
Project ID:

Test Report: Asbestos Analysis in Bulk Material for Occupational Health and Safety British Columbia Regulation 188/2011 via EPA 600/R-93/116 Method

Client Sample ID: A-10B **Lab Sample ID:** 551700852-0024
Sample Description: Near north edge of roof- central/Roof seam sealant (on asphalt roof sheeting)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Black	0.0%	100%	None Detected	

Client Sample ID: A-10C **Lab Sample ID:** 551700852-0025
Sample Description: Near north edge of roof- east/Roof seam sealant (on asphalt roof sheeting)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Black	0.0%	100%	None Detected	

Client Sample ID: A-11A **Lab Sample ID:** 551700852-0026
Sample Description: At east roof drain/Asphalt roof sheeting (red)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Black	0.0%	100%	None Detected	

Client Sample ID: A-11B **Lab Sample ID:** 551700852-0027
Sample Description: At west roof drain/Asphalt roof sheeting (red)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Black	0.0%	100%	None Detected	

Client Sample ID: A-11C **Lab Sample ID:** 551700852-0028
Sample Description: Near east roof edge/Asphalt roof sheeting (red)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM Grav. Reduction	2/02/2017	Black	0.0%	100%	None Detected	

Analyst(s):

Natalie D'Amico	PLM (6)
Ronald Ng	PLM (1) PLM Grav. Reduction (6)
Shorthri Kalikutty	PLM Grav. Reduction (14)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Report amended: 02/08/201711:52:42 Replaces initial report from: 02/02/201715:47:49 Reason Code: Data Entry-Change to Sample ID

APPENDIX D
SUMMARY OF SUSPECTED LCP SAMPLES

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Appendix D: Summary of Suspected LCP Bulk Samples
February, 2017

Sample No.	Sample Colour and Substrate	Location	Lab Result (ppm)	Lead Containing (Yes/No)
Current Assessment				
P-01	**Red on metal**	**Frame of main entrance door**	**32,000**	**Yes**
P-02	**Bright red on metal**	**Pipe collar near north wall (west)**	**1,400**	**Yes**
P-03	Bright blue on metal	West unit between red process pipes	<230	No
P-04	**Black on concrete and metal**	**West concrete curb**	**800**	**Yes**
P-05	Grey on concrete	Floor in southwest corner	<100	No
P-06	**Grey on metal**	**Roof framing member adjacent to main door**	**1,600**	**Yes**
P-07	Dull red/brown on metal	East mechanical unit	<590	No
P-08	**Navy blue on metal**	**Mechanical equipment in northwest corner**	**12,000**	**Yes**
Exterior Door Replacement Assessment				
110-P-01	**Red on metal**	**Exterior door frame**	**29,000**	**Yes**
110-P-02	Light green on concrete	Interior wall beside door	<90	No
110-P-03	White on concrete	Exterior wall beside door	<90	No
Fire Alarm Assessment				
L-09	Light green on concrete	Room 100, concrete wall	<120	No
Table Note: Bold, highlighted text indicates confirmed LCP				

APPENDIX E
CERTIFICATE OF ANALYSIS—SUMMARY OF SUSPECTED LCP SAMPLES

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L9T 5N4
Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	551700856
CustomerID:	55JACQ30NN
CustomerPO:	123220791
ProjectID:	

Attn: **Sean Brigden**
Stantec Consulting Ltd.
400 - 655 Tyee Road
Victoria, BC V9A 6X5

Phone: (250) 389-2346
Fax:
Received: 01/26/17 10:50 AM
Collected: 1/24/2017

Project: **123220791**

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

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Lead Concentration*
P-01	*551700856-0001*	1/24/2017	2/2/2017	32000 ppm
	Site: Frame of main entrance door Desc: Red/main entrance door and frame (metal)			
P-02	*551700856-0002*	1/24/2017	2/2/2017	1400 ppm
	Site: Pipe collar near north wall (west) Desc: Bright red/process pipes and equipment (metal)			
P-03	*551700856-0003*	1/24/2017	2/2/2017	<230 ppm
	Site: West unit between red process pipes Desc: Bright blue/process pipes and equipment (metal) Insufficient sample to reach reporting limit.			
P-04	*551700856-0004*	1/24/2017	2/2/2017	800 ppm
	Site: West concrete curb Desc: Black/concrete curbs, metal process equipment and metal framing			
P-05	*551700856-0005*	1/24/2017	2/2/2017	<100 ppm
	Site: Floor in southwest corner Desc: Grey/concrete floors Insufficient sample to reach reporting limit.			
P-06	*551700856-0006*	1/24/2017	2/2/2017	1600 ppm
	Site: Roof framing member adjacent to main door Desc: Grey/roof structural members and underside of q-deck ceiling (metal)			
P-07	*551700856-0007*	1/24/2017	2/2/2017	<590 ppm
	Site: East mechanical unit Desc: Dull red-brown/process equipment (metal) Insufficient sample to reach reporting limit.			
P-08	*551700856-0008*	1/24/2017	2/2/2017	12000 ppm
	Site: Mechanical equipment in northwest corner Desc: Navy blue/process pipes/equipment (metal)			

Rowena Fanto, Lead Supervisor
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/02/2017 09:45:53

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L9T 5N4
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http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	551612352
CustomerID:	55JACQ30L
CustomerPO:	123220729
ProjectID:	

Attn: **Keith Irwin**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 11/15/16 10:12 AM
Collected:

Project: **123220729 BUILDING 110 - PUMP HOUSE**

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

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Lead Concentration*
110-P-01	*551612352-0001*		11/18/2016	29000 ppm
	Site: DOOR FRAME Desc: RED DOOR AND TRIM			
110-P-02	*551612352-0002*		11/18/2016	<90 ppm
	Site: BESIDE DOOR Desc: LIGHT GREEN INTERIOR WALLS			
110-P-03	*551612352-0003*		11/18/2016	<90 ppm
	Site: BESIDE DOOR Desc: WHITE EXTERIOR WALLS			

Rowena Fanto, Lead Supervisor
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 11/22/2016 08:13:35

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L4T 1G3
Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	551601654
CustomerID:	55JACQ30L
CustomerPO:	123220504.200.1
ProjectID:	

Attn: **Amanda Bell**
Stantec Consulting, Ltd.
500 - 4730 Kingsway
Burnaby, BC V5H 0C6

Phone: (604) 412-3004
Fax:
Received: 02/17/16 10:11 AM
Collected:

Project: **123220504.200.1 PUMP HOUSE**

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

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Lead Concentration*
L-09	*551601654-0001*		2/18/2016	<120 ppm
	Site: LIGHT GREEN- ROOM 100 Insufficient sample to reach reporting limit.			

Lisa Podzyhun
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements established by the AIHA-LAP, LLC, unless specifically indicated otherwise.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/24/2016 08:01:43