



**Public Works and
Government Services Canada**

Requisition No. EZ108-161544

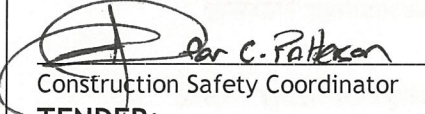
SPECIFICATIONS
For
Pacific Forestry Centre
506 West Burnside
LIGHTING & POWER DISTRIBUTION UPGRADE
Victoria, BC

Project No. R. 076284.001 October 31, 2015

APPROVED BY:

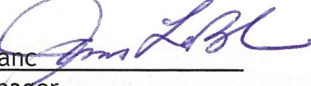


Regional Manager, A&E Services 2015-11-06.
Date



Construction Safety Coordinator 2015-11-05
Date

TENDER:

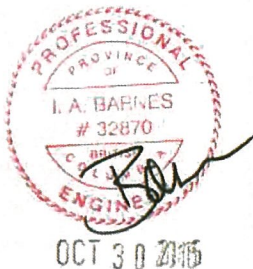


Jamie LeBlanc 2015-11-06
Project Manager Date

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AES Manager Date

ISSUED FOR TENDER

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1.1 CODES

- .1 Perform work to CURRENT Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date.

1.2 DESCRIPTION OF WORK

- .1 Work of this Contract comprises installation of a new primary voltage service entrance and associated equipment, and further identified as:
**Pacific Forestry Centre 506 West Burnside
Lighting and Power Distribution Upgrade
Job No. R. 076284.001**
- .2 Work to be performed under this Contract includes, but is not limited to, the following items covered further in the Contract documents:
 - .1 Retrofit of existing low voltage Panelboards with new breakers, bussing and replacement covers.
 - .2 Replacement or retrofit of all interior and exterior building light fixtures.
 - .3 Installation of new site lighting with associated civil works.
 - .4 Installation of lighting control devices at existing control locations.
 - .5 Commissioning and testing of all equipment installed as part of this contract.
 - .6 Demonstration and training of personnel as directed by the Departmental Representative. Refer to Section 01 79 00 Demonstration and Training.
- .3 The following items are noted in the contract documents and have been noted as 'Not in Contract' or similar wording. These items are NOT in the scope of this tender.
 - .1 Replacement of exit signs.
 - .2 Supply and installation of static resistive generator load bank.
 - .3 Supply and installation of 1000 amp transfer switch at main service entrance; supply and installation of associated feeders, controls and cabling.
 - .4 Modifications to existing 600V distribution board to support installation of new transfer switch.
 - .5 Installation/replacement of bus duct and associated feeders and distribution.
- .4 "Green" requirements:
 - .1 Use only environmentally responsible green materials/ products with no VOC emissions or minimum VOC emissions of indoor off-gassing contaminants for improved indoor air quality - subject of Departmental Representative's approval of submitted MSDS Product Data.
 - .2 Use materials/products containing highest percentage of recycled and recovered materials practicable - consistent with maintaining cost effective satisfactory levels of competition.
 - .3 Adhere to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.

- .5 Perform all work in accordance with National Building Code of Canada (NBC) 2012, WorkSafeBC/Workers' Compensation Board (WCB) Regulations and these Contract Documents. Where there is a conflict between Contract Documents and referenced standards, the most stringent will be applied.

1.3 CONTRACT DOCUMENTS

- .1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

1.4 DIVISION OF SPECIFICATIONS

- .1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.
- .2 A division may consist of the work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.
- .3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

1.5 HOURS OF WORK

- .1 Restrictive as follows:
 - .1 Schedule deconstruction, removal and construction work in offices and lab spaces after normal working hours of the building and during the day on weekends and/or holidays. Normal weekday working hours of the building are 0800 – 1630 hours, Monday to Friday. Work in common spaces, corridors or building exterior may be completed during the noted regular working hours.
 - .2 Notify Departmental Representative of all after hours work, including weekends and holidays.
 - .3 All work impacting provision of power to the building and its users must be fully coordinated to the benefit of the building occupants. Contractor shall assume that all outages will be during weekends or evenings.

1.6 WORK SCHEDULE

- .1 Do not change approved Schedule without notifying Departmental Representative.
- .2 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

1.7 TIME TO COMPLETION

- .1 Completion of this project shall be no later than 52 weeks from award of contract or December 31st, 2016, whichever occurs sooner.

1.8 COST BREAKDOWN

- .1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregating Contract price.
- .2 Provide a projection of project billing as proposed on a month by month basis accounting for expected delivery of equipment, project phasing and mobilisation.

1.9 CODES, BYLAWS, STANDARDS

- .1 Perform work in accordance with the Canadian Electrical Code 2012, and other indicated Codes, Construction Standards and/or any other Code or Bylaw of local application.
- .2 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.
- .3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.
- .4 In any case of conflict or discrepancy, the most stringent requirements shall apply.

1.10 DOCUMENTS REQUIRED

- .1 Maintain 1 copy each of the following at the job site:
 - .1 Contract drawings.
 - .2 Contract specifications.
 - .3 Addenda to Contract documents.
 - .4 Copy of approved work schedule.
 - .5 Reviewed/approved shop drawings.
 - .6 Change orders.
 - .7 Other modifications to Contract.
 - .8 Field test reports.
 - .9 Reviewed/approved samples.
 - .10 Manufacturers' installation and application instructions.
 - .11 One set of record drawings and specifications for "as-built" purposes.
 - .12 Canadian Electrical Code 2012.
 - .13 Current construction standards of workmanship listed in technical Sections.
 - .14 Contractor Safety Plan.

1.11 REGULATORY REQUIREMENTS

- .1 Obtain and pay for - Building Permit, Certificates, Licenses and other permits required by regulatory municipal, provincial or federal authorities to complete the work.
- .2 Provide inspection authorities with plans and information required for issue of acceptance certificates.

- .3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

1.12 CONTRACTOR'S USE OF SITE

- .1 Use of site:
 - .1 Exclusive and complete for execution of work.
 - .2 Assume responsibility for assigned premises for performance of this work.
 - .3 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative such as moving contractors and furniture installers.
- .2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.
- .3 Do not unreasonably encumber site with material or equipment.
- .4 A 1-hour site safety orientation to be completed by all workers. Personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
- .5 Limit use of premises for Work, for storage and for access to allow for continuous occupancy of building.
- .6 Co-ordinate use of premises under direction of the Departmental Representative.
- .7 Assume full responsibility for protection and safekeeping of Products under this Contract.
- .8 Do not use any other part of property unless approved in writing by the Departmental Representative.
- .9 Store materials and equipment only where directed by the Departmental Representative. Obtain and pay for use of additional storage and work areas if required.
- .10 Ensure access to assigned lay down or construction areas is maintained for fire and emergency access at all times.
- .11 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .12 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work.
- .13 Condition of existing work at completion of operations to be equal to or better than that which existed before new work started.
- .14 Provide necessary protection and hoarding to prevent unauthorized entry into areas of work at all times by staff and public.
- .15 Inform the Departmental Representative 3 working days prior to performing work inside the building. Entry into areas of work will be by authorized personnel only and must be delineated during execution of work.
- .16 The contractor can have limited access to the site from 7:00 to 17:00 and after hours with prior notification. The Departmental Representative will provide and coordinate site access requirements with the Contractor at time of award.
- .17 Adjacent portions of building and property will remain in use during Work.

- .18 Co-operate with the Departmental Representative by scheduling operations to minimize conflict and to facilitate continuous use of building. Do not impede, restrict or obstruct use of building or adjacent portions of property.
 - .19 Do work in a manner that will minimize creation of noise that would disturb day-to-day operation of building and adjacent property.
 - .20 Locate stationary noise generating equipment as far away as practical from occupied parts of building, or where directed by the Departmental Representative.
 - .21 Co-ordinate with the Departmental Representative for necessary shutdown of services affecting occupied parts of building and adjacent property where serviced from building. Provide 14 days of notice prior to shutdown. Minimize occurrences and durations of shutdowns.
 - .22 Co-ordinate with the Departmental Representative to ensure that construction activities do not compromise security of building and site.
 - .23 Ensure that construction activities do not compromise other active systems within the building and site.
- 1.13 EXAMINATION**
- .1 Examine site and be familiar and conversant with existing conditions likely to affect work.
 - .2 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.
- 1.14 LOCATION OF EQUIPMENT AND FIXTURES**
- .1 Location of equipment and devices indicated or specified are to be considered as approximate.
 - .2 Locate equipment, devices 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 his approval for actual location.
 - .4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Departmental Representative and/or as specified.
- 1.15 CUTTING AND PATCHING**
- .1 Cut existing surfaces as required to accommodate new work.
 - .2 Remove items so shown or specified.
 - .3 Do not cut, bore, or sleeve load-bearing members.
 - .4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
 - .5 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture.

- .6 Making good is defined as matching construction and finishing materials and the adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed from 1.5 metres in ambient light, and includes painting the whole surface to the next change in plane.
- .7 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas used by public or government staff.
- .8 Protect adjacent surfaces. Make good or replace damaged surfaces and equipment to satisfaction of the Departmental Representative, at no cost to Contract.
- .9 Provide barricade warning tape to mark perimeter of work area, as directed by the Departmental Representative.

1.16 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.
- .3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

1.17 ACCEPTANCE OF SUBSTRATES

- .1 Each trade shall examine surfaces prepared by others and job conditions which may affect his work, and shall report defects to the Departmental Representative. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

1.18 QUALITY OF WORK

- .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
- .2 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code of Canada 2010 and local Construction Standards.
- .3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

1.19 WORKS COORDINATION

- .1 Coordinate work of subtrades:
 - .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
- .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.
 - .1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.

- .2 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.
 - .1 Pay particularly close attention to overhead work above ceilings and within or near to building structural elements.
 - .2 Identify on coordination drawings, building elements, services lines, rough-in points and indicate location services entrance to site.
 - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
 - .4 Publish minutes of each meeting.
 - .5 Plan and coordinate work in such a way to minimize quantity of service line offsets.
 - .6 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submit shop drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
- .4 Work cooperation:
 - .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
 - .2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.
 - .3 Ensure disputes between subcontractors are resolved.
- .5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.
- .6 Maintain efficient and continuous supervision.

1.20 APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- .1 In accordance with Section 01 33 00, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.
- .2 Allow sufficient time for the following:
 - .1 Review of product data.
 - .2 Approval of shop drawings.
 - .3 Review of re-submission.
 - .4 Ordering of approved material and/or products - refer to Sections of Divisions 2 to 48.

1.21 RELICS AND ANTIQUITIES

- .1 Relics and antiquities and items of historical or scientific interest shall remain property of Department. Protect such articles and request directives from Departmental Representative.

- .2 Give immediate notice to Departmental Representative if evidence of archeological finds are encountered during excavation/construction, and await Departmental Representative's written instructions before proceeding with work in this area.

1.22 SECURITY CLEARANCES

- .1 Personnel employed on this project will be subject to security check. Obtain requisite clearances, as instructed, for each individual required to enter the premises.
- .2 Personnel will be checked at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.
- .3 Contractor shall be fully responsible for securing the premises and its contents throughout the construction period.

1.23 PROJECT MEETINGS

- .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.24 TESTING AND INSPECTIONS

- .1 The Contractor will appoint and pay for the services of the factory technical representative for the following:
 - .1 Inspection and testing required of individual door controllers.
 - .2 Inspection and testing of the system software.
 - .3 Testing, adjustment and balancing of overhead door/gate and associated electrical equipment and systems.
 - .1 Tests specified to be carried out by Contractor under the Departmental Representative's supervision.
- .2 Contractor shall furnish labour and facilities to:
 - .1 Notify Departmental Representative in advance of planned testing.
- .3 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.
- .4 Provide Departmental Representative with 2 copies of testing and commissioning reports as soon as they are available.

1.25 AS-BUILT DOCUMENTS

- .1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, and 2 copies of the original AutoCAD files for "as-built" purposes.
- .2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

1.26 CLEANING

- .1 Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.

- .2 **Ensure cleanup of the work areas each day after completion of work.**
- .3 Clean interior building areas when ready to receive finish painting and continue cleaning on an as-needed basis until building is sufficiently completed or ready for occupancy.
- .4 In preparation for interim and final inspections:
 - .1 Examine all sight-exposed interior and exterior surfaced and concealed spaces.
 - .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces, including glass and other polished surfaces.
- .5 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

1.27 DUST CONTROL

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

1.28 ENVIRONMENTAL PROTECTION

- .1 Prevent extraneous materials from contaminating air beyond construction area, by providing temporary enclosures during work.
- .2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.
- .3 Ensure proper disposal procedures in accordance with all applicable territorial regulations.

1.29 MAINTENANCE MATERIALS, SPECIAL TOOLS AND SPARE PARTS

- .1 Specific requirements for maintenance materials, tools and spare parts are specified in individual technical sections of Divisions 02 to 48, where required.

1.30 ADDITIONAL DRAWINGS

- .1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.
- .2 Upon request, Departmental Representative may furnish up to a maximum of 10 sets of Contract documents for use by the Contractor at no additional cost. Should more than 10 sets of documents be required the Departmental Representative will provide them at additional cost.

1.31 BUILDING SMOKING ENVIRONMENT

- .1 Smoking on the site is not permitted.

1.32 SYSTEM OF MEASUREMENT

- .1 The metric system of measurement (SI) will be employed on this Contract.

1.33 FAMILIARIZATION WITH SITE

- .1 Before submitting tender, visit site - as indicated in tender documents and become familiar with all **conditions likely to affect the cost of the work.**

1.34 SUBMISSION OF TENDER

- .1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and inspected the site, and is fully conversant with all conditions.

END OF SECTION

Part 1 General**1.1 FACILITY OPERATIONS AND SECURITY PROCEDURES**

- .1 All construction staff shall become thoroughly familiar with and abide by all provisions and requirements of the facility, Safety and Security Procedures and Restrictions.
 - .1 The parking area(s) to be used by construction employees will be designated by the Departmental Representative. Parking in other locations will be prohibited and vehicles may be subject to removal.
 - .2 Speed limits are posted on site. Failure to abide by site speed limits may result in removal of employee and vehicle from site.

1.2 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant Federal, municipal, provincial and other regulations.
- .2 Provide hoarding, and scaffolding plan for Departmental Representative to review 5 business days prior to installation.

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work, provide temporary means to maintain security as per Departmental Representatives direction.
- .4 Closures: protect work temporarily until permanent enclosures are completed.
- .5 Coordinate with Departmental Representative in scheduling operations to minimize conflict and to facilitate use of space.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.5 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 3 working days of notice for necessary interruption of civil, mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

- .1 Optimize and plan shut-downs so that services are restored in time for normal facility operation hours. Coordinate all shut-downs with utility providers and facility users.
- .2 Contractor shall be held responsible for damages to facility equipment as the result of service shut-downs.
- .3 Contractor shall be held responsible for any and all unscheduled shut-downs of building utilities and services.
- .4 Contractor will not be allowed to connect to Departmental Representative's existing data and communication services.
- .5 Submit a "Fire Alarm Bypass" request to Departmental Representative 3 working days in advance for approval.
- .6 Obtain permission from Departmental Representative for access to restricted areas outside the construction zones 3 working days in advance.
- .3 Provide for personnel and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.6 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted within Pacific Forestry Centre.

1.7 NOISE CONTROL

- .1 Comply with applicable provincial by-law for noise control.

1.8 PARALLEL PROJECTS

- .1 Additional projects will be underway at the Pacific Forestry Centre during completion of this project. The contractor shall work around and coordinate access, material deliveries, etc with other projects to ensure traffic congestion or delays do not occur.
- .2 Any additional delays, coordination or other costs shall be included by the contractor as part of this project.

END OF SECTION

Part 1 General

- .1 This section includes the following:
 - .1 Coordination of Work under administration of Departmental Representative.
 - .2 Scheduled Pre-construction and Site meetings.
 - .3 Project planning and construction schedule.
 - .4 Site progress monitoring and control.

1.1 DESCRIPTION

- .1 Coordinate and manage construction schedule, submittals, use of site, temporary utilities, construction facilities, quality control program, and construction Work, with progress of Work of subcontractors, other contractors and Departmental Representative.

1.2 PRE-CONSTRUCTION MEETING

- .1 Pre-construction Meeting:
 - .1 Within 10 days after award of Contract, Departmental Representative will arrange pre-construction meeting.
 - .2 Departmental Representative, Contractor and members of Pacific Forestry Centre will be in attendance.
 - .3 Departmental Representative will establish time and location of meeting and notify parties concerned.
 - .4 The Departmental Representative will chair the meeting, record minutes and issue minutes to all attendees.
 - .1 Agenda of meeting is generally as follows:
 - .1 Project team introductions including main construction personnel, PWGSC personnel, PFC and consultants.
 - .2 Communication protocol for submittals.
 - .3 Start date on site.
 - .4 PFC security requirements.
 - .5 Construction Organization and Start-up:
 - .1 Comply with Departmental Representative's allocation of mobilization areas of site; for access, traffic, and parking facilities.
 - .2 During construction coordinate use of site and facilities through Departmental Representative's procedures for intra-project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.
 - .3 Comply with instructions of Departmental Representative for use of temporary utilities and construction facilities.
 - .4 Coordinate layout of construction barrier with Departmental Representative.

1.3 PROJECT PLANNING

- .1 Plan construction activities, submittals and field reviews ahead of time for efficient and effective management to ensure timely completion of project.

1.4 SCHEDULES

- .1 Submit preliminary construction schedule to Departmental Representative during Pre-Construction meeting.
- .2 After review, revise and resubmit schedule. Submit final full schedule within 2 weeks after Pre-Construction meeting.
- .3 During progress of Work revise and resubmit as directed by Departmental Representative.

1.5 CONSTRUCTION SITE MEETINGS

- .1 During course of Work and prior to project completion, Departmental Representative will request Construction Site Meetings as required.
- .2 Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance.
- .3 Agenda to include following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Review of Health and Safety including any incidents, near misses, and WorkSafe BC visits.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Corrective measures and procedures to regain projected schedule.
 - .8 Revision to construction schedule.
 - .9 Progress schedule, during succeeding work period.
 - .10 Review submittal schedules: expedite as required.
 - .11 Update of Red Line As-Built Drawings.
 - .12 Maintenance of quality standards.
 - .13 Review proposed changes for effect on construction schedule and on completion date.
 - .14 Other business.

1.6 WALK THROUGH FIELD REVIEW BY DEPARTMENTAL REPRESENTATIVE

- .1 Departmental Representative will carry out the following:
 - .1 Walk-through field review of the work with contractor's representatives.
 - .2 Preparation and distribution of the Walk-through field review Reports. Reports will be distributed within 5 days of field review.

1.7 SUBMITTALS

- .1 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.
- .2 Process substitutions through Departmental Representative.
- .3 Deliver closeout submittals for review and inspections, for transmittal to Departmental Representative.

1.8 CLOSEOUT PROCEDURES

- .1 Notify Departmental Representative when Work is considered Substantially Complete. Contractor to prepare list of defects, deficiencies and incomplete work prior to inspection by Departmental Representative. Follow procedures as outlined in Section 01 78 00 – Closeout Submittals.
- .2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
- .3 Comply with Departmental Representative's instructions for correction of items of Work listed in deficiency list. completion or correction.
- .4 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

- .1 Schedule and administer site meetings throughout the progress of the work on a regular basis or at the call of Departmental Representative.
- .2 Prepare and distribute agenda at least three (3) days prior to the meetings.
- .3 Distribute written notice of each meeting seven (7) days in advance of meeting date to Departmental Representative.
- .4 Meeting space can be held in the meeting room in the PFC, location to be determined. Book meeting or room in advance through Departmental Representative.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within five (5) days after meetings and transmit to meeting participants and affected parties not in attendance, Departmental Representative and Consultants.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRE- CONSTRUCTION MEETING

- .1 Within 15 days after award of Contract: Departmental Representative will request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Attendance will include, but is not limited to, the Departmental Representative, members of the Pacific Forestry Centre (PFC) and Contractor.
- .3 Departmental Representative to establish time and location of preconstruction meeting, Contractor to notify parties concerned a minimum of 4 working days before meeting.
- .4 Departmental Representative will chair the meeting, record minutes and issue minutes.
- .5 Agenda to include:
 - .1 Introduction of official representative of participants in the Work.
 - .2 Start date on site.
 - .3 Communication Protocol for submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 51 00 - Temporary Facilities.
 - .5 PFC Security requirements.
 - .6 Site safety in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

- .7 Communication Protocol for proposed changes, change orders, procedures, approvals required.
- .8 Owner's Work.
- .9 Record drawings in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .12 Monthly progress claims, administrative procedures, photographs, hold backs.
- .13 Appointment of inspection and testing agencies or firms.

1.3 PROGRESS MEETINGS

- .1 During course of Work and two weeks prior to Project Completion, schedule progress meetings bi-weekly.
- .2 Attendance to include but is not limited to Departmental Representative, members of the Pacific Forestry Centre and Contractor.
- .3 Contractor responsible to record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days after meeting.
- .4 Record next meeting dates in the meeting minutes or notify parties minimum of seven (7) days in advance for other ad-hoc meetings.
- .5 Agenda to include, at a minimum, the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Health and Safety including any incidents, near misses, and WorkSafe BC visits.
 - .3 Review of Work progress since previous meeting.
 - .4 Coordination discussions with Pacific Forestry Centre.
 - .5 Construction schedule review.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Corrective measures and procedures to regain projected schedule.
 - .8 Request for Information (RFI) log review.
 - .9 Engineering Disciplines Reviews.
 - .1 Electrical
 - .10 Change order log review.
 - .11 Review submittal schedule.
 - .12 Review updated as built.
 - .13 Review and resolve site issues.
 - .14 New business.

END OF SECTION

1.1 SCHEDULES REQUIRED

- .1 Submit schedules as follows.
 - .1 Construction progress schedule.
 - .2 Submittal schedule for shop drawings and product data.
 - .3 Product delivery schedule.

1.2 FORMAT

- .1 Prepare schedule in form of horizontal bar chart (GANNT).
- .2 Provide a separate bar for each major item of work, trade or operation.
- .3 Provide horizontal time scale identifying first work day of each week.
- .4 Format for listings: chronological order of start of each item of work.
- .5 Identification of listings: by Specification subjects or system descriptions.

1.3 SUBMISSION

- .1 Submit initial schedule within 7 working days after award of Contract.
- .2 Submit minimum of 3 copies to be retained by the Departmental Representative.
- .3 The Departmental Representative will review schedule and return review copy within 7 working days after receipt.
- .4 Re-submit finalized schedule within 3 working days after return of review copy.
- .5 Submit revised progress schedule with each application for payment.
- .6 Distribute copies of revised schedule to:
 - .1 Subcontractors.
 - .2 Other concerned parties.
- .7 Instruct recipients to report to Contractor within 5 working days, any problems anticipated by timetable shown in schedule.

1.4 SCHEDULING

- .1 Include complete sequence of construction activities.
- .2 Include dates for commencement and completion of each major element of construction as follows.
- .3 Show projected percentage of completion of each item as of first day of week.
- .4 Indicate progress of each activity to date of submission schedule.
- .5 Show changes occurring since previous submission of schedule:
 - .1 Major changes in scope.
 - .2 Activities modified since previous submission.
 - .3 Revised projections of progress and completion.
 - .4 Other identifiable changes.
- .6 Provide a narrative report to define:
 - .1 Problem areas, anticipated delays and impact on schedule.
 - .2 Corrective action recommended and its effect.

1.5 PROGRESS REPORTS

- .1 Maintain accurate record of the progress of the Work. Submit progress reports at times requested by the Departmental Representative.
- .2 Include in reports dates of commencement and percentage of work completed for different parts of the Work.

1.6 STAFFING AND OVERTIME

- .1 Cease work at any particular point and transfer workers to other designated points, when so directed, should the Departmental Representative judge it necessary to expedite the Work.
- .2 Should the Work fail to progress according to the approved progress schedule, work such additional time (including weekends and holidays), employ additional workers, or both, as may be required to bring the Work back on schedule, at no additional cost to Contract.

1.7 SUBMITTALS SCHEDULE

- .1 Include schedule for submitting shop drawings, product data and samples.
- .2 Indicate dates for submitting, review time, re-submission time, last date for meeting fabrication schedule.
- .3 Include dates when reviewed submittals will be required from the Departmental Representative.

END OF SECTION

1.1 APPROVALS

- .1 Approval of shop drawings and samples: Refer to Section 01 11 55 - General Instructions.

1.2 GENERAL

- .1 This Section specifies general requirements and procedures for Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review. Additional specific requirements for submissions are specified in individual technical sections.
- .2 Present shop drawings, product data and samples in SI Metric units.
- .3 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.
- .5 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract documents and stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Departmental Representative's review of submission unless Departmental Representative gives written acceptance of specific deviations.
- .7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative.
- .8 Notify Departmental Representative in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.
- .9 Do not proceed with work until relevant submissions are reviewed and approved by Departmental Representative.

1.3 SUBMISSION REQUIREMENTS

- .1 Co-ordinate each submission with requirements of work and Contract documents. Individual submissions will not be reviewed until all related information is available.
- .2 Allow 10 working days for Departmental Representative's review of each submission, unless noted otherwise.
- .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.

- .4 Submissions to include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative, certifying approval of submissions, verification of field measurements and compliance with Contract documents.
- .5 Details of appropriate portions of work as applicable.
 - .1 Fabrication.
 - .2 Layout, showing dimensions (including identified field dimensions and clearances).
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .6 After Departmental Representative's review, distribute copies.

1.4 SHOP DRAWINGS

- .1 Shop drawings: original drawings or modified standard drawings provided by Contractor to illustrate details of portion of work which are specific to project requirements.
- .2 Maximum sheet size: 850 x 1050 mm.
- .3 Submit 6 prints of shop drawings for each requirement requested in specification sections and/or as requested by Departmental Representative.
- .4 Cross-reference shop drawing information to applicable portions of Contract documents.

1.5 SHOP DRAWINGS REVIEW

- .1 Review of shop drawings by Department Representative is for the sole purpose of ascertaining conformance with the general concept.
- .2 This review will not mean the Department Representative approves detail design inherent in shop drawings, responsibility for which remains with Contractor submitting same.
- .3 This review will not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract documents.

- .4 Without restricting the generality of the foregoing, Contractor is responsible for:
 - .1 Dimensions to be confirmed and correlated at job site.
 - .2 Information that pertains solely to fabrication processes or to techniques of construction and installation.
 - .3 Co-ordination of work of all sub-trades.

1.6 PRODUCT DATA

- .1 Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products or any other specified information.
- .2 Delete information not applicable to project.
- .3 Supplement standard information to provide details applicable to project.
- .4 Cross-reference product data information to applicable portions of Contract documents.
- .5 Submit 6 copies of product data.

1.7 SAMPLES

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

1.8 PROGRESS SCHEDULE

- .1 Submit work schedule and cost breakdown as required in Section 01 11 55 - General Instructions.

END OF SECTION

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 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 Structure
 - .4 CSA Z1006-10 – Management of Work In Confined Space
- .4 National Fire Code of Canada 2010 (as amended)
 - .1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.
- .5 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Province of British Columbia:
 - .1 Workers Compensation Act Part 3-Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation.
- .7 NMS Section 00 10 10 Specification Index (Appendix A thru Appendix E).

1.2 Related Sections

- .1 Refer to the current NMS Sections as indicated in Section 000110 Specification Index.

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 013300.
- .2 Work effected by submittal shall not proceed until review is complete.
- .3 Submit the following:
 - .1 Site Specific 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 Copy of Contractors' Construction Safety Manual Emergency Procedures.
- .4 The Departmental Representative will review the Contractor's Site Specific Project Health and Safety Plan and Emergency Procedures, and provide comments to the Contractor within 5 (five) 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 Site Specific 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
- .4 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 contractor shall appoint a Health and Safety Coordinator who is a Registered Occupational Hygienist and shall:
 - .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 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work sites.
 - .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 work sites against entry.
 - .3 Erect temporary enclosure around the Contractor Off-Site Offload facility (as shown on the drawings) using 1.8m fencing. Provide secured access gates as required. Maintain fence in good repair.

1.9 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.

1.10 Project/Site Conditions

- .1 Work at site will involve contact with:
 - .1 PWGSC and other Federal employees,
 - .2 PFC (federal) operational staff,
 - .3 Other contractors,
 - .4 Unpredictable weather conditions,
 - .5 Threat of tsunami and earthquake,
 - .6 Restricted access space,
 - .7 Possible lead in paint in interior work areas,
 - .8 Contact with PFC (federal) staff moving chemicals in service hallways,
 - .9 Concealed and buried electrical services,
 - .10 Excavating and trenching,
 - .11 Noise levels Issue's.
 - .12 Hazardous Building Materials Assessment - Appendix A.

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 permits related to project before start of work.

1.13 Filing of Notice

- .1 The Prime 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 Health and Safety Plan

- .1 Develop, implement, and enforce a Site Specific Project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Primary requirements:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work, procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communication 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.

- .2 Develop the Site Specific project health and Safety Plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
- .3 Revise and update Site Specific Project Health and Safety Plan as required, and re-submit to the Departmental Representative.
- .4 Departmental Representative's review: the review of the contractors' Site Specific Safety Project 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 Site Specific Project 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 and other PWGSC staff as required.
- .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
 - .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative and PWGSC site staff.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
 - .1 Work at high angles.
 - .2 Work in confined spaces or where there is a risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work on, over, under and adjacent to water.
 - .6 Workplaces where there are persons who require physical assistance to be moved.
- .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
- .5 At least once each year, emergency drills must be held to ensure awareness and effectiveness of emergency exit routes and procedures, and a record of the drills must be kept.

- .6 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 013300].
 - .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 NMS Sections as indicated in Section 000110 Specification Index.

1.17 Off Site Contingency and Emergency Response Plan

- .1 Prior to commencing Work involving handling of hazardous materials, develop off site Contingency and Emergency Response Plan.
- .2 Plan must provide immediate response to serious site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from Site.

1.18 Personnel Health, Safety, and Hygiene

- .1 Training: ensure personnel entering Site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.
- .2 Levels of Protection: establish levels of protection for each Work area based on planned activity and location of activity.
- .3 Personal Protective Equipment
- .4 Furnish site personnel with appropriate PPE as specified above. Ensure that safety equipment and protective clothing is kept clean and maintained.
- .5 Develop protective equipment usage procedures and ensure that procedures are strictly followed by site personnel; include following procedures as minimum:
- .6 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on site within work zones.
- .7 Ensure footwear is steel-toed safety shoes or boots and is covered by rubber overshoes when entering or working in potentially contaminated work areas.
- .8 Dispose of or decontaminate PPE worn on site at end of each workday.
- .9 Decontaminate reusable PPE before reissuing.
- .10 Ensure site personnel have passed respirator fit test prior to entering potentially contaminated work areas.

- .11 Ensure facial hair does not interfere with proper respirator fit.
 - .1 Respiratory Protection:
 - .1 Provide site personnel with extensive training in usage and limitations of, and qualitative fit testing for, air purifying and supplied-air respirators in accordance with specified regulations.
 - .2 Develop, implement, and maintain respirator program.
 - .3 Monitor, evaluate, and provide respiratory protection for site personnel.
 - .4 Ensure levels of protection as listed have been chosen consistent with site-specific potential airborne hazards associated with major contaminants identified on site.
 - .5 In absence of additional air monitoring information or substance identification, retain an industrial hygiene specialist to determine minimum levels of respiratory protection required.
 - .6 Immediately notify Departmental Representative when level of respiratory protection required increases.
 - .7 Ensure appropriate respiratory protection during Work activities. As minimum requirement, ensure that persons entering potentially contaminated work areas are supplied with and use appropriate respiratory protection.
 - .2 Heat Stress/Cold Stress:
 - .1 Implement heat stress or cold stress monitoring program as applicable and include in site-specific Health and Safety Plan.
 - .3 Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
 - .1 Suitable containers for storage and disposal of used disposable PPE.
 - .2 Potable water and suitable sanitation facility.
 - .4 Emergency and First-Aid Equipment:
 - .1 Locate and maintain emergency and first-aid equipment in appropriate location on site including first-aid kit to accommodate number of site personnel; portable emergency eye wash; 9 kg ABC type dry chemical fire extinguishers as required.
- 1.19 Asbestos Hazard**
 - .1 Modifications to spray- or trowel-applied asbestos surfaces can be hazardous to health.
 - .2 Removal and handling of asbestos will be performed as per Worksafe B.C. Regulations Part 6 Asbestos.
 - .3 Refer to Hazardous Building Materials Assessment in Appendix A.
- 1.20 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 Section 00 01 10 Specification Index.

1.21 Removal of Lead-Containing Paints

- .1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.
- .2 Carry out demolition activities involving lead-containing paints in accordance with applicable Provincial regulations.
- .3 Refer to Hazardous Building Materials Assessment in Appendix A.

1.22 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.
 - .3 Develop, implement and enforce a communication plan with Departmental representative and maintenance staff for all electrical work and lockout procedures.
 - .4 Follow the Isolation procedure forms for high voltage isolation supplied by PWGSC.

1.23 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.

1.24 Overloading

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

1.25 Falsework

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

1.26 Scaffolding

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

1.27 Confined Spaces

- .1 Carry out work in confined spaces in compliance with Worksafe B.C. Part 9 Confined Spaces and CSA Z1006-10 Management of Work in Confined Space.

1.28 Restricted Access

- .1 Contractor shall perform a hazard assessment and develop an appropriate restricted access entry plan in accordance with Worksafe B.C. regulations.

1.29 Confined Space and Restricted Space Outside of Defined Work Site

- .1 Carry out work in confined spaces in compliance with Worksafe B.C. Part 9 Confined Spaces and CSA Z1006-10 Management of Work in Confined Space. Coordinate all confined space entry work with PWGSC Departmental Representative through the contractor's confined space entry permit system.
- .2 Contractor shall perform a hazard assessment and develop an appropriate restricted access entry plan in accordance with Worksafe B.C. regulations. Coordinate all restricted access space entry work with the PWGSC Departmental Representative prior to entry.
- .3 The Contractor is required to provide a reasonable amount of time to the Departmental Representative for making arrangements for entry and/or access to Confined Space or Restricted Access spaces located outside the designated work site.

1.30 Powder-Actuated Devices

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

1.31 Fire Safety and Hot Work

- .1 Coordinate all hot work with PWGSC Departmental Representative through the contractors' hot work permit system.
- .2 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .3 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.

1.32 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.

1.33 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.

1.34 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.

1.35 Posted Documents

- .1 Post legible versions of the following documents on site:
 - .1 Site Specific 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.
 - .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 Health and Safety Coordinator, 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.

1.36 Meetings

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

1.37 Correction of Non-Compliance

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

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 Environmental protection plan to include:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting contaminated soils and hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .6 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
- .7 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

- .9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
 - .10 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .11 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- 1.3 FIRES**
- .1 Fires and burning of rubbish on site is not permitted.
- 1.4 DISPOSAL OF WASTES**
- .1 Do not bury rubbish and waste materials on site.
 - .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways.
- 1.5 DRAINAGE**
- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
 - .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
 - .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- 1.6 WORK ADJACENT TO WATERWAY**
- .1 Do not dump excavated fill, waste material or debris in waterways.
- 1.7 POLLUTION CONTROL**
- .1 Maintain temporary erosion and pollution control features installed under this contract.
 - .2 Control emissions from equipment and plant to local authorities' emission requirements.
 - .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- 1.8 HISTORICAL/ARCHAEOLOGICAL CONTROL**
- .1 Give immediate notice to the Departmental Representative if evidence of archaeological finds are encountered during construction and await written instructions before proceeding with work in the vicinity of any such finds.
 - .2 Relics, antiquities and items of historical or scientific interest shall remain the property of the Crown. Protect such articles and request directives from the Departmental Representative.

1.9 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.10 SPILLS OR RELEASE OF DELETERIOUS SUBSTANCES

- .1 Measures to be implemented to prevent, control or mitigate spills or release of deleterious substances:
 - .1 Contractor shall take due care to ensure no deleterious materials enter any surface drainage pathways located in the project area.
 - .2 Emergency response procedure for spills of deleterious substances must be in place. In the event of a spill, the contractor will immediately implement their Spill Response Protocol.
 - .3 The Contractor is responsible for all costs associated with a spill or release as a result of their actions. This will include but not limited costs of spill response equipment and materials, associated sampling, analysis and any required restoration of the impacted area.
 - .4 Response equipment to be on site at all times (i.e. spill kits) and workers trained in their location and use. The resources on hand must be sufficient to respond effectively and expediently to any spill that could occur on site.
 - .5 All construction equipment brought onto the site will be clean and properly maintained.
 - .6 Any equipment maintenance must occur in a designated area and must be conducted away from any surface water drains or collection points.
 - .7 Any equipment remaining on site overnight shall have appropriately placed drip pans.
 - .8 Waste generated will be prevented from entering the environment.
 - .9 Prevent discharges containing asphalt, grout, concrete or other waste materials from reaching storm drains or the marine environment. This includes, but is not limited to:
 - .1 Cleaning equipment off site; and
 - .2 Protection of any other drainage structures not identified here with filter fences and/or silt socks, if required.
 - .10 Protection of the roadways from tracking of mud, soil and debris needs to be maintained throughout the work.

- .11 Limit of work activities to normal business hours to minimize noise outside of those hours. Ensure that equipment and machinery is properly maintained to minimize unnecessary noise pollution. Consider local municipal noise bylaws when mobilizing equipment.
- .12 All utilities must be located prior to excavation.

1.11

IMPORT OF FILL MATERIAL

- .1 Prior to import of any material used for surfacing, backfilling or any other use requiring fill material the Contractor will provide sufficient documentation, as agreed on by Departmental Representative, to ensure that the imported material meets the Canadian Council of Ministers of the Environment (CCME) Residential/Parkland (RL/PL) Land Usage Soil Quality Guidelines.
- .2 Environmental characterization of fill material must be conducted in accordance with the following: British Columbia, Ministry of Environment, Technical Guidance Document #1 – Site Characterization and Confirmation Testing.
- .3 Prior to import of any material the Contractor must inform the Departmental representative of the proposed fill source(s) and identify the nature of current and historic activities conducted at the source.
- .4 The Departmental Representative reserves the right to request additional testing of imported material at the source and at the deposit site to satisfy their requirements. All testing will be done at the Contractor's cost.
- .5 All material brought to the site that does not meet the CCME RL/PL Guidelines will be removed from the property immediately at the Contractors cost.

END OF SECTION

1.1 INSPECTION

- .1 Be responsible for quality control during execution of Work.
- .2 Allow the Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by the Departmental Representative's instructions, or law of Place of Work.
- .4 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.
- .5 The 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, Canada will pay cost of examination and replacement.

1.2 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.3 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 the Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of the Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by the Departmental Representative.

1.4 REPORTS

- .1 Submit 3 copies of inspection and test reports to the Departmental Representative.
- .2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

END OF SECTION

Part 1 General**1.1 ACCESS AND DELIVERY**

- .1 Contractor is required to use only the designated entrance to access the work site, for deliveries to site, and as the exit for offsite disposal.
 - .1 Maintain for duration of contract.
 - .2 Make good damage resulting from Contractor's use.
- .2 Use of the Pacific Forestry Centre facility will be granted to the Contractor through the Departmental Representative.
 - .1 The contractor's work site is to be used for loading and unloading purposes.
- .3 Provide and maintain access roads, sidewalk crossing ramps and construction runways as may be required for access to the work. All roadways and walkways outside of the Contractor's work site must be kept clear of materials and equipment at all times.
- .4 Provide and maintain competent flag operators, traffic signals, barricades and flares, lights or lanterns as may be required to perform work and protect other users of the Facility.

1.2 CONSTRUCTION PARKING

- .1 Construction staff shall be responsible for their own parking in nearby private facilities.

1.3 STORAGE FACILITIES

- .1 Confine work and operations of employees to areas indicated on Contract Documents. Do not unreasonably encumber premises with products. Storage space to be limited to the area of construction.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work or existing structure or elements.
- .3 Provide and pay for all off-site storage as required. Note that storage space is limited on site. Refer to site plan for location of Contractor's site storage and lay-down area.

1.4 SANITARY FACILITIES

- .1 Contractor will provide their own portable sanitary facilities. Maintain in a safe and sanitary condition. Construction staff will not be allowed to use Pacific Forestry Centre's washrooms.

1.5 HEATING AND VENTILATION

- .1 Do not begin work until arrangements have been made with the Departmental Representative for protection of on-floor heating, ventilating and air conditioning.
- .2 If there is any dirt in the heating and ventilation system, at the completion of work, it will be the Contractor's responsibility to return system to its original state in accordance with the Departmental Representative's directions.

- .3 Prevent dust and odour migration to other occupied areas.
 - .1 Do not deactivate HVAC system to occupied floors. Purge air from construction floors only when directed by Departmental Representative, where dust and fumes will be generated.
 - .2 Change filters in existing HVAC system frequently.

- 1.6 SCAFFOLDING**
 - .1 Construct and maintain scaffolding in rigid, secure and safe manner.
 - .2 Erect scaffolding independent of walls. Remove promptly when no longer required.

- 1.7 HOISTING**
 - .1 Provide, operate and maintain hoists required for moving of workers, materials and equipment. Make financial arrangements with Sub-contractors for their use of hoists.
 - .2 Hoists shall be operated by qualified operator.

- 1.8 HOARDING**
 - .1 Prior to all demolition and construction, install plywood hoarding or protective barrier as detailed. Maintain in safe and clean condition throughout duration of project. Submit hoarding plan to Departmental Representative for approval.
 - .2 Erect and maintain safety barricades around all openings and other danger areas as required by Building Code and WCB.
 - .3 Installation of hoarding must not create permanent damage to existing wall cladding or flooring finish which is of heritage value.

- 1.9 SITE OFFICE**
 - .1 Contractor to provide their own trailer as temporary site office in an area to be designated by the Departmental Representative.
 - .2 Contractor should clear and demolish site office at end of project according to contract requirement.

- 1.10 REMOVAL OF TEMPORARY FACILITIES**
 - .1 Remove temporary facilities from site when directed by the Departmental Representative.

- 1.11 SIGNS AND NOTICES**
 - .1 Signs and notices for safety and instruction shall be in both official languages or graphic symbols conforming to CAN/CSA-Z321.
 - .2 Maintain approved signs and notices in good condition for duration of Project, and dispose of offsite on completion of Project when directed by Departmental Representative.

- 1.12 CLEAN-UP**
 - .1 Remove construction debris, waste materials, packaging material from work site daily.

- .2 Clean dirt of mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.
- .5 At completion of Project: Remove and dispose of all debris, thoroughly clean and restore site to condition found at commencement of Work. Repair and make good to all damage caused by construction activities.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 N/A

1.2 REFERENCES

- .1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: 2012-01-18.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations.

1.5 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.6 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.7 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.9 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.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

1.1 PRODUCTS/MATERIAL AND EQUIPMENT

- .1 Use NEW products/material and equipment unless otherwise specified. Term "products" is referred to throughout specifications.
- .2 Use products of one (1) manufacturer for material and equipment of same type or classification unless otherwise specified.
- .3 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer instructions. Departmental Representative will designate which document is to be followed.
- .5 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur.
 - .1 Prevent electrolytic action between dissimilar metals.
 - .2 Use non-corrosive fasteners, anchors and spacers for securing exterior work.
- .6 Fastenings which cause spalling or cracking are not acceptable.
- .7 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .8 Use heavy hexagon heads, semi-finished unless otherwise specified.
- .9 Bolts may not project more than 1 diameter beyond nuts.
- .10 Types of washers as follows:
 - .1 Plain type washers: use on equipment and sheet metal.
 - .2 Soft gasket lock type washers: use where vibrations occur.
 - .3 Resilient washers: use with stainless steel items and fasteners.
 - .4 FRP fibre reinforced plastic washers: use with FRP items and fabrications.
- .11 Deliver, store and maintain packaged material and equipment with manufacturer seals and labels intact.
- .12 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
- .13 Store products in accordance with supplier instructions.
- .14 Touch up damaged factory finished surfaces to Departmental Representative's satisfaction:
 - .1 Use primer or enamel to match original.
 - .2 Do not paint over nameplates.

1.2 QUALITY OF PRODUCTS

- .1 Products, materials and equipment (referred to as products) incorporated into work to 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 will be rejected regardless of previous inspections.
 - .1 Inspection does not relieve responsibility, but is precaution against oversight or error.
 - .2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet requirements of specifications. Produce documents when requested by Departmental Representative.
- .4 Should any dispute arise as to quality or fitness of products, the decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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.

1.3 AVAILABILITY OF PRODUCTS

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.
- .3 In event of failure to notify Departmental Representative at start of work and should it subsequently appear that work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in either Contract price or Contract time.

1.4 MANUFACTURER INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer instructions.
 - .1 Do not rely on labels or enclosures provided with products.
 - .2 Obtain written instructions directly from manufacturer.
- .2 Notify Departmental Representative in writing of conflicts between specifications and manufacturer 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 either Contract price or Contract time.

1.5 CONTRACTOR'S OPTIONS FOR SELECTION OF PRODUCTS FOR TENDERING

- .1 Products are 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 Prescriptive specifications and indicated Products.
- .3 Products specified by performance and referenced standard: select any product meeting or exceeding 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 "Special Instructions to Tenderers".
- .5 When products are specified by referenced standard or by Performance specifications, upon request of Departmental Representative obtain from manufacturer and independent laboratory report showing that product meets or exceeds specified requirements.

1.6 SUBSTITUTION AFTER CONTRACT AWARD

- .1 No substitutions are permitted without prior written approval of 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 proposed substitution.
- .3 Proposals will be considered by 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 attention of Departmental Representative is considered by Departmental Representative as equivalent to product specified and will result in a credit to 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 project. Pay for design or drawing changes required as result of substitution.
- .5 Amounts of all credits arising from approval of substitutions will be determined by Departmental Representative and Contract price will be reduced accordingly.

END OF SECTION

Part 1 General

1.1 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.2 LAYOUT

- .1 Confirm all project requirements prior to starting work.
- .2 Make no changes or relocations without prior written notice to Departmental Representative.
- .3 Confirm all structural, electrical, civil and mechanical work prior to starting construction.

1.3 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.

1.4 RECORDS

- .1 Maintain a complete, accurate log of work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1.1 SUBMITTALS

- .1 Submit written request in advance of cutting or alteration which affects any of following.
 - .1 Structural integrity of any part of Project.
 - .2 Efficiency, maintenance or safety of any operational element.
 - .3 Visual qualities of sight-exposed elements.
 - .4 Interior and exterior building finishes.

1.2 INCLUDE IN REQUEST

- .1 Identification of Project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on work of Other Contractor.
- .7 Written permission of affected Other Contractor.
- .8 Date and time work will be executed.

1.3 MATERIALS

- .1 Required for original installation.

1.4 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 Cover adjacent surfaces and finishes with clean and dry drop sheets, kraft paper, cardboard or other suitable coverings during minor demolition.

1.5 EXECUTION

- .1 Execute cutting, fitting and patching required to perform work. Perform minor demolition required for alterations with care not to damage adjacent construction, fittings, fixtures, surfaces and finishes scheduled to remain.
- .2 Obtain Departmental Representative's approval before cutting, boring or sleeving load-bearing members
- .3 Fit several parts together, to integrate with other work.
- .4 Uncover work to install ill-timed work, at no cost to Contract.
- .5 Remove and replace defective and non-conforming work, at no cost to Contract.
- .6 Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing. Make cuts with clean, true, smooth edges.

- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Restore work with new products in accordance with requirements of Contract Documents.
- .9 Include cost of making good all surfaces, substrates and work disturbed by removal of existing work and by installation of new work.

1.6 MATCHING TO EXISTING WORK

- .1 Make new work in existing areas and all alteration/renovation work match in every respect similar items in existing areas.
- .2 Use new materials to match existing items. Where perfect matches cannot be made as to quality, texture, colour and pattern remove existing materials and replace with new materials of comparable quality selected by the Departmental Representative, to extent directed by the Departmental Representative.
- .3 Execute Work carefully wherever existing work is being re-used. Make repairs to such reused items after re-installation to properly restore them. Where proper restoration is impractical, such items will be rejected and replaced to the Departmental Representative's approval.
- .4 After removal of reusable items, carefully patch and repair original location.
- .5 Wherever existing work is being altered to make way for new work, perform such cutting and patching neatly and make finished installations equal to quality and appearance.
- .6 Where new work is a continuation or an extension of existing work take care to blend both together with complete regard to appearance. Obvious joints and visible patches not acceptable.

1.7 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.
- .3 Supply such devices as straight edges and templates required to facilitate the Departmental Representative's inspection of work.
- .4 Review layouts with the Departmental Representative prior to commencement of work.

1.8 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 the Departmental Representative of impending installation and obtain his approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by the Departmental Representative.

END OF SECTION

1.1 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 the Departmental Representative. Refer to Section 01 35 43 - Environmental Procedures for additional requirements.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris. Locate where directed by the Departmental Representative.
- .5 Provide and use clearly marked separate bins for recycling wherever facilities are available. Refer to Section 01 74 21 - Waste Management and Disposal for additional requirements.
- .6 Remove waste material and debris from site and deposit in waste containers at end of each working day.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer.
- .9 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

- .1 When Work is substantially completed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris.
- .3 Prior to final review, remove surplus products, tools, construction machinery and equipment.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Remove stains, spots, marks and dirt from decorative work, electrical/mechanical fixtures, furniture fittings; walls, floors and ceilings.
- .6 Clean lighting reflectors, lenses and other lighting surfaces.
- .7 Vacuum clean and dust room interiors.
- .8 Sweep and power wash pavement around building and all pavement parking/storage areas used by Contractor to remove all traces of construction spillage, stains and residue. Do not blast dirty water onto adjacent buildings and site features.

END OF SECTION

1.1 RELATED WORK

- .1 Refer to every technical section for waste management and disposal requirements.

1.2 DEFINITIONS

- .1 Waste Reduction Workplan: written report which addresses opportunities for reduction, re-use or recycling of materials.
- .2 Materials Source Separation Program: consists of series of ongoing activities to separate re-usable and recyclable waste material into material categories from other types of waste at point of generation.

1.3 MATERIALS SOURCE SEPARATION

- .1 Before project start-up, prepare Materials Source Separation Program. Provide separate containers for re-usable and/or recyclable materials of following:
 - .1 Construction waste: including but not limited to following types.
 - .1 Uncontaminated packaging (wood, metal banding, cardboard, paper, plastic wrappings, polystyrene).
 - .2 Wood pallets (recycle or return to shipper).
 - .3 Metals (pipe, conduit, ducting, wiring, miscellaneous cuttings)
 - .4 Wood (uncontaminated).
 - .5 Paint, solvent, oil.
 - .6 Other materials as indicated in technical sections.
 - .2 Administration/worker waste (uncontaminated): including but not limited to following types.
 - .1 Paper, cardboard.
 - .2 Plastic containers and lids marked types 1 through 6.
 - .3 Glass and aluminum drink containers (recycle or return to vendor).
- .2 Implement Materials Source Separation Program for waste generated on project in compliance with approved methods and as approved by Departmental Representative.
- .3 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .4 Locate separated materials in areas which minimize material damage.

1.4 DIVERSION OF MATERIALS

- .1 Create list of materials to be separated from general waste stream and stockpiled in separate containers, to approval of Departmental Representative and consistent with applicable fire regulations.
 - .1 Mark containers.
 - .2 Provide instruction on disposal practices.

1.5 STORAGE, HANDLING AND APPLICATION

- .1 Do work in compliance with Waste Reduction Workplan.
- .2 Handle waste materials not re-used, salvaged, or recycled in accordance with appropriate regulations and codes.
- .3 Materials in separated condition: collect, handle, store on site and transport off-site to approved and authorized recycling facility.
- .4 Materials must be immediately separated into required categories for re-use or recycling.
- .5 Unless specified otherwise, materials for removal become Contractor's property.
- .6 On-site sale of salvaged/recyclable material is not permitted.
- .7 On-site burning of material is not permitted.
- .8 Provide Departmental Representative with receipts indicating quantity of material delivered to landfill.
- .9 Provide Departmental Representative with receipts indicating quantity and type of materials sent for recycling.

END OF SECTION

1.1 INSPECTION AND DECLARATION

- .1 Contractor's inspection: Contractor and all Subcontractors will conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify the Departmental Representative in writing of satisfactory completion of Contractor's inspection and that corrections have been made.
 - .2 Request the Departmental Representative's inspection.
- .2 The Departmental Representative's inspection: the Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor will correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Certificates required by authorities having jurisdiction have been submitted.
 - .4 Work is complete and ready for Final Inspection.
- .4 Final inspection: when items noted above are completed, request final inspection of Work by the Departmental Representative and Contractor. If Work is deemed incomplete by the Departmental Representative, complete outstanding items and request re-inspection.

END OF SECTION

1.1 SUBMISSION

- .1 Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- .2 Revise content of documents as required before final submittal.
- .3 Phasing of submission:
 - .1 5 working days before substantial performance of work submit to Departmental Representative 4 final copies of operation and maintenance manuals.
 - .2 5 working days before substantial performance of work submit to Departmental Representative 4 final copies of supplements to operation and maintenance manuals for each subsequent phase.
- .4 Ensure that spare parts, maintenance materials and special tools provided are new, neither damaged nor defective and of same quality and manufacture as products provided in work.
- .5 If requested, furnish evidence as to type, source and quality of products provided.
- .6 Defective products will be rejected, regardless of previous inspections. Replace defective products at no cost to Contract.

1.2 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 D-ring, loose leaf 219 x 279 mm size with spine and face pockets.
- .3 Cover: identify each binder with typed or printed title "Project Record Documents"; list title of project and identify subject matter of contents.
- .4 Arrange content by systems under section numbers and sequence of Specifications Index.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.3 CONTENTS, EACH VOLUME

- .1 Table of contents - provide the following:
 - .1 Title of project.
 - .2 Date of submission.
 - .3 Names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .4 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

- .3 Product data: mark each sheet to clearly identify products and component parts, and data applicable to installation. Delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

1.4 RECORD DOCUMENTS

- .1 Contract drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not on original Contract drawings.
 - .5 References to related shop drawings and modifications.
- .2 Contract specifications: legibly mark each item to record actual "Workmanship of Construction", including:
 - .1 Manufacturer, trade name and catalogue number of each "Product/Material" actually installed, particularly optional items and substitute items.
 - .2 Changes made by addenda and change orders.
- .3 Recording information:
 - .1 Record changes in red ink.
 - .2 Mark on one (1) set of drawings, specifications and shop drawings with changes during progress of work.
 - .3 Provide one (1) set of CDs in AutoCAD dwg. file format with all as-built information on the CDs.
 - .4 Submit all sets for the Departmental Representative.

1.5 EQUIPMENT AND SYSTEMS

- .1 Operating procedures - include the following:
 - .1 Start-up, break-in, and routine normal operating instructions and sequences.
 - .2 Regulation, control, stopping, shutdown, and emergency instructions.
 - .3 Summer, winter and any special operating instructions.
- .2 Provide servicing schedule required.
- .3 Include manufacturer printed operation and maintenance instructions.
- .4 Include sequence of operation by controls manufacturer.
- .5 Provide original manufacturer parts list, illustrations, assembly drawings and diagrams required for maintenance.
- .6 Provide installed control diagrams by controls manufacturer.
- .7 Additional requirements: as specified in individual specification Sections.

1.6 MANUFACTURER DOCUMENTATION REPORTS

- .1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and system, instruct Departmental Representative's indicated facility personnel and provide detailed written report that demonstration and instructions have been completed.
- .2 Departmental Representative will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed upon times.

1.7 SPARE PARTS

- .1 Provide spare parts in quantities specified in individual specification Sections.
- .2 Provide items of same manufacture and quality as items in work.
- .3 Deliver to on-site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to the Departmental Representative. Include approved listings in maintenance manual.
- .5 Obtain receipt for delivered products and submit to Departmental Representative.

1.8 MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in work.
- .3 Provide all software, licenses, interface and cabling devices required to setup or maintain all equipment as installed in this project, whether specifically requested or not. Software shall be fully operational and not time-limited or demonstration versions. All passwords, keys or hardware locks will be provided to the Owner.
- .4 Deliver to on-site location as directed; place and store.
- .5 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in maintenance manual.
- .6 Obtain receipt for delivered products and submit to Departmental Representative.

1.9 WARRANTIES, BONDS, TEST REPORTS, INSPECTION REPORTS

- .1 Obtain Warranties, Bonds, Test Results, Inspection Reports executed in duplicate by subcontractors, suppliers, manufacturers and inspection agencies within 10 working days after completion of applicable item of work.
- .2 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until date of substantial performance is determined.
- .3 Verify that documents are in proper form, contain full information and are notarized.
- .4 Co-execute submittals when required.
- .5 Retain warranties and bonds until time specified for submittal.

1.10

COMPLETION

- .1 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 and adjusted and are fully operational.
 - .4 Certificates required by BC Electrical Safety Authority has been submitted.
 - .5 Work is complete and ready for final inspection.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Procedures for demonstration and instruction of equipment and systems to Owner's personnel.

1.2 RELATED SECTIONS

- .1 Section 01 78 00 - Closeout Submittals.
- .2 Section 01 91 13 – General Commissioning (Cx) Requirements.
- .3 Section 01 91 31 –Commissioning (Cx) Plan.
- .4 Section 01 91 33 – Commissioning: Forms.
- .5 Section 01 91 41 – Commissioning: Training.

1.3 DESCRIPTION

- .1 Demonstrate operation and maintenance of equipment and systems to Departmental Representative two weeks prior to date of final inspection.
- .2 Owner will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

1.4 QUALITY CONTROL

- .1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.5 SUBMITTALS

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

1.6 CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation in accordance with Manufacturer's recommendations.
- .2 Testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements and equipment and systems are fully operational.
- .3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.7 PREPARATION

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

1.8 DEMONSTRATION AND INSTRUCTIONS

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location.
- .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .3 Review contents of manual in detail to explain all aspects of operation and maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.
- .5 Training and demonstration will be performed by manufacturers representative and will include actual interaction with all systems requiring software or computer interface.

1.9 TIME ALLOCATED FOR INSTRUCTIONS

- .1 Contractor shall provide for a total of 1 working day of demonstration and training for all systems in the project, including but not limited to:
 - .1 Transfer Switch and controls
 - .2 Panelboards and distribution
 - .3 Interior Lighting and controls
 - .4 Exterior Lighting and controls

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 Section Includes:
General requirements relating to commissioning of project's components and systems, specifying general requirements to Performance Verification of components, equipment, sub-systems, systems, and integrated systems.
- .2 Related Sections:
 - .1 Section 01 33 00 - Submittal Procedures
 - .2 Section 01 45 00 - Quality Control.
 - .3 Section 01 91 31- Commissioning (Cx) Plan
 - .4 Section 26 05 00 - Common Work Results - Electrical.
 - .5 Section 26 09 24 – Low Voltage Lighting Controls
 - .6 Section 26 09 25 – Lighting Control Devices
 - .7 Section 26 24 16 – Panelboards Breaker Type
 - .8 Section 26 28 21 – Moulded Case Circuit Breakers
 - .9 Section 26 36 23 – Automatic Transfer Switches
 - .10 Section 26 50 00 - Lighting
 - .11 Section 26 53 00 – Exit Signs
 - .12 Section 26 05 44 - Installation of Cables in Trenches and Ducts
 - .13 Section 26 12 16 - Dry Type, Medium and High Voltage Transformers
 - .14 Section 26 13 18 - Primary Switchgear Assembly to 27kV
 - .15 Section 26 29 05 - Protective Relays
- .3 Acronyms:
 - .1 AFD - Alternate Forms of Delivery, service provider.
 - .2 BMM - Building Management Manual.
 - .3 Cx - Commissioning.
 - .4 EMCS - Energy Monitoring and Control Systems.
 - .5 O&M - Operation and Maintenance.
 - .6 PI - Product Information.
 - .7 PV - Performance Verification.
 - .8 TAB - Testing, Adjusting and Balancing.

1.2 REFERENCE

- .1 Public Works and Government Services Canada (PWGSC)
 - .1 CSA Z320.11
 - .2 ANSI/NETA Standard for Maintenance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 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 Cx is to be performed by an independent third party after work is completed and prior to energizing any equipment. The General Contractor is to engage and hire the services of the independent third party Commissioning Authority and commissioning Provider. The independent third party must have performed similar work for a minimum of 5 years. Contractor shall provide documentation attesting to the qualifications and experience of the proposed Testing Agency(ies) performing all commissioning work and preparing commissioning documents. These references shall be reviewed by the Consultant and Departmental Representative confirming the suitability of the Testing Agencies. The Testing Agency may only be engaged after review and approval of these documents by the Consultant and Departmental Representative.
- .3 Retain the services of a qualified Testing Agency to carry out the tests and calibration as required herein. Testing Agency shall be familiar with NETA Standards as specified herein and shall have accreditation equivalent to a full NETA member company:
- .1 This project shall only be undertaken by firms familiar with and having a long and demonstrable successful track record in the field of switchgear and transformer modification and installation, protection and control, and arc flash mitigation. The proponent shall be experienced in working with an industrial type primary voltage distribution system using parallel feeders. Provide documented experience on projects of this type.
 - .2 All protection settings must be reviewed by a Professional Engineer registered in British Columbia who is an employee of Testing Agency. Provide documentation naming this individual along with their credentials.
 - .3 All work must be performed by qualified technicians/electricians with applicable accreditation for the appropriate permitting required. Provide a list of all personnel and their qualifications.
 - .4 Provide three references, including contact information for completed projects similar to this in scope and technical content.
- .4 Furnish Independent Testing agency professional engineer's letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions. The letter is to be submitted stamped by a Professional Engineer, registered in BC, and provided to the Departmental Representative
- .5 Employ only personnel who are qualified and experienced in required field of work. Personnel must be familiar with the equipment and procedures necessary to complete the work as specified herein.

- .6 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.
- .7 Design Criteria: as per client's requirements or determined by designer to meet Project functional and operational requirements.

1.4 COMMISSIONING OVERVIEW

- .1 Cx to be a line item of General Contractor's cost breakdown.
- .2 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .3 Cx is to ensure the built facility 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.
- .4 Complete all start-up and verification of systems prior to review by Commissioning Agent.
 - .1 To bring mechanical, electrical and building architectural systems and components from a state of static completion to a state of dynamic operation.
 - .2 To verify conformance to contract requirements.
 - .3 To confirm installations meet requirements of Contract Documents.
 - .4 To provide all testing documents and records.
 - .5 To ensure completed facility meets contract requirements.
 - .6 To provide a documented operator training program.
 - .7 To verify accuracy of project record drawings and operating and maintenance manuals.
- .5 Departmental Representative will issue Interim Acceptance Certificate of Substantial Completion when:
 - .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.

1.5 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 unfunctional system, including related systems as deemed required by Cx Authority and Departmental Representative, Cx Authority 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 General Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.6 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 Co-ordinate 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 Submit factory testing report of Electrical Equipment to Departmental Representative for review and approval.
 - .11 Ensure "As-Built" system schematics are available.
- .4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.7 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.

1.8 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit no later than 4 weeks after award of Contract:
 - .1 Name of Cx Authority and General Contractor's Cx Provider.
 - .2 Draft Cx documentation.

- .3 Preliminary Cx schedule.
- .2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.
- .3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.
- .4 Provide additional documentation relating to Cx process required by Departmental Representative, specifically;
 - .1 Cx Plan and Schedule
 - .2 Accepted Shop drawings
 - .3 Completed PI forms
 - .4 Approved TAB report
 - .5 Approved PV forms
 - .6 Approved O&M manuals
 - .7 Approved System and Integrated System Test Report
 - .8 Approved Factory testing reports
 - .9 Approved Training and Attendance forms
 - .10 Accepted "As-built" Plans and Specifications
 - .11 Final Cx Report

1.9 COMMISSIONING DOCUMENTATION

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use.
- .2 General Contractor to review and approve Cx documentation submitted by Cx Provider prior to submission to Departmental Representative for review.
- .3 Provide completed and approved Cx documentation to Departmental Representative.

1.10 COMMISSIONING SCHEDULE

- .1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 17 Construction Progress Schedule Bar (GANTT Chart).
- .2 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.

1.11 COMMISSIONING MEETINGS

- .1 Convene Cx meetings following project meetings: Section 01 32 17 Construction Progress Schedule Bar (GANTT Chart) and as specified herein.
- .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. Section 01 32 17 Construction Progress Schedule Bar (GANTT Chart). General Contractor 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 General 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 General Contractor with their Commissioning Provider, who will record and distribute minutes.
- .7 Ensure subcontractors and relevant manufacturer representatives are present at 60% and subsequent Cx meetings and as required.

1.12 STARTING AND TESTING

- .1 General Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.13 WITNESSING OF STARTING AND TESTING

- .1 Provide 14 days' notice prior to commencement.
- .2 Cx Authority and Departmental Representative to witness of start-up and testing.
- .3 Cx Authority and Departmental Representative shall be advised of and shall be in attendance during energization of any and all equipment as part of this project.
- .4 General Contractor's Cx Provider to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.
 - .1 Minimum of 5 years experience in design, installation and operation of equipment and systems.
 - .2 Ability to interpret test results accurately.
 - .3 To report results in clear, concise, logical manner.

1.14 PROCEDURES

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and general testing in following distinct phases:
 - .1 Included in delivery and installation
 - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
 - .2 Visual inspection of quality of installation.

- .2 Prior to startup:
 - .1 Insulation resistance test and continuity test of all new cables and all cables with connections changed during construction
 - .2 All high voltage terminations tested with infrared imaging. Spot temperature readings are not acceptable
 - .3 Refer to the NETA Acceptance Testing specifications for detailed commissioning requirements for the following equipment:
 - .1 Cables, High Voltage.
 - .2 Switches, Air, High Voltage
 - .3 Circuit Breakers, Air, Insulated/Molded Case, High Voltage.
 - .4 Instrument Transformers
 - .5 Digital Protection Relays.
 - .6 Variable Load Banks.
 - .4 Startup: follow accepted start-up procedures.
 - .5 Operational testing: document equipment performance.
 - .6 System PV: include repetition of tests after correcting deficiencies.
 - .7 Post-substantial performance verification: to include fine-tuning.
- .3 Conduct following tests in accordance with Section 01 45 00 - Quality Control.
 - .1 Power distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
 - .5 Systems: fire alarm system communications.
 - .6 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Megger 600-2.4kV circuits, feeder and equipment with a 5000V instrument.
 - .4 Check resistance to ground before energizing.
- .4 Correct deficiencies and obtain approval from Cx Authority and Departmental Representative after distinct phases have been completed and before commencing next phase.
- .5 Document requires tests on approved PV forms.

- .6 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following
 - .1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.
 - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.
 - .3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.
 - .1 Rejected equipment to be removed from site and replace with new.
 - .2 Subject new equipment/systems to specified start-up procedures.

1.15 START-UP DOCUMENTATION

- .1 Assemble start-up documentation and submit to Cx Authority and Departmental Representative for approval before commencement of commissioning.
- .2 Start-up documentation to include:
 - .1 Factory and on-site test certificates for specified equipment.
 - .2 Pre-start-up inspection reports.
 - .3 Signed installation/start-up check lists.
 - .4 Start-up reports,
 - .5 Step-by-step description of complete start-up procedures, to permit Cx Authority and Departmental Representative to repeat start-up at any time.

1.16 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer develop written maintenance program and submit to Cx Authority for review and Departmental Representative for approval before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of Certificate of Substantial Performance.

1.17 TEST RESULTS

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

1.18 START OF COMMISSIONING

- .1 Notify Cx Authority and Departmental Representative at least 4 weeks prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.19 INSTRUMENTS / EQUIPMENT

- .1 Submit to Departmental Representative for review and approval:
 - .1 Complete list of instruments proposed to be used.
 - .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
- .2 Provide the following equipment as required:
 - .1 2-way radios.
 - .2 Ladders.
 - .3 Equipment as required to complete work.

1.20 COMMISSIONING PERFORMANCE VERIFICATION

- .1 Carry out Cx:
 - .1 Under accepted simulated operating conditions, over entire operating range, in all modes.
 - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for performance verification.

1.21 WITNESSING COMMISSIONING

- .1 Cx Authority to witness activities and verify results. Departmental Representative to witness activities and verify results as required.

1.22 AUTHORITIES HAVING JURISDICTION

- .1 Where start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to Departmental Representative within 5 days of test and with Cx report.
- .4 Authorities having jurisdiction in this project include Township of Esquimalt and BC Safety Authority.

1.23 EXTRAPOLATION OF RESULTS

- .1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.24 SUNDRY CHECKS AND ADJUSTMENTS

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

1.25 DEFICIENCIES, FAULTS, DEFECTS

- .1 Correct deficiencies found during start-up and Cx to satisfaction of Cx Authority and Departmental Representative.
- .2 Report problems, faults or defects affecting Cx to Cx Authority and Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

1.26 COMPLETION OF COMMISSIONING

- .1 Upon completion of Cx, leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities, complete Cx prior to issuance of Certificate of Substantial Performance.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

1.27 ACTIVITIES UPON COMPLETION OF COMMISSIONING

- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.28 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.29 OCCUPANCY

- .1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy of facility.

1.30 INSTALLED INSTRUMENTATION

- .1 Use instruments installed under Contract for TAB and PV if:
 - .1 Accuracy complies with these specifications.
 - .2 Calibration certificates have been deposited with Departmental Representative.

1.31 PERFORMANCE VERIFICATION TOLERANCES

- .1 Application tolerances:
 - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.
- .2 Instrument accuracy tolerances:
 - .1 To be of higher order of magnitude than equipment or system being tested.
- .3 Measurement tolerances during verification:
 - .1 Unless otherwise specified actual values to be within +/- 2% of recorded values.

1.32 OWNER'S PERFORMANCE TESTING

- .1 Performance testing of equipment or system by Cx Authority and Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 Section Includes:
 - .1 Description of overall structure of Cx Plan and roles and responsibilities of Cx team.

1.2 REFERENCES

- .1 PWGSC Cx manual CP-1 with CSA Z320-11.
- .2 Public Works and Government Services Canada (PWGSC)
 - .1 PWGSC - Commissioning Guidelines CP.3 -3rd edition-03.
- .3 Underwriters' Laboratories of Canada (ULC)
- .4 ANSI/NETA Standard for Maintenance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 GENERAL

- .1 Provide fully functional facilities:
 - .1 Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
 - .2 Facility user and O&M personnel have been fully trained in aspects of installed systems.
 - .3 Optimized life cycle costs.
 - .4 Complete documentation relating to installed equipment and systems.
- .2 Term "Cx" in this section means "Commissioning".
- .3 Use this Cx Plan as master planning document for Cx:
 - .1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.
 - .2 Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.
 - .3 Sets out deliverables relating to O&M, process and administration of Cx.
 - .4 Describes process of verification of how built works meet design requirements.
 - .5 Produces a complete functional system prior to issuance of Certificate of Substantial Performance.
 - .6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
 - .1 Overview of Cx.
 - .2 General description of elements that make up Cx Plan.
 - .3 Process and methodology for successful Cx.
- .4 Acronyms:
 - .1 Cx - Commissioning.

- .2 BMM - Building Management Manual.
- .3 EMCS - Energy Monitoring and Control Systems.
- .4 MSDS - Material Safety Data Sheets.
- .5 PI - Product Information.
- .6 PV - Performance Verification.
- .7 TAB - Testing, Adjusting and Balancing.
- .8 WHMIS - Workplace Hazardous Materials Information System.
- .5 Commissioning terms used in this Section:
 - .1 Bumping: short term start-up to prove ability to start and prove correct rotation.
 - .2 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

1.4 DEVELOPMENT OF 100% CX PLAN

- .1 Cx Plan to be 100% completed within 12 weeks of award of contract to take into account:
 - .1 Approved shop drawings and product data.
 - .2 Approved changes to contract.
 - .3 Contractor's project schedule.
 - .4 Cx schedule.
 - .5 Contractor's, sub-contractor's, suppliers' requirements.
 - .6 Project construction team's and Cx team's requirements.
- .2 Submit completed Cx Plan to Cx Authority for review and obtain written approval from and Departmental Representative.

1.5 REFINEMENT OF CX PLAN

- .1 During construction phase, revise, refine and update Cx Plan to include:
 - .1 Changes resulting from Client program modifications.
 - .2 Approved design and construction changes.
- .2 Revise, refine and update every 3 months during construction phase. At each revision, indicate revision number and date.
- .3 Submit completed Cx Plan to Cx Authority for review and obtain written approval from and Departmental Representative.
- .4 Include testing parameters at full range of operating conditions and check responses of equipment and systems.

1.6 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM

- .1 General Contractor to maintain overall responsibility for project and is sole point of contact between members of commissioning team.
- .2 General Contractor is to engage and hire the services of an independent third party Commissioning Authority to ensure Cx activities are carried out to ensure delivery of a fully operational project including:
 - .1 Organizing Cx.

- .2 Monitoring operations Cx activities.
- .3 Review of Cx documentation from operational perspective.
- .4 Review for performance, reliability, durability of operation, accessibility, maintainability, operational efficiency under conditions of operation.
- .5 Protection of health, safety and comfort of occupants and O&M personnel.
- .6 Monitoring of Cx activities, training, development of Cx documentation.
- .7 Work closely with members of Cx Team.
- .8 Certifying accuracy of reported results
- .9 Certifying tabs and other results
- .10 Developing BMM.
- .11 Ensuring implementation of final Cx Plan.
- .12 Implementation of Training Plan
- .3 Departmental Representative is responsible for:
 - .1 Witnessing reported results.
 - .2 Witnessing TAB and other tests.
 - .3 Provides basis of design data not included in the Contract Documents.
 - .4 Reviews commissioning checklists and test forms to ensure applicability to the project and provide comments to the Commissioning Agent.
 - .5 Attends commissioning activities as required to certify the site adaptation and related work meet the design intent and the project requirements.
- .4 Construction Team: contractor, sub-contractors, suppliers and support disciplines, is responsible for construction/installation in accordance with contract documents, including:
 - .1 Testing.
 - .2 TAB.
 - .3 Performance of Cx activities.
 - .4 Delivery of training and Cx documentation.
 - .5 Assigning one person as point of contact Departmental Representative for administrative
 - .6 and coordination purposes.
- .5 General Contractor it to engage and hire the services of an independent third party Commissioning Provider to implement specified Cx activities including:
 - .1 Demonstrations.
 - .2 Training.
 - .3 Testing.
 - .4 Preparation, submission of test reports.
 - .5 Performing verification of performance of installed systems and equipment.
- .6 PFC Facility Manager: represents lead role in Operation Phase and onwards and is responsible for:
 - .1 Receiving facility.

- .2 Day-To-Day operation and maintenance of facility.

1.7 EXTENT OF CX

- .1 The General Contractor shall provide commissioning services for the following items .
 - .1 List of Electrical Equipment and Acceptance Tests:
 - .1 Preventable Inspections - Box, Conduit & Cable Installations
 - .2 Underground Services/Manholes
 - .3 Ground system inspection/report
 - .4 Protective Relay System
 - .5 Instrument Transformers
 - .6 25kV Switchgear and Circuit Breakers
 - .7 Dry Type Transformer: Preventable Inspection
 - .8 Meggering and Hi-Pot Report
 - .9 Implementation of Coordination Study Settings
 - .10 Certificates and/or Equipment Test Report
 - .11 Equipment Spare Parts Report
 - .12 Generic Acceptance Report
 - .13 Twelve Step Final Acceptance Report

1.8 DELIVERABLES RELATING TO O&M PERSPECTIVES

- .1 General requirements:
 - .1 Compile English documentation.
 - .2 Documentation to be computer-compatible format ready for inputting for data management.
- .2 Provide deliverables:
 - .1 Warranties.
 - .2 Project record documentation.
 - .3 Inventory of spare parts, special tools and maintenance materials.
 - .4 Maintenance Management System (MMS) identification system used.
 - .5 WHMIS information.
 - .6 MSDS data sheets.
 - .7 Electrical Panel inventory containing detailed inventory of electrical circuitry for each panel board. Duplicate of inventory inside each panel.

1.9 DELIVERABLES RELATING TO THE CX PROCESS

- .1 General:
 - .1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications.

- .2 Definitions:
 - .1 Cx as used in this section includes:
 - .1 Cx of components, equipment, systems, subsystems, and integrated systems.
 - .2 Factory inspections and performance verification tests.
- .3 Deliverables: provide:
 - .1 Cx Specifications.
 - .2 Startup, pre-Cx activities and documentation for systems, and equipment.
 - .3 Completed installation checklists (ICL).
 - .4 Completed product information (PI) report forms.
 - .5 Completed performance verification (PV) report forms.
 - .6 Results of Performance Verification Tests and Inspections.
 - .7 Description of Cx activities and documentation.
 - .8 Description of Cx of integrated systems and documentation.
 - .9 Tests witnessed by Departmental Representative.
 - .10 Training Plans.
 - .11 Cx Reports.
 - .12 Prescribed activities during warranty period.
- .4 Cx Authority to witness and certify tests and reports of results provided to Departmental Representative.

1.10 PRE-CX ACTIVITIES AND RELATED DOCUMENTATION

- .1 Items listed in this Cx Plan include the following:
 - .1 Pre-Start-Up inspections: by Cx Authority prior to permission to start up and rectification of deficiencies to Departmental Representative's satisfaction.
 - .2 Cx Authority to use approved check lists.
 - .3 Cx Authority will monitor some of these pre-start-up inspections.
 - .4 Include completed documentation with Cx report.
 - .5 Conduct pre-start-up tests: conduct pressure, static, flushing, cleaning, and "bumping" during construction as specified in technical sections. To be witnessed and certified by Cx Authority and does not form part of Cx specifications.
 - .6 Cx Authority will monitor some of these inspections and tests.
 - .7 Include completed documentation in Cx report.
- .2 Pre-Cx Activities - ELECTRICAL:
 - .1 Low voltage, medium voltage and high voltage distribution systems require independent testing agency to perform pre-energization and post-energization tests.

1.11 START-UP

- .1 Start up components, equipment and systems.
- .2 Cx Authority to monitor some of these start-up activities.
 - .1 Rectify start-up deficiencies to satisfaction of Cx Authority Departmental Representative.
- .3 Performance Verification (PV):
 - .1 Approved Cx Provider to perform.
 - .1 Repeat when necessary until results are acceptable to Departmental Representative.
 - .2 Use procedures modified generic procedures to suit project requirements.
 - .3 Cx Authority to witness and certify reported results using approved PI and PV forms.
 - .4 Cx Authority to approve completed PV reports and provide to Departmental Representative.
 - .5 Cx Authority and Departmental Representative reserves the right to verify up to 30% of reported results at random.
 - .6 Failure of randomly selected item shall result in rejection of PV report or report of system startup and testing.

1.12 CX ACTIVITIES AND RELATED DOCUMENTATION

- .1 Perform Commissioning by specified Cx Provider using procedures developed by Cx Authority.
- .2 Cx Authority to monitor Cx activities.
- .3 Upon satisfactory completion, Cx Provider performing tests to prepare Cx Report using approved PV forms.
- .4 Cx Authority to witness, certify reported results of, Cx activities and forward to Cx Authority.
- .5 Departmental Representative reserves right to verify a percentage of reported results at no cost to contract.

1.13 MECHANICAL SYSTEMS TESTING, ADJUSTING AND BALANCING

- .1 Testing:
 - .1 Quality Assurance:
 - .1 Test equipment and material where specified or required by authority having jurisdiction to demonstrate its proper and safe operation.
 - .2 Test procedures shall be in accordance with applicable portions of NFPA, NETA, CSA and other recognized test codes as far as field conditions permit.
 - .3 Provide notice to the Cx Authority before tests.
 - .2 Liability: During tests, assume responsibility for damages in the event of injury to personnel, building or equipment and bear costs for liability, repairs and restoration.

1.14 ELECTRICAL TESTING, ADJUSTING AND BALANCING

- .1 Conduct and pay for tests of the following:
 - .1 Distribution system including phasing, voltage, grounding, load balancing, hi-pot testing of the 12.5/25kV system and transformer prior to energizing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
- .2 Furnish manufacturers certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer' s instructions .
- .3 Carry out tests in presence of the Cx Authority and Departmental Representative.
- .4 Give advance notice of proposed time of tests so that the Cx Authority and Departmental Representative can be represented at the tests.
- .5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .6 Submit test results for review by the Cx Authority and Departmental Representative.
- .7 Test all systems in accordance with details in appropriate sections.
- .8 Testing methods and test results: in accordance with CSA, CEC, NETA MTS, and regulations of the supply authority and other authorities having jurisdiction.
- .9 Liability: During tests, assume responsibility for damages in the event of injury to personnel, building or equipment and bear costs for liability, repairs and restoration .
- .10 Remove and replace with new materials all conductors that are found to be shorted or grounded.
- .11 Conduct dielectric tests, hi-pot tests, insulation resistance tests and ground continuity tests as required by the nature of the various systems and equipment.
- .12 With the systems completely connected and lamped, conduct the following tests on the power system:
 - .1 Control and Switching: test all circuits for the correct operation of devices, switches and controls.
 - .2 Polarity Tests: test all circuits for correct operation of devices, switches and controls.
 - .3 Voltage Tests: make a voltage test at the last outlet of each circuit. Maximum drop in potential permitted will be 2% on 120V, and 208V branch circuits. 2% on 208V feeder circuits, and 5% on 600V feeder circuits. Correct any deficiency in this respect.
 - .4 Phase Balance: measure the load on each phase at each switchboard, splitter, distribution panel board and lighting and power panel board. Report results in writing to the Cx Authority and Departmental Representative. Re-arrange phase connections as necessary to balance the load on each phase as instructed by the Cx Authority and Departmental Representative with the re-arrangement being restricted to the exchanging of connections at the distribution points mentioned in this

- paragraph. After marking any such changes, make available to the Cx Authority and Departmental Representative, drawings or marked prints showing the modified connections.
- .5 Supply Voltage: measure the line voltage of each phase at the load terminals of the main breakers and report the results in writing to the Cx Authority and Departmental Representative. Perform this test with the majority of electrical equipment in use.
 - .6 Motor Loading: measure the line current of each phase of each motor with the motor operating under load and report the results in writing to the Cx Authority and Departmental Representative. Upon indications of any imbalance or overload, thoroughly examine electrical connections and rectify any defective parts or wiring. If electrical connections are correct, overloads due to defects in the driven machines shall be reported in writing to the Cx Authority and Departmental Representative. Verify motor full load amps and overload
 - .7 Relays are properly sized and adjusted accordingly.
 - .8 General Operations: energize and put into operation each and every electrical circuit and item. Make repairs, alterations, replacements, tests and adjustments necessary for a complete and satisfactory operating electrical system.
- .13 Carry out tests covering "General Operation" at the time of acceptance of the work.
 - .14 Test all systems and obtain written confirmation from the manufacturer of each system that all components have been installed correctly and that the system is functioning as intended. Present separate certification for all systems including: fire alarm, power distribution, to the Cx Authority and Departmental Representative.
 - .15 Provide labour, instruments, apparatus and pay all expenses required for the tests. The Cx Authority and Departmental Representative reserves the right to demand proof of the accuracy of all instruments used.
 - .16 When tests are performed, the Cx Authority and Departmental Representative may require that equipment be opened and removed from their housings to examine interior of equipment, terminations and connections. Provide all required labour and tools.
 - .17 Co-ordinate the testing of motors with the trades providing the equipment driven by the motors so that they are carried out at the time the driven equipment is put on test. In addition to the motor loading tests, provide labour and instruments to take and record all motor load readings required to supplement the tests on the driven equipment through various load sequences, as required by the trades involved.
 - .18 Insulation Resistance Testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 351-600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Megger 601-25kV circuits, feeder and equipment with 5000 V instrument.

- .4 Check resistance to ground before energizing.

1.15 INSTALLATION CHECK LISTS (ICL)

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.16 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.17 PERFORMANCE VERIFICATION (PV) REPORT

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.18 DELIVERABLES RELATING TO ADMINISTRATION OF CX

- .1 General:
 - .1 Because of risk assessment, complete Cx of occupancy, weather and seasonal-sensitive equipment and systems in these areas before building is occupied.

1.19 CX SCHEDULES

- .1 Prepare detailed Cx Schedule and submit to Departmental Representative for review and approval same time as project Construction Schedule. Include:
 - .1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:
 - .1 Design criteria, design intents.
 - .2 Pre-TAB review: 28 days after contract award, and before construction starts.
 - .3 Cx agents' credentials: 60 days before start of Cx.
 - .4 Cx procedures: 3 months after award of contract.
 - .5 Cx Report format: 3 months after contract award.
 - .6 Discussion of heating/cooling loads for Cx: 3 months before start-up.
 - .7 Submission of list of instrumentation with relevant certificates: 21 days before start of Cx.
 - .8 Notification of intention to start TAB: 21 days before start of TAB.
 - .9 TAB: after successful start-up, correction of deficiencies and verification of normal and safe operation.
 - .10 Notification of intention to start Cx: 14 days before start of Cx.
 - .11 Notification of intention to start Cx of integrated systems: after Cx of related systems is completed 14 days before start of integrated system Cx.
 - .12 Identification of deferred Cx.
 - .13 Implementation of training plans.

- .14 Cx reports: immediately upon successful completion of Cx.
- .2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over to Property Manager.
- .3 Six (6) months in Cx schedule for verification of performance in all seasons and wear conditions.
- .2 After approval, incorporate Cx Schedule into Construction Schedule.
- .3 Consultant, Contractor, Contractor's Cx Provider, Cx Authority, and Departmental Representative will monitor progress of Cx against this schedule.

1.20 CX REPORTS

- .1 Submit reports of tests, witnessed and certified by Cx Authority and Departmental Representative to Departmental Representative who will verify reported results.
- .2 Include completed and certified PV reports in properly formatted Cx Reports.
- .3 Before reports are accepted, reported results to be subject to verification by Cx Authority.

1.21 TESTS TO BE PERFORMED BY OWNER/USER

- .1 None is anticipated on this project.

1.22 TRAINING PLANS

- .1 Refer to Section 01 91 41 - Commissioning (Cx) - Training.

1.23 FINAL SETTINGS

- .1 Upon completion of Cx to satisfaction of Cx Authority and Departmental Representative lock control devices in their final positions, indelibly mark settings marked and include in Cx Reports.

END OF SECTION

Part 1 General**1.1 SUMMARY****.1 Section Includes:**

- .1 Commissioning forms to be completed for equipment, system and integrated system.

1.2 INSTALLATION/START-UP CHECK LISTS**.1 Include the following data:**

- .1 Product manufacturer's installation instructions and recommended checks.
- .2 Special procedures as specified in relevant technical sections.
- .3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Cx Authority and Departmental Representative supplemental additional data lists will be required for specific project conditions.**.3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.****.4 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to Cx Authority and Departmental Representative. Check lists will be required during Commissioning and will be included in Building Maintenance Manual (BMM) at completion of project.****.5 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.****1.3 PRODUCT INFORMATION (PI) REPORT FORMS****.1 Product Information (PI) forms compile gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the BMM at completion of work.****.2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Cx Authority and Departmental Representative's approval.****1.4 PERFORMANCE VERIFICATION (PV) FORMS****.1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.****.2 PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.**

- .3 Prior to PV of integrated system, complete PV forms of related systems and obtain Cx Authority and Departmental Representative approval.

1.5 COMMISSIONING FORMS

- .1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
 - .1 Contractor provides project-specific Commissioning forms with Specification data included.
 - .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
 - .3 Confirm operation as per design criteria and intent.
 - .4 Identify variances between design and operation and reasons for variances.
 - .5 Verify operation in specified normal and emergency modes and under specified load conditions.
 - .6 Record analytical and substantiating data.
 - .7 Verify reported results.
 - .8 Form to bear signatures of recording technician.
 - .9 Submit immediately after tests are performed.
 - .10 Reported results in true measured SI unit values.
 - .11 Provide Cx Authority and Departmental Representative with originals of completed forms.
 - .12 Maintain copy on site during start-up, testing and commissioning period.

1.6 LANGUAGE

- .1 To suit the language profile of the awarded contract.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 Section Includes:
 - .1 This Section specifies roles and responsibilities of Commissioning Training.
- .2 Related Sections:
 - .1 General Commissioning (Cx) Requirements Section 01 91 13
 - .2 Commissioning (Cx) Plan Section 01 91 31

1.2 TRAINEES

- .1 Trainees: personnel selected for operating and maintaining this facility. Includes Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.
- .2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

1.3 INSTRUCTORS

- .1 Engineer will provide:
 - .1 Descriptions of systems.
 - .2 Instruction on design philosophy, design criteria, and design intent.
- .2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:
 - .1 Start-Up, operation, shut-down of equipment, components and systems.
 - .2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.
 - .3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.
- .3 Contractor and equipment manufacturer to provide instruction on:
 - .1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

1.4 TRAINING OBJECTIVES

- .1 Training to be detailed and duration to ensure:
 - .1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
 - .2 Effective on-going inspection, measurements of system performance.
 - .3 Proper preventive maintenance, diagnosis and trouble-shooting.
 - .4 Ability to update documentation.
 - .5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.5 TRAINING MATERIALS

- .1 Instructors to be responsible for content and quality.
- .2 Training materials to include:
 - .1 "As-Built" Contract Documents.
 - .2 Operating Manual.
 - .3 Maintenance Manual.
 - .4 Management Manual.
 - .5 TAB and PV Reports.
- .3 Project Manager, Cx Authority and Facility Manager will review training manuals.
- .4 Training materials to be in a format that permits future training procedures to same degree of
- .5 detail.
- .6 Supplement training materials:
 - .1 Transparencies for overhead projectors.
 - .2 Multimedia presentations.
 - .3 Manufacturer's training videos.
 - .4 Equipment models.

1.6 SCHEDULING

- .1 Include in Commissioning Schedule time for training.
- .2 Deliver training during regular working hours, training sessions to be 8 hours in length.
- .3 Training to be completed prior to acceptance of facility.

1.7 RESPONSIBILITIES

- .1 Be responsible for:
 - .1 Implementation of training activities,
 - .2 Coordination among instructors,
 - .3 Quality of training, training materials.
- .2 Commissioning Authority will evaluate training and materials.
- .3 Upon completion of training, provide written report, signed by Instructors, witnessed by Commissioning Authority.

1.8 ELECTRICAL SYSTEM TRAINING

- .1 Organize and conduct training courses to instruct the Departmental Representative in the operation and preventative maintenance of equipment and systems provided at the completion of the project.
- .2 Provide services of qualified personnel, including each sub-trade, each major equipment supplier and design engineer to and instruct on their equipment or systems.
- .3 One-person day shall be eight hours including one half hour for breaks, and one person week shall be five person days.

- .4 Submit sessions schedule and list of representatives to the Departmental Representative for approval 30 days prior to course starting date. Confirm attendance of course by written notification to all participants, followed by verbal confirmation just prior to course starting date.
- .5 Submit final copies of record drawings and operating and maintenance manuals to Departmental Representative. Submit a written follow-up of all courses, complete with an attendants list to the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 31 19 – Project Meetings.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 35 43 – Environmental Procedures.
- .4 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .5 Section 01 74 11 – Cleaning.

1.2 REFERENCES

- .1 CSA International
 - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .2 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .3 Canadian Environmental Protection Act (CEPA), 1999, C.33.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section:
 - .1 01 33 00 - Submittal Procedures.
 - .2 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .3 01 35 43 - Environmental Procedures.

1.4 SITE CONDITIONS

- .1 Review "Designated Substance Report" and take precautions to protect environment.
- .2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous is encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Proceed only after receipt of written instructions have been received from Departmental Representative.
- .3 Notify Departmental Representative before disrupting building access or services.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 EXAMINATION

- .1 Inspect site with Departmental Representative 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.
- .4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
 - .1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.
 - .2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2 Protection of In-Place Conditions:
 - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.
 - .2 Keep noise, dust, and inconvenience to occupants to minimum. Dust control in laboratories to be reviewed with departmental representative prior to starting work to ensure sensitive specimens are not damaged.
 - .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.

- .3 Demolition/Removal:
 - .1 Remove items as indicated.
 - .2 Removal of Pavements, Curbs and Gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials.
 - .3 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.

3.3

CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .4 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-2012, Canadian Electrical Code, Part 1 (21st Edition), Safety Standard for Electrical Installations.
 - .2 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
 - .1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.
- .3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.2 DEFINITIONS

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.3 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates and labels for control items in English

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit for review single line electrical diagrams under plexiglass and locate as indicated.
 - .1 Electrical distribution system in Main Electrical Room.
- .3 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of BC, Canada.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.
 - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.

- .5 Submit copies of 600 x 600 mm minimum size drawings and product data to authority having jurisdiction.
- .6 If changes are required, notify Departmental Representative of these changes before they are made.
- .4 Quality Control: in accordance with Section 01 45 00 - Quality Control. Provide CSA certified equipment and material.
 - .1 Where CSA certified material is not available, submit such material to authority having jurisdiction for special approval before delivery to site.
 - .2 Submit test results of installed electrical systems and instrumentation.
 - .3 Permits and fees: in accordance with General Conditions of contract.
 - .4 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .5 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.5 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Contractor license or apprentices in accordance per the conditions of Provincial Act respecting manpower vocational training and qualification.
- .3 Site Meetings:
 - .1 In accordance with Section 01 32 17 - Construction Progress Schedule - Bar (GANTT) Charts.
 - .2 Site Meetings: as part of Manufacturer's Field Services described in Part 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
 - .1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.
- .4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.
- .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 SYSTEM STARTUP

- .1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.8 OPERATING INSTRUCTIONS

- .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
- .4 Post instructions where directed.
- .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.9 RECORD DRAWINGS

- .1 In addition to requirements for record drawings noted in Section 01 78 00 - Closeout Submittal, the following shall also be completed as per 01 78 00 - 1.4.3:
 - .1 Complete, detailed single line, three line and wiring diagrams for all new equipment installed as part of this project including: protection relays and controls; transfer switches, load bank controls, electrical panels, generator modifications, lighting controls (both indoor and outdoor).
 - .2 Review and document existing systems providing detailed single line, three line and wiring diagrams for the following: 600V, and 120/208V main distribution protection, metering and connections including documentation of single phase protection scheme; metering arrangements, protection devices, panel and equipment locations.

Part 2 Products**2.1 MATERIALS AND EQUIPMENT**

- .1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Material and equipment to be CSA certified. Where CSA certified material and equipment is are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.
- .3 Factory assemble control panels and component assemblies.

2.2 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of inspection authorities.
- .2 Decal signs, minimum size 175 x 250 mm.

2.3 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.4 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: lamicoid 3 mm thick plastic engraving sheet, black face, white core, lettering accurately aligned and engraved into core.
 - .2 Sizes as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters
- .2 Labels: embossed plastic labels with 6mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets and pull boxes: indicate system and voltage.
- .8 Transformers: indicate capacity, primary and secondary voltages.

2.5 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.

- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.6 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.7 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment light gray to EEMAC 2Y-1.
 - .2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

Part 3 Execution

3.1 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .2 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.4 LOCATION OF OUTLETS

- .1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.
- .2 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.6 FIELD QUALITY CONTROL

- .1 Load Balance:
 - .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
 - .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
 - .3 Provide upon completion of work, load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests in accordance with Section 01 45 00 - Quality Control.
 - .1 Power distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Motors, heaters and associated control equipment including sequenced operation of systems.
 - .5 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Megger 5001-25kV circuits, feeders and equipment with a 5000 V instrument.
 - .4 Check resistance to ground before energizing.
- .3 Carry out tests in presence of Departmental Representative.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .5 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 as described in PART 1 - SUBMITTALS.
 - .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.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.7

CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for grounding equipment and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

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

1.4 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 EQUIPMENT

- .1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.
- .2 Rod electrodes: copper clad steel 19 mm diameter by minimum 3 m long.
- .3 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
- .4 Insulated grounding conductors: green, copper conductors, size as indicated.
- .5 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.
- .6 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.

- .3 Bolted type conductor connectors.
- .4 Thermit welded type conductor connectors.
- .5 Bonding jumpers, straps.
- .6 Pressure wire connectors.

Part 3 Execution

3.1 EXAMINATION

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

3.2 INSTALLATION GENERAL

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process or permanent mechanical connectors or inspectable wrought copper compression connectors to ANSI/IEEE 837.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Soldered joints not permitted.
- .7 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.
- .8 Connect building structural steel and metal siding to ground by welding copper to steel.
- .9 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

3.3 MAINTENANCE HOLES

- .1 Install conveniently located grounding stud, electrode, size as indicated stranded copper conductor in each maintenance hole.
- .2 Install ground rod in each maintenance hole so that top projects through bottom of maintenance hole. Provide with lug to which grounding connection can be made. Confirm ground resistance meets or exceeds Canadian Electrical Code minimum requirements.

3.4 ELECTRODES

- .1 Install rod electrodes and make grounding connections as indicated.
- .2 Bond separate, multiple electrodes together.
- .3 Use size 3/0AWG copper conductors for connections to electrodes.
- .4 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.

3.5 SYSTEM AND CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections to neutral.

3.6 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, duct systems, frames of motors, motor control centres, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting, cable trays.

3.7 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.
- .4 Disconnect ground fault indicator during tests.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 This section specifies U shape support channels either surface mounted. Suspended or set in poured concrete walls or ceilings.

Part 2 Products**2.1 SUPPORT CHANNELS**

- .1 U shape, size 41 x 41mm, 2.5mm thick, surface mounted, suspended, or set in poured concrete walls and ceilings.

Part 3 Execution**3.1 INSTALLATION**

- .1 Secure equipment to surfaces with lead anchors or nylon shields as required.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
 - .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two or more conduits use channels at 1.5m on centre spacing.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Consultant.

- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

Part 1 General**1.1 SCOPE OF WORK**

- .1 This specification contains the requirements for a fixed, resistive AC load bank with variable load steps and automatic controls.

Part 2 PRODUCTS**2.1 RATINGS**

- .1 The total capacity of the load bank shall be 750KW at 600 Volts, 3 Phase. 60 Hertz, with 725 Amps per Phase with Unity Power Factor with 50KW minimum load step resolution.
- .2 The duty cycle shall be continuous and the load bank shall operate in an ambient temperature of -28°C to 49°C.

2.2 CONSTRUCTION

- .1 The load bank shall be constructed of heavy gauge aluminized steel per ASTM A463 or coated mild steel that meets or exceeds physical and chemical performance of polyurethane enamel coatings. Galvanized steel has a low corrosion threshold and shall not be used for exterior load bank construction.
- .2 The main input load bus, load step relays, fuses and blower/control relays shall be located within the load bank enclosure. A thermostatically controlled heater shall be located within the control section to protect control devices from the effects of moisture and condensation.
- .3 The load bank shall be outdoor weatherproof construction. All exterior fasteners shall be stainless steel. The load bank shall include forklift channels in the base for lifting. Mounting provisions shall be included for securely affixing the load bank to a concrete base.
- .4 For maximum protection and reliability in an outdoor environment, airflow shall be horizontal screened air intake and fixed louver shall be provided at the exhaust.
- .5 The exterior of the load bank shall be painted with polyurethane enamel paint at a minimum 2 MILS dry film thickness with a spatter finish.
- .6 Load elements shall be contained in one or more resistor cases or trays. Each can be removed in their entirety as a unit if service becomes necessary.

2.3 RESISTIVE LOAD ELEMENTS

- .1 Load elements shall be helically wound chromium alloy de-rated to operate at approximately 50% of maximum continuous rating of the wire. Elements must be fully supported across the entire length within the air stream by segmented ceramic insulators on a stainless steel rod. Element supports will be designed that should a wire break, it will not short to adjacent conductors or to ground.
- .2 The change in resistance due to temperature shall be minimized by maintaining conservative watt densities. The overall tolerance of the load bank shall be -0% to +5% KW at rated voltage. A -5%, +5% rating allows the load bank to deliver less than rated KW and shall not be used. The load bank must deliver rated KW at rated voltage.
- .3 A minimum of 15 load steps shall be provided.

2.4 COOLING

- .1 The load bank shall be cooled by an integral TEFC motor which is direct coupled to the cooling fan blade. The fan motor must be electrically protected against overload using a motor overload device and short circuit protected using three (3) current limiting fuses with an interrupting rating of 200K A.I.C.
- .2 The fan motor must be rigidly supported by formed steel or structural members which attach to the frame of the load bank.

2.5 PROTECTIVE DEVICES

- .1 A differential pressure switch shall be provided to detect air loss. The switch shall be electrically interlocked with the load application controls to prevent load from being applied if cooling air is not present.
- .2 An overtemperature switch shall be provided to sense the load bank exhaust. The switch shall be electrically interlocked with the load application controls to prevent load from being applied.
- .3 To provide for major fault protection, branch fuses shall be provided on all three phases of switched load steps above 50KW. Branch fuses shall be current limiting type with an interrupting rating of 200K A.I.C.
- .4 The exterior of the load bank shall have appropriate warning/caution statements on access panels.

2.6 CONTROL PANEL

- .1 The control panel shall be a remote mounted panel designed for indoor use. It shall contain a power ON/OFF switch, a power ON indication light, blower START/STOP pushbuttons, Blower ON light, and blower FAILURE light. Load selection shall include a master load ON/OFF switch and individual load step switches (one for each load step).
- .2 In the event of a legitimate utility failure, load bank shall do one of two things (dependant on position of selector switch);
 - .1 Load dump. When utility failure occurs and load bank is in use, all load bank loads are released.
 - .2 Load Regulate. When utility failure occurs, load bank will add load to maintain total generator loading (sum of building loads and load bank loads) to a prescribed power band.

2.7 QUALITY CONTROL

- .1 The load bank shall be fully tested using a test specification written by the supplier. Tests shall include electrical functional testing, verifying conformance to assembly drawings and specifications. Each load step shall be cold resistance checked to verify proper calibration of resistive load steps and proper ohm value. These test results shall be supplied as part of the closeout submittals. Tests using high potential equipment shall be performed to ensure isolation of the load circuits from the control circuits and to determine isolation of the load circuits from the load bank frame. Tests of all safety circuits shall be performed to verify conformance to the specification.
- .2 The Load Bank Shall Be c U.L. Listed.

Part 3 EXECUTION

- .1 The load bank shall be securely mounted to the cast in place concrete slab as noted. Mounting means shall be designed and signed off by the contractor's Seismic Engineer.
- .2 Connect all conduits to control and power sources.
- .3 Mount remote load bank control panel in standby power room. Connect to load bank with control wiring as required by manufacturer for control of fans, all elements, feedback, faults and status indication.
- .4 Supply and connect current transformers to Standby feeder for input to automatic controls. Controls shall be set to regulate total generator output power to be within a prescribed power band and field adjustable in the future by the owner.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 This section specifies rigid and flexible conduits, fasteners, fittings and installation.

1.2 REFERENCES

- .1 Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware: to CSA C22.2 No. 18.
- .2 Rigid metal conduit (RMC): to CSA C22.2 No. 45.
- .3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83.
- .4 Flexible metal conduit (FMC): to CSA C22.2 No. 56.

1.3 BASIC WIRING METHODS

- .1 Underground or in concrete exterior to building:
 - .1 All wiring shall be in Schedule 40 RPVC conduit.
- .2 Partition walls and ceilings:
 - .1 All wiring to be run in EMT conduit for:
 - .1 Branch circuits.
 - .2 Low voltage systems.
 - .3 Distribution feeders and sub-feeders.
 - .4 Surface wiring in electrical and mechanical rooms.
- .3 Motors, transformers and all vibrating equipment:
 - .1 Short (600mm to 1200mm) PVC jacketed flexible conduit with liquid tight connectors shall be used. Allow sufficient slack to avoid strain on connectors at extreme extension of equipment movement.
- .4 Surface raceways - interior:
 - .1 All surface raceways shall be EMT, except if located without protection in areas susceptible to damage, which shall be rigid steel conduit.
- .5 Primary Voltage - Surface Mounted:
 - .1 All conduit containing primary voltage wiring shall be galvanized rigid steel with threaded couplings and connections.

1.4 LOCATION

- .1 Electrical drawings are diagrammatic and do not show all conduits, wire, cable, etc. Electrical contractor to provide conduit, wire cable, etc., for a complete operating job to meet in all respects the intent of the drawings and specifications.
- .2 Outlet positions shown on architectural drawings (plans and elevations) to take precedence over locations and mounting heights indicated on electrical plans or in specifications.
- .3 Locate electrical devices on walls with regard given for convenience of operation and conservation of wall space. Switches, receptacles, fire alarm pull stations, etc. generally to be vertically lined up where items are in the same general location. Adjacent common devices to be installed in common outlet box.

- .4 Review the exact location criteria of each electrical outlet and device with the Architect and Consultant prior to rough-in. Relocate any item installed without architectural confirmation as required by the architect or Consultant at no cost to the owner as long as the relocation is within 3m of the location originally shown on the electrical drawings.
- .5 Locate light switches on latch side of doors. Locate disconnect devices in mechanical rooms on latch side of door.
- .6 All outlets located on exterior walls to be complete with moulded plastic vapour barriers to maintain integrity of wall vapour barrier system.
- .7 All raceways and wiring shall be installed concealed in building fabric, except for mechanical and electrical rooms where they shall be installed on the surface.
- .8 All outlet boxes, junction boxes, and cabinets to hold electrical devices shall be mounted so the equipment can be flush mounted unless indicated otherwise.
- .9 All junction boxes and other raceway access devices shall be mounted to avoid being visible from public areas. Obtain approval from Architect or Consultant for any and all junction boxes that, due to the building design, cannot be concealed.
- .10 All junction boxes mounted, out of necessity, on surface of solid walls shall be painted to match adjacent surface, with junction boxes painted to match designated systems.

Part 2 Products

2.1 EMT RACEWAY

- .1 Electrical Metallic Tubing (EMT) shall be galvanized steel of sufficient quality and thickness to allow smooth field formed bends.
- .2 EMT couplings, connectors and fittings shall be steel. Cast type units shall not be used on this installation.

2.2 RIGID METAL CONDUIT

- .1 Rigid metal conduit to be hot dip galvanized steel, fully taper threaded ends, couplings and connections.
- .2 Schedule 40 steel.
- .3 Size as noted in drawings.
- .4 All 90 degree bends to be factory fabricated.

2.3 OUTLET BOXES AND JUNCTION BOXES

- .1 Except as noted for rigid PVC raceways, all outlet boxes and junction boxes shall be one piece formed or welded.
- .2 Outlet boxes to be galvanized steel.
- .3 Junction boxes to be galvanized steel or aluminum.

2.4 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1500mm oc.
- .4 Threaded rods, 6 mm dia., to support suspended channels.

2.5 CONDUIT FITTINGS

- .1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- .2 Factory "ells" where 90° bends are required for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT. Set-screws are not acceptable.

2.6 FISH CORD

- .1 Polypropylene.

Part 3 Execution**3.1 INSTALLATION**

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.
- .3 Use electrical metallic tubing (EMT) except in cast concrete and above 2.4 m not subject to mechanical injury.
- .4 Use flexible metal conduit for connection to motors in dry areas, connection to recessed incandescent fixtures without a prewired outlet box, connection to surface or recessed fluorescent fixtures and work in movable metal partitions.
- .5 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.
- .6 Minimum conduit size for lighting and power circuits: 19mm.
- .7 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .8 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .9 Install fish cord in empty conduits.
- .10 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .11 Dry conduits out before installing wire.
- .12 Conduits shall be installed mechanically continuous from outlet to outlet and without pockets. All the necessary standard bushings, elbows and bends shall be provided. All conduit bends shall have a radius of not less than six (6) times the internal diameter of the conduit and in no case shall the equivalent of more than four quarter bends from outlet to outlet be made. For all conduit sizes to be used for low voltage raceway, the conduits shall have a minimum bending radius of 230mm.
- .13 Conduit bends shall be made with no more than 10% flattening of the conduit. Bends shall be smooth throughout deformations.
- .14 On surface wall runs, all conduit shall be installed in true vertical or horizontal direction and on ceilings in true 90 degree angles or parallel to the walls. Crossings of conduits shall also be made at 90 degree angles. Parallel running conduit shall be kept on equal spacing on the entire length of run including bends.
- .15 All conduits shall be fastened to structure with steel straps (no cast type straps allowed).

- .16 Where more than three conduits are run parallel in ceiling cavity, they shall be installed on cantruss type channel, complete with all Manufacturer's fittings to secure channel to structure and to conduit.
- .17 Raceways extending out concrete slabs shall be securely protected using rebar stubs or similar material. All duct stubs are to be kept sealed during construction

3.2 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended or surface channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.3 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

3.4 CONDUITS UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 This section specifies the installation of direct buried cables and cables in ducts including protection, markers and testing.

1.2 REFERENCES

- .1 Canadian Standards Association, (CSA International)
- .2 Insulated Cable Engineers Association, Inc. (ICEA)

Part 2 Products

- .1 Plastic burial marker tape. 150mm wide, yellow in color indicating "Electrical Line Buried Below – High Voltage".

Part 3 Execution**3.1 CABLE INSTALLATION IN DUCTS**

- .1 Install cables as indicated in ducts.
 - .1 Do not pull spliced cables inside ducts.
- .2 Install multiple cables in duct simultaneously.
- .3 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .4 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.
- .5 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .6 After installation of cables, seal duct ends with duct sealing compound.

3.2 MARKERS

- .1 Install continuous plastic marker tape with metallic strip along entire length of underground conduit run. Marker tape shall be 300mm below grade.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Perform tests using qualified personnel. Provide necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests.
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.
 - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.

- .6 Acceptance Tests
 - .1 Ensure that terminations and accessory equipment are disconnected.
 - .1 Megger test all cables to ensure integrity of the insulation system.
- .7 Provide Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test.
- .8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 This section specifies materials and installation for control systems and devices for lighting equipment.

1.2 SCOPE OF WORK

- .1 Provide a lighting control system as shown on the drawings and as specified herein, complete with all hardware required for a complete and fully operating system.

1.3 SYSTEM DESCRIPTION

- .1 Lighting control system to provide control and switching of lighting loads by use of:
 - .1 Dimming switches
 - .2 Occupancy sensor lighting control
 - .3 Photosensitive daylighting control
 - .4 Exterior lighting combination time clock and photoelectric control
 - .5 Manual switch control.

1.4 PRODUCT DATA

- .1 Submittal package: Submit shop drawings and product data as specified below in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide manufacturers catalogue sheets, specifications and installation instructions for all system components.

1.5 MANUFACTURERS

- .1 Shall have a minimum of 10 years experience in the manufacture of low voltage lighting control systems and sensors.

Part 2 Products**2.1 COMPONENTS**

- .1 All system components shall be of the same manufacturer.
- .2 Designed for lighting control up to and including 600V 20 amp as required.

2.2 DIMMING SWITCHES

- .1 Line voltage dimmers suitable for LED drivers
 - .1 Full range dimmer designed to produce 0 to 100% brightness control by means of single slider.
 - .2 Advanced solid-state circuitry with silicon symmetrical switch.
 - .3 LED push button switch separate from slide to turn dimmer on/off.
 - .4 Rated: 1000 watts at 120V.



- .5 Multi-location capability.
- .6 Radio/TV interference filter.
- .7 Fully compatible with dimmed fixtures or equipment supplied in this project.

2.3 OCCUPANCY SENSOR LIGHTING CONTROLS

- .1 Wall mounted wall switch
 - .1 PIR occupancy sensor.
 - .2 Adjustable delayed-off time setting 30 seconds to 30 minutes.
 - .3 Adjustable for vacancy, occupancy or both functions with adjustable time delays.
 - .4 Manual on/off over ride pushbutton.
 - .5 180° field of view.
 - .6 120V or 347V supply as required.

2.4 PHOTSENSITIVE DAYLIGHTING CONTROL

- .1 Dimming Light Level Sensor
 - .1 Indoor ceiling mounted photosensor.
 - .2 Low voltage (0-10VDC) control signal to reduce light output in proportion to the amount of daylight sensed.
 - .3 0-10V automatic dimming with interface power supply for line voltage dimming.
 - .4 Adjustable set point settings.
 - .5 Closed loop operation.
- .2 Light Level Switch
 - .1 Indoor ceiling or wall mounted photo conductive cell.
 - .2 Switches lights off when sufficient daylight is sensed.
 - .3 With range suitable for sensing area.

2.5 EXTERIOR LIGHTING ELECTRONIC TIMECLOCK/PHOTOCELL CONTROL L.V. RELAYS

- .1 Microprocessor controlled low voltage lighting control panel with adjustments and indications built into face of controller.
- .2 Two output groups, each with three outputs (max two 20A relays per output) and two on/off momentary outputs.
- .3 Master override buttons built into the control panel.
- .4 Memory backup (7 days).
- .5 Astronomical Clock.
- .6 Complete with NEMA 1 enclosure with lockable door and transformer.
- .7 Remote photo sensor complete with weatherproof mounting package.

Part 3 Execution

3.1 INSTALLATION

- .1 Install system panels and components at locations shown on the drawings and in strict accordance with manufacturer's instructions.

3.2 Daylight Sensors

- .1 Locate daylight sensors at locations indicated on the drawings and per manufacturer's recommendations for closed loop and open loop applications. Ensure there is no artificial light shining directly into the sensor head.
- .2 Adhere to manufacturer's recommendations for wiring and programming.

3.3 Occupancy Sensors

- .1 Locate sensors in rooms indicated on the drawings . Locate sensors so there are no objects blocking the infra red sensor from viewing all of the coverage area. Keep away from HVAC vents and direct light from light fixtures.
- .2 Adhere to manufacturer's recommendations for location, wiring and programming.
- .3 Sensors shall be setup as vacancy with manual turn on for all rooms except as follows:
 - .1 Storage Rooms/closets – occupancy on; vacancy off.
 - .2 Washrooms - occupancy on; vacancy off.

3.4 Line Voltage Wiring

- .1 Use wire gauges from #10AWG to #12AWG as appropriately sized for the circuit.

3.5 FIELD QUALITY CONTROL

- .1 On completion of installation, manufacturer representative shall be notified to carry out site inspection and report any inconsistencies in the installation or system operation to the Consultant. Corrections are to be implemented to comply with required installation and operational parameters defined in the drawings and specifications.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 This section specifies photoelectric lighting control equipment for exterior use only.

1.2 PRODUCE DATA

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

Part 2 Products**2.1 PHOTOELECTRIC LIGHTING CONTROL**

- .1 Wall or luminaire mounting.
- .2 Capable of switching 1800 W of lighting at 120 or 347 V as noted.
- .3 Voltage variation: plus or minus 10%.
- .4 Temperature range: minus 40°C to plus 40°C.
- .5 Switching on lights at 70 lux.
- .6 Switching off lights at 105 lux.
- .7 Rated for a minimum of 5000 operations.
- .8 Options:
 - .1 Lightning arrester.
 - .2 Fail-safe circuit completed when relay de-energized.
 - .3 Twist-lock type receptacle.
 - .4 Terminal strip.
 - .5 Sensitivity adjustment.
- .9 Switching time delay of 0 to 30 s.
- .10 Wall mounting bracket.
- .11 Colour coded leads: size 10 AWG, 500mm long.

2.2 CONTACTOR

- .1 Cabinet mounting.
- .2 Capable of switching multiple lamp circuits with total lighting load of 6000 W.
- .3 Waterproof enclosure.
- .4 Manual override.

Part 3 Execution**3.1 INSTALLATION**

- .1 Install photoelectric controls in accordance with manufacturer's instructions.
- .2 Install on the building exterior as indicated on plans.
- .3 Install contactors and manual override switch in a wall cabinet inside the main electrical room.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 This Section specifies standard and custom panelboards and their installation.

1.2 SCOPE OF WORK

- .1 Provide and install retrofit panelboards as indicated on the drawings, single line diagram, panel schedules and these specifications.
- .2 Types of panelboards in this section include the following:
 - .1 CDP type Power distribution panelboards.
 - .2 Lighting and power panelboards

1.3 PRODUCT INFORMATION

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and cover dimensions.
- .3 Shop drawings to include custom cover to match new breaker assembly and existing enclosure.

1.4 PLANT ASSEMBLY

- .1 Install circuit breakers in panelboards before shipment from plant.
- .2 In addition to CSA requirements, manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- .3 All panelboards to be of a common manufacturer.
- .4 Panel retrofits shall come complete with CSA (or equivalent accepted mark) to be applied on retrofitted assembly.

1.5 FINISH

- .1 Apply finishes in accordance with Section 26 05 00 – Common Work Results - Electrical.
- .2 Panel finish in electrical and equipment rooms and closets to be standard ASA Grey baked enamel. Confirm with Consultant prior to shop finishing panels.
- .3 Panels in finished and/or public areas to be either as clause .2 above or prepared to accept painting to closely match surroundings as directed by the Architect. In the later instance, the final paint coat to be done by Division 09 but coordinated by the Electrical Division, in particular for protection and masking of locks and sensitive parts. Confirm with Consultant prior to paint finishing panels.

Part 2 Products**2.1 PANELBOARDS, DOORS AND TRIMS**

- .1 Panelboards: to CSA C22.2 No. 29 and product of one manufacturer.
- .2 Bus and breakers **unless otherwise indicated on the drawings** and in the specifications, shall be rated for:
 - .1 Minimum 10 kA at 208Y/120V.

- .2 Minimum 22 kA at 600Y/347V.
- .3 Tin plated copper bus with full size neutral.
- .4 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number.
- .5 Mains capacity, number of circuits and number and size of branch circuit breakers as indicated.
- .6 Provide all necessary connectors and mounting hardware in every space to facilitate installation of future breakers. Provide blank fillers for all spaces.
- .7 Concealed hinges and concealed trim mounting screws, hinged locking door with flush catch.
- .8 Panelboards to have flush, locking doors. (Gasketed where required for damp locations).
- .9 Provide two keys for each panelboard and key similar voltage and system panelboards alike.
- .10 Panel tubs to be typically 450 to 600mm wide but suiting existing panels.
- .11 Provide "sprinkler-proof" design in areas where sprinkler fire protection is installed. In any event, all surface mounted enclosures to be complete with sprinkler drip cover.
- .12 Provide door within door trims where indicated to facilitate ease of service maintenance Each tub trim cover to be hinged and self supporting and to swing out to expose breaker cable terminations and wireways. Hinged trim shall be secured with cover screws on opening side by concealed machine screws. Hinged breaker cover shall be recessed into the hinged overall tub cover. Breaker cover shall have latch type closures. Submit details on shop drawings prior to manufacturing.
- .13 CDP type panels or panels with 100 amp or larger breakers shall be complete with integral locking devices on each circuit breaker.

2.2

BREAKERS

- .1 All breakers to be:
 - .1 For Lighting Panelboards: Bolt on type molded case, non-adjustable and non-interchangeable trip, single, two and three pole, 120/208V or 347/600V and with trip free position separate from "On" or "Off" positions.
 - .2 For Power Distribution Panelboards: Bolt on type molded case, adjustable and interchangeable trip, single, two and three pole, 120/208V or 347/600V and with trip free position separate from "On" or "Off" positions.
- .2 Two and three pole breakers to have common simultaneous trip and able to be located in any circuit position within the panelboard.
- .3 Main breaker (where required) to be separately mounted at top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.
- .4 Provide circuit breakers with indicated trip ratings as shown in the panelboard schedules or the Single Line Diagram.
- .5 Provide spare circuit breakers as indicated on panel schedules or single line diagram as applicable.
- .6 Provide breaker type Ground Fault Interrupter(s) (GFI) as indicated.

- .7 Provide Lock-on devices as indicated and for Fire Alarm circuits, Security Equipment circuits, Exit sign circuits and Emergency Battery Equipment circuits.

2.3 PANELBOARD IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results - Electrical.
- .2 Nameplate for each panelboard size 5 (2 line) engraved as indicated and include panel designation and voltage/phase.
- .3 Complete updated circuit directory with typewritten card(s) located in slide-in plastic pocket(s) fixed to the back of the related door. Existing loads on existing panel board schedules shall be transcribed and replicated on new panel schedules. Directory card to indicate the panel designation, mains size, voltage/phase and the location and load controlled of each circuit. Include a “letter sized” paper copy of each directory in the project maintenance manual.
- .4 Provide a plasticized typewritten information card fixed to the back of the each panel door. Information card to indicate the panel designation and location, feeder type and size and locations of any controlling contactors and feeder pullboxes. Include a “letter sized” paper copy of each information card in the project maintenance manual.

Part 3 Execution

3.1 INSTALLATION

- .1 Replace panelboard interiors as indicated and mount securely, plumb true and square, to existing enclosure.
- .2 Replace feeder conductors as noted in drawings.
- .3 Connect existing loads to circuits as indicated. Do not splice conductors in panelboard. Ensure breaker and neutral bus locations suit existing panel and conductor arrangements.
- .4 Connect neutral conductors to common neutral bus with respective neutral identified.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

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

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2No.248.12-[94] , Low Voltage Fuses Part 12: Class R (Bi-National Standard with, UL 248-12 (1st Edition).

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit fuse performance data characteristics for each fuse type and size above 50A. Performance data to include: average melting time-current characteristics.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with the Waste Reduction Workplan.
 - .1 Place materials defined as hazardous or toxic waste in designated containers.
 - .2 Ensure emptied containers are sealed and stored safely for disposal away from children.
 - .3 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

1.5 DELIVERY AND STORAGE

- .1 Ship fuses in original containers.
- .2 Do not ship fuses installed in switchboard.
- .3 Store fuses in original containers in [storage cabinet] [moisture free location].

1.6 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

Part 2 Products**2.1 FUSES GENERAL**

- .1 Fuses: product of one manufacturer for entire project.

2.2 FUSE TYPES

- .1 Class J fuses (formerly HRCI- J).
 - .1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.
 - .2 Type J2, fast acting.

Part 3 Execution

3.1 INSTALLATION

- .1 Install fuses in mounting devices immediately before energizing circuit.
- .2 Ensure correct fuses fitted to physically matched mounting devices.
- .3 Ensure correct fuses fitted to assigned electrical circuit.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES**

- .1 This section specifies equipment and components for ground fault circuit interrupters (GFCIs).

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-C22.2 No.144- latest edition, Ground Fault Circuit Interrupters.
- .2 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA PG 2.2-latest edition, Application Guide for Ground Fault Protection Devices for Equipment.

1.3 PRODUCT DATA

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data and shop drawings.
- .3 Submit test report for field testing of ground fault equipment to Consultant and a certificate that system as installed meets criteria specified herein.

Part 2 Products**2.1 MATERIALS**

- .1 Components comprising ground fault protective system to be of same manufacturer.

2.2 BREAKER TYPE GROUND FAULT INTERRUPTER

- .1 Single pole ground fault circuit interrupter for indicated voltage c/w test and reset facilities.

Part 3 Execution**3.1 INSTALLATION**

- .1 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results – Electrical.
- .2 Arrange for field testing of ground fault equipment by ground fault equipment manufacturer before commissioning service.
- .3 Demonstrate simulated ground fault tests.

END OF SECTION

Part 1 General**1.1 SECTION INCLUDES****1.2 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International).
 - .1 CSA-C22.2 No. 5-[02], Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include time-current characteristic curves for breakers with ampacity of 100A and over.

Part 2 Products**2.1 BREAKERS GENERAL**

- .1 Moulded-case circuit breakers, to CSA C22.2 No. 5
- .2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
 - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers with interchangeable trips as indicated.
- .6 Circuit breakers to have minimum 10kA symmetrical rms interrupting capacity rating.

2.2 THERMAL MAGNETIC BREAKERS

- .1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 SOLID STATE TRIP BREAKERS

- .1 Moulded case circuit breaker to operate by means of solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, and long time, short time, instantaneous tripping for phase, ground fault short circuit protection.

2.4 OPTIONAL FEATURES

- .1 Include:

- .1 Shunt trip.
- .2 Auxiliary switch.
- .3 On-off locking device.
- .4 Handle mechanism.

Part 3 Execution

3.1 INSTALLATION

- .1 Install circuit breakers in new, existing or retrofit distribution assemblies as noted in drawings.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 This section specifies materials and installation for automatic load transfer equipment which can monitor voltage on all phases of normal power supply, initiate cranking of standby generator unit, transfer loads and shut down standby unit when normal power is re-established.
- .2 The Contractor shall furnish and install the low voltage automatic transfer switch having the ratings, features/accessories and enclosures as specified herein and as shown on the contract drawings.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C282 – Emergency Electrical power Supply for Buildings
 - .2 CSA C22.2 No.178- latest edition, Automatic Transfer Switches.
 - .3 CSA C22.2 No. 5.1 Moulded Case Circuit Breakers

1.3 SCOPE OF WORK

- .1 Provide and install a breaker type, open transition automatic transfer switches with bypass isolation, and having the ratings, features/accessories and enclosures as shown on the drawings and as specified herein:
 - .1 Bus rating: 1000 A 600V 3-phase 4-wire c/w full maintenance bypass.

1.4 SYSTEM DESCRIPTION

- .1 Automatic load transfer equipment to:
 - .1 Monitor voltage on phases of normal power supply.
 - .2 Initiate cranking of standby generator unit on normal power failure or abnormal voltage on any one phase below preset adjustable limits for adjustable period of time.
 - .3 Transfer load from normal supply to standby unit when standby unit reaches rated frequency and voltage pre-set adjustable limits.
 - .4 Transfer load from standby unit to normal power supply when normal power restored, confirmed by sensing of voltage on phases above adjustable pre-set limit for adjustable time period.
 - .5 Shut down standby unit after running unloaded to cool down using adjustable time delay relay.
 - .6 Accept a remote load dump signal to place the transfer switch in a neutral position such that it cannot supply generator power to the loads. Switch shall return to providing power to the load upon release of this signal.
 - .7 Transfer system shall be complete with mechanically interlocked circuit breaker switching devices configured such that a complete bypass on to generator or utility power can be provided, effectively isolating the transfer switch mechanism and connecting the load directly to the generator or utility. This will generally be provided using a five breaker switching scheme.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Include:
 - .1 Make, model and type.
 - .2 Load classification.
 - .3 Single line diagram showing controls and relays.
 - .4 Description of equipment operation including:
 - .1 Automatic starting and transfer to standby unit and back to normal power.
 - .2 Test control.
 - .3 Manual control.
 - .4 Automatic shutdown.
 - .5 Bypass and isolation scheme.
- 1.6 CLOSEOUT SUBMITTALS**
- .1 Provide operation and maintenance data for automatic load transfer equipment for incorporation into manual.
 - .2 Detailed instructions to permit effective operation, maintenance and repair.
 - .3 Technical data:
 - .1 Schematic diagram of components, controls and relays.
 - .2 Illustrated parts lists with parts catalogue numbers.
 - .3 Certified copy of factory test results.
- Part 2 Products**
- 2.1 MATERIALS**
- .1 Instrument transformers: to CAN3-C13.
 - .2 Contactors: to ANSI/NEMA ICS2.
- 2.2 CIRCUIT BREAKER TYPE TRANSFER EQUIPMENT**
- .1 Circuit Breaker Type Transfer Equipment: to CSA C22.2No.5.
 - .2 Rated: 600 V, 60Hz, 1000 A, 4 wire, solid neutral.
 - .1 Fault withstand rating: 42 kA symmetrical for 3 cycles with maximum peak value of 50 kA.
 - .2 One normal-three phase molded-case circuit breaker with non automatic, mounted on common base, designed for double throw action, motor operated, mechanically held and interlocked, wall/floor mounted CSA enclosure.
 - .3 One emergency-three phase molded-case circuit breaker with non automatic, mounted on common base, designed for double throw action, motor operated, mechanically held and interlocked, wall/floor mounted CSA enclosure.

- .4 Five bypass/isolation molded-case circuit breakers with non automatic, mounted on common base, designed for double throw action, manually actuated, mechanically held and interlocked, wall/floor mounted CSA enclosure.
- .5 Circuit breakers:
 - .1 Interrupting rating: 50 A symmetrical.
- .6 Dead front construction with access to relays and controls for inspection and maintenance, and manual operating lever for transfer switch.
- .7 Main contacts - silver plated, protected by arc disruption means.
- .8 Auxiliary contact: silver plated to initiate emergency generator start-up on failure of normal power.
- .9 Solid neutral bar, fully rated.
- .10 Overlapping neutral contacts on contractor type transfer equipment.
- .11 Switchable neutral pole on circuit breaker type equipment.

2.3

CONTROLS

- .1 Selector switch - four position "Test", "Auto", "Manual", "Engine start".
 - .1 Test position - Normal power failure simulated. Engine starts and transfer takes place. Return switch to "Auto" to stop engine.
 - .2 Auto position - Normal operation of transfer switch on failure of normal power; retransfers on return of normal voltage and shuts down engine.
 - .3 Manual position - Transfer switch may be operated by manual handle but transfer switch will not operate automatically and engine will not start.
 - .4 Engine start position - Engine starts but unit will not transfer unless normal power supply fails. Switch must be returned to "Auto" to stop engine.
- .2 Control transformers: dry type with 120V secondary to isolate control circuits from:
 - .1 Normal power supply.
 - .2 Emergency power supply.
- .3 Relays: continuous duty, industrial control type, with wiping action contacts rated 10 A minimum:
 - .1 Voltage sensing: 3 phase for normal power and on one phase only for emergency, solid state type, adjustable drop out and pick up, close differential, 2V minimum undervoltage protection.
 - .2 Time delay: normal power to standby, adjustable solid state, 0 to 60s.
 - .3 Time delay on engine starting to override momentary power outages or dips, adjustable solid state, 0 to 60s delay.
 - .4 Time delay on retransfer from standby to normal power, adjustable 0 to 60s.
 - .5 Time delay for engine cool-off to permit standby set to run unloaded after retransfer to normal power, adjustable solid state, 20s intervals to 10 min.
 - .6 Time delay during transfer to stop transfer action in neutral position to prevent fast transfer, adjustable, 5s intervals to 180s.
 - .7 Frequency sensing, to prevent transfer from normal power supply until frequency of standby unit reaches preset adjustable values.
- .4 Solid state electronic in-phase monitor.

2.4 ACCESSORIES

- .1 Pilot lights to indicate power availability normal and standby, switch position, green for normal, red for standby, mounted in panel.
- .2 Plant exerciser: 168h timer to start standby unit once each week for selected interval but does not transfer load from normal supply. Timer adjustable 0-168h in 15 min intervals.
- .3 Auxiliary relay to provide 2 N.O. and 2 N.C. contacts for remote alarms.
- .4 Instruments:
 - .1 Digital true rms, indicating type 2 accuracy, flush panel mounting:
 - .1 Voltmeter: ac, scale 0 to 750V.
 - .2 Ammeter: ac, scale 0 to 1000A.
 - .3 Frequency meter: scale 55 to 65 Hz.
- .5 Digital Voltmeter indicated line to line and phase to line voltages.
- .6 Potential transformers - dry type for indoor use:
 - .1 Ratio: 600 to 120.
 - .2 Rating: 600V, 60Hz.
 - .3 Accuracy rating: 5%.
- .7 Digital Ammeter current displays for all phases.
- .8 Current transformers - dry type for indoor use:
 - .1 Ratio: 1000 to 5.
 - .2 Rating: 600 V, 60Hz.
 - .3 Accuracy rating: 5%.
 - .4 Positive action automatic short- circuiting device in secondary terminals.
- .9 Manual bypass: five breaker bypass scheme with mechanical interlocks.

2.5 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Control panel:
 - .1 For selector switch and manual switch: size4 nameplates.
 - .2 For meters, indicating lights, minor controls: size2 nameplates.

2.6 OPERATIONS

- .1 The automatic transfer switches are to be continuous rated as per drawings for – 3 phase – 4 wire - 600V operation, and are to be compatible with existing emergency generator.
- .2 The automatic transfer switches shall include standard components and provide control to:
 - .1 Select through a switch “with load” or “without load” to test as follows:
 - .1 “Without load” the generator set runs unloaded.
 - .2 “With load” the automatic transfer switch transfers load to the generator set as if normal source interruption occurred.
 - .2 Monitor each ungrounded line with a calibrated dial adjustable voltage solid state sensors and sense a decrease of voltage below a set point or

- loss of voltage on any phase of the normal power supply. Voltage sensors shall be temperature compensated.
- .3 Signal the engine generator set to start in the event of power interruption. A solid state time delay shall delay this signal three seconds to avoid nuisance start-ups on momentary voltage dips or power outages. The maximum 15 second reaction time permitted under CSA standard C282 shall include the three second start delay.
 - .4 Retransfer the load to the line after normal power restoration. A time delay shall delay this retransfer to avoid short term normal power restoration (variable one to five minutes, set at one minute).
 - .5 Provide an automatic retransfer of the load from generating set to normal source if the generating set output interrupts after normal source restores voltage.
 - .6 Signal the engine generator to stop after load retransfer to normal source. A solid state time delay on stop shall permit the engine to run unloaded to cool down before shutdown.
 - .7 Provide a device to electrically disconnect the control sections from the transfer switch for maintenance service during normal operation.
- .3 Selected automatic transfer switch shall be included in a factory assembly with bypass-isolation switch equipment. The bypass-isolation switch shall provide a safe means for manually bypassing the transfer switch from either source (Normal or Emergency) to the load, while under load if necessary, and to isolate the transfer switch from both sources for maintenance or repair. Designs that bypass to only one source are not acceptable under this specification.
- .1 Ratings:
 - .1 Bypass-isolation switch equipment shall be ULC Listed and CSA approved, manually operated with continuous current rating, voltage and frequency ratings, and withstand and closing ratings equal to the transfer switch ratings at the specified conditions of ambient temperature, humidity and altitude.
 - .2 Construction:
 - .1 The bypass-isolation and transfer switch shall be mechanically held in each position. Switching mechanisms shall be break before make on all poles. The switch mechanism shall be an over centre toggle device which provides stored energy contact operation during both opening and closing. The speed of contact operation shall be independent of the force applied to the operating handles, which permits manual operation under load.
 - .3 Bypass Switch(s):
 - .1 Equipment shall provide manual bypass without load break to the source connected to the load by the transfer switch. Equipment requiring load break before bypass is not acceptable under this specification.

- .4 Interlocks:
 - .1 Positive mechanical interlocks shall prevent all possible source to source interconnections. Designs which depend on electrical interlocks to prevent source to source interconnections, or which intentionally interconnect the sources, are not acceptable.
 - .2 The interlock system shall assure a properly sequenced, mechanically guided bypass and isolation action.
 - .3 The equipment shall utilize automatic mechanical stops.
- .4 Contractor is to install automatic transfer switch, and make all necessary connections to facilitate a complete operational system, in conjunction with existing emergency generator installation. Contractor is to provide Departmental Representative with written Verification Report complete with test results.

2.7 SOURCE QUALITY CONTROL

- .1 Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested in presence of Departmental Representative.
- .2 Notify Departmental Representative 10 days in advance of date of factory test.
- .3 Tests:
 - .1 Operate equipment both mechanically and electrically to ensure proper performance.
 - .2 Check selector switch, in modes of operation Test, Auto, Manual, Engine Start and record results.
 - .3 Check voltage sensing and time delay relay settings.
 - .4 Check:
 - .1 Automatic starting and transfer of load on failure of normal power.
 - .2 Retransfer of load when normal power supply resumed.
 - .3 Automatic shutdown.
 - .4 In-phase monitor operation.

Part 3 Execution

3.1 INSTALLATION

- .1 Locate, install and connect transfer equipment.
- .2 Check relays, solid state monitors and adjust as required.
- .3 Install and connect remote alarms.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with this specification and as follows:
 - .1 Energize transfer equipment from normal power supply.
 - .2 Set selector switch in "Test" position to ensure proper standby start, running, transfer, retransfer. Return selector switch to "Auto" position to ensure standby shuts down.

- .3 Set selector switch in "Auto" position and open normal power supply disconnect. Standby should start, come up to rated voltage and frequency, and then load should transfer to standby. Allow to operate for 10min, then close main power supply disconnect. Load should transfer back to normal power supply and standby should shutdown.
- .4 Repeat, at 1h intervals, 3 times, complete test with selector switch in each position, for each test.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 This section specifies the materials and installation for luminaires for the entire project including exterior lighting fixtures.
- .2 Refer to the Luminaire Schedule on the electrical drawings.
- .3 In this section the term 'luminaire' also applies to retrofit kits or assemblies.

1.2 REFERENCES

- .1 CAN/CSA C22.1-09, Canadian Electrical Code, Part I.
- .2 CAN/CSA C22.2 No.9.0, General Requirements for Luminaires.

1.3 PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit complete photometric and heat dissipation data prepared by independent testing laboratory for proposed luminaires.

1.4 SAMPLE LUMINAIRES

- .1 Submit sample luminaires for review prior to manufacturing when requested by the Departmental Representative.
- .2 Sample luminaires to be operable and complete with lamps, accessories and a plug-in power cord if requested by the Departmental Representative.
- .3 Deliver samples to the Departmental Representatives office or to another location as directed. Collect the sample(s) at the conclusion of the review.

1.5 INTENT

- .1 Provide lighting fixtures and accessories for all outlets as listed in the Luminaire Schedule and as shown on drawings.
- .2 Lighting fixtures shall be structurally well designed and constructed, using new parts and materials of the highest commercial grade available.
- .3 Ground all lighting equipment to grounding system.
- .4 Verify all ceiling types and finishes before ordering fixtures and provide fixtures suitable for mounting in or on ceilings being installed in each area, as specified. Where fixture types specified are not suitable for ceiling being installed, obtain written instructions from the Departmental Representative before ordering fixtures.
- .5 Fixtures of the same or similar type shall be supplied by the same manufacturer.
- .6 Where retrofit luminaires are noted, retrofit kits shall be CSA approved for as an assembly with the existing enclosures. The existing enclosures shall be considered for supply of the kits and the kits must include ALL hardware required to complete the installation including wiring, mounts, adaptors, drivers, splices, lenses and trims.

Part 2 Products

2.1 SOLID STATE LIGHTING

- .1 Solid state lighting rated correlated colour temperature (CCT) shall be with four (4) MacAdam ellipses of the specified CCT in the luminaire schedule. Colour consistency between lamps in the same fixture type shall be within four (4) MacAdam ellipses of the rated CCT.
- .2 Solid state lighting shall have a CRI greater or equal to the value listed in the luminaire schedule. In addition the lamps shall have an R9 value greater than 50 measured under the same conditions as the CRI.
- .3 Solid state lighting systems (including required drivers) shall have a power factor greater than 90 at full rated output.
- .4 Solid state lighting lumen maintenance data shall be provided for L70 testing.

2.2 FIXTURES

- .1 Accessories and components shall comply with relevant CSA Standards.
- .2 Recessed downlight fixtures shall be of the approved prewired type with junction box forming an integral part of the fixture assembly and so located in relation to the fixture that the junction box is CSA approved for 75 degree C wire. The electrical trade shall supply and install all necessary plaster rings, supports, etc., required for complete and proper installation.
- .3 Except where otherwise noted in the Luminaire Schedule, depth of recessed fluorescent fixtures shall not exceed 150 mm, including mounting yokes, or bridges. Design of reflector and lamp position shall be to provide high efficiency, even brightness and lack of lamp lines.
- .4 All metal parts shall be thoroughly cleaned and finished in high reflectance baked enamel over corrosion-resistant primer. Finish as indicated in luminaire schedule.
- .5 All internal fixture diffusers, lens panels, lens frames, etc., shall be securely and adequately supported and shall be removable without the use of tools for cleaning.
- .6 Fixtures shall incorporate adequate gasketing, stops and barriers to form light traps and prevent light leaks.
- .7 Fixtures shall be designed for adequate dissipation of ballast and lamp heat to avoid short ballast life, nuisance thermal tripping and decreased lamp output. Heat test reports by independent laboratories shall be provided where required by the Departmental Representative.
- .8 Construction of all fixtures shall be such as to provide a rigid well aligned fixture. Formed or ribbed backplates, end plates, reinforcing channel, heavy gauge sockets, straps, etc., shall be used where required to accomplish this.
- .9 The construction and performance of all fluorescent fixtures shall be subject to the acceptance of the Departmental Representative.

Part 3 Execution

3.1 INSTALLATION AND SUPPORTS

- .1 Provide complete and proper support for all fixtures, fixture hangers, etc., including headers in ceiling space, where required, for proper support of outlet boxes and fixture hanger assemblies.
- .2 Support fixtures as shown on the drawings, level, plumb and true with the structure and other equipment in a horizontal or vertical position as intended. Wall or side bracket mounted fixture housings shall be rigidly installed and adjusted to give a neat flush fit to the surface on which it is mounted.
- .3 All hangers, supports, fastenings or accessory fittings shall be protected against corrosion. Care shall be taken during the installation to assure that insulation and corrosion protection is not damaged.
- .4 Self aligning seismically rated ball joint hangers shall be used for rod suspended fixtures. Ceiling canopies or hood assemblies intended to cover the suspension attachments shall be installed to fit tightly to the ceiling without restricting the alignment of the hanger. Support fixtures by hangers and mounting arrangements which will not cause the fixture frame, housing, sides or lens frame to be distorted; or prevent complete alignment of several fixtures in a row.
- .5 The suspension length of all ceiling mounted suspended types of lighting fixtures as listed in the Fixture Schedule shall be the overall length from the ceiling to the lowest point of the fixture body, reflector or glassware in its hanging position.
- .6 Metal inserts, expansion bolts or toggle bolts in concrete slabs for stems which do not carry wiring must be accurately located in relation to the outlet boxes, to allow perfect alignment and spacing of suspension stems.
- .7 Where fixtures are surface mounted on the underside of an inverted tee bar ceiling, the fixture shall be supported either directly from the building structure by means of rod hangers and inserts or by means of metal angle headers, supported from the tee bar framing structure above the tile. Fixtures shall be supported from the quarter points.
- .8 Wiring from outlet boxes to fluorescent fixtures and wiring through fluorescent fixture channels shall be rated for 90 degrees C.
- .9 Connection to incandescent fixtures shall be by means of approved fixture type wiring.
- .10 All recessed fixtures to be installed so that they are removable from below to gain access to outlet box or prewired fixture box. Connect all recessed fixtures to boxes with flexible conduit and approved fixture wire. Provide approved drywall enclosures in insulated ceilings. Volume of enclosure to comply with Electrical Code.
- .11 Install fixture lenses as late as possible to protect from dirt and dust. Remove and clean or replace lenses to the satisfaction of the Departmental Representative.

END OF SECTION

Part 1 General

1.1 SCOPE OF WORK

- .1 Replace all existing exit signs with new as noted in these drawings.
- .2 New fixtures shall be of the same configuration as the existing units with similar orientation using CSA indicated green 'running man' signage.

1.2 PRODUCT DATA

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: submit manufacturer's product data sheets indicating dimensions, materials, and finishes, including classifications and certifications.

Part 2 Products

2.1 EXIT SIGN TYPES

- .1 General Public Areas:
 - .1 Edge lit acrylic blade, LED type with brushed aluminum housing. Connect to 120V life safety emergency power supply. Replace existing exit signs.
- .2 Maintenance Area Type
 - .1 White polycarbonate housing with faceplate, LED type, connect to life safety emergency power supply. Connect to 120V life safety emergency power supply. Replace existing exit signs.
- .3 All exit signs shall comply with CAN/CSA C860.
- .4 Exit signs shall be complete with 10 year warranty.

2.2 MOUNTING TYPE

- .1 Exit signs to be suitable for universal mounting. Allow for exit signs to be mounted as to best suit ceiling/wall type and architectural features:
 - .1 Surface wall mounted
 - .2 End wall mounted double face
 - .3 Recessed wall mounted
 - .4 Ceiling mounted single face
 - .5 Ceiling mounted double face
- .2 Exit signs to have direction arrows as indicated in drawings.
- .3 Provide steel rod pendant supports for exit signs to mount to +3.5m A.F.F. in high ceiling areas as required.

Part 3 Execution

3.1 INSTALLATION

- .1 Install exit signs as shown on plans complete with double face units where indicated.
- .2 Connect to life safety emergency power circuit as indicated on the plans.
- .3 Exit signs must be clear of all visual obstruction.
- .4 Contractor to confirm locations before final installation.

3.2 MOUNTING HEIGHT

- .1 Ceiling mounted signs shall be mounted directly on ceiling, unless it is obstructed from view. Stem mount using two fixture rods (9.5mm white smooth type).

3.3 SPARE

- .1 Provide quantity of twelve (12) spare exit signs, (six of each of the two styles noted) to hand over the Departmental Representative.

END OF SECTION

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center
506 West Burnside Road, Victoria, BC



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Project No.: 1156-14042

March 21, 2014

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC

March 21, 2014

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HAZARDOUS BUILDING MATERIALS ASSESSMENT

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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Public Works and Government Services Canada (PWGSC) on behalf of Natural Resources Canada to conduct a hazardous building materials assessment of the Canadian Forest Service Center (subject facility) located at 506 West Burnside Road, in Victoria, British Columbia.

The purpose of the project was to assess for the presence (or absence) and estimated extent of hazardous building materials within the subject facility 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 & Safety Regulation* (BC Reg. 296/97), prior to proposed renovation activities.

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

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

A summary of findings and recommendations is presented below. Recommendations pertaining to the handling, removal, transportation and disposal of identified hazardous materials are provided in Section 6 of this report.

It should be noted that this summary is subject to the same restrictions and limitations as presented in Section 4 (Assessment Limitations) and Section 7 (Closure). The information provided is to be read in conjunction with the remainder of this report.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC

March 21, 2014

Summary of Findings
Identified Asbestos-Containing Materials (ACMs)
A Wing
<ul style="list-style-type: none">• Skim coat plaster applied to the walls and ceilings of the north, south and west stairwells on all floors.• Black colour fire stop caulking applied to floor penetrations for mechanical pipes throughout the penthouse.• Grey colour fire stop caulking applied to floor penetrations for mechanical ductwork throughout the penthouse.• Silver colour fire stop caulking (rigid consistency) applied to floor penetrations for mechanical ductwork throughout the penthouse.• Light grey colour, chalk-like parging cement applied to pipe fittings observed in rooms 069, 073 and 045 on the ground floor and on one fitting observed in the first floor east hallway - Presumed present in other locations throughout A wing including inaccessible wall and ceiling cavities.• Grey colour, fibrous parging cement applied to pipe fittings observed to be present within the ceiling space above rooms on the ground floor (047, CR1, CR2, CR3, 044, CR4, CR5 and CR6) - Presumed present in other locations throughout A wing including inaccessible wall and ceiling cavities.• Flex duct fabric between mechanical ductwork in the penthouse.• White colour fibrous insulation between mechanical ductwork and floor penetrations in the penthouse. This material may be present, concealed in other areas of the building.• Red colour duct mastic on mechanical ductwork joints throughout.• Cement products (including):<ul style="list-style-type: none">– Cement board lining within fume hoods throughout– Cement exhaust pipe leading from fume hoods to exhaust fans on the roof throughout– Exhaust fans on the roof with cement vent caps (eight cement vent caps observed on the roof)• Masonry block walls on the ground floor were not destructively assessed, but may be filled with vermiculite insulation (a suspected ACM). <p>Previously Identified ACMs:</p> <ul style="list-style-type: none">• Inner lining material within herbarium storage cabinetry (ACM is not visible; it is reportedly present within the metal cabinet panels).• Floor tile (9"x9" size) – Brown and blue colour tiles present within various rooms on all floors. <p>The above-noted materials were generally found to be in GOOD condition, with the exception of the following ACMs observed in POOR condition:</p> <ul style="list-style-type: none">• Light grey colour, chalk-like parging cement applied to a fitting (flange) present within room 069.• Grey colour, fibrous parging cement applied to fittings present within the ceiling space above rooms on the ground floor (047, CR1, CR2, CR3, 044, CR4, CR5 and CR6) were observed in POOR condition. These fittings are present above a solid plaster ceiling.
B Wing
<ul style="list-style-type: none">• Red colour duct mastic on mechanical ductwork joints throughout. <p>The above-noted material was generally found to be in GOOD condition.</p>
Header Building
<ul style="list-style-type: none">• Drywall joint compound applied to drywall walls and ceilings throughout.• Floor tile (9"x9" size) green colour present within workshop H05 and rooms H06, H07, H08 and H09.• Cement panels present beneath windows on the exterior of the building.• Cement board liner within a fume hood in room H08.• Perimeter masonry block walls were not destructively assessed, but may be filled with vermiculite insulation (a suspected ACM). <p>The above-noted materials were generally found to be in GOOD condition, with the exception of drywall joint compound observed to have some minor damage (POOR condition) in sporadic locations on various walls.</p>

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC

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Summary of Findings
Identified Asbestos-Containing Materials (ACMs) - continued
Annex Building
<ul style="list-style-type: none">• Drywall joint compound applied to drywall walls and ceilings throughout.• Floor tile (12"x12" size) beige with brown streaks present within the men's and women's washrooms. <p>The above-noted materials were generally found to be in GOOD condition, with the exception of drywall joint compound observed to have some minor damage (POOR condition) in sporadic locations on various walls.</p>
Workshop/Garages, Equipment Shed, Glasshouse and Shadehouse
<ul style="list-style-type: none">• No ACMs identified.
Identified Lead-Containing Paints (LCPs) and Other Lead-Containing Materials
A Wing
<p>The following LCPs were identified:</p> <ul style="list-style-type: none">• Grey colour paint – Present on metal rooftop mechanical ductwork.• White colour paint – Present on metal rooftop railing.• Cream colour paint – Present on steel mechanical pipe within the penthouse.• Silver colour paint – Present on cast iron drain pipe within the penthouse.• Red colour paint – Present on steel sprinkler pipe throughout.• Cream colour paint – Present on the walls and ceiling within the penthouse.• Grey/blue colour paint – Present on the concrete floor in the east hallway on the 1st floor.• White colour paint – Present on plaster walls and ceilings in stairwells.• Red colour paint (with yellow colour paint layer beneath) – Present on metal doors and door frames throughout the ground floor north and south hallways.• Grey colour paint – Present on metal exterior trim and stucco siding on the building. <p>Lead is expected to be present in the solder used on copper domestic pipes, in the caulking on bell fittings for cast iron drainage pipes and in electrical equipment (i.e., batteries for emergency lighting/signage).</p>
B Wing
<p>The following LCPs were identified:</p> <ul style="list-style-type: none">• Off-white colour paint – Present on metal doors and door trim throughout the ground floor.• Green colour paint – Present on metal door trim throughout the ground floor.• Yellow colour paint – Present on metal door trim throughout the ground floor.• Grey colour paint – Present on metal door trim on the entrance door to A Wing on the 3rd floor.• Grey colour paint – Present on metal siding on the exterior of the building. <p>Lead is expected to be present in the solder used on copper domestic pipes, in the caulking on bell fittings for cast iron drainage pipes and in electrical equipment (i.e., batteries for emergency lighting/signage).</p>
Header Building
<p>The following LCPs were identified:</p> <ul style="list-style-type: none">• Beige colour paint – Present on drywall interior walls and ceilings throughout.• Light green colour paint – Present on metal interior posts and doors throughout.• Dark green colour paint – Present on metal interior doors throughout. <p>Lead is expected to be present in the solder used on copper domestic pipes, in the caulking on bell fittings for cast iron drainage pipes and in electrical equipment (i.e., batteries for emergency lighting/signage).</p>

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC

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Summary of Findings
Identified Lead-Containing Paints (LCPs) and Other Lead-Containing Materials - continued
Annex Building
<p>The following LCPs were identified:</p> <ul style="list-style-type: none">• Grey colour paint – Present on wood exterior trim on the building.• White colour paint – Present on wood exterior siding on the building. <p>Lead is expected to be present in the solder used on copper domestic pipes, in the caulking on bell fittings for cast iron drainage pipes and in electrical equipment (i.e., batteries for emergency lighting/signage).</p>
Workshop/Garages
<p>The following LCPs were identified:</p> <ul style="list-style-type: none">• Beige colour paint – Present on metal mechanical ductwork throughout.• White colour paint – Present on drywall interior walls and ceilings throughout. <p>Lead is expected to be present in the solder used on copper domestic pipes, in the caulking on bell fittings for cast iron drainage pipes and in electrical equipment (i.e., batteries for emergency lighting/signage).</p>
Equipment Shed
<p>The following LCPs were identified:</p> <ul style="list-style-type: none">• White colour paint – Present on wood shed structure. <p>Lead is expected to be present in the solder used on copper domestic pipes, in the caulking on bell fittings for cast iron drainage pipes and in electrical equipment (i.e., batteries for emergency lighting/signage).</p>
Glasshouse and Shadehouse
<ul style="list-style-type: none">• No suspected LCPs or other presumed lead-containing materials observed.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC

March 21, 2014

Summary of Findings

Polychlorinated Biphenyls (PCBs)

The following observations were made pertaining to PCB-containing equipment within the subject facility:

- A Wing
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs.
 - Approximately 30-40 fluorescent light ballasts that appear to be of pre-1985 vintage may have ballasts that contain PCBs.
- B Wing
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs.
 - Approximately 10-20 fluorescent light ballasts that appear to be of pre-1985 vintage may have ballasts that contain PCBs.
- Header Building
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs.
 - Approximately 5-10 fluorescent light ballasts that appear to be of pre-1985 vintage may have ballasts that contain PCBs.
- Annex Building
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs.
 - Approximately 5-10 fluorescent light ballasts that appear to be of pre-1985 vintage may have ballasts that contain PCBs.
- Workshop/garages
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs.
 - Approximately 5 fluorescent light ballasts that appear to be of pre-1985 vintage may have ballasts that contain PCBs.
- Equipment shed
 - No suspected PCB-containing equipment observed.
- Glasshouse
 - No suspected PCB-containing equipment observed.
- Shadehouse
 - No suspected PCB-containing equipment observed.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC

March 21, 2014

Summary of Findings

Mould

The following observations were made pertaining to mould and moisture-impacted materials within the subject facility:

- Header Building
 - Suspect mould and moisture-impacted drywall was observed on the ceiling in room H9 (approximately 5 square feet of suspect mould was observed).
 - NOTE: The above noted suspect mould/moisture-impacted material is present on an identified ACM.
- B Wing
 - No suspected mould and/or moisture-impacted building materials were observed.
- Header Building
 - No suspected mould and/or moisture-impacted building materials were observed.
- Annex Building
 - Moisture-impacted ceiling tiles and an adjacent light fixture were observed near the alternate entrance to the building.
- Workshop/garages
 - No suspected mould and/or moisture-impacted building materials were observed.
- Equipment shed
 - No suspected mould and/or moisture-impacted building materials were observed.
- Glasshouse
 - No suspected mould and/or moisture-impacted building materials were observed.
- Shadehouse
 - No suspected mould and/or moisture-impacted building materials were observed.

Mercury

The following observations were made pertaining to mercury-containing equipment within the subject facility:

- A Wing
 - One mercury-containing thermometer was observed within the penthouse.
- B Wing
 - Six mercury-containing thermometers were observed within the penthouse.
- Header Building
 - 10 mercury-containing thermometers were observed within the mechanical rooms (five in each mechanical room).
- Annex Building
 - None observed.
- Workshop/garages
 - None observed.
- Equipment shed
 - One mercury-containing thermostat was observed.
- Glasshouse
 - None observed.
- Shadehouse
 - None observed.

In addition to the above, mercury vapour is expected to be present within fluorescent light tubes observed throughout the subject facility.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC
March 21, 2014

Summary of Findings	
Ozone-Depleting Substances (ODSs)	
<ul style="list-style-type: none">• Various pieces of equipment with ODSs present were identified throughout the subject facility. A summary listing provided by Natural Resources Canada of the ODS-containing equipment present, including location along with refrigerant type and amount in each piece of equipment, is presented in Appendix F.	
Silica	
<ul style="list-style-type: none">• Silica may be present in concrete, cement, mortar, ceramic wall and floor tiles, stucco finishes and acoustic ceiling tiles observed in various locations throughout the subject facility.	

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC

March 21, 2014

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Public Works and Government Services Canada (PWGSC) on behalf of Natural Resources Canada to conduct a hazardous building materials assessment of the Canadian Forest Service Center (subject facility) located at 506 West Burnside Road, in Victoria, British Columbia.

The purpose of the project was to assess for the presence (or absence) and estimated extent of hazardous building materials within the subject facility 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 & Safety Regulation* (BC Reg. 296/97), prior to proposed renovation activities.

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

Site work was completed within the subject facility between January 21 and 24, 2014.

2.0 BACKGROUND

The subject facility is comprised of the following structures:

- Main Building
 - A Wing: (Three storey building with a basement/ground level and a mechanical penthouse. Primarily constructed of concrete, interior finishes include, wall and ceiling plaster, ceiling tiles, terrazzo, vinyl and ceramic flooring. Brick, stucco and stone exterior cladding.)
 - B Wing: (Three storey building with a ground level and a mechanical penthouse. Primarily constructed of steel, interior finishes include drywall walls and ceilings, ceiling tiles, vinyl, sheet and ceramic flooring. Metal exterior cladding.)
- Header Building (Single storey building, primarily constructed of concrete, interior finishes include, vinyl and sheet flooring, drywall walls and ceilings. Brick exterior cladding.)
- Annex Building (Single storey building, primarily constructed of wood framing, interior finishes include drywall walls and ceiling, ceiling tiles, carpet and vinyl flooring. Wood and stucco exterior cladding.)
- Workshop/garages (Single storey workshop/garage structure, primarily constructed of wood and with a concrete foundation.)
- Equipment shed (Wood shed structure)
- Glasshouse
- Shadehouse

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Stantec understands that the A wing of the main building and the out buildings were constructed in the early 1960s and the B wing of the main building was added in 1984. These construction time periods are 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.

In addition to the above, Stantec was provided with the following reports pertaining to asbestos-containing building materials at the subject facility:

- "Canadian Forest Service, 506 West Burnside Road, Victoria, BC, Asbestos Hazard Assessment Survey" prepared by North West Environmental, dated January 1999 (North West Assessment)
- "Workplace Investigation, Herbarium, Pacific Forestry Services, Victoria, BC" dated May 2005 (Workplace Investigation) – reviewed on-site only

According to the North West Assessment and the Workplace Investigation, the following ACMs have been identified within the subject facility:

- North West Assessment
 - Mechanical piping
 - Floor tile
 - Asbestos cement products
 - Drywall
 - Gaskets
 - Fire Doors
- Workplace Investigation
 - Inner liner material within Herbarium storage cabinetry

Stantec understands that a fire suppression system upgrade is planned within A Wing, and that as part of the project planning process, the North West Assessment was reviewed by PWGSC, and found to be outdated (regulatory changes pertaining to various hazardous building materials, including asbestos and lead, have occurred since its completion). As such, and as a measure of diligence in maintaining compliance with the Canada Labour Code and BC Reg. 296/97 as they pertain to identifying hazards prior to conducting renovation work within, and to update the records pertaining to hazardous building materials for the facility in general, PWGSC commissioned this assessment.

3.0 SCOPE AND METHODOLOGY

Zack Kranjec of Stantec conducted a visual assessment within the subject facility between January 21 and 24, 2014. Site work was conducted in general compliance with the requirements of the Canada Labour Code, the BC Reg. 296/97 and Stantec's Safe Work Practices (SWPs).

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Mechanical systems, structures and finishes of the subject facility were visually examined to determine the suspected presence of ACMs, lead including LCPs, PCBs, mercury, ODSs, and silica. Where building materials were suspected but not confirmed to contain asbestos or 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.

Assessment and sampling activities were directed to include area-specific sampling of building materials that may be disturbed during the planned fire suppression system upgrade within A Wing, as well as to encompass the remainder of the subject facility.

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-CONTAINING MATERIALS (ACMs)

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 called 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 facility, 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 the BC Reg. 296/97.

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

Based on these criteria, samples were collected from "homogenous applications" of observed suspected ACMs (materials suspected to contain asbestos that are uniform in material type, color, texture application and estimated installation date) and submitted to EMSL Canada Inc. (EMSL) in Mississauga, Ontario for analysis of asbestos content using Polarized Light Microscopy (PLM) with dispersion staining, in accordance with the US Environmental Protection Agency

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(EPA) 600/R-93/116 Method "Method for the Determination of Asbestos in Bulk Building Materials".

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

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 is then considered to be ACM.

In addition to the above, a "positive stop" option was used during the laboratory analysis of the non-friable building material samples submitted for asbestos analysis (excluding non-friable or potentially friable wall and/or ceiling finish materials). 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 non-friable material. At this point, further analysis of subsequent samples within the set is deemed to be unnecessary (as the entire set will be considered ACM, per above), and the remainder of the samples within the set are not analysed.

The "positive stop" option was not utilized for analysis of sample sets pertaining to friable materials or non-friable/potentially friable wall and/or ceiling finish materials, as both the asbestos content(s) and the application(s) of these materials are often inconsistent. For these materials, the analysis of all samples within the set can provide additional information that may assist in determining the extent of application of asbestos-containing versus non-asbestos forms of the materials – or can provide evidence that further sampling should be conducted, on a case-by-case basis.

3.1.2 Potential Asbestos-Containing Vermiculite Insulation

The assessment considered 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 (SWPs), which take into account current provincial regulations pertaining to such work (i.e., sampling procedures, required number of samples, and laboratory analytical procedures).

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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-CONTAINING PAINTS (LCPs) AND LEAD-CONTAINING MATERIALS

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 (5,000 parts per million, or "ppm" – equivalent to mg/kg) in 1976 under the Federal *Hazardous Products Act*. Recently, 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 has since been reduced to 90 ppm). In addition, 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, this value (600 ppm) will be referenced when defining paints as LCPs.

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 (AIHA) Environmental Lead Laboratory Approval Program.

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3.3 POLYCHLORINATED BIPHENYLS (PCBs)

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

Suspected PCB-containing electrical equipment can be visually inspected and compared to the Environment Canada reference guide entitled "Identification of Lamp Ballasts Containing PCBs, Report EPS 2/CC/2", dated August 1991 (PCB Guide).

3.4 MOULD

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

With respect to mould and/or moisture, the 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: Health Effects and Investigation Methods", Federal-Provincial Committee on Environmental and Occupational Health, 2004 (referred to as the "Health Canada Guide").

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- "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 (ODSs)

Chlorofluorocarbons (CFCs) 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 BC 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 by BC Reg. 296/97. According to both legislative instruments, the time-weighted average exposure limit for airborne silica dust is 0.025 mg/m³.

The presence of silica was assessed through visual means.

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4.0 ASSESSMENT LIMITATIONS

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

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

4.1 ASBESTOS-CONTAINING MATERIALS (ACMs)

Due to the limitations of sampling techniques and assessing occupied and operational facilities, and limitations associated with sampling so as not to compromise the integrity of various building systems (e.g., roof, envelope, etc.), the asbestos content of some materials within the subject facility could neither be confirmed nor denied. Suspected ACMs that were not sampled include, but are not limited to, the following:

- Roofing materials
- Sub-grade materials
- Interior components of mechanical equipment (e.g., inner linings or gaskets in boilers)
- Interior components of heating, ventilation and air conditioning (HVAC) units
- Heat protection materials inside mechanical installations (e.g., gaskets) and light fixtures (e.g., paper backing in sealed incandescent fixtures)
- Flooring material concealed beneath ceramic tile, brickwork, hardwood flooring, and/or concealed beneath existing sub-floors
- Drywall and/or wall plaster and associated finish materials concealed behind new and/or additional walls or ceilings
- Woven tape inside duct connection joints or inner ducting insulation
- Materials within wall cavities, hard ceiling cavities or crawlspaces
- Insulation materials inside fire doors

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-CONTAINING PAINTS (LCPs) AND LEAD-CONTAINING MATERIALS

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 facility only. The presence of lead or lead-containing materials in inaccessible areas not assessed includes, but is not limited to: ceiling spaces, wall cavities, crawlspaces, and buried materials.

With respect to paint, samples of suspected LCPs were collected within the subject facility only from surfaces of major paint applications where visually different paint colours and/or types

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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 (PCBs)

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 facility were not removed for comparison to the PCB Guide.

Conclusions and recommendations regarding the presence of PCBs within the subject facility 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 facility. The exact extent and/or number of fluorescent lamp ballasts containing PCBs, if any, within the subject facility will not be commented on.

4.4 MOULD

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) were conducted in accessed portions of the subject facility 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 facility 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 facility 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 facility was conducted in accessible areas only. The presence of mercury or mercury-containing

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equipment in inaccessible areas includes, but is not limited to: ceiling spaces, wall cavities, and crawlspaces, or as internal parts of HVAC mechanisms.

4.6 OZONE-DEPLETING SUBSTANCES (ODSs)

Visual assessment for the presence of ODSs within the subject facility was conducted in accessible areas only. The presence of ODS-containing equipment in inaccessible areas including, but not limited to, ceiling spaces, wall cavities and crawlspaces, was not assessed. In addition, portable equipment that may contain ODSs (refrigerators, drink coolers, etc.) was not considered as part of this assessment.

4.7 SILICA

Visual assessment for the presence of silica-containing materials within the subject facility was conducted in accessible areas only. The presence of potential silica-containing materials in inaccessible areas including, but not limited to, ceiling spaces, wall cavities and crawlspaces was not assessed.

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-CONTAINING MATERIALS (ACMs)

In addition to the materials identified during the North West Assessment and the Workplace Investigation, Stantec identified and sampled various suspected ACMs, including the following:

- Plasters
- Drywall joint compound
- Fire stop caulking
- Acoustical ceiling tiles
- Vinyl floor tile
- Sheet flooring
- Parging cement applied to mechanical pipe fittings
- Flex duct fabric
- Duct insulation
- Duct insulation inner liner
- Duct mastic/sealant
- Mechanical pipe wrap
- Mechanical insulation

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- Wall penetration parging
- Exterior stucco
- Exterior stone wall grout
- Fibre board
- Interior/exterior sealants and caulking
- Cementitious fire stop
- Fire proofing
- Tank insulation
- Cement board liner
- Cement panel
- Cement vent caps
- Cement pipe

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

Based on observations of building construction (estimated vintage of interior finishes and uniformity of building material use) and on interpretations of the results of suspected ACM samples collected, the materials presented in Tables 5.1-1 (A Wing), 5.1-2 (B Wing), 5.1-3 (Header Building) and 5.1-4 (Annex Building) , below were identified as ACMs within the subject facility.

No ACMs were identified through sampling conducted in the Workshop/Garages and Glasshouse, while no suspected ACMs were observed in the Equipment Shed or Shadehouse.

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Table 5.1-1: Summary of Identified ACMs – A WING

Identified ACM Description		Photo
Skim coat plaster applied to the walls and ceilings of the north, south and west stairwells on all floors.		
Condition	GOOD	
% Type	8 - 10% Chrysotile Sampled in the north stairwell (2 nd floor), visually similar materials present in the south and west stairwells.	
Friability	Non-friable	
Black colour fire stop caulking applied to floor penetrations for mechanical pipes throughout the penthouse.		
Condition	GOOD	
% Type	3% Chrysotile	
Friability	Non-friable	

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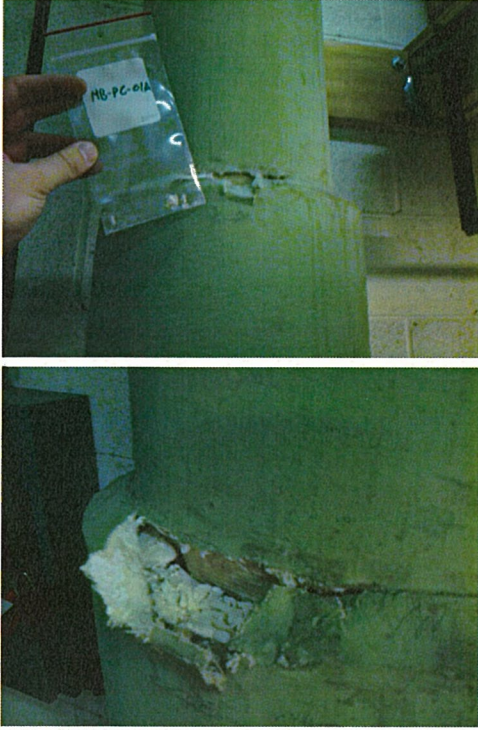
Table 5.1-1: Summary of Identified ACMs – <u>A WING</u>		Photo
Identified ACM Description		
Grey colour fire stop caulking applied to floor penetrations for mechanical ductwork throughout the penthouse.		
Condition	GOOD	
% Type	5% Chrysotile	
Friability	Non-friable	
Silver colour fire stop caulking (rigid consistency) applied to floor penetrations for mechanical ductwork throughout the penthouse.		
Condition	GOOD	
% Type	5% Chrysotile	
Friability	Non-friable	

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Table 5.1-1: Summary of Identified ACMs – A WING

Identified ACM Description		Photo
<p>Light grey colour chalk-like parging cement applied to pipe fittings observed in rooms 069, 073 and 045 on the ground floor and a fitting observed in the first floor east hallway.</p> <p>Presumed present in other locations throughout A Wing including inaccessible wall and ceiling cavities.</p>		
Condition	GOOD in general, the fitting (flange) shown here in room 069 was observed in POOR condition.	
% Type	8 – 10% Amosite, 2 - 8% Chrysotile Sampled in room 069 on the ground floor and in the first floor east hallway, visually similar materials present in rooms 073 and 045.	
Friability	Friable	

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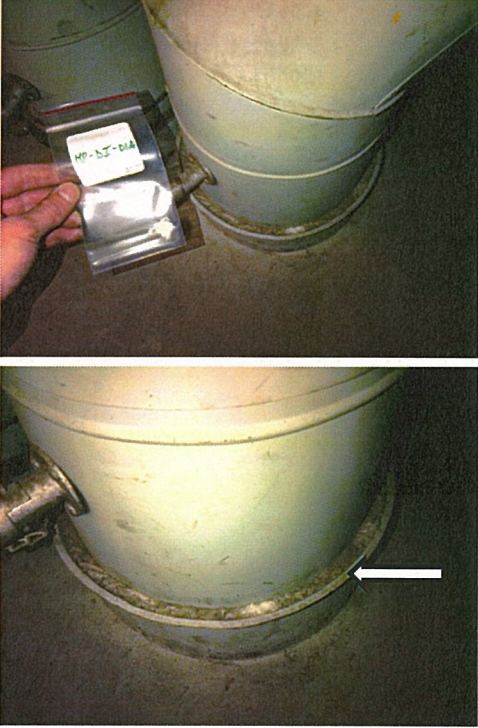
Table 5.1-1: Summary of Identified ACMs – <u>A WING</u>		Photo
Identified ACM Description		
<p>Grey colour fibrous parging cement applied to pipe fittings observed to be present within the ceiling space above cold rooms on the ground floor (047, CR1, CR2, CR3, 044, CR4, CR5, and CR6).</p> <p>Presumed present in other locations throughout A wing including inaccessible wall and ceiling cavities.</p>		
Condition	<p>POOR – Fittings present within the ceiling space above rooms on the ground floor (047, CR1, CR2, CR3, 044, CR4, CR5 and CR6) were observed in POOR condition. These fittings are present above a solid plaster ceiling.</p>	
% Type	<p>45% Chrysotile</p> <p>Sampled within the ceiling space above room CR4, visually similar materials present within ceiling space of rooms 047, CR1, CR2, CR3, 044, CR5 and CR6.</p>	
Friability	<p>Friable</p>	

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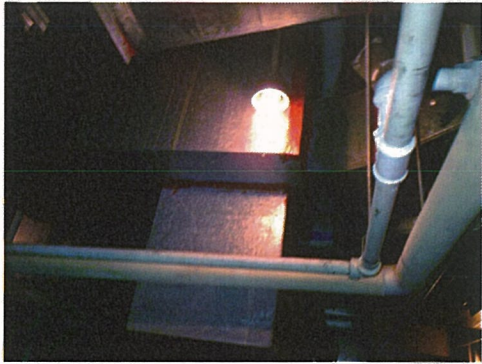

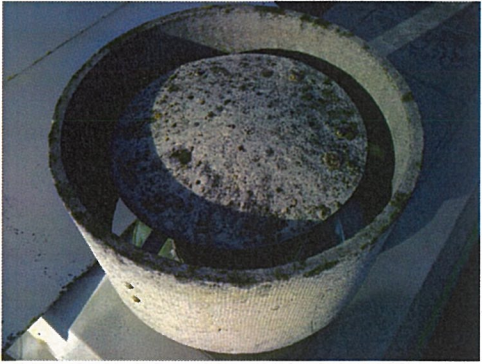
Table 5.1-1: Summary of Identified ACMs – A WING

Identified ACM Description		Photo
Flex duct fabric between mechanical ductwork in the penthouse.		
Condition	GOOD	
% Type	75 - 80% Chrysotile	
Friability	Friable	
White colour fibrous insulation between mechanical ductwork and floor penetrations in the penthouse. This material may be present, concealed in other areas of the building.		
Condition	GOOD	
% Type	50% Chrysotile	
Friability	Friable	

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Table 5.1-1: Summary of Identified ACMs – A WING		Photo
Identified ACM Description Red colour duct mastic on mechanical ductwork joints throughout the building.		
Condition	GOOD	
% Type	4% Chrysotile	
Friability	Non-friable	
Identified ACM Description Cement products (including): <ul style="list-style-type: none"> • Cement board lining within fume hoods throughout. • Cement exhaust pipe leading from fume hoods to exhaust fans on the roof throughout. • Exhaust fans on the roof with cement vent caps (eight cement vent caps observed on the roof). 		 
Condition	GOOD	
% Type	Presumed asbestos-containing material – Not sampled to preserve its mechanical integrity.	
Friability	Non-friable	

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Identified ACM Description		Photo
Previously Identified ACMs (North West Assessment and Workplace Investigation)		
Inner lining material within herbarium storage cabinetry (ACM is not visible, it is reportedly present within the metal cabinet panels).		
Condition	GOOD	
% Type	90% Chrysotile (as indicated in the Workplace Investigation)	
Friability	Non-friable in-situ (contained within metal panels). Friable if panels are dismantled.	
Floor tile (9"x9" size) – Brown and blue colour tiles (brown colour tile shown here) present in various room areas on all floors.		
Condition	GOOD	
% Type	2 – 10% Chrysotile (as indicated in the North West Assessment)	
Friability	Non-friable	

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Identified ACM Description		Photo
Red colour duct mastic on mechanical ductwork joints throughout (exhaust ducting and return ducting).		
Condition	GOOD	
% Type	4% Chrysotile	
Friability	Non-friable	

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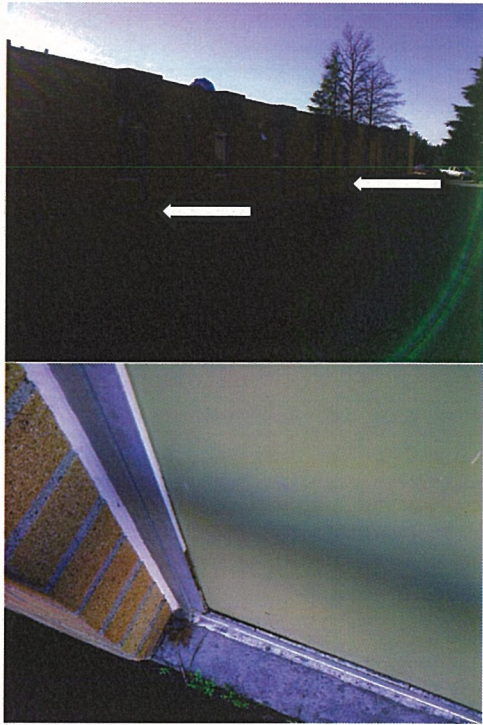
Table 5.1-3: Summary of Identified ACMs – HEADER BUILDING

Identified ACM Description		Photo
Drywall joint compound applied to drywall walls and ceilings throughout the building.		
Condition	Generally in GOOD condition with some minor damage (POOR condition) to various wall areas.	
% Type	3% Chrysotile	
Friability	Non-friable in situ (friable once disturbed)	
Floor tile (9"x9" size) green colour present within workshop H05 and rooms H06, H07, H08 and H09.		
Condition	GOOD	
% Type	4% Chrysotile Sampled in workshop H05 and room H09, visually similar materials present in rooms H06, H07 and H08.	
Friability	Non-friable	

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Identified ACM Description		Photo
Cement panels present beneath windows on the exterior of the building.		
Condition	GOOD	
% Type	15% Chrysotile	
Friability	Non-friable	
Cement board liner within a fume hood in room H08.		No photo
Condition	GOOD	
% Type	Presumed ACM – Not sampled	
Friability	Non-friable	

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Identified ACM Description		Photo
Drywall joint compound applied to drywall walls and ceilings throughout.		
Condition	Generally GOOD with some damaged (POOR condition) areas observed.	
% Type	< 1-3% Chrysotile	
Friability	Non-friable in situ (friable once disturbed)	
Floor tile (12"x12" size) beige with brown streaks present within the men's and women's washrooms.		
Condition	GOOD	
% Type	3% Chrysotile	
Friability	Non-friable	

5.1.1 Potential Asbestos-Containing Vermiculite Insulation

Vermiculite insulation was not observed in areas accessed during this assessment.

It should be noted that various interior walls throughout the ground floor of A Wing and the exterior walls of the Header Building are comprised of masonry blocks. As this assessment was non-intrusive (non-destructive) in nature, Stantec did not assess the content of the masonry

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blocks. As such, it is possible that the blocks may be filled with asbestos-containing vermiculite insulation.

5.2 LEAD-CONTAINING PAINTS (LCPs) AND LEAD CONTAINING MATERIALS

Lead may be present in the following materials throughout the subject facility:

- Solder used on copper domestic pipes
- Caulking on bell fittings for cast iron drainage pipes
- Electrical equipment (i.e., batteries for emergency lighting/signage)


With respect to paint, 37 paint chip samples of suspected LCPs were collected within the subject facility and submitted to EMSL for analysis of lead content. A summary of the sample types, locations and analytical results is presented in **Appendix C**.

A copy of the certificate of analysis provided by EMSL for the suspected LCP samples submitted is included in **Appendix E**.

Based on observations and interpretations of suspected LCP sample analytical results, the materials presented in Table Tables 5.2-1 (A Wing), 5.2-2 (B Wing), 5.2-3 (Header Building), 5.2-4 (Annex Building), 5.2-5 (Workshop/Garages) and 5.2-6 (Equipment Shed) were identified as LCPs within the subject facility.

No suspected LCPs were observed in the Glasshouse or Shadehouse.

Table 5.2-1: Summary of Identified LCPs – A WING

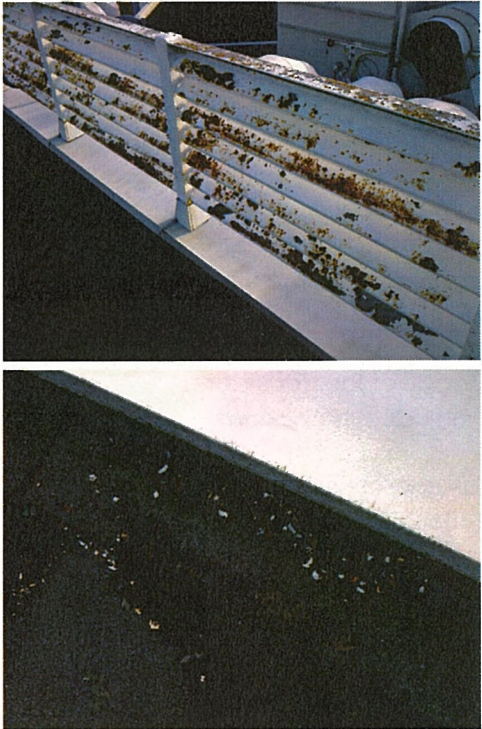
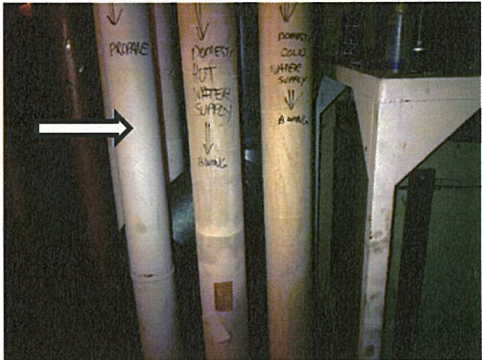
Lead-Containing Material Description	Photo
<p>Grey colour paint – Present on metal rooftop mechanical ductwork (1, 700 ppm).</p> <p>This material was generally observed to be in GOOD condition with the exception of some peeling due to outdoor deterioration.</p>	

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Table 5.2-1: Summary of Identified LCPs – A WING




Lead-Containing Material Description	Photo
<p>White colour paint – Present on metal rooftop railing (18,000 ppm).</p> <p>This material was observed in POOR condition (rusting and flaking paint throughout railing structure) and paint chip debris was observed on the roof.</p>	
<p>Cream colour paint – Present on steel mechanical pipe within the penthouse (990 ppm).</p> <p>This material was generally observed to be in GOOD condition.</p>	

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Table 5.2-1: Summary of Identified LCPs – A WING



Lead-Containing Material Description	Photo
<p>Silver colour paint – Present on cast iron drain pipe within the penthouse (960 ppm).</p> <p>This material was generally observed to be in GOOD condition.</p>	
<p>Red colour paint – Present on steel sprinkler pipe throughout the building (7,600 ppm).</p> <p>This material was generally observed to be in GOOD condition.</p>	
<p>Cream colour paint – Present on the walls and ceiling within the penthouse (940 ppm).</p> <p>This material was generally observed to be in GOOD condition.</p>	

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Table 5.2-1: Summary of Identified LCPs – A WING

Lead-Containing Material Description	Photo
<p>Grey/blue colour paint – Present on the concrete floor in the east hallway on the 1st floor (630 ppm). This material was generally observed to be in GOOD condition.</p>	<p>No photo</p>
<p>White colour paint – Present on plaster walls and ceilings in stairwells (1,600 ppm). This material was generally observed to be in GOOD condition.</p>	
<p>Red colour paint (with yellow colour paint layer beneath) – Present on metal doors and door frames throughout the ground floor north and south hallways (2,800 ppm). No photo for the red colour door frame sampled, however this photo shows the yellow colour paint present beneath (which is present on the majority of doors/door frames throughout the ground floor north and south hallways). This material was generally observed to be in GOOD condition.</p>	

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Table 5.2-1: Summary of Identified LCPs – A WING



Lead-Containing Material Description	Photo
<p>Grey colour paint – Present on metal exterior trim and stucco siding on the building (2,800 ppm).</p> <p>This material was generally observed to be in GOOD condition with the exception of some peeling due to outdoor deterioration.</p>	

Table 5.2-2: Summary of Identified LCPs – B WING


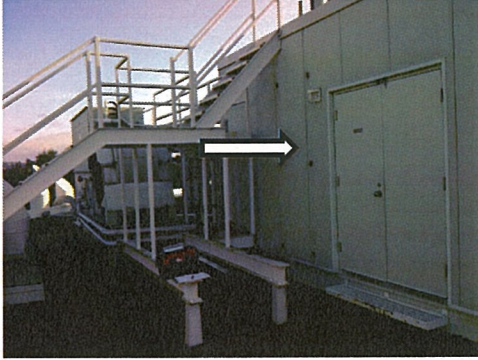
Lead-Containing Material Description	Photo
<p>Off-white colour paint – Present on metal doors and door trim throughout the ground floor (2,000 ppm).</p> <p>This material was generally observed to be in GOOD condition.</p>	
<p>Green colour paint – Present on metal door trim throughout the ground floor (1,800 ppm).</p> <p>This material was generally observed to be in GOOD condition.</p>	<p>No photo</p>

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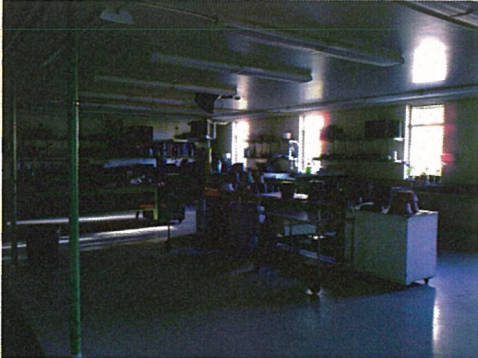


Table 5.2-2: Summary of Identified LCPs – B WING

Lead-Containing Material Description	Photo
<p>Yellow colour paint – Present on metal door trim throughout the ground floor (1,100 ppm). This material was generally observed to be in GOOD condition.</p>	<p>No photo</p>
<p>Grey colour paint – Present on metal door trim on the entrance door to A Wing on the 3rd floor (2,400 ppm). This material was generally observed to be in GOOD condition.</p>	 A photograph showing the interior of a door frame. The door is open, revealing a grey-painted metal threshold and trim. A white arrow points to the grey-painted metal trim on the right side of the door frame.
<p>Grey colour paint – Present on metal siding on the exterior of the building (1,200 ppm). This material was generally observed to be in GOOD condition.</p>	 A photograph of the exterior of a building. The building has grey metal siding. A white arrow points to the grey metal siding on the right side of the building. In the foreground, there is a metal staircase with railings.

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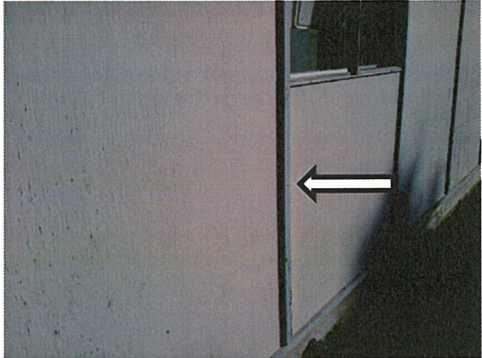
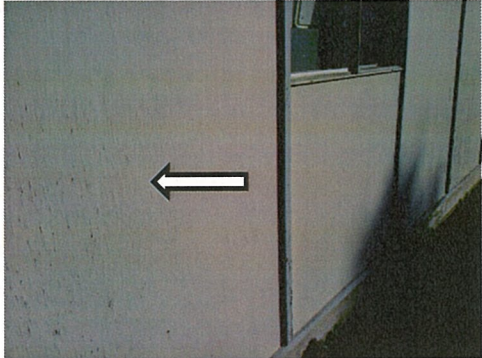
Lead-Containing Material Description	Photo
<p>Beige colour paint – Present on drywall interior walls and ceilings throughout (1,800 ppm). This material was generally observed to be in GOOD condition.</p>	
<p>Light green colour paint – Present on metal interior posts and doors throughout (3,800 ppm). This material was generally observed to be in GOOD condition.</p>	
<p>Dark green colour paint – Present on metal interior doors throughout (27,000 ppm). This material was generally observed to be in GOOD condition.</p>	

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Table 5.2-4: Summary of Identified LCPs – ANNEX BUILDING



Lead-Containing Material Description	Photo
<p>Grey colour paint – Present on wood exterior trim on the building (1,200 ppm).</p> <p>This material was generally observed to be in GOOD condition with the exception of some peeling due to outdoor deterioration.</p>	 A photograph showing a close-up of a grey-painted wood exterior trim. A white arrow with a black outline points to the right, indicating the location of the lead-containing material.
<p>White colour paint – Present on wood exterior siding on the building (2,300 ppm).</p> <p>This material was generally observed to be in GOOD condition with the exception of some peeling due to outdoor deterioration.</p>	 A photograph showing a close-up of white-painted wood exterior siding. A white arrow with a black outline points to the left, indicating the location of the lead-containing material.

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Table 5.2-5: Summary of Identified LCPs – WORKSHOP/GARAGES


Lead-Containing Material Description	Photo
<p>Beige colour paint – Present on metal mechanical ductwork throughout (2,400 ppm). This material was generally observed to be in GOOD condition with the exception of some peeling.</p>	
<p>White colour paint – Present on drywall interior walls and ceilings throughout (680 ppm). This material was generally observed to be in GOOD condition.</p>	

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Table 5.2-6: Summary of Identified LCPs – EQUIPMENT SHED

Lead-Containing Material Description	Photo
<p>White colour paint – Present on wood shed structure (6,700 ppm).</p> <p>This material was generally observed to be in GOOD condition with the exception of some peeling due to outdoor deterioration.</p>	

5.3 POLYCHLORINATED BIPHENYLS (PCBs)

The following observations were made for PCB-containing equipment within the subject facility:

- A Wing
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs. Approximately 30-40 fluorescent light ballasts that appear to be of pre-1985 vintage, may have ballasts that contain PCBs.
 - Dry type transformers observed in electrical rooms throughout.
- B Wing
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs. Approximately 10-20 fluorescent light ballasts that appear to be of pre-1985 vintage, may have ballasts that contain PCBs.
 - Dry type transformers observed in electrical rooms throughout.
- Header Building
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs. Approximately 5-10 fluorescent light ballasts that appear to be of pre-1985 vintage, may have ballasts that contain PCBs.
 - Dry type transformer observed in electrical room.
- Annex Building
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs. Approximately 5-10 fluorescent light ballasts that appear to be of pre-1985 vintage, may have ballasts that contain PCBs.

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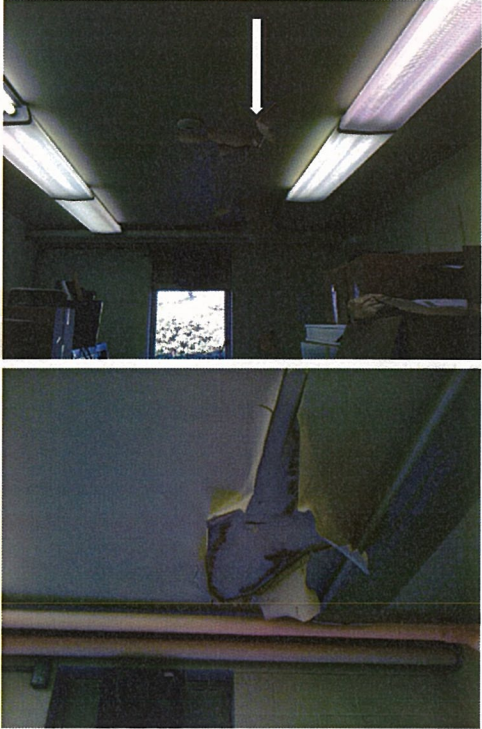
- Workshop/Garages
 - Fluorescent light fixtures with low voltage light tubes observed predominantly throughout the building, which are not expected to have ballasts that contain PCBs. Approximately 5 fluorescent light ballasts that appear to be of pre-1985 vintage, may have ballasts that contain PCBs.
- Equipment Shed
 - None observed.
- Glasshouse
 - None observed.
- Shadehouse
 - None observed.

5.4 MOULD

Mould and/or moisture-impacted building materials were observed as presented below in Tables 5.4.1 (Header Building) and 5.4.2 (Annex Building).

No mould and/or moisture-impacted building materials were observed within A Wing, B Wing, Workshop/Garages, Equipment Shed, Glasshouse and Shadehouse.

Table 5.4-1: Summary of Mould/Moisture Observations – HEADER BUILDING


Identified/Suspect Mould and/or Moisture Impacted Building Material Observed	Photo
<p>Suspect mould and moisture-impacted drywall was on the ceiling in room H9.</p> <ul style="list-style-type: none"> • NOTE: The above noted suspect mould/moisture-impacted material is an identified ACM. 	

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Table 5.4-2: Summary of Mould/Moisture Observations – ANNEX BUILDING

Identified/Suspect Mould and/or Moisture Impacted Building Material Observed	Photo
Moisture-impacted ceiling tiles were observed on the ceiling and within a light fixture near the alternate entrance to the building.	

5.5 MERCURY

The following observations were made for mercury-containing equipment within the subject facility:

- A Wing
 - One mercury-containing thermometer was observed within the penthouse.
- B Wing
 - Six mercury-containing thermometers were observed within the penthouse.
- Header Building
 - 10 mercury-containing thermometers were observed within the mechanical rooms (five in each mechanical room).
- Annex Building
 - None observed.
- Workshop/Garages
 - None observed.
- Equipment Shed
 - One mercury-containing thermostat was observed.
- Glasshouse
 - None observed.
- Shadehouse
 - None observed.

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In addition to the above, mercury vapour is expected to be present in fluorescent light tubes observed throughout the subject facility.

5.6 OZONE-DEPLETING SUBSTANCES (ODSs)

Various pieces of equipment with ODSs present were identified throughout the subject facility. A summary listing provided by Natural Resources Canada of the ODS-containing equipment identified, including location, refrigerant type and amount, is presented in **Appendix F**.

5.7 SILICA

Silica may be present in concrete, cement, mortar, ceramic wall and floor tiles, stucco finishes and acoustic ceiling tiles observed in various locations throughout the subject facility.

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-CONTAINING MATERIALS (ACMs)

Due to the confirmed presence of asbestos within the subject facility, and in accordance with the Canada Labour Code and the provisions of the BC Reg. 296/97, Stantec recommends that an asbestos exposure control plan (also known as an "asbestos management plan" (AMP) or "asbestos operations and management plan") be developed and implemented for the subject facility. 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 facility. 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 facility, including provisions for employees that require asbestos awareness training.

Identified ACMs that were observed in GOOD condition can be managed in place based on the limited potential for damage to these materials and/or release of airborne asbestos fibres.

If identified ACMs are to be impacted by renovation activities they should be handled in accordance with the procedures outlined in the current version of the WorkSafeBC document entitled "Safe Work Practices for Handling Asbestos", by a qualified asbestos abatement contractor, prior to the onset of renovation activities that may disturb them.

If materials that are visually similar to identified ACMs are discovered within the subject facility in locations not outlined in this report, these materials should be considered as asbestos-containing and handled as such, unless proven otherwise, through analytical testing.

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If encountered during renovation activities, any suspected ACMs not accessible during this assessment should be considered as asbestos-containing and handled as such, unless proven otherwise, through analytical testing.

Ensure asbestos containing waste is handled, stored, and disposed of in accordance with the requirements of the *Federal Transportation of Dangerous Goods Regulation and the British Columbia Hazardous Waste Regulation* (BC Reg. 63/88).

6.1.1 Asbestos-Containing Materials (ACMs) - POOR Condition

Various ACMs were observed in POOR condition within the subject facility and require action, as summarized below:

- A Wing
 - Remove or repair the light grey colour, chalk-like parging cement applied to a fitting (flange) present within room 069.
 - Remove or repair the grey colour, fibrous parging cement applied to fittings present within the ceiling space above rooms on the ground floor (047, CR1, CR2, CR3, 044, CR4, CR5 and CR6) were observed in POOR condition.
 - o As these fittings are present above a solid plaster ceiling, an alternative strategy would be to fully enclose that cavity, restrict access and post appropriate signage at any potential entry points (signage that indicates the presence of asbestos in poor condition within the ceiling space). This recommendation applies ONLY if the ceiling space is not part of the air handling system for that area of the facility (i.e., open-air return plenum). If the ceiling space is part of the air handling system, the above-noted abatement is required.
- Header Building
 - Repair areas of drywall joint compound observed to have minor damage (POOR condition) on various wall areas.
- Annex Building
 - Repair areas of drywall joint compound observed to have minor damage (POOR condition) on various wall areas.

The above noted work should be conducted by an experienced asbestos abatement contractor.

6.1.2 Potential for Asbestos-Containing Vermiculite Insulation

Destructive testing for the presence of potential asbestos-containing vermiculite insulation should precede any work that will require disturbance of masonry block walls within the subject facility (e.g., creating openings, drilling, otherwise damaging surfaces to expose the masonry block cavity).

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6.2 LEAD-CONTAINING PAINTS (LCPs) AND LEAD-CONTAINING MATERIALS

As identified LCPs and lead-containing materials were observed in GOOD condition, no action is currently required.

For LCPs and lead-containing materials that are to be disturbed and/or removed during renovation or other activities, ensure compliance with the following:

- The occupational exposure control requirements of the Canada Labour Code and BC OH&S Reg., including the provisions of the *Lead Guideline*
- The disposal requirements of the *British Columbia Hazardous Waste Regulation* (BC Reg. 63/88)
- The 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/m³) 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.

As it has been reported that employees at the subject facility are often required to conduct maintenance work that may require disturbances to surfaces coated with LCPs, consideration should be given to developing an Exposure Control Plan for lead at the subject facility, which should include provisions for the following:

- Awareness training for workers that may be required to disturb lead-containing materials or materials coated with LCPs
- Safe work practices for working with lead-containing materials or materials coated with LCPs during typical maintenance activities

6.3 POLYCHLORINATED BIPHENYLS (PCBs)

Some fluorescent light ballasts that appear to be of pre-1985 vintage, may contain PCBs. When removed as part of renovation activities fluorescent lamp ballasts within older fixtures should be assessed in reference to the PCB Guide prior to disposal.

If PCB-containing ballasts are identified, these items can be managed in place, where they are operating and in GOOD condition. No further action is currently required until such time that renovation or demolition activities are to be conducted, or until 2025, when PCB-containing items will require removal and disposal according to the *PCB Regulations* (SOR/2008-273).

PCB-containing items identified for removal and disposal should be handled, transported, stored and disposed of according to the *Federal Transportation of Dangerous Goods Regulation*, BC Reg. 63/88, and the *PCB Regulations* (SOR/2008-273).

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6.4 MOULD

Documents published by Health Canada, Ontario Ministry of Health, American Industrial Hygiene Association (AIHA), American Conference of Governmental Industrial Hygienists (ACGIH) and others, provide guidance for interpreting the results of mould investigations. The Health Canada Guide states that:

"Identifiable promoters of fungal growth require correction, and any visible fungi require removal."

To this end, Stantec recommends the following course of action within the subject facility:

- Header Building
 - Remove and dispose of approximately 10 square feet of suspect mould/moisture-impacted drywall from the ceiling in room H9 within the Header Building. Identify the source of moisture prior to re-instating with new building materials.
 - The above noted work will impact asbestos-containing drywall joint compound.
- Annex Building
 - Remove and dispose of approximately 5 square feet of moisture impacted ceiling tiles and the adjacent fluorescent light fixture from the ceiling near the alternate entrance to the building. Identify the source of moisture prior to re-instating with new building materials.
 - The above noted work may impact asbestos-containing drywall joint compound present on the ceiling behind ceiling tiles.

The above noted work should be completed by an experienced asbestos abatement contractor.

6.5 MERCURY

Mercury-containing items can be managed in place. No action is currently required.

If mercury-containing materials (e.g., thermometers, thermostats, fluorescent light tubes) are require removal and disposal for renovation or operations and maintenance activities, ensure all mercury waste is handled, stored and disposed of in accordance with the requirements of the BC Reg. 63/88 and the Federal *Transportation of Dangerous Goods Regulation*.

6.6 OZONE-DEPLETING SUBSTANCES (ODSs)

ODS-containing equipment/materials can be managed in place, and must be serviced by licensed refrigeration technicians (as defined in the Federal *Halocarbon Regulations*, 2003 [FHR 2003]).

If ODS-containing equipment is to be removed and disposed of, ODSs must be handled, recycled, stored, and/or disposed of in accordance with the requirements of the *British*

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Columbia Waste Management Act - Ozone Depleting Substances and Other Halocarbons Regulation (BC Reg. 387/99) and the FHR 2003.

6.7 SILICA

Silica-containing materials can be managed in place, no action is currently required.

If silica-containing materials are to be disturbed, 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/m³). 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 demolition 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 and Natural Resources 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 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 facility.

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.

HAZARDOUS BUILDING MATERIALS ASSESSMENT

Canadian Forestry Service Center 506 West Burnside Road, Victoria, BC

March 21, 2014

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.

Respectfully submitted,

Stantec Consulting Ltd.

Reviewed by:



Zack Kranjec, Dipl. T.
Project Technologist

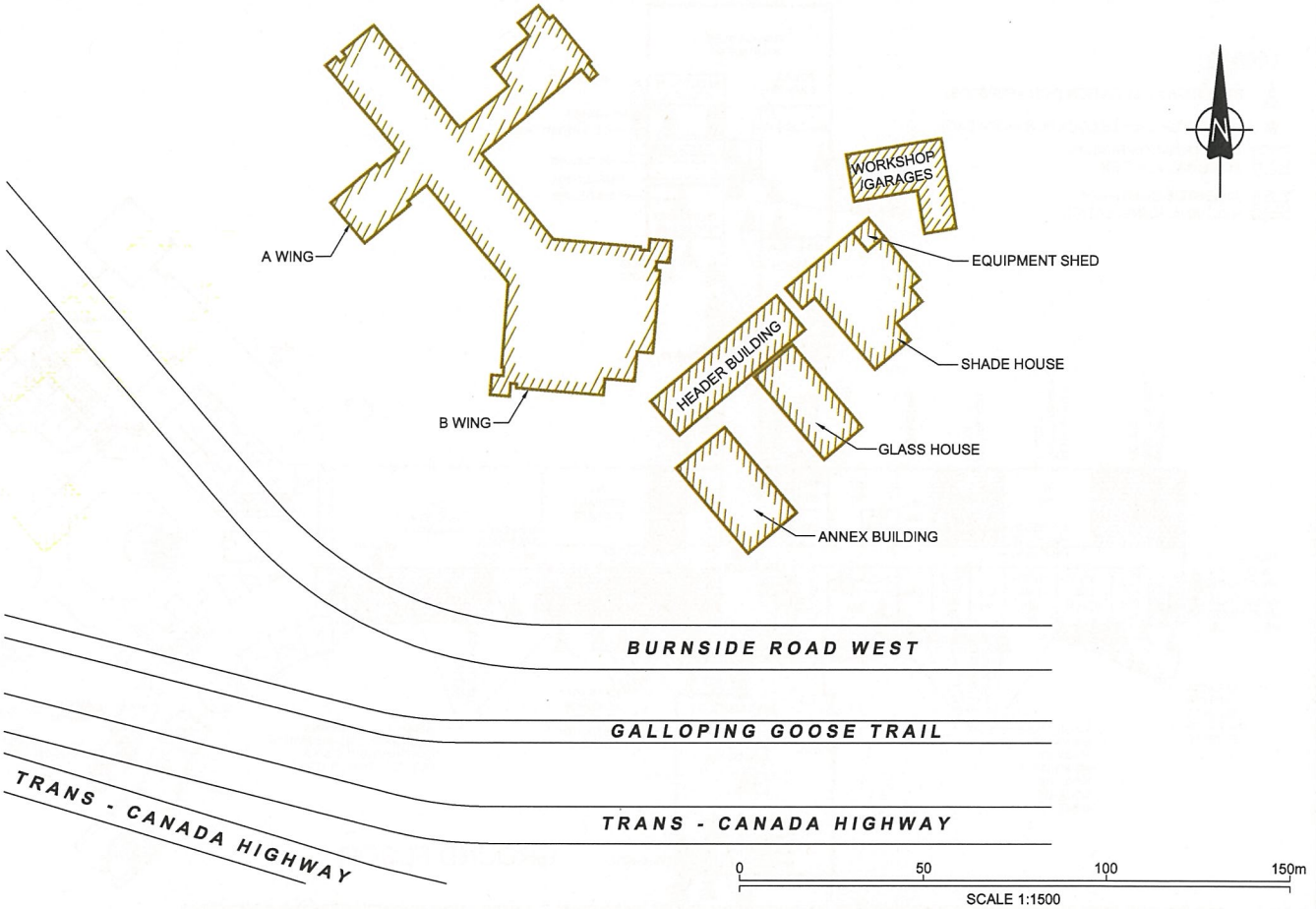


Sean Brigden, B.Sc., P.B.Dipl., CRSP
Senior Reviewer

ZK/SB/bd

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Appendix A
Floor Plans

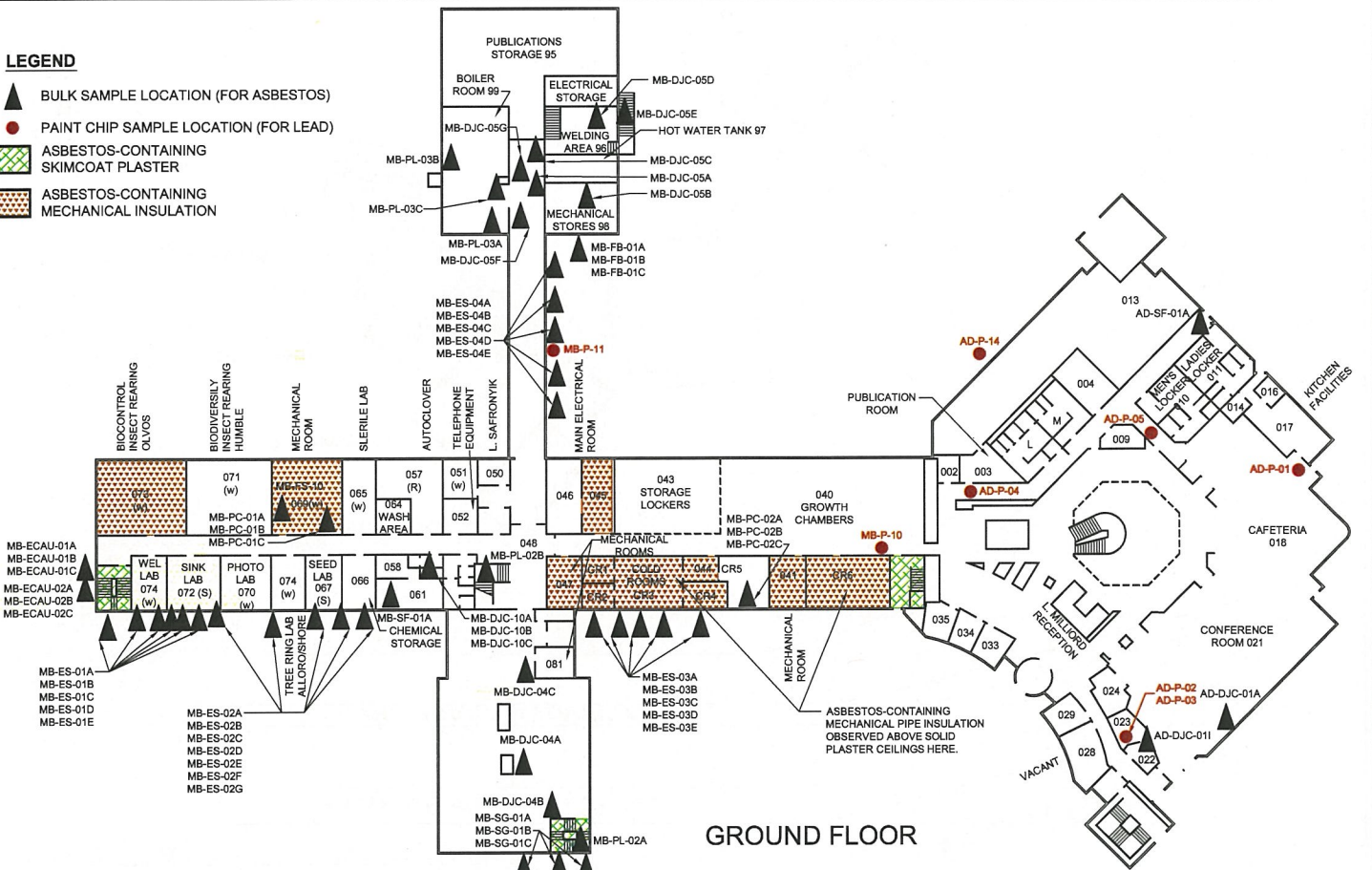


NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

<p>SITE PLAN</p> <p>PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC</p>	Project No.: 115614042	<p>Dwg. No.:</p> <p>1</p>	
	Scale: 1 : 1500		
Client: PWGSC	Date: 14/03/11		
	Dwn. By: CD CS SL2014030075		
	App'd By: TW		

LEGEND

- ▲ BULK SAMPLE LOCATION (FOR ASBESTOS)
- PAINT CHIP SAMPLE LOCATION (FOR LEAD)
- ▨ ASBESTOS-CONTAINING SKIMCOAT PLASTER
- ▩ ASBESTOS-CONTAINING MECHANICAL INSULATION



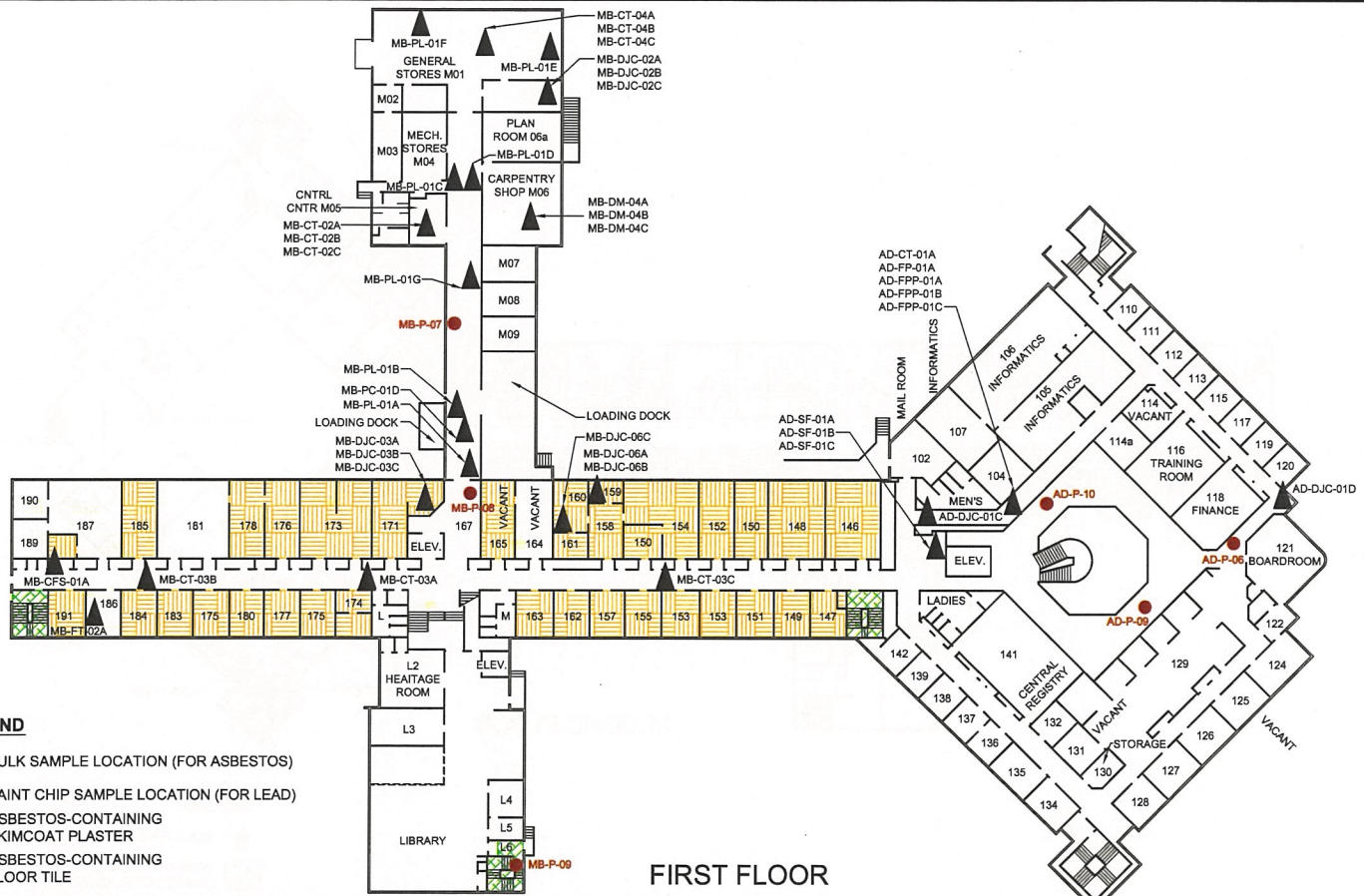
GROUND FLOOR

NOTES: 1. RED COLOUR DUCT MASTIC PRESENT ON MECHANICAL DUCTWORK JOINTS THROUGHOUT A WING AND B WING IS ASBESTOS-CONTAINING.
 2. 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

PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC

Client: PWGSC	Project No.: 115614042	Dwg. No.:	2
	Scale: N.T.S.		
	Date: 14/03/12		
	Dwn. By: CD CS SL2014030086		
	App'd By: TW		



FIRST FLOOR

LEGEND

- ▲ BULK SAMPLE LOCATION (FOR ASBESTOS)
- PAINT CHIP SAMPLE LOCATION (FOR LEAD)
- ▨ ASBESTOS-CONTAINING SKIMCOAT PLASTER
- ▨ ASBESTOS-CONTAINING FLOOR TILE

- NOTES:**
1. ASBESTOS-CONTAINING CEMENT BOARD LINES PRESENT WITHIN FUME HOODS THROUGHOUT.
 2. ASBESTOS-CONTAINING CEMENT PIPE (FUME HOOD EXHAUST PIPING) PRESENT WITHIN PIPE CHASES THROUGHOUT.
 3. 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

PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC

Client: PWGSC




Project No.:	115614042
Scale:	N.T.S.
Date:	14/03/12
Dwn. By:	CD CS SL2014030087
App'd By:	TW

Dwg. No.:	3	



SECOND FLOOR

LEGEND

-  BULK SAMPLE LOCATION (FOR ASBESTOS)
-  ASBESTOS-CONTAINING SKIMCOAT PLASTER
-  ASBESTOS-CONTAINING FLOOR TILE

- NOTES:** 1. ASBESTOS-CONTAINING CEMENT BOARD LINES PRESENT WITHIN FUME HOODS THROUGHOUT.
 2. ASBESTOS-CONTAINING CEMENT PIPE (FUME HOOD EXHAUST PIPING) PRESENT WITHIN PIPE CHASES THROUGHOUT.
 3. 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

PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC

Client: PWGSC

Project No.:	115614042
Scale:	N.T.S.
Date:	14/03/12
Dwn. By:	CD CS SL2014030088
App'd By:	TW

Dwg. No.:

4





THIRD FLOOR

- NOTES:** 1. ASBESTOS-CONTAINING CEMENT BOARD LINES PRESENT WITHIN FUME HOODS THROUGHOUT.
 2. ASBESTOS-CONTAINING CEMENT PIPE (FUME HOOD EXHAUST PIPING) PRESENT WITHIN PIPE CHASES THROUGHOUT.
 3. 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**

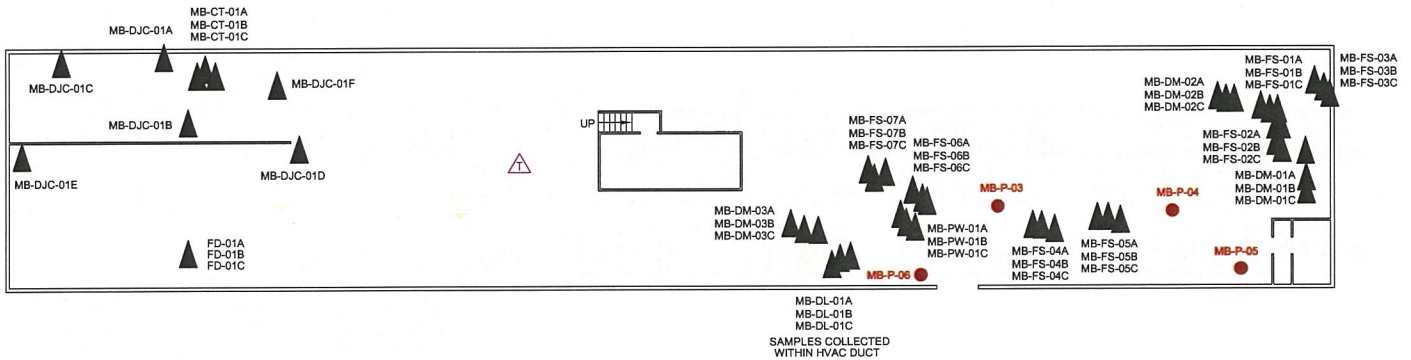
PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC

Client: PWGSC

Project No.:	115614042
Scale:	N.T.S.
Date:	14/03/12
Dwn. By:	CD VM/CS SL2014030089
App'd By:	TW

Dwg. No.:
5





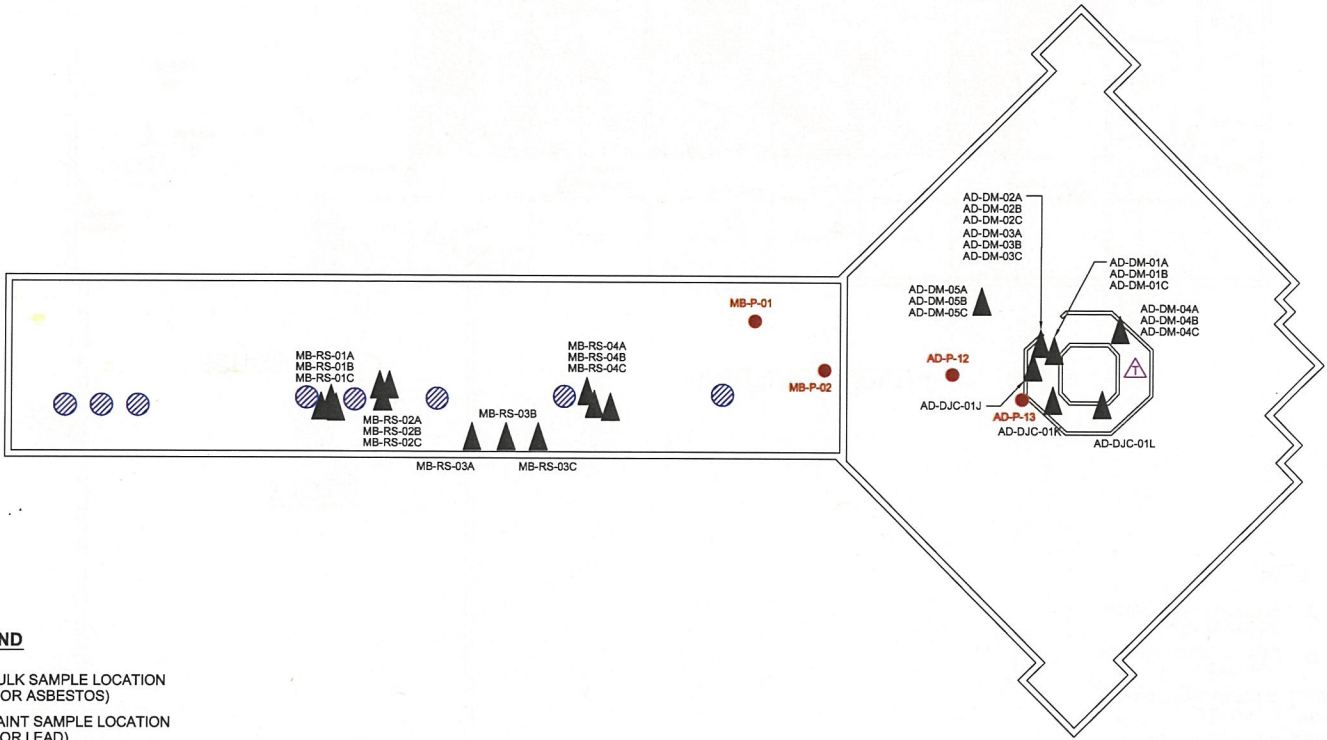
PENTHOUSE - A WING

LEGEND

- BULK SAMPLE LOCATION (FOR ASBESTOS)
- PAINT SAMPLE LOCATION (FOR LEAD)
- MERCURY-CONTAINING THERMOMETER

- NOTES:**
1. BLACK COLOUR FIRE STOP CAULKING APPLIED TO FLOOR MECHANICAL PIPE PENETRATIONS THROUGHOUT THE PENTHOUSE IS ASBESTOS-CONTAINING.
 2. GREY COLOUR FIRE STOP CAULKING APPLIED TO MECHANICAL DUCTWORK PENETRATIONS THROUGHOUT THE PENTHOUSE IS ASBESTOS-CONTAINING.
 3. SILVER COLOUR FIRE STOP CAULKING APPLIED TO FLOOR MECHANICAL DUCTWORK PENETRATIONS THROUGHOUT THE PENTHOUSE IS ASBESTOS-CONTAINING.
 4. WHITE COLOUR, FIBROUS INSULATION PRESENT BETWEEN MECHANICAL DUCTWORK AND FLOOR PENETRATIONS IS ASBESTOS-CONTAINING.
 5. RED COLOUR DUCT MASTIC PRESENT ON MECHANICAL DUCTWORK JOINTS THROUGHOUT IS ASBESTOS-CONTAINING.
 6. ASBESTOS-CONTAINING CEMENT PIPE (FUME HOOD EXHAUST PIPING) PRESENT THROUGHOUT PENTHOUSE.
 7. THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

<p>FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS</p> <p>PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC</p>		Project No.: 115614042	6	
		Scale: N.T.S.		
		Client: PWGSC	Date: 14/03/12	Dwn. By: CD VM/CSS SL2014030090



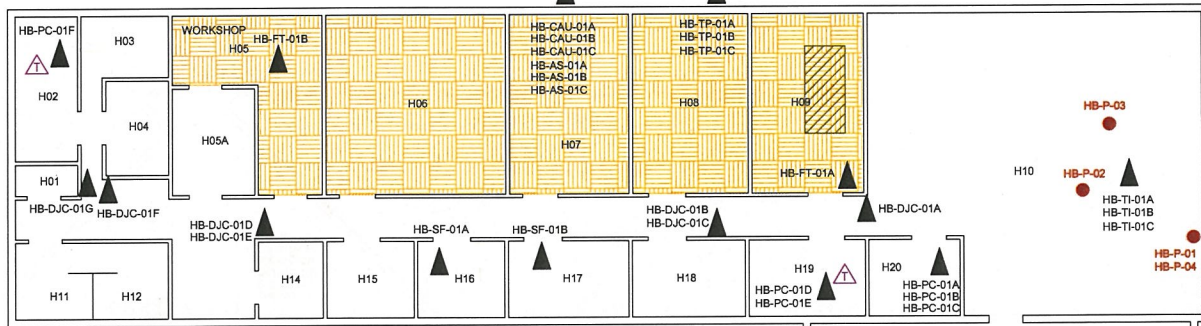
LEGEND

- ▲ BULK SAMPLE LOCATION (FOR ASBESTOS)
- PAINT SAMPLE LOCATION (FOR LEAD)
- ⊘ ASBESTOS-CONTAINING CEMENT (TRANSITE) VENT CAPS
- ⚠ MERCURY-CONTAINING THERMOMETERS

ROOF - A WING AND B WING (INCLUDING PENTHOUSE FOR B WING)

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

<p>FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS</p> <p>PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC</p>		Project No.: 115614042	Dwg. No.: 7	
		Scale: N.T.S.		
Client: PWGSC		Date: 14/03/12		
		Dwn. By: CD ^{VM/CS} SL2014030091		
		App'd By: TW		



HEADER BUILDING

GLASSHOUSE

LEGEND

- ▲ BULK SAMPLE LOCATION (FOR ASBESTOS)
- PAINT SAMPLE LOCATION (FOR LEAD)
- ▤ ASBESTOS-CONTAINING FLOOR TILE
- ▨ SUSPECT MOULD/ MOISTURE-IMPACTED CEILING
- ⚠ 5 NOS. MERCURY-CONTAINING THERMOMETERS

- NOTES:** 1. DRYWALL JOINT COMPOUND APPLIED TO DRYWALL WALLS AND CEILINGS IS ASBESTOS-CONTAINING.
 2. CEMENT PANELS BENEATH WINDOWS ON THE EXTERIOR OF THE BUILDING ARE ASBESTOS-CONTAINING.
 3. 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

PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC

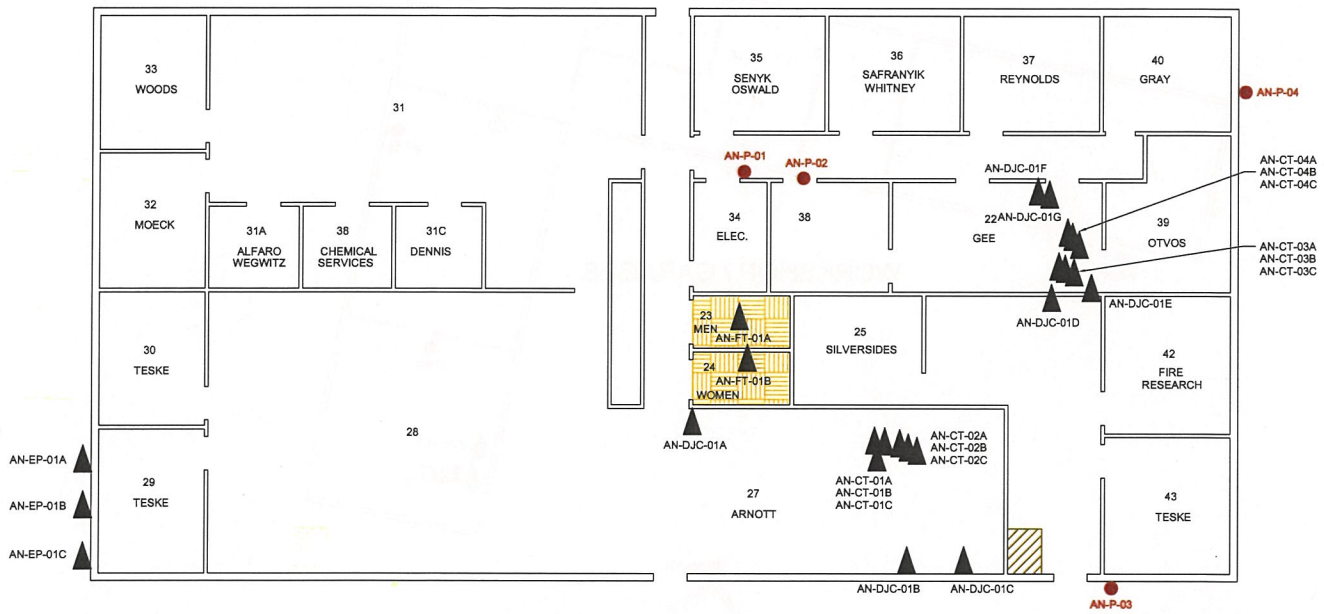
Client: PWGSC

Project No.:	115614042
Scale:	N.T.S.
Date:	14/03/19
Dwn. By:	CD ^{CSVM} SL2014030179
App'd By:	TW

Dwg. No.:

8





ANNEX BUILDING

LEGEND

- BULK SAMPLE LOCATION (FOR ASBESTOS)
- PAINT SAMPLE LOCATION (FOR LEAD)
- ASBESTOS-CONTAINING FLOOR TILE
- SUSPECT MOULD/ MOISTURE-IMPACTED CEILING

NOTES: 1. DRYWALL JOINT COMPOUND APPLIED TO DRYWALL WALLS AND CEILINGS IS ASBESTOS-CONTAINING.
 2. THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

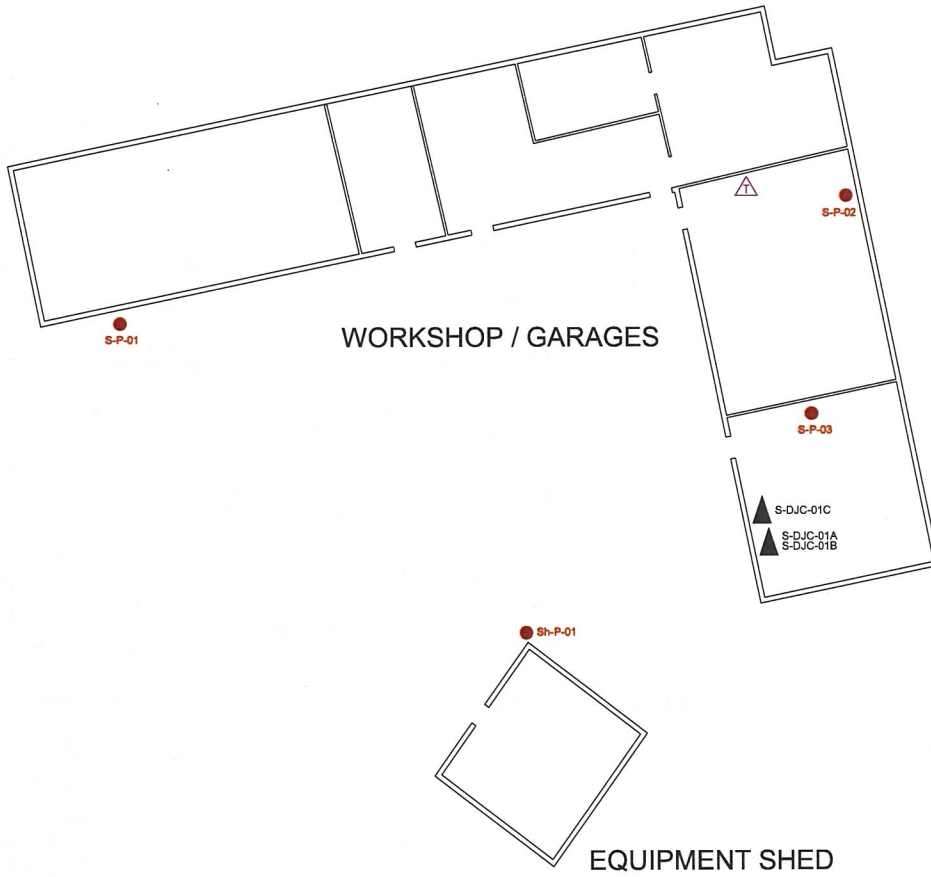
FLOOR PLAN SHOWING HAZARDOUS BUILDING MATERIALS AND BULK SAMPLE LOCATIONS

PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC

Client: PWGSC

Project No.:	115614042
Scale:	N.T.S.
Date:	14/03/12
Dwn. By:	CD VM/CS SL2014030093
App'd By:	TW

Dwg. No.:	9	



LEGEND

- ▲ BULK SAMPLE LOCATION (FOR ASBESTOS)
- PAINT SAMPLE LOCATION (FOR LEAD)
- △ MERCURY-CONTAINING THERMOSTAT

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 PACIFIC FOREST SERVICE CENTRE, 506 WEST BURNSIDE ROAD, VICTORIA, BC	Project No.: 115614042	Dwg. No.:	10
	Scale: N.T.S.	Date: 14/03/11	
Client: PWGSC	Dwn. By: CD ^{VM} _{SL2014030084}	App'd By: TW	

Appendix B
Summary of Suspected ACM Bulk Samples

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

Final Report

Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-PL-01A	Plaster – Base layer	1 st floor East hallway Wall	None detected
MB-PL-01B	Plaster – Base layer	1 st floor East hallway Wall	None detected
MB-PL-01C	Plaster – Base layer	1 st floor East hallway Column	None detected
MB-PL-01D	Plaster – Base layer	1 st floor East hallway Ceiling	None detected
MB-PL-01E	Plaster – Base layer	1 st floor General Stores M01 Wall	None detected
MB-PL-01F	Plaster – Base layer	1 st floor General Stores M01 Wall	None detected
MB-PL-01G	Plaster – Base layer	1 st floor East hallway Wall	None detected
MB-PL-02A	Plaster – Skim and base layers	Ground floor West staircase Wall	None detected
MB-PL-02B	Plaster – Skim and base layers	Ground floor Central staircase Bulkhead	None detected
MB-PL-02C	Plaster – Skim and base layers	1 st floor Room 187 Wall	None detected
MB-PL-02D	Plaster – Skim and base layers	2 nd floor Room 290 Wall	None detected
MB-PL-02E	Plaster – Skim and base layers	2 nd floor Room 284 Wall	None detected

Hazardous Building Materials Assessment

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-PL-02F	Plaster – Skim and base layers	3 rd floor Room 389 Wall	None detected
MB-PL-02G	Plaster – Skim and base layers	3 rd floor Room 382 Wall	None detected
MB-PL-02H	Plaster – Skim and base layers	3 rd floor Insectary Wall	None detected
MB-PL-02I	Plaster – Skim and base layers	3 rd floor Insectary Wall	None detected
MB-PL-02J	Plaster – Skim and base layers	3 rd floor Herbarium Wall	None detected
MB-PL-02K	Plaster – Skim and base layers	3 rd floor Herbarium Wall	None detected
MB-PL-03A	Plaster – Base layer	Ground floor Boiler Room Wall	None detected
MB-PL-03B	Plaster – Base layer	Ground floor Boiler Room Wall	None detected
MB-PL-03C	Plaster – Base layer	Ground floor Boiler Room Wall	None detected
MB-PL-04A	Plaster – Skim layer	2nd floor North stairwell Wall	10% Chrysotile
MB-PL-04B	Plaster – Skim layer	2nd floor North stairwell Wall	10% Chrysotile
MB-PL-04C	Plaster – Skim layer	2nd floor North stairwell Wall	10% Chrysotile

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-PL-04D	Plaster – Skim layer	2 nd floor North stairwell Wall	10% Chrysotile
MB-PL-04E	Plaster – Skim layer	2 nd floor North stairwell Wall	8% Chrysotile
MB-DJC-01A	Drywall joint compound	Penthouse Storage room	None detected
MB-DJC-01B	Drywall joint compound	Penthouse Storage room	None detected
MB-DJC-01C	Drywall joint compound	Penthouse Storage room	None detected
MB-DJC-01D	Drywall joint compound	Penthouse Storage room	None detected
MB-DJC-01E	Drywall joint compound	Penthouse Storage room	None detected
MB-DJC-02A	Drywall joint compound	1 st floor General stores M01 Wall	None detected
MB-DJC-02B	Drywall joint compound	1 st floor General stores M01 Wall	None detected
MB-DJC-02C	Drywall joint compound	1 st floor General stores M01 Wall	None detected
MB-DJC-03A	Drywall joint compound	1 st floor Room 167 Partition wall	None detected
MB-DJC-03B	Drywall joint compound	1 st floor Room 167 Partition wall	None detected
MB-DJC-03C	Drywall joint compound	1 st floor Room 167 Partition wall	None detected

Hazardous Building Materials Assessment

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Final Report

Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-DJC-04A	Drywall joint compound	Ground floor Library Column	None detected
MB-DJC-04B	Drywall joint compound	Ground floor Library Wall	None detected
MB-DJC-04C	Drywall joint compound	Ground floor Library Wall	None detected
MB-DJC-04D	Drywall joint compound	1 st floor Library Wall	None detected
MB-DJC-04E	Drywall joint compound	1 st floor Library Wall	None detected
MB-DJC-05A	Drywall joint compound	Ground floor East hallway Wall	None detected
MB-DJC-05B	Drywall joint compound	Ground floor Mechanical stores 98 Wall	None detected
MB-DJC-05C	Drywall joint compound	Ground floor Side hallway leading to staircase to outside building Wall	None detected
MB-DJC-05D	Drywall joint compound	Ground floor Welding area 96 Wall	None detected
MB-DJC-05E	Drywall joint compound	Ground floor Staircase to outside building Wall	None detected
MB-DJC-05F	Drywall joint compound	Ground floor East hallway Wall	None detected
MB-DJC-05G	Drywall joint compound	Ground floor East hallway Wall	None detected

Hazardous Building Materials Assessment

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-DJC-06A	Drywall joint compound	1 st floor Room 159/160 Partition walls	None detected
MB-DJC-06B	Drywall joint compound	1 st floor Room 159/160 Partition walls	None detected
MB-DJC-06C	Drywall joint compound	1 st floor Room 159/160 Partition walls	None detected
MB-DJC-07A	Drywall joint compound	3 rd floor Room 396/397, 395 – 399 and 387 Partition walls	None detected
MB-DJC-07B	Drywall joint compound	3 rd floor Room 396/397, 395 – 399 and 387 Partition walls	None detected
MB-DJC-07C	Drywall joint compound	3 rd floor Room 396/397, 395 – 399 and 387 Partition walls	None detected
MB-DJC-08A	Drywall joint compound	3 rd floor Insectary Partition wall	None detected
MB-DJC-08B	Drywall joint compound	3 rd floor Insectary Partition wall	None detected
MB-DJC-08C	Drywall joint compound	3 rd floor Insectary Partition wall	None detected
MB-DJC-09A	Drywall joint compound	3 rd floor Herbarium Partition wall	None detected
MB-DJC-09B	Drywall joint compound	3 rd floor Herbarium Partition wall	None detected
MB-DJC-09C	Drywall joint compound	3 rd floor Herbarium Partition wall	None detected

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-DJC-10A	Drywall joint compound	Ground floor Quarantine room Partition wall	None detected
MB-DJC-10B	Drywall joint compound	Ground floor Quarantine room Partition wall	None detected
MB-DJC-10C	Drywall joint compound	Ground floor Quarantine room Partition wall	None detected
MB-FS-01A	Fire stop caulking White colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-01B	Fire stop caulking White colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-01C	Fire stop caulking White colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-02A	Fire stop caulking Black colour	Penthouse Floor penetrations (mechanical pipe)	3% Chrysotile
MB-FS-02B	Fire stop caulking Black colour	Penthouse Floor penetrations (mechanical pipe)	Stop positive (not analyzed)
MB-FS-02C	Fire stop caulking Black colour	Penthouse Floor penetrations (mechanical pipe)	Stop positive (not analyzed)
MB-FS-03A	Fire stop caulking Red colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-03B	Fire stop caulking Red colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-03C	Fire stop caulking Red colour	Penthouse Floor penetrations (mechanical pipe)	None detected

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-FS-04A	Fire stop caulking Red/brown (textured) colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-04B	Fire stop caulking Red/brown (textured) colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-04C	Fire stop caulking Red/brown (textured) colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-05A	Fire stop caulking Grey colour	Penthouse Floor penetrations (mechanical ductwork)	5% Chrysotile
MB-FS-05B	Fire stop caulking Grey colour	Penthouse Floor penetrations (mechanical ductwork)	Stop positive (not analyzed)
MB-FS-05C	Fire stop caulking Grey colour	Penthouse Floor penetrations (mechanical ductwork)	Stop positive (not analyzed)
MB-FS-06A	Fire stop caulking Light grey colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-06B	Fire stop caulking Light grey colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-06C	Fire stop caulking Light grey colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-07A	Fire stop caulking Dark grey colour	Penthouse Floor penetrations (mechanical pipe)	< 0.25% Chrysotile
MB-FS-07B	Fire stop caulking Dark grey colour	Penthouse Floor penetrations (mechanical pipe)	None detected
MB-FS-07C	Fire stop caulking Dark grey colour	Penthouse Floor penetrations (mechanical pipe)	None detected

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-FS-08A	Fire stop caulking Silver colour – malleable	Penthouse Floor penetrations (mechanical ductwork)	None detected
MB-FS-08B	Fire stop caulking Silver colour – malleable	Penthouse Floor penetrations (mechanical ductwork)	None detected
MB-FS-08C	Fire stop caulking Silver colour – malleable	Penthouse Floor penetrations (mechanical ductwork)	None detected
MB-FS-09A	Fire stop caulking Silver colour - hardened	Penthouse Floor penetrations (mechanical ductwork)	5% Chrysotile
MB-FS-09B	Fire stop caulking Silver colour - hardened	Penthouse Floor penetrations (mechanical ductwork)	Stop positive (not analyzed)
MB-FS-09C	Fire stop caulking Silver colour - hardened	Penthouse Floor penetrations (mechanical ductwork)	Stop positive (not analyzed)
MB-FS-10A	Fire stop caulking Red/brown (textured) colour	Ground floor Room 069 Wall penetrations (mechanical pipe)	None detected
MB-FS-10B	Fire stop caulking Red/brown (textured) colour	Ground floor Room 069 Wall penetrations (mechanical pipe)	None detected
MB-FS-10C	Fire stop caulking Red/brown (textured) colour	Ground floor Room 069 Wall penetrations (mechanical pipe)	None detected
MB-CT-01A	Ceiling tile (2'x4' size) Textured with fibreglass core	Penthouse Storage room Suspended ceiling	None detected
MB-CT-01B	Ceiling tile (2'x4' size) Textured with fibreglass core	Penthouse Storage room Suspended ceiling	None detected

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-CT-01C	Ceiling tile (2'x4' size) Textured with fibreglass core	Penthouse Storage room Suspended ceiling	None detected
MB-CT-02A	Ceiling tile (1'x1' size) Random fissures and pinholes	Room M05 Suspended ceiling	None detected
MB-CT-02B	Ceiling tile (1'x1' size) Random fissures and pinholes	Room M05 Suspended ceiling	None detected
MB-CT-02C	Ceiling tile (1'x1' size) Random fissures and pinholes	Room M05 Suspended ceiling	None detected
MB-CT-03A	Ceiling tile (2'x2' size) Random large and small holes	1 st floor Main hallway Suspended ceiling	None detected
MB-CT-03B	Ceiling tile (2'x2' size) Random large and small holes	1 st floor Main hallway Suspended ceiling	None detected
MB-CT-03C	Ceiling tile (2'x2' size) Random large and small holes	1 st floor Main hallway Suspended ceiling	None detected
MB-CT-04A	Ceiling tile (2'x4' size) Standard fissures and pinholes	1 st floor General stores M01 Suspended ceiling	None detected
MB-CT-04B	Ceiling tile (2'x4' size) Standard fissures and pinholes	1 st floor General stores M01 Suspended ceiling	None detected
MB-CT-04C	Ceiling tile (2'x4' size) Standard fissures and pinholes	1 st floor General stores M01 Suspended ceiling	None detected
MB-FT-01A	Floor tile (9"x9" size) Brown colour	1 st floor Room 187 Flooring	None detected
MB-FT-01A MASTIC	Floor tile mastic	1 st floor Room 187 Flooring	None detected
MB-FT-01B	Floor tile (9"x9" size) Brown colour	2 nd floor Room 290 Flooring	None detected

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-FT-01B MASTIC	Floor tile mastic	2 nd floor Room 290 Flooring	None detected
MB-FT-01C	Floor tile (9"x9" size) Brown colour	3 rd floor Room 387 Flooring	None detected
MB-FT-01C MASTIC	Floor tile mastic	3 rd floor Room 387 Flooring	None detected
MB-FT-02A	Floor tile (9"x9" size) Green colour	1 st floor Room 186 Flooring	None detected
MB-FT-02A MASTIC	Floor tile mastic	1 st floor Room 186 Flooring	None detected
MB-FT-02B	Floor tile (9"x9" size) Green colour	2 nd floor Room 284 Flooring	None detected
MB-FT-02B MASTIC	Floor tile mastic	2 nd floor Room 284 Flooring	None detected
MB-FT-02C	Floor tile (9"x9" size) Green colour	3 rd floor Room 382 Flooring	None detected
MB-FT-02C MASTIC	Floor tile mastic	3 rd floor Room 382 Flooring	None detected
MB-SF-01	Sheet flooring Grey colour	Ground floor Quarantine room Flooring	None detected
MB-PC-01A	Parging cement applied to pipe fittings Light grey colour Chalk-like texture	Ground floor Room 069 Mechanical pipe	10% Amosite 8% Chrysotile

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-PC-01B	Parging cement applied to pipe fittings Light grey colour, chalk-like texture	Ground floor Room 069 Mechanical pipe	10% Amosite 5% Chrysotile
MB-PC-01C	Parging cement applied to pipe fittings Light grey colour, chalk-like texture	Ground floor Room 069 Mechanical pipe	10% Amosite 4% Chrysotile
MB-PC-01D	Parging cement applied to pipe fittings Light grey colour, chalk-like texture	1 st floor East hallway Mechanical pipe fitting (at ceiling)	8% Amosite 2% Chrysotile
MB-PC-02A	Parging cement applied to pipe fittings Grey colour, fibrous	Room CR5 Within ceiling space (above plaster ceiling)	45% Chrysotile
MB-PC-02B	Parging cement applied to pipe fittings Grey colour, fibrous	Room CR5 Within ceiling space (above plaster ceiling)	45% Chrysotile
MB-PC-02C	Parging cement applied to pipe fittings Grey colour, fibrous	Room CR5 Within ceiling space (above plaster ceiling)	45% Chrysotile
MB-FD-01A	Flex duct fabric	Penthouse Mechanical ductwork	80% Chrysotile
MB-FD-01B	Flex duct fabric	Penthouse Mechanical ductwork	80% Chrysotile
MB-FD-01C	Flex duct fabric	Penthouse Mechanical ductwork	75% Chrysotile
MB-DI-01A	Duct insulation White colour, fibrous	Penthouse Between mechanical ductwork and floor penetrations	50% Chrysotile
MB-DI-01B	Duct insulation White colour, fibrous	Penthouse Between mechanical ductwork and floor penetrations	Stop positive (not analyzed)
MB-DI-01C	Duct insulation White colour, fibrous	Penthouse Between mechanical ductwork and floor penetrations	Stop positive (not analyzed)

Hazardous Building Materials Assessment

506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-DL-01A	Duct insulation inner liner Black colour mastic and fibreglass insulation	Penthouse Mechanical ductwork	None detected
MB-DL-01B	Duct insulation inner liner Black colour mastic and fibreglass insulation	Penthouse Mechanical ductwork	None detected
MB-DL-01C	Duct insulation inner liner Black colour mastic and fibreglass insulation	Penthouse Mechanical ductwork	None detected
MB-DM-01A	Duct mastic Green colour	Penthouse Mechanical ductwork	None detected
MB-DM-01B	Duct mastic Green colour	Penthouse Mechanical ductwork	None detected
MB-DM-01C	Duct mastic Green colour	Penthouse Mechanical ductwork	None detected
MB-DM-02A	Duct mastic Red colour	Penthouse Mechanical ductwork	4% Chrysotile
MB-DM-02B	Duct mastic Red colour	Penthouse Mechanical ductwork	Stop positive (not analyzed)
MB-DM-02C	Duct mastic Red colour	Penthouse Mechanical ductwork	Stop positive (not analyzed)
MB-DM-03A	Duct mastic Dark grey colour	Penthouse Mechanical ductwork	None detected
MB-DM-03B	Duct mastic Dark grey colour	Penthouse Mechanical ductwork	None detected
MB-DM-03C	Duct mastic Dark grey colour	Penthouse Mechanical ductwork	None detected
MB-DM-04A	Duct mastic Light grey colour	Room M06 Mechanical ductwork	None detected
MB-DM-04B	Duct mastic Light grey colour	Room M06 Mechanical ductwork	None detected
MB-DM-04C	Duct mastic Light grey colour	Room M06 Mechanical ductwork	None detected
MB-PW-01A	Mechanical pipe wrap	Penthouse Mechanical pipe	None detected

Hazardous Building Materials Assessment

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-PW-01B	Mechanical pipe wrap	Penthouse Mechanical pipe	None detected
MB-PW-01C	Mechanical pipe wrap	Penthouse Mechanical pipe	None detected
MB-PW-02A	Mechanical pipe wrap	Penthouse Mechanical pipe	None detected
MB-PW-02B	Mechanical pipe wrap	Penthouse Mechanical pipe	None detected
MB-PW-02C	Mechanical pipe wrap	Penthouse Mechanical pipe	None detected
MB-WP-01A	Wall parging (at pipe penetrations) Light grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected
MB-WP-01B	Wall parging (at pipe penetrations) Light grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected
MB-WP-01C	Wall parging (at pipe penetrations) Light grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected
MB-WP-02A	Wall parging (at pipe penetrations) Medium grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected
MB-WP-02B	Wall parging (at pipe penetrations) Medium grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected
MB-WP-02C	Wall parging (at pipe penetrations) Medium grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-WP-03A	Wall parging (at pipe penetrations) Dark grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected
MB-WP-03B	Wall parging (at pipe penetrations) Dark grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected
MB-WP-03C	Wall parging (at pipe penetrations) Dark grey colour	3 rd floor Chase 318 Wall penetrations (mechanical pipe)	None detected
MB-ES-01A	Exterior wall base stucco Grey with pebbles	Building exterior	None detected
MB-ES-01B	Exterior wall base stucco Grey with pebbles	Building exterior	None detected
MB-ES-01C	Exterior wall base stucco Grey with pebbles	Building exterior	None detected
MB-ES-01D	Exterior wall base stucco Grey with pebbles	Building exterior	None detected
MB-ES-01E	Exterior wall base stucco Grey with pebbles	Building exterior	None detected
MB-ES-02A	Exterior siding/column stucco White with pebbles	Building exterior	< 0.25% Chrysotile
MB-ES-02B	Exterior siding/column stucco White with pebbles	Building exterior	None detected
MB-ES-02C	Exterior siding/column stucco White with pebbles	Building exterior	None detected
MB-ES-02D	Exterior siding/column stucco White with pebbles	Building exterior	None detected
MB-ES-02E	Exterior siding/column stucco White with pebbles	Building exterior	None detected
MB-ES-02F	Exterior siding/column stucco White with pebbles	Building exterior	None detected
MB-ES-02G	Exterior siding/column stucco White with pebbles	Building exterior	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-ES-03A	Exterior wall base stucco Dark grey colour, textured	Building exterior	None detected
MB-ES-03B	Exterior wall base stucco Dark grey colour, textured	Building exterior	None detected
MB-ES-03C	Exterior wall base stucco Dark grey colour, textured	Building exterior	None detected
MB-ES-03D	Exterior wall base stucco Dark grey colour, textured	Building exterior	None detected
MB-ES-03E	Exterior wall base stucco Dark grey colour, textured	Building exterior	None detected
MB-ES-04A	Exterior wall base stucco Grey colour, textured	Building exterior	None detected
MB-ES-04B	Exterior wall base stucco Grey colour, textured	Building exterior	None detected
MB-ES-04C	Exterior wall base stucco Grey colour, textured	Building exterior	None detected
MB-ES-04D	Exterior wall base stucco Grey colour, textured	Building exterior	None detected
MB-ES-04E	Exterior wall base stucco Grey colour, textured	Building exterior	None detected
MB-SG-01A	Exterior stone wall grout	Building exterior	< 0.25% Chrysotile
MB-SG-01B	Exterior stone wall grout	Building exterior	None detected
MB-SG-01C	Exterior stone wall grout	Building exterior	None detected
MB-FB-01A	Fibre board Red and grey colour	Building exterior Around alternate entrance door to storage room within general stores M01	None detected
MB-FB-01B	Fibre board Red and grey colour	Building exterior Around alternate entrance door to storage room within general stores M01	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-FB-01C	Fibre board Red and grey colour	Building exterior Around alternate entrance door to storage room within general stores M01	None detected
MB-ECAU-01A	Exterior siding caulking Dark grey colour	Building exterior Siding	None detected
MB-ECAU-01B	Exterior siding caulking Dark grey colour	Building exterior Siding	None detected
MB-ECAU-01C	Exterior siding caulking Dark grey colour	Building exterior Siding	None detected
MB-ECAU-02A	Exterior window caulking Light grey colour	Building exterior Windows	None detected
MB-ECAU-02B	Exterior window caulking Light grey colour	Building exterior Windows	None detected
MB-ECAU-02C	Exterior window caulking Light grey colour	Building exterior Windows	None detected
MB-RS-01A	Exterior sealant Black colour	Rooftop Roof vent	None detected
MB-RS-01B	Exterior sealant Black colour	Rooftop Roof vent	None detected
MB-RS-01C	Exterior sealant Black colour	Rooftop Roof vent	None detected
MB-RS-02A	Exterior sealant (roofing tar) Black colour	Rooftop Mechanical	None detected
MB-RS-02B	Exterior sealant (roofing tar) Black colour	Rooftop Mechanical	None detected
MB-RS-02C	Exterior sealant (roofing tar) Black colour	Rooftop Mechanical	None detected
MB-RS-03A	Exterior sealant White colour	Rooftop Flashing/railing	None detected
MB-RS-03B	Exterior sealant White colour	Rooftop Flashing/railing	None detected
MB-RS-03C	Exterior sealant White colour	Rooftop Flashing/railing	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
A Wing			
MB-RS-04A	Exterior sealant White colour	Rooftop Mechanical	None detected
MB-RS-04A	Exterior sealant White colour	Rooftop Mechanical	None detected
MB-RS-04A	Exterior sealant White colour	Rooftop Mechanical	None detected
MB-CFS-01A	Fire stop Light grey, fibrous	1 st floor Pipe chase 130 Applied to wall area within the pipe chase	None detected
MB-CFS-01B	Fire stop Light grey, fibrous	1 st floor Pipe chase 130 Applied to wall area within the pipe chase	None detected
MB-CFS-01C	Fire stop Light grey, fibrous	1 st floor Pipe chase 130 Applied to wall area within the pipe chase	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
B Wing			
AD-DJC-01A	Drywall joint compound	Ground floor Conference room 021 Wall	None detected
AD-DJC-01B	Drywall joint compound	Ground floor Hallway in front of room 008 Wall	None detected
AD-DJC-01C	Drywall joint compound	1 st floor Hallway (outside men's washroom) Wall	None detected
AD-DJC-01D	Drywall joint compound	1 st floor Hallway (outside room 120)	None detected
AD-DJC-01E	Drywall joint compound	2 nd floor West stairwell Wall	None detected
AD-DJC-01F	Drywall joint compound	2 nd floor Hallway (outside room 216) Wall	None detected
AD-DJC-01G	Drywall joint compound	2 nd floor East stairwell Wall	None detected
AD-DJC-01H	Drywall joint compound	3 rd floor Hallway (outside room 302) Wall	None detected
AD-DJC-01I	Drywall joint compound	3 rd floor Hallway Wall	None detected
AD-DJC-01J	Drywall joint compound	Penthouse Wall	None detected
AD-DJC-01K	Drywall joint compound	Penthouse Wall	None detected
AD-DJC-01L	Drywall joint compound	Penthouse Wall	None detected
AD-SF-01A	Sheet flooring Grey colour	Ground floor Hallway (at rear entrance door) Flooring	None detected

Hazardous Building Materials Assessment

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
B Wing			
AD-SF-01A MASTIC	Sheet flooring mastic	Ground floor Hallway (at rear entrance door) Flooring	None detected
AD-SF-01B	Sheet flooring Grey colour	Ground floor Hallway (at rear entrance door) Flooring	None detected
AD-SF-01B MASTIC	Sheet flooring mastic	Ground floor Hallway (at rear entrance door) Flooring	None detected
AD-SF-01C	Sheet flooring Grey colour	Ground floor Hallway (at rear entrance door) Flooring	None detected
AD-SF-01C MASTIC	Sheet flooring mastic	Ground floor Hallway (at rear entrance door) Flooring	None detected
AD-SF-02A	Sheet flooring Blue colour	2 nd floor Hallway (south end lobby area) Flooring	None detected
AD-SF-02A MASTIC	Sheet flooring mastic	2 nd floor Hallway (south end lobby area) Flooring	None detected
AD-CAU-01A	Duct sealant Grey colour	Penthouse Mechanical ductwork	None detected
AD-CAU-01B	Duct sealant Grey colour	Penthouse Mechanical ductwork	None detected
AD-CAU-01C	Duct sealant Grey colour	Penthouse Mechanical ductwork	None detected
AD-CAU-02A	Caulking/sealant Silver colour	Rooftop	None detected
AD-CAU-02B	Caulking/sealant Silver colour	Rooftop	None detected
AD-CAU-02C	Caulking/sealant Silver colour	Rooftop	None detected
AD-CAU-03A	Caulking/sealant Grey colour	Rooftop	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
B Wing			
AD-CAU-03B	Caulking/sealant Grey colour	Rooftop	None detected
AD-CAU-03C	Caulking/sealant Grey colour	Rooftop	None detected
AD-CAU-04A	Caulking/sealant White colour	Rooftop	None detected
AD-CAU-04B	Caulking/sealant White colour	Rooftop	None detected
AD-CAU-04C	Caulking/sealant White colour	Rooftop	None detected
AD-CT-01A	Ceiling tile (2'x2' size) Random large and small holes	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-CT-01B	Ceiling tile (2'x2' size) Random large and small holes	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-CT-01C	Ceiling tile (2'x2' size) Random large and small holes	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-DM-01A	Duct mastic Red colour	Penthouse Exhaust ducting	4% Chrysotile
AD-DM-01B	Duct mastic Red colour	Penthouse Exhaust ducting	Stop positive (not analyzed)
AD-DM-01C	Duct mastic Red colour	Penthouse Exhaust ducting	Stop positive (not analyzed)
AD-DM-02A	Duct mastic Red colour	Penthouse Return ducting	4% Chrysotile
AD-DM-02B	Duct mastic Red colour	Penthouse Return ducting	Stop positive (not analyzed)
AD-DM-02C	Duct mastic Red colour	Penthouse Return ducting	Stop positive (not analyzed)
AD-DM-03A	Duct mastic Grey colour	Penthouse Return ducting	None detected
AD-DM-03B	Duct mastic Grey colour	Penthouse Return ducting	None detected

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506 West Burnside Road, Victoria, BC

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
B Wing			
AD-DM-03C	Duct mastic Grey colour	Penthouse Return ducting	None detected
AD-DM-04A	Duct mastic Brown colour	Penthouse Return ducting (fire damper doors)	None detected
AD-DM-04B	Duct mastic Brown colour	Penthouse Return ducting (fire damper doors)	None detected
AD-DM-04C	Duct mastic Brown colour	Penthouse Return ducting (fire damper doors)	None detected
AD-DM-05A	Duct mastic Light grey colour	Rooftop Exterior ducting	None detected
AD-DM-05B	Duct mastic Light grey colour	Rooftop Exterior ducting	None detected
AD-DM-05C	Duct mastic Light grey colour	Rooftop Exterior ducting	None detected
AD-FP-01A	Fire proofing White colour, fibrous	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-FP-01B	Fire proofing White colour, fibrous	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-FP-01C	Fire proofing White colour, fibrous	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-FP-01D	Fire proofing White colour, fibrous	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-FP-01E	Fire proofing White colour, fibrous	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-FP-01F	Fire proofing White colour, fibrous	1 st floor Hallway (outside room 104) Suspended ceiling	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
B Wing			
AD-FP-01G	Fire proofing White colour, fibrous	1 st floor Hallway (outside room 104) Suspended ceiling	None detected
AD-FPP-01A	Fire proofing patch Grey colour, cementitious	Above suspended ceiling	None detected (15 - 20% Vermiculite detected in sample)
AD-FPP-01B	Fire proofing patch Grey colour, cementitious	Above suspended ceiling	None detected (15 - 20% Vermiculite detected in sample)
AD-FPP-01C	Fire proofing patch Grey colour, cementitious	Above suspended ceiling	None detected (15 - 20% Vermiculite detected in sample)

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
Header Building			
HB-DJC-01A	Drywall joint compound	Interior wall	3% Chrysotile
HB-DJC-01B	Drywall joint compound	Interior wall	None detected
HB-DJC-01C	Drywall joint compound	Interior wall	None detected
HB-DJC-01D	Drywall joint compound	Interior wall	None detected
HB-DJC-01E	Drywall joint compound	Interior wall	None detected
HB-DJC-01F	Drywall joint compound	Interior wall	None detected
HB-DJC-01G	Drywall joint compound	Interior wall	3% Chrysotile
HB-PC-01A	Parging cement applied to pipe fittings Light grey colour, chalk-like	Room H20	None detected
HB-PC-01B	Parging cement applied to pipe fittings Light grey colour, chalk-like	Room H20	None detected
HB-PC-01C	Parging cement applied to pipe fittings Light grey colour, chalk-like	Room H20	None detected
HB-PC-01D	Parging cement applied to pipe fittings Light grey colour, chalk-like	Room H19	None detected
HB-PC-01E	Parging cement applied to pipe fittings Light grey colour, chalk-like	Room H19	None detected
HB-PC-01F	Parging cement applied to pipe fittings Light grey colour, chalk-like	Room H02	None detected
HB-TI-01A	Tank insulation Grey colour, fibrous	Autoclaving tank	None detected
HB-TI-01B	Tank insulation Grey colour, fibrous	Autoclaving tank	None detected
HB-TI-01C	Tank insulation Grey colour, fibrous	Autoclaving tank	None detected
HB-FT-01A	Floor tile (9"x9" size) Green colour	Room H09	4% Chrysotile

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
Header Building			
HB-FT-01A MASTIC	Floor tile mastic	Room H09	None detected
HB-FT-01B	Floor tile (9"x9" size) Green colour	Workshop H05	4% Chrysotile
HB-FT-01B MASTIC	Floor tile mastic	Workshop H05	None detected
HB-SF-01A	Sheet flooring Brown colour	Room H16	None detected
HB-SF-01A MASTIC	Sheet flooring mastic	Room H16	None detected
HB-SF-01B	Sheet flooring Brown colour	Room H17	None detected
HB-SF-01B MASTIC	Sheet flooring mastic	Room H17	None detected
HB-AS-01A	Liner between cement panels and trim White colour, rigid	Building exterior	None detected
HB-AS-01B	Liner between cement panels and trim White colour, rigid	Building exterior	None detected
HB-AS-01C	Liner between cement panels and trim White colour, rigid	Building exterior	None detected
HB-CAU-01A	Exterior caulking around windows/cement panels	Building exterior	None detected
HB-CAU-01B	Exterior caulking around windows/cement panels	Building exterior	None detected
HB-CAU-01C	Exterior caulking around windows/cement panels	Building exterior	None detected
HB-TP-01A	Cement (Transite) panels	Building exterior	15% Chrysotile
HB-TP-01B	Cement (Transite) panels	Building exterior	Stop positive (not analyzed)
HB-TP-01C	Cement (Transite) panels	Building exterior	Stop positive (not analyzed)

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
Annex Building			
AN-DJC-01A	Drywall joint compound	Interior wall	< 1% Chrysotile
AN-DJC-01B	Drywall joint compound	Interior wall	2% Chrysotile
AN-DJC-01C	Drywall joint compound	Interior wall	3% Chrysotile
AN-DJC-01D	Drywall joint compound	Interior wall	None detected
AN-DJC-01E	Drywall joint compound	Interior wall	None detected
AN-DJC-01F	Drywall joint compound	Interior wall	None detected
AN-DJC-01G	Drywall joint compound	Interior wall	None detected
AN-FT-01A	Floor tile (12"x12" size) Beige with brown streaks	Flooring	3% Chrysotile
AN-FT-01A MASTIC	Floor tile mastic	Flooring	None detected
AN-FT-01B	Floor tile (12"x12" size) Beige with brown streaks	Flooring	3% Chrysotile
AN-FT-01B MASTIC	Floor tile mastic	Flooring	None detected
AN-EP-01A	Exterior stucco Grey colour	Building exterior	None detected
AN-EP-01B	Exterior stucco Grey colour	Building exterior	None detected
AN-EP-01C	Exterior stucco Grey colour	Building exterior	None detected
AN-CT-01A	Ceiling tile (1'x1' size) Random fissures and pinholes – grey core	Ceiling	None detected
AN-CT-01B	Ceiling tile (1'x1' size) Random fissures and pinholes – grey core	Ceiling	None detected
AN-CT-01C	Ceiling tile (1'x1' size) Random fissures and pinholes – grey core	Ceiling	None detected
AN-CT-02A	Ceiling tile (1'x1' size) Random large fissures and pinholes – light brown core	Ceiling	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
Annex Building			
AN-CT-02B	Ceiling tile (1'x1' size) Random large fissures and pinholes – light brown core	Ceiling	None detected
AN-CT-02C	Ceiling tile (1'x1' size) Random large fissures and pinholes – light brown core	Ceiling	None detected
AN-CT-03A	Ceiling tile (1'x1' size) Random flecks and pinholes – grey core	Ceiling	None detected
AN-CT-03B	Ceiling tile (1'x1' size) Random flecks and pinholes – grey core	Ceiling	None detected
AN-CT-03C	Ceiling tile (1'x1' size) Random flecks and pinholes – grey core	Ceiling	None detected
AN-CT-04A	Ceiling tile (1'x1' size) Random small fissures and pinholes – light brown core	Ceiling	None detected
AN-CT-04B	Ceiling tile (1'x1' size) Random small fissures and pinholes – light brown core	Ceiling	None detected
AN-CT-04C	Ceiling tile (1'x1' size) Random small fissures and pinholes – light brown core	Ceiling	None detected

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Appendix B: Summary Table – Suspected ACM Bulk Samples

Sample Number	Material Description	Sample Location	Result (% Asbestos)
Workshop/Garages			
S-DJC-01A	Drywall joint compound	Interior wall	None detected
S-DJC-01B	Drywall joint compound	Interior wall	None detected
S-DJC-01C	Drywall joint compound	Interior wall	None detected
S-DJC-01D	Drywall joint compound	Interior wall	None detected
S-DJC-01E	Drywall joint compound	Interior wall	None detected
Glasshouse			
GH-CAU-01A	Caulking/sealant Silver colour	On mechanical pipe covering (tin covering)	None detected
GH-CAU-01B	Caulking/sealant Silver colour	On mechanical pipe covering (tin covering)	None detected
GH-CAU-01C	Caulking/sealant Silver colour	On mechanical pipe covering (tin covering)	None detected
GH-CAU-02A	Caulking/sealant White colour	On wall base/mechanical ducting	None detected
GH-CAU-02B	Caulking/sealant White colour	On wall base/mechanical ducting	None detected
GH-CAU-02C	Caulking/sealant White colour	On wall base/mechanical ducting	None detected
Equipment Shed			
No suspected ACMs observed			
Shadehouse			
No suspected ACMs observed			

Appendix C
Summary of Suspected LCP Bulk Samples

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Appendix C: Summary Table – Suspected LCP Bulk Samples

Sample Number	Paint Description	Location	Analysis (Lead – ppm)
A Wing			
MB-P-01	Grey colour	Rooftop Mechanical ductwork	1,700
MB-P-02	White colour	Rooftop Railing	18,000
MB-P-03	Cream colour	Penthouse Pipe	990
MB-P-04	Silver colour	Penthouse Cast iron drain pipe	960
MB-P-05	Red colour	Penthouse Sprinkler pipe	7,600
MB-P-06	Cream colour	Penthouse Wall	940
MB-P-07	Grey/blue colour	1 st floor east hallway Floor	630
MB-P-08	Cream colour	1 st floor Walls/ceiling	560
MB-P-09	White colour	1 st floor west stairwell Walls	1,600
MB-P-10	Red colour (yellow colour beneath)	Ground floor Doors/door frames	2,800
MB-P-11	Grey colour	Building exterior Trim	2,800
B Wing			
AD-P-01	Beige colour	Cafeteria 018 Walls	< 90
AD-P-02	White colour	Room 023 Walls	< 90
AD-P-03	Off-white colour	Room 023 Door trim	2,000
AD-P-04	Green colour	Hallway outside room 003 Door trim	1,800
AD-P-05	Yellow colour	Hallway outside room 009 Door trim	1,100

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Appendix C: Summary Table – Suspected LCP Bulk Samples

Sample Number	Paint Description	Location	Analysis (Lead – ppm)
AD-P-06	Beige colour	Hallway outside boardroom 121 Walls	< 90
AD-P-07	Grey colour	Walls	< 90
AD-P-08	Grey colour	3rd floor entrance doors to A Wing Door trim	2,400
AD-P-09	Beige colour	1 st floor atrium Vertical ducts	460
AD-P-10	Grey colour	1 st floor atrium Vertical ducts	< 470
AD-P-11	White colour	Penthouse Interior wall	210
AD-P-12	White colour	Rooftop Exterior staircase	< 90
AD-P-13	Grey colour	Rooftop Exterior siding	1,200
AD-P-14	Grey colour	Ground floor Exterior structural steel	520
Header Building			
HB-P-01	Beige colour	Interior walls	1,800
HB-P-02	Light grey colour	Floor	<90
HB-P-03	Light green colour	Interior posts and doors	3,800
HB-P-04	Dark green colour	Interior doors	27,000
Annex Building			
AN-P-01	Beige colour	Interior walls	< 90
AN-P-02	Yellow colour	Interior doors and door frames	< 130
AN-P-03	Grey colour	Building exterior Trim	1,200
AN-P-04	White colour	Building exterior Siding	2,300
Workshop/Garages			
S-P-01	Brown colour	Building exterior Siding	130
S-P-02	Beige colour	Mechanical ductwork	2,400
S-P-03	White colour	Interior Walls	680

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Appendix C: Summary Table – Suspected LCP Bulk Samples

Sample Number	Paint Description	Location	Analysis (Lead – ppm)
Equipment Shed			
Sh-P-01	White colour	Building exterior/interior Siding	6,700
Glasshouse – no suspected LCPs observed			
Equipment Shed – no suspected LCPs observed			

Appendix D
Certificate of Analysis – Suspected ACM Samples



EMSL Canada Inc.

10 Falconer Drive, Unit #3 Mississauga, ON L5N 3L8
Phone/Fax: 289-997-4602 / (289) 997-4607
<http://www.EMSL.com> / torontolab@emsl.com

EMSL Canada Order 551400515
Customer ID: 55JACQ30L
Customer PO: 115614042
Project ID:

Attn: Zack Kranjec
Stantec Consulting, Ltd.
1100- 111 Dunsmuir Street
Vancouver, BC V6B 6A3

Phone: (604) 696-8272
Fax:
Collected:
Received: 1/29/2014
Analyzed: 3/11/2014

Proj: 115614042

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: MB-PL-01A

Lab Sample ID: 551400515-0001

Sample Description: Wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-01B

Lab Sample ID: 551400515-0002

Sample Description: Wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-01C

Lab Sample ID: 551400515-0003

Sample Description: Column/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-01D

Lab Sample ID: 551400515-0004

Sample Description: Ceiling/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-01E

Lab Sample ID: 551400515-0005

Sample Description: Wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-01F

Lab Sample ID: 551400515-0006

Sample Description: Wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-01G

Lab Sample ID: 551400515-0007

Sample Description: Wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	



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Customer ID: 55JACQ30L
Customer PO: 115614042
Project ID:

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Client Sample ID: MB-PL-02A **Lab Sample ID:** 551400515-0008
Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02B **Lab Sample ID:** 551400515-0009
Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02C **Lab Sample ID:** 551400515-0010
Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02D **Lab Sample ID:** 551400515-0011
Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02E **Lab Sample ID:** 551400515-0012
Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02F **Lab Sample ID:** 551400515-0013
Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02G **Lab Sample ID:** 551400515-0014
Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02H **Lab Sample ID:** 551400515-0015
Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	



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Client Sample ID: MB-PL-02I **Lab Sample ID:** 551400515-0016

Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02J **Lab Sample ID:** 551400515-0017

Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-02K **Lab Sample ID:** 551400515-0018

Sample Description: Wall/plaster-skim & base layers

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-03A **Lab Sample ID:** 551400515-0019

Sample Description: Boiler room wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-03B **Lab Sample ID:** 551400515-0020

Sample Description: Boiler room wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-PL-03C **Lab Sample ID:** 551400515-0021

Sample Description: Boiler room wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-PL-04A **Lab Sample ID:** 551400515-0022

Sample Description: Boiler room wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	90%	10% Chrysotile	

Client Sample ID: MB-PL-04B **Lab Sample ID:** 551400515-0023

Sample Description: Stairwell wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	90%	10% Chrysotile	



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Client Sample ID: MB-PL-04C **Lab Sample ID:** 551400515-0024
Sample Description: Stairwell wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	90%	10% Chrysotile	

Client Sample ID: MB-PL-04D **Lab Sample ID:** 551400515-0025
Sample Description: Stairwell wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	90%	10% Chrysotile	

Client Sample ID: MB-PL-04E **Lab Sample ID:** 551400515-0026
Sample Description: Stairwell wall/plaster-base layer

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	92%	8% Chrysotile	

Client Sample ID: MB-DJC-01A **Lab Sample ID:** 551400515-0027
Sample Description: Penthouse storage room/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-01B **Lab Sample ID:** 551400515-0028
Sample Description: Penthouse storage room/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-01C **Lab Sample ID:** 551400515-0029
Sample Description: Penthouse storage room/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-01D **Lab Sample ID:** 551400515-0030
Sample Description: Penthouse storage room/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-01E **Lab Sample ID:** 551400515-0031
Sample Description: Penthouse storage room/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	



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Client Sample ID: MB-DJC-02A **Lab Sample ID:** 551400515-0032
Sample Description: 1st floor stores/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-02B **Lab Sample ID:** 551400515-0033
Sample Description: 1st floor stores/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-02C **Lab Sample ID:** 551400515-0034
Sample Description: 1st floor stores/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-03A **Lab Sample ID:** 551400515-0035
Sample Description: 1st floor lobby elevators/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-03B **Lab Sample ID:** 551400515-0036
Sample Description: 1st floor lobby elevators/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-03C **Lab Sample ID:** 551400515-0037
Sample Description: 1st floor lobby elevators/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-04A **Lab Sample ID:** 551400515-0038
Sample Description: Library lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-04B **Lab Sample ID:** 551400515-0039
Sample Description: Library lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	



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Client Sample ID: MB-DJC-04C **Lab Sample ID:** 551400515-0040
Sample Description: Library lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-04D **Lab Sample ID:** 551400515-0041
Sample Description: Library lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-04E **Lab Sample ID:** 551400515-0042
Sample Description: Library lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-05A **Lab Sample ID:** 551400515-0043
Sample Description: Mech/shops/hallway lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-05B **Lab Sample ID:** 551400515-0044
Sample Description: Mech/shops/hallway lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-05C **Lab Sample ID:** 551400515-0045
Sample Description: Mech/shops/hallway lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-05D **Lab Sample ID:** 551400515-0046
Sample Description: Mech/shops/hallway lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-05E **Lab Sample ID:** 551400515-0047
Sample Description: Mech/shops/hallway lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	



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Client Sample ID: MB-DJC-05F **Lab Sample ID:** 551400515-0048
Sample Description: Mech/shops/hallway lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-05G **Lab Sample ID:** 551400515-0049
Sample Description: Mech/shops/hallway lower level/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-06A **Lab Sample ID:** 551400515-0050
Sample Description: Room 159/160 partitions/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-06B **Lab Sample ID:** 551400515-0051
Sample Description: Room 159/160 partitions/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-06C **Lab Sample ID:** 551400515-0052
Sample Description: Room 159/160 partitions/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-07A **Lab Sample ID:** 551400515-0053
Sample Description: Room 396/397,395-399 & 387 partitions/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-07B **Lab Sample ID:** 551400515-0054
Sample Description: Room 396/397,395-399 & 387 partitions/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-07C **Lab Sample ID:** 551400515-0055
Sample Description: Room 396/397,395-399 & 387 partitions/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	



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Client Sample ID: MB-DJC-08A **Lab Sample ID:** 551400515-0056
Sample Description: Insectary partitons/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-08B **Lab Sample ID:** 551400515-0057
Sample Description: Insectary partitons/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-08C **Lab Sample ID:** 551400515-0058
Sample Description: Insectary partitons/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-09A **Lab Sample ID:** 551400515-0059
Sample Description: Herbarium partiton/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-09B **Lab Sample ID:** 551400515-0060
Sample Description: Herbarium partiton/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-09C **Lab Sample ID:** 551400515-0061
Sample Description: Herbarium partiton/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-10A **Lab Sample ID:** 551400515-0062
Sample Description: Quarantime room partition/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-DJC-10B **Lab Sample ID:** 551400515-0063
Sample Description: Quarantime room partition/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	



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Client Sample ID: MB-DJC-10C **Lab Sample ID:** 551400515-0064
Sample Description: Quarantine room partition/drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-FS-01A **Lab Sample ID:** 551400515-0065
Sample Description: White colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-FS-01B **Lab Sample ID:** 551400515-0066
Sample Description: White colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-FS-01C **Lab Sample ID:** 551400515-0067
Sample Description: White colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-FS-02A **Lab Sample ID:** 551400515-0068
Sample Description: Black colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Black	0%	97%	3% Chrysotile	

Client Sample ID: MB-FS-02B **Lab Sample ID:** 551400515-0069
Sample Description: Black colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014					Stop Positive (Not Analyzed)

Client Sample ID: MB-FS-02C **Lab Sample ID:** 551400515-0070
Sample Description: Black colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014					Stop Positive (Not Analyzed)

Client Sample ID: MB-FS-03A **Lab Sample ID:** 551400515-0071
Sample Description: Red colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Red	2%	98%	None Detected	



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Client Sample ID: MB-FS-03B **Lab Sample ID:** 551400515-0072
Sample Description: Red colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Red/Silver	2%	98%	None Detected	

Client Sample ID: MB-FS-03C **Lab Sample ID:** 551400515-0073
Sample Description: Red colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Silver	4%	96%	None Detected	

Client Sample ID: MB-FS-04A **Lab Sample ID:** 551400515-0074
Sample Description: Red/brown (textured) colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Gray	0%	100%	None Detected	

Client Sample ID: MB-FS-04B **Lab Sample ID:** 551400515-0075
Sample Description: Red/brown (textured) colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Gray	0%	100%	None Detected	

Client Sample ID: MB-FS-04C **Lab Sample ID:** 551400515-0076
Sample Description: Red/brown (textured) colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Gray	0%	100%	None Detected	

Client Sample ID: MB-FS-05A **Lab Sample ID:** 551400515-0077
Sample Description: Grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	95%	5% Chrysotile	

Client Sample ID: MB-FS-05B **Lab Sample ID:** 551400515-0078
Sample Description: Grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014					Stop Positive (Not Analyzed)

Client Sample ID: MB-FS-05C **Lab Sample ID:** 551400515-0079
Sample Description: Grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014					Stop Positive (Not Analyzed)



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Client Sample ID: MB-FS-06A **Lab Sample ID:** 551400515-0080

Sample Description: Light grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-FS-06B **Lab Sample ID:** 551400515-0081

Sample Description: Light grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-FS-06C **Lab Sample ID:** 551400515-0082

Sample Description: Light grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-FS-07A **Lab Sample ID:** 551400515-0083

Sample Description: Dark grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	<1% Chrysotile	
400 PLM Pt Ct	3/11/2014	Gray	0%	100%	<0.25% Chrysotile	

Client Sample ID: MB-FS-07B **Lab Sample ID:** 551400515-0084

Sample Description: Dark grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-FS-07C **Lab Sample ID:** 551400515-0085

Sample Description: Dark grey colour/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various/Silver	0%	100%	None Detected	

Client Sample ID: MB-FS-08A **Lab Sample ID:** 551400515-0086

Sample Description: Silver colour-malleable/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-FS-08B **Lab Sample ID:** 551400515-0087

Sample Description: Silver colour-malleable/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	



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Client Sample ID: MB-FS-08C **Lab Sample ID:** 551400515-0088
Sample Description: Silver colour-malleable/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Silver	0%	100%	None Detected	

Client Sample ID: MB-FS-09A **Lab Sample ID:** 551400515-0089
Sample Description: Silver colour-hardened/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Various	0%	95%	5% Chrysotile	

Client Sample ID: MB-FS-09B **Lab Sample ID:** 551400515-0090
Sample Description: Silver colour-hardened/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: MB-FS-09C **Lab Sample ID:** 551400515-0091
Sample Description: Silver colour-hardened/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: MB-FS-10A **Lab Sample ID:** 551400515-0092
Sample Description: Red/brown (textured) colour ground fl @ wallpipe/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Various	0%	100%	None Detected	

Client Sample ID: MB-FS-10B **Lab Sample ID:** 551400515-0093
Sample Description: Red/brown (textured) colour ground fl @ wallpipe/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Various	0%	100%	None Detected	

Client Sample ID: MB-FS-10C **Lab Sample ID:** 551400515-0094
Sample Description: Red/brown (textured) colour ground fl @ wallpipe/fire stop caulking

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown	4%	96%	None Detected	

Client Sample ID: MB-CT-01A **Lab Sample ID:** 551400515-0095
Sample Description: Penthouse storage rm suspended ct/ceiling 2'x4' size textured w/fiberglass core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	60%	40%	None Detected	



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Client Sample ID: MB-CT-01B **Lab Sample ID:** 551400515-0096
Sample Description: Penthouse storage rm suspended ct/ceiling 2'x4' size textured w/fiberglass core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	60%	40%	None Detected	

Client Sample ID: MB-CT-01C **Lab Sample ID:** 551400515-0097
Sample Description: Penthouse storage rm suspended ct/ceiling 2'x4' size textured w/fiberglass core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	45%	55%	None Detected	

Client Sample ID: MB-CT-02A **Lab Sample ID:** 551400515-0098
Sample Description: Room M05 suspended ct/ceiling 1'x1' size random fissures & pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/White	80%	20%	None Detected	

Client Sample ID: MB-CT-02B **Lab Sample ID:** 551400515-0099
Sample Description: Room M05 suspended ct/ceiling 1'x1' size random fissures & pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/White	80%	20%	None Detected	

Client Sample ID: MB-CT-02C **Lab Sample ID:** 551400515-0100
Sample Description: Room M05 suspended ct/ceiling 1'x1' size random fissures & pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	80%	20%	None Detected	

Client Sample ID: MB-CT-03A **Lab Sample ID:** 551400515-0101
Sample Description: 1st floor suspended/ceiling tile 2'x2' size random large & small hols

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/White	85%	15%	None Detected	

Client Sample ID: MB-CT-03B **Lab Sample ID:** 551400515-0102
Sample Description: 1st floor suspended/ceiling tile 2'x2' size random large & small hols

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/White	85%	15%	None Detected	

Client Sample ID: MB-CT-03C **Lab Sample ID:** 551400515-0103
Sample Description: 1st floor suspended/ceiling tile 2'x2' size random large & small hols

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	80%	20%	None Detected	



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Client Sample ID: MB-CT-04A **Lab Sample ID:** 551400515-0104

Sample Description: 1st floor stores suspended/ceiling tile 2'x4' size standard fissures & pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/White	80%	20%	None Detected	

Client Sample ID: MB-CT-04B **Lab Sample ID:** 551400515-0105

Sample Description: 1st floor stores suspended/ceiling tile 2'x4' size standard fissures & pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/White	80%	20%	None Detected	

Client Sample ID: MB-CT-04C **Lab Sample ID:** 551400515-0106

Sample Description: 1st floor stores suspended/ceiling tile 2'x4' size standard fissures & pinholes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	80%	20%	None Detected	

Client Sample ID: MB-FT-01A **Lab Sample ID:** 551400515-0107

Sample Description: Flooring/floor tile 9"x9" size brown colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Various	0%	100%	None Detected	

Client Sample ID: MB-FT-01A MASTIC **Lab Sample ID:** 551400515-0107A

Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: MB-FT-01B **Lab Sample ID:** 551400515-0108

Sample Description: Flooring/floor tile 9"x9" size brown colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Various	0%	100%	None Detected	

Client Sample ID: MB-FT-01B MASTIC **Lab Sample ID:** 551400515-0108A

Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: MB-FT-01C **Lab Sample ID:** 551400515-0109

Sample Description: Flooring/floor tile 9"x9" size brown colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown	0%	100%	None Detected	



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Client Sample ID: MB-FT-01C MASTIC **Lab Sample ID:** 551400515-0109A

Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: MB-FT-02A **Lab Sample ID:** 551400515-0110

Sample Description: Flooring/floor tile 9"x9" size green colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Various/Green	0%	100%	None Detected	

Client Sample ID: MB-FT-02A MASTIC **Lab Sample ID:** 551400515-0110A

Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: MB-FT-02B **Lab Sample ID:** 551400515-0111

Sample Description: Flooring/floor tile 9"x9" size green colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Various/Green	0%	100%	None Detected	

Client Sample ID: MB-FT-02B MASTIC **Lab Sample ID:** 551400515-0111A

Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: MB-FT-02C **Lab Sample ID:** 551400515-0112

Sample Description: Flooring/floor tile 9"x9" size green colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Various/Green	0%	100%	None Detected	

Client Sample ID: MB-FT-02C MASTIC **Lab Sample ID:** 551400515-0112A

Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: MB-SF-01 **Lab Sample ID:** 551400515-0113

Sample Description: Quarantine room flooring/sheet flooring grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	



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Client Sample ID: MB-SF-01 MASTIC **Lab Sample ID:** 551400515-0113A
Sample Description: Quarantine room flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Brown	0%	100%	None Detected	

Client Sample ID: MB-PC-01A **Lab Sample ID:** 551400515-0114
Sample Description: Room 069/parging cement applied to pipe fittings lt grey colour chalk like texture

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	45%	37%	10% Amosite 8% Chrysotile	

Client Sample ID: MB-PC-01B **Lab Sample ID:** 551400515-0115
Sample Description: Room 069/parging cement applied to pipe fittings lt grey colour chalk like texture

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	45%	40%	10% Amosite 5% Chrysotile	

Client Sample ID: MB-PC-01C **Lab Sample ID:** 551400515-0116
Sample Description: Room 069/parging cement applied to pipe fittings lt grey colour chalk like texture

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	45%	41%	10% Amosite 4% Chrysotile	

Client Sample ID: MB-PC-01D **Lab Sample ID:** 551400515-0117
Sample Description: 1st floor hallway to general stores/shops/parging cement applied to pipe fittings lt grey colour chalk like texture

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	40%	50%	8% Amosite 2% Chrysotile	

Client Sample ID: MB-PC-02A **Lab Sample ID:** 551400515-0118
Sample Description: Room CR5 w/in ceiling space above plaster ceiling/parging cement applied to pipe fittings grey colour fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/Variou	0%	55%	45% Chrysotile	

Client Sample ID: MB-PC-02B **Lab Sample ID:** 551400515-0119
Sample Description: Room CR5 w/in ceiling space above plaster ceiling/parging cement applied to pipe fittings grey colour fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/Variou	20%	35%	45% Chrysotile	



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Client Sample ID: MB-PC-02C **Lab Sample ID:** 551400515-0120

Sample Description: Room CR5 w/in ceiling space above plaster ceiling/parging cement applied to pipe fittings grey colour fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White/Various	0%	55%	45% Chrysotile	

Client Sample ID: MB-FD-01A **Lab Sample ID:** 551400515-0121

Sample Description: Penthouse mechanical ducting/flex duct fabric

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Black	0%	20%	80% Chrysotile	

Client Sample ID: MB-FD-01B **Lab Sample ID:** 551400515-0122

Sample Description: Penthouse mechanical ducting/flex duct fabric

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray	0%	20%	80% Chrysotile	

Client Sample ID: MB-FD-01C **Lab Sample ID:** 551400515-0123

Sample Description: Penthouse mechanical ducting/flex duct fabric

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Black	0%	25%	75% Chrysotile	

Client Sample ID: MB-DI-01A **Lab Sample ID:** 551400515-0124

Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	30%	20%	50% Chrysotile	

Client Sample ID: MB-DI-01B **Lab Sample ID:** 551400515-0125

Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: MB-DI-01C **Lab Sample ID:** 551400515-0126

Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: MB-DL-01A **Lab Sample ID:** 551400515-0127

Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Black/Yellow	40%	60%	None Detected	



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Client Sample ID: MB-DL-01B **Lab Sample ID:** 551400515-0128
Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Black/Yellow	40%	60%	None Detected	

Client Sample ID: MB-DL-01C **Lab Sample ID:** 551400515-0129
Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Black	50%	50%	None Detected	

Client Sample ID: MB-DM-01A **Lab Sample ID:** 551400515-0130
Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Black/Green	0%	100%	None Detected	

Client Sample ID: MB-DM-01B **Lab Sample ID:** 551400515-0131
Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Black/Green	0%	100%	None Detected	

Client Sample ID: MB-DM-01C **Lab Sample ID:** 551400515-0132
Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Black	0%	100%	None Detected	

Client Sample ID: MB-DM-02A **Lab Sample ID:** 551400515-0133
Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Red	0%	96%	4% Chrysotile	

Client Sample ID: MB-DM-02B **Lab Sample ID:** 551400515-0134
Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: MB-DM-02C **Lab Sample ID:** 551400515-0135
Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)



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Client Sample ID: MB-DM-03A **Lab Sample ID:** 551400515-0136

Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-DM-03B **Lab Sample ID:** 551400515-0137

Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-DM-03C **Lab Sample ID:** 551400515-0138

Sample Description: Penthouse mechanical ducting/Penthouse Mechanical ducting

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-DM-04A **Lab Sample ID:** 551400515-0139

Sample Description: Room M06 Mechanical ducting/Duct mastic Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-DM-04B **Lab Sample ID:** 551400515-0140

Sample Description: Room M06 Mechanical ducting/Duct mastic Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-DM-04C **Lab Sample ID:** 551400515-0141

Sample Description: Room M06 Mechanical ducting/Duct mastic Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-PW-01A **Lab Sample ID:** 551400515-0142

Sample Description: Penthouse Mechanical Pipe/Mechanical pipe wrap

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White/Various/Blaci	35%	65%	None Detected	

Client Sample ID: MB-PW-01B **Lab Sample ID:** 551400515-0143

Sample Description: Penthouse Mechanical Pipe/Mechanical pipe wrap

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White/Various/Blaci	35%	65%	None Detected	



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Client Sample ID: MB-PW-01C **Lab Sample ID:** 551400515-0144
Sample Description: Penthouse Mechanical Pipe/Mechanical pipe wrap

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	rown/Various/Blac	40%	60%	None Detected	

Client Sample ID: MB-PW-02A **Lab Sample ID:** 551400515-0145
Sample Description: Penthouse Mechanical Pipe/Mechanical pipe wrap

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	rown/Various/Blac	60%	40%	None Detected	

Client Sample ID: MB-PW-02B **Lab Sample ID:** 551400515-0146
Sample Description: Penthouse Mechanical Pipe/Mechanical pipe wrap

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	rown/Various/Blac	60%	40%	None Detected	

Client Sample ID: MB-PW-02C **Lab Sample ID:** 551400515-0147
Sample Description: Penthouse Mechanical Pipe/Mechanical pipe wrap

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	rown/Various/Blac	55%	45%	None Detected	

Client Sample ID: MB-WP-01A **Lab Sample ID:** 551400515-0148
Sample Description: Chase 318/Wall parging (at pipe penetrations) Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-WP-01B **Lab Sample ID:** 551400515-0149
Sample Description: Chase 318/Wall parging (at pipe penetrations) Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-WP-01C **Lab Sample ID:** 551400515-0150
Sample Description: Chase 318/Wall parging (at pipe penetrations) Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-WP-02A **Lab Sample ID:** 551400515-0151
Sample Description: Chase 318/Wall parging (at pipe penetrations) Medium grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	



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Client Sample ID: MB-WP-02B **Lab Sample ID:** 551400515-0152
Sample Description: Chase 318/Wall parging (at pipe penetrations) Medium grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-WP-02C **Lab Sample ID:** 551400515-0153
Sample Description: Chase 318/Wall parging (at pipe penetrations) Medium grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-WP-03A **Lab Sample ID:** 551400515-0154
Sample Description: Chase 318/Wall parging (at pipe penetrations) Dark grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-WP-03B **Lab Sample ID:** 551400515-0155
Sample Description: Chase 318/Wall parging (at pipe penetrations) Dark grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-WP-03C **Lab Sample ID:** 551400515-0156
Sample Description: Chase 318/Wall parging (at pipe penetrations) Dark grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-ES-01A **Lab Sample ID:** 551400515-0157
Sample Description: Building Exterior/Exterior wall base stucco Grey with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-ES-01B **Lab Sample ID:** 551400515-0158
Sample Description: Building Exterior/Exterior wall base stucco Grey with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	0%	100%	None Detected	

Client Sample ID: MB-ES-01C **Lab Sample ID:** 551400515-0159
Sample Description: Building Exterior/Exterior wall base stucco Grey with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	



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Client Sample ID: MB-ES-01D **Lab Sample ID:** 551400515-0160
Sample Description: Building Exterior/Exterior wall base stucco Grey with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-ES-01E **Lab Sample ID:** 551400515-0161
Sample Description: Building Exterior/Exterior wall base stucco Grey with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-ES-02A **Lab Sample ID:** 551400515-0162
Sample Description: Building Exterior/Exterior siding/column stucco White with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	<1% Chrysotile	
400 PLM Pt Ct	3/11/2014	Gray/White/Various	0%	100%	<0.25% Chrysotile	

Client Sample ID: MB-ES-02B **Lab Sample ID:** 551400515-0163
Sample Description: Building Exterior/Exterior siding/column stucco White with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-ES-02C **Lab Sample ID:** 551400515-0164
Sample Description: Building Exterior/Exterior siding/column stucco White with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-ES-02D **Lab Sample ID:** 551400515-0165
Sample Description: Building Exterior/Exterior siding/column stucco White with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-ES-02E **Lab Sample ID:** 551400515-0166
Sample Description: Building Exterior/Exterior siding/column stucco White with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White/Various	0%	100%	None Detected	

Client Sample ID: MB-ES-02F **Lab Sample ID:** 551400515-0167
Sample Description: Building Exterior/Exterior siding/column stucco White with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White/Various	0%	100%	None Detected	



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Client Sample ID: MB-ES-02G **Lab Sample ID:** 551400515-0168
Sample Description: Building Exterior/Exterior siding/column stucco White with pebbles

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White/Various	0%	100%	None Detected	

Client Sample ID: MB-ES-03A **Lab Sample ID:** 551400515-0169
Sample Description: Building Exterior/Exterior wall base stucco Dark grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	0%	100%	None Detected	

Client Sample ID: MB-ES-03B **Lab Sample ID:** 551400515-0170
Sample Description: Building Exterior/Exterior wall base stucco Dark grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	0%	100%	None Detected	

Client Sample ID: MB-ES-03C **Lab Sample ID:** 551400515-0171
Sample Description: Building Exterior/Exterior wall base stucco Dark grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	0%	100%	None Detected	

Client Sample ID: MB-ES-03D **Lab Sample ID:** 551400515-0172
Sample Description: Building Exterior/Exterior wall base stucco Dark grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-ES-03E **Lab Sample ID:** 551400515-0173
Sample Description: Building Exterior/Exterior wall base stucco Dark grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: MB-ES-04A **Lab Sample ID:** 551400515-0174
Sample Description: Building Exterior/Exterior wall base stucco Grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-ES-04B **Lab Sample ID:** 551400515-0175
Sample Description: Building Exterior/Exterior wall base stucco Grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	



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Client Sample ID: MB-ES-04C **Lab Sample ID:** 551400515-0176
Sample Description: Building Exterior/Exterior wall base stucco Grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-ES-04D **Lab Sample ID:** 551400515-0177
Sample Description: Building Exterior/Exterior wall base stucco Grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-ES-04E **Lab Sample ID:** 551400515-0178
Sample Description: Building Exterior/Exterior wall base stucco Grey colour, textured

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-SG-01A **Lab Sample ID:** 551400515-0179
Sample Description: Building Exterior/Exterior stone wall grout

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	<1% Chrysotile	
400 PLM Pt Ct	3/11/2014	Gray/White/Various	0%	100%	<0.25% Chrysotile	

Client Sample ID: MB-SG-01B **Lab Sample ID:** 551400515-0180
Sample Description: Building Exterior/Exterior stone wall grout

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-SG-01C **Lab Sample ID:** 551400515-0181
Sample Description: Building Exterior/Exterior stone wall grout

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: MB-FB-01A **Lab Sample ID:** 551400515-0182
Sample Description: Building Exterior/Fibre board Red and grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	25%	75%	None Detected	

Client Sample ID: MB-FB-01B **Lab Sample ID:** 551400515-0183
Sample Description: Building Exterior/Fibre board Red and grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	40%	60%	None Detected	



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Client Sample ID: MB-FB-01C **Lab Sample ID:** 551400515-0184

Sample Description: Building Exterior/Fibre board Red and grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Tan	30%	70%	None Detected	

Client Sample ID: MB-ECAU-01A **Lab Sample ID:** 551400515-0185

Sample Description: Building Exterior Siding/Exterior siding caulking Dark grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-ECAU-01B **Lab Sample ID:** 551400515-0186

Sample Description: Building Exterior Siding/Exterior siding caulking Dark grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-ECAU-01C **Lab Sample ID:** 551400515-0187

Sample Description: Building Exterior Siding/Exterior siding caulking Dark grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown	0%	100%	None Detected	

Client Sample ID: MB-ECAU-02A **Lab Sample ID:** 551400515-0188

Sample Description: Building Exterior Windows/Exterior window caulking Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-ECAU-02B **Lab Sample ID:** 551400515-0189

Sample Description: Building Exterior Windows/Exterior window caulking Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-ECAU-02C **Lab Sample ID:** 551400515-0190

Sample Description: Building Exterior Windows/Exterior window caulking Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: MB-RS-01A **Lab Sample ID:** 551400515-0191

Sample Description: Rooftop/Exterior sealant Roof vent black colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Black	0%	100%	None Detected	



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Client Sample ID: MB-RS-01B **Lab Sample ID:** 551400515-0192
Sample Description: Rooftop/Exterior sealant Roof vent black colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Black	0%	100%	None Detected	

Client Sample ID: MB-RS-01C **Lab Sample ID:** 551400515-0193
Sample Description: Rooftop/Exterior sealant Roof vent black colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown	0%	100%	None Detected	

Client Sample ID: MB-RS-02A **Lab Sample ID:** 551400515-0194
Sample Description: Rooftop/Exterior sealant (roofing tar) Mechanical Black colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Black	0%	100%	None Detected	

Client Sample ID: MB-RS-02B **Lab Sample ID:** 551400515-0195
Sample Description: Rooftop/Exterior sealant (roofing tar) Mechanical Black colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Black	0%	100%	None Detected	

Client Sample ID: MB-RS-02C **Lab Sample ID:** 551400515-0196
Sample Description: Rooftop/Exterior sealant (roofing tar) Mechanical Black colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Black	0%	100%	None Detected	

Client Sample ID: MB-RS-03A **Lab Sample ID:** 551400515-0197
Sample Description: Rooftop/Exterior sealant Flashing/railing White Colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	0%	100%	None Detected	

Client Sample ID: MB-RS-03B **Lab Sample ID:** 551400515-0198
Sample Description: Rooftop/Exterior sealant Flashing/railing White Colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	0%	100%	None Detected	

Client Sample ID: MB-RS-03C **Lab Sample ID:** 551400515-0199
Sample Description: Rooftop/Exterior sealant Flashing/railing White Colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	0%	100%	None Detected	



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Client Sample ID: MB-RS-04A **Lab Sample ID:** 551400515-0200
Sample Description: Rooftop/Exterior Sealant Mechanical White Colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-RS-04B **Lab Sample ID:** 551400515-0201
Sample Description: Rooftop/Exterior Sealant Mechanical White Colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: MB-RS-04C **Lab Sample ID:** 551400515-0202
Sample Description: Rooftop/Exterior Sealant Mechanical White Colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Analyst(s)

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Kevin Pang	PLM	(48)
	400 PLM Pt Ct	(3)
Lama Mohammad	PLM	(102)

Kevin Pang
or other Approved Signatory

Any questions please contact Kevin Pang.

None Detected = <0.5%. 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.

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Initial report from: 02/04/2014 22:36:47



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EMSL Canada Order 551400633
Customer ID: 55JACQ30L
Customer PO: 115614042
Project ID:

Attn: Zack Kranjec
Stantec Consulting, Ltd.
1100- 111 Dunsmuir Street
Vancouver, BC V6B 6A3

Phone: (604) 696-8272
Fax:
Collected:
Received: 2/03/2014
Analyzed: 2/07/2014

Proj: 115614042

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: MB-CFS-01A

Lab Sample ID: 551400633-0001

Sample Description: CHASE FIRE STOP-GREY COLOUR, FIBROUS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/07/2014	Gray	15%	85%	None Detected	

Client Sample ID: MB-CFS-01B

Lab Sample ID: 551400633-0002

Sample Description: CHASE FIRE STOP-GREY COLOUR, FIBROUS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/07/2014	Gray	15%	85%	None Detected	

Client Sample ID: MB-CFS-01C

Lab Sample ID: 551400633-0003

Sample Description: CHASE FIRE STOP-GREY COLOUR, FIBROUS

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/07/2014	Gray	15%	85%	None Detected	

Analyst(s)

Lisa Podzyhun PLM (3)

Kevin Pang
or other Approved Signatory

Any questions please contact Kevin Pang.

None Detected = <0.5%. 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

Initial report from: 02/10/2014 10:16:28



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EMSL Canada Order 551400515
Customer ID: 55JACQ30L
Customer PO: 115614042
Project ID:

Attn: Zack Kranjec
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Phone: (604) 696-8272
Fax:
Collected:
Received: 1/29/2014
Analyzed: 3/11/2014

Proj: 115614042

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: AD-DJC-01A **Lab Sample ID:** 551400515-0203

Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01B **Lab Sample ID:** 551400515-0204

Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01C **Lab Sample ID:** 551400515-0205

Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01D **Lab Sample ID:** 551400515-0206

Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01E **Lab Sample ID:** 551400515-0207

Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01F **Lab Sample ID:** 551400515-0208

Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01G **Lab Sample ID:** 551400515-0209

Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	



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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: AD-DJC-01H **Lab Sample ID:** 551400515-0210
Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01I **Lab Sample ID:** 551400515-0211
Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01J **Lab Sample ID:** 551400515-0212
Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01K **Lab Sample ID:** 551400515-0213
Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-DJC-01L **Lab Sample ID:** 551400515-0214
Sample Description: Wall/Drywall Joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-SF-01A **Lab Sample ID:** 551400515-0215
Sample Description: Flooring/Sheet flooring Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: AD-SF-01A MASTIC **Lab Sample ID:** 551400515-0215A
Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: AD-SF-01B **Lab Sample ID:** 551400515-0216
Sample Description: Flooring/Sheet flooring Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	30%	70%	None Detected	



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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: AD-SF-01B MASTIC **Lab Sample ID:** 551400515-0216A
Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: AD-SF-01C **Lab Sample ID:** 551400515-0217
Sample Description: Flooring/Sheet flooring Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: AD-SF-01C MASTIC **Lab Sample ID:** 551400515-0217A
Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Tan	0%	100%	None Detected	

Client Sample ID: AD-SF-02A **Lab Sample ID:** 551400515-0218
Sample Description: Flooring/Sheet flooring Blue colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various/Blue	30%	70%	None Detected	

Client Sample ID: AD-SF-02A MASTIC **Lab Sample ID:** 551400515-0218A
Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Clear	0%	100%	None Detected	

Client Sample ID: AD-CAU-01A **Lab Sample ID:** 551400515-0219
Sample Description: Mechanical ducting/Duct sealant Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-CAU-01B **Lab Sample ID:** 551400515-0220
Sample Description: Mechanical ducting/Duct sealant Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-CAU-01C **Lab Sample ID:** 551400515-0221
Sample Description: Mechanical ducting/Duct sealant Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	



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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: AD-CAU-02A **Lab Sample ID:** 551400515-0222
Sample Description: Rooftop/Caulking/sealant Silvery colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-CAU-02B **Lab Sample ID:** 551400515-0223
Sample Description: Rooftop/Caulking/sealant Silvery colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-CAU-02C **Lab Sample ID:** 551400515-0224
Sample Description: Rooftop/Caulking/sealant Silvery colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-CAU-03A **Lab Sample ID:** 551400515-0225
Sample Description: Rooftop/Caulking/sealant Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-CAU-03B **Lab Sample ID:** 551400515-0226
Sample Description: Rooftop/Caulking/sealant Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-CAU-03C **Lab Sample ID:** 551400515-0227
Sample Description: Rooftop/Caulking/sealant Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-CAU-04A **Lab Sample ID:** 551400515-0228
Sample Description: Rooftop/Caulking/sealant White colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-CAU-04B **Lab Sample ID:** 551400515-0229
Sample Description: Rooftop/Caulking/sealant White colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	



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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: AD-CAU-04C **Lab Sample ID:** 551400515-0230
Sample Description: Rooftop/Caulking/sealant White colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AD-CT-01A **Lab Sample ID:** 551400515-0231
Sample Description: Suspended ceiling/Ceiling tile (2'X 2' size) Random large and small holes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Tan/White	80%	20%	None Detected	

Client Sample ID: AD-CT-01B **Lab Sample ID:** 551400515-0232
Sample Description: Suspended ceiling/Ceiling tile (2'X 2' size) Random large and small holes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Tan/White	80%	20%	None Detected	

Client Sample ID: AD-CT-01C **Lab Sample ID:** 551400515-0233
Sample Description: Suspended ceiling/Ceiling tile (2'X 2' size) Random large and small holes

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Tan/White	80%	20%	None Detected	

Client Sample ID: AD-DM-01A **Lab Sample ID:** 551400515-0234
Sample Description: Penthouse Exhaust ducting/Duct mastic Red colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Red	0%	96%	4% Chrysotile	

Client Sample ID: AD-DM-01B **Lab Sample ID:** 551400515-0235
Sample Description: Penthouse Exhaust ducting/Duct mastic Red colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: AD-DM-01C **Lab Sample ID:** 551400515-0236
Sample Description: Penthouse Exhaust ducting/Duct mastic Red colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: AD-DM-02A **Lab Sample ID:** 551400515-0237
Sample Description: Penthouse Return ducting/Duct mastic Red colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Red	0%	96%	4% Chrysotile	



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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: AD-DM-02B **Lab Sample ID:** 551400515-0238
Sample Description: Penthouse Return ducting/Duct mastic Red colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: AD-DM-02C **Lab Sample ID:** 551400515-0239
Sample Description: Penthouse Return ducting/Duct mastic Red colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014					Stop Positive (Not Analyzed)

Client Sample ID: AD-DM-03A **Lab Sample ID:** 551400515-0240
Sample Description: Penthouse Return ducting/Duct mastic Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-DM-03B **Lab Sample ID:** 551400515-0241
Sample Description: Penthouse Return ducting/Duct mastic Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-DM-03C **Lab Sample ID:** 551400515-0242
Sample Description: Penthouse Return ducting/Duct mastic Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-DM-04A **Lab Sample ID:** 551400515-0243
Sample Description: Penthouse Return ducting (fire damper doors)/Duct mastic Brown colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown	5%	95%	None Detected	

Client Sample ID: AD-DM-04B **Lab Sample ID:** 551400515-0244
Sample Description: Penthouse Return ducting (fire damper doors)/Duct mastic Brown colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown	5%	95%	None Detected	

Client Sample ID: AD-DM-04C **Lab Sample ID:** 551400515-0245
Sample Description: Penthouse Return ducting (fire damper doors)/Duct mastic Brown colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown	5%	95%	None Detected	



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Client Sample ID: AD-DM-05A **Lab Sample ID:** 551400515-0246

Sample Description: Rooftop Exterior ducting/Duct mastic Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-DM-05B **Lab Sample ID:** 551400515-0247

Sample Description: Rooftop Exterior ducting/Duct mastic Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-DM-05C **Lab Sample ID:** 551400515-0248

Sample Description: Rooftop Exterior ducting/Duct mastic Light grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	0%	100%	None Detected	

Client Sample ID: AD-FP-01A **Lab Sample ID:** 551400515-0249

Sample Description: Above suspended ceiling/Fire proofing White colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	65%	35%	None Detected	Labeled as AN-FP-01A on sample bag.

Client Sample ID: AD-FP-01B **Lab Sample ID:** 551400515-0250

Sample Description: Above suspended ceiling/Fire proofing White colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	65%	35%	None Detected	Labeled as AN-FP-01B on sample bag.

Client Sample ID: AD-FP-01C **Lab Sample ID:** 551400515-0251

Sample Description: Above suspended ceiling/Fire proofing White colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	65%	35%	None Detected	Labeled as AN-FP-01C on sample bag.

Client Sample ID: AD-FP-01D **Lab Sample ID:** 551400515-0252

Sample Description: Above suspended ceiling/Fire proofing White colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray	65%	35%	None Detected	Labeled as AN-FP-01D on sample bag.

Client Sample ID: AD-FP-01E **Lab Sample ID:** 551400515-0253

Sample Description: Above suspended ceiling/Fire proofing White colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	65%	35%	None Detected	Labeled as AN-FP-01E on sample bag.



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Client Sample ID: AD-FP-01F **Lab Sample ID:** 551400515-0254
Sample Description: Above suspended ceiling/Fire proofing White colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	65%	35%	None Detected	Labeled as AN-FP-01F on sample bag.

Client Sample ID: AD-FP-01G **Lab Sample ID:** 551400515-0255
Sample Description: Above suspended ceiling/Fire proofing White colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray	65%	35%	None Detected	Labeled as AN-FP-01G on sample bag.

Client Sample ID: AD-FPP-01A **Lab Sample ID:** 551400515-0256
Sample Description: Above suspended ceiling/Fire proofing Grey colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	40%	60%	None Detected	VERMICULITE PRESENT.

Client Sample ID: AD-FPP-01B **Lab Sample ID:** 551400515-0257
Sample Description: Above suspended ceiling/Fire proofing Grey colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	40%	60%	None Detected	VERMICULITE PRESENT.

Client Sample ID: AD-FPP-01C **Lab Sample ID:** 551400515-0258
Sample Description: Above suspended ceiling/Fire proofing Grey colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	40%	60%	None Detected	VERMICULITE PRESENT.

Analyst(s)

Alice Feng	PLM	(5)
Kevin Pang	PLM	(4)
Lama Mohammad	PLM	(2)
Lisa Podzyhun	PLM	(45)

Kevin Pang
or other Approved Signatory

Any questions please contact Kevin Pang.

None Detected = <0.5%. 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

Initial report from: 02/04/2014 22:52:15



EMSL Canada Inc.

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EMSL Canada Order 551400515
Customer ID: 55JACQ30L
Customer PO: 115614042
Project ID:

Attn: Zack Kranjec
Stantec Consulting, Ltd.
1100- 111 Dunsmuir Street
Vancouver, BC V6B 6A3

Phone: (604) 696-8272
Fax:
Collected:
Received: 1/29/2014
Analyzed: 3/11/2014

Proj: 115614042

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: HB-DJC-01A

Lab Sample ID: 551400515-0259

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Tan	0%	97%	3% Chrysotile	

Client Sample ID: HB-DJC-01B

Lab Sample ID: 551400515-0260

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: HB-DJC-01C

Lab Sample ID: 551400515-0261

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: HB-DJC-01D

Lab Sample ID: 551400515-0262

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: HB-DJC-01E

Lab Sample ID: 551400515-0263

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: HB-DJC-01F

Lab Sample ID: 551400515-0264

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	White	0%	100%	None Detected	

Client Sample ID: HB-DJC-01G

Lab Sample ID: 551400515-0265

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	97%	3% Chrysotile	



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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: HB-PC-01A **Lab Sample ID:** 551400515-0266

Sample Description: Room H19/Parging cement applied to pipe fittings Light grey colour, chalk-like

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Various	5%	95%	None Detected	

Client Sample ID: HB-PC-01B **Lab Sample ID:** 551400515-0267

Sample Description: Room H19/Parging cement applied to pipe fittings Light grey colour, chalk-like

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Various	5%	95%	None Detected	

Client Sample ID: HB-PC-01C **Lab Sample ID:** 551400515-0268

Sample Description: Room H19/Parging cement applied to pipe fittings Light grey colour, chalk-like

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown	5%	95%	None Detected	

Client Sample ID: HB-PC-01D **Lab Sample ID:** 551400515-0269

Sample Description: Mechanical room/Parging cement applied to pipe fittings Light grey colour, chalk-like

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Various	5%	95%	None Detected	

Client Sample ID: HB-PC-01E **Lab Sample ID:** 551400515-0270

Sample Description: Mechanical room/Parging cement applied to pipe fittings Light grey colour, chalk-like

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Tan	8%	92%	None Detected	

Client Sample ID: HB-PC-01F **Lab Sample ID:** 551400515-0271

Sample Description: Mechanical room/Parging cement applied to pipe fittings Light grey colour, chalk-like

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Tan	10%	90%	None Detected	

Client Sample ID: HB-TI-01A **Lab Sample ID:** 551400515-0272

Sample Description: Autoclaving tank/Tank insulation Grey colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: HB-TI-01B **Lab Sample ID:** 551400515-0273

Sample Description: Autoclaving tank/Tank insulation Grey colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	



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Client Sample ID: HB-TI-01C **Lab Sample ID:** 551400515-0274

Sample Description: Autoclaving tank/Tank insulation Grey colour, fibrous

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Tan	8%	92%	None Detected	

Client Sample ID: HB-FT-01 **Lab Sample ID:** 551400515-0275

Sample Description: Room H09/Floor tile (9"x9" size) Green colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Green	0%	96%	4% Chrysotile	

Client Sample ID: HB-FT-01 MASTIC **Lab Sample ID:** 551400515-0275A

Sample Description: Room H09

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Black	0%	100%	None Detected	

Client Sample ID: HB-FT-01B **Lab Sample ID:** 551400515-0276

Sample Description: Workshop/Floor tile (9"x9" size) Green colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Green	0%	96%	4% Chrysotile	

Client Sample ID: HB-FT-01B MASTIC **Lab Sample ID:** 551400515-0276A

Sample Description: Workshop

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Black	0%	100%	None Detected	

Client Sample ID: HB-SF-01A **Lab Sample ID:** 551400515-0277

Sample Description: H16/Sheet flooring Brown colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Tan	40%	60%	None Detected	

Client Sample ID: HB-SF-01A MASTIC **Lab Sample ID:** 551400515-0277A

Sample Description: H16

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Brown	0%	100%	None Detected	

Client Sample ID: HB-SF-01B **Lab Sample ID:** 551400515-0278

Sample Description: H17/Sheet flooring Brown colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Brown/Tan	35%	65%	None Detected	



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Client Sample ID: HB-SF-01B MASTIC **Lab Sample ID:** 551400515-0278A
Sample Description: H17

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Brown/Black	0%	100%	None Detected	

Client Sample ID: HB-AS-01A **Lab Sample ID:** 551400515-0279
Sample Description: Building exterior/Liner between cement panels and trim White colour, rigid

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: HB-AS-01B **Lab Sample ID:** 551400515-0280
Sample Description: Building exterior/Liner between cement panels and trim White colour, rigid

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: HB-AS-01C **Lab Sample ID:** 551400515-0281
Sample Description: Building exterior/Liner between cement panels and trim White colour, rigid

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: HB-CAU-01A **Lab Sample ID:** 551400515-0282
Sample Description: Building exterior/Exterior caulking around windows/cement panels

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: HB-CAU-01B **Lab Sample ID:** 551400515-0283
Sample Description: Building exterior/Exterior caulking around windows/cement panels

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: HB-CAU-01C **Lab Sample ID:** 551400515-0284
Sample Description: Building exterior/Exterior caulking around windows/cement panels

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray	0%	100%	None Detected	

Client Sample ID: HB-TP-01A **Lab Sample ID:** 551400515-0285
Sample Description: Building exterior/Cement (Transite) panels

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014	Gray/White	0%	85%	15% Chrysotile	



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Client Sample ID: HB-TP-01B **Lab Sample ID:** 551400515-0286
Sample Description: Building exterior/Cement (Transite) panels

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014					Stop Positive (Not Analyzed)

Client Sample ID: HB-TP-01C **Lab Sample ID:** 551400515-0287
Sample Description: Building exterior/Cement (Transite) panels

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/03/2014					Stop Positive (Not Analyzed)

Analyst(s)

Alice Feng	PLM	(17)
Kevin Pang	PLM	(14)

Kevin Pang
or other Approved Signatory

Any questions please contact Kevin Pang.

None Detected = <0.5%. 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

Initial report from: 02/04/2014 22:53:44



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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: AN-DJC-01A **Lab Sample ID:** 551400515-0288
Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	<1% Chrysotile	

Client Sample ID: AN-DJC-01B **Lab Sample ID:** 551400515-0289
Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	98%	2% Chrysotile	

Client Sample ID: AN-DJC-01C **Lab Sample ID:** 551400515-0290
Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	97%	3% Chrysotile	

Client Sample ID: AN-DJC-01D **Lab Sample ID:** 551400515-0291
Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	2%	98%	None Detected	

Client Sample ID: AN-DJC-01E **Lab Sample ID:** 551400515-0292
Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: AN-DJC-01F **Lab Sample ID:** 551400515-0292A
Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	Sample not on COC

Client Sample ID: AN-DJC-01G **Lab Sample ID:** 551400515-0292B
Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	1%	99%	None Detected	Sample not on COC



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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: AN-FT-01A **Lab Sample ID:** 551400515-0293
Sample Description: Flooring/Floor tile (12"x12") Beige with brown streaks

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Tan	0%	97%	3% Chrysotile	

Client Sample ID: AN-FT-01A MASTIC **Lab Sample ID:** 551400515-0293A
Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Black	0%	100%	None Detected	

Client Sample ID: AN-FT-01B **Lab Sample ID:** 551400515-0294
Sample Description: Flooring/Floor tile (12"x12") Beige with brown streaks

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Tan	0%	97%	3% Chrysotile	

Client Sample ID: AN-FT-01B MASTIC **Lab Sample ID:** 551400515-0294A
Sample Description: Flooring

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	3/11/2014	Black	0%	100%	None Detected	

Client Sample ID: AN-EP-01A **Lab Sample ID:** 551400515-0295
Sample Description: Building exterior/Exterior stucco Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: AN-EP-01B **Lab Sample ID:** 551400515-0296
Sample Description: Building exterior/Exterior stucco Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Various	0%	100%	None Detected	

Client Sample ID: AN-EP-01C **Lab Sample ID:** 551400515-0297
Sample Description: Building exterior/Exterior stucco Grey colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White/Various	0%	100%	None Detected	

Client Sample ID: AN-CT-01A **Lab Sample ID:** 551400515-0298
Sample Description: Ceiling/Ceiling tile (1'x1' size) Randon fissures and pinholes - grey core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Tan/White	80%	20%	None Detected	



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Customer ID: 55JACQ30L
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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: AN-CT-01B **Lab Sample ID:** 551400515-0299
Sample Description: Ceiling/Ceiling tile (1'x1' size) Randon fissures and pinholes - grey core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Tan/White	80%	20%	None Detected	

Client Sample ID: AN-CT-01C **Lab Sample ID:** 551400515-0300
Sample Description: Ceiling/Ceiling tile (1'x1' size) Randon fissures and pinholes - grey core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/Gray/White	80%	20%	None Detected	

Client Sample ID: AN-CT-02A **Lab Sample ID:** 551400515-0301
Sample Description: Ceiling/Ceiling tile (1'x1' size) Randon large fisures and pinholes - light brown core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/White	85%	15%	None Detected	

Client Sample ID: AN-CT-02B **Lab Sample ID:** 551400515-0302
Sample Description: Ceiling/Ceiling tile (1'x1' size) Randon large fisures and pinholes - light brown core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/White	85%	15%	None Detected	

Client Sample ID: AN-CT-02C **Lab Sample ID:** 551400515-0303
Sample Description: Ceiling/Ceiling tile (1'x1' size) Randon large fisures and pinholes - light brown core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/White	85%	15%	None Detected	

Client Sample ID: AN-CT-03A **Lab Sample ID:** 551400515-0304
Sample Description: Ceiling/Ceiling tile (1'x1' size) Random flecks and pinholes - grey core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	80%	20%	None Detected	

Client Sample ID: AN-CT-03B **Lab Sample ID:** 551400515-0305
Sample Description: Ceiling/Ceiling tile (1'x1' size) Random flecks and pinholes - grey core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	80%	20%	None Detected	

Client Sample ID: AN-CT-03C **Lab Sample ID:** 551400515-0306
Sample Description: Ceiling/Ceiling tile (1'x1' size) Random flecks and pinholes - grey core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/White	80%	20%	None Detected	



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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: AN-CT-04A **Lab Sample ID:** 551400515-0307
Sample Description: Ceiling/Ceiling tile (1'x1' size) Random small fissures and pinholes - light brown core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/White	85%	15%	None Detected	

Client Sample ID: AN-CT-04B **Lab Sample ID:** 551400515-0308
Sample Description: Ceiling/Ceiling tile (1'x1' size) Random small fissures and pinholes - light brown core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/White	85%	15%	None Detected	

Client Sample ID: AN-CT-04C **Lab Sample ID:** 551400515-0309
Sample Description: Ceiling/Ceiling tile (1'x1' size) Random small fissures and pinholes - light brown core

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Brown/White	85%	15%	None Detected	

Analyst(s)

Alice Feng	PLM	(16)
Kevin Pang	PLM	(2)
Lama Mohammad	PLM	(8)

Kevin Pang
or other Approved Signatory

Any questions please contact Kevin Pang.

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Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 02/04/2014 22:55:44



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Client Sample ID: S-DJC-01A

Lab Sample ID: 551400515-0310

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: S-DJC-01B

Lab Sample ID: 551400515-0311

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: S-DJC-01C

Lab Sample ID: 551400515-0312

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: S-DJC-01D

Lab Sample ID: 551400515-0313

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: S-DJC-01E

Lab Sample ID: 551400515-0314

Sample Description: Wall/Drywall joint compound

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Analyst(s)

Alice Feng	PLM	(2)
Kevin Pang	PLM	(3)

Kevin Pang
or other Approved Signatory

Any questions please contact Kevin Pang.

None Detected = <0.5%. 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

Initial report from: 02/04/2014 22:56:54



EMSL Canada Inc.

10 Falconer Drive, Unit #3 Mississauga, ON L5N 3L8
Phone/Fax: 289-997-4602 / (289) 997-4607
<http://www.EMSL.com> / torontolab@emsl.com

EMSL Canada Order 551400515
Customer ID: 55JACQ30L
Customer PO: 115614042
Project ID:

Attn: Zack Kranjec
Stantec Consulting, Ltd.
1100- 111 Dunsmuir Street
Vancouver, BC V6B 6A3

Phone: (604) 696-8272
Fax:
Collected:
Received: 1/29/2014
Analyzed: 2/04/2014

Proj: 115614042

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: GH-CAU-01A

Lab Sample ID: 551400515-0315

Sample Description: On pipe covering (tin covering)/Caulking/sealant Silver colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Silver	0%	100%	None Detected	

Client Sample ID: GH-CAU-01B

Lab Sample ID: 551400515-0316

Sample Description: On pipe covering (tin covering)/Caulking/sealant Silver colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Silver	0%	100%	None Detected	

Client Sample ID: GH-CAU-01C

Lab Sample ID: 551400515-0317

Sample Description: On pipe covering (tin covering)/Caulking/sealant Silver colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	Gray/Silver	0%	100%	None Detected	

Client Sample ID: GH-CAU-02A

Lab Sample ID: 551400515-0318

Sample Description: On wall basement/mechanical ducting/Caulking/sealant White colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: GH-CAU-02B

Lab Sample ID: 551400515-0319

Sample Description: On wall basement/mechanical ducting/Caulking/sealant White colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	

Client Sample ID: GH-CAU-02C

Lab Sample ID: 551400515-0320

Sample Description: On wall basement/mechanical ducting/Caulking/sealant White colour

TEST	Analyzed Date	Color	Non-Asbestos		Asbestos	Comment
			Fibrous	Non-Fibrous		
PLM	2/04/2014	White	0%	100%	None Detected	



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EMSL Canada Order 551400515
Customer ID: 55JACQ30L
Customer PO: 115614042
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

Analyst(s)

Alice Feng	PLM	(2)
Kevin Pang	PLM	(4)

Kevin Pang
or other Approved Signatory

Any questions please contact Kevin Pang.

None Detected = <0.5%. 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

Initial report from: 02/04/2014 22:57:56

Appendix E
Certificate of Analysis – Suspected LCP Samples



EMSL Canada Inc.

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CustomerID: 55JACQ30L
CustomerPO: 115614042
ProjectID:

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Stantec Consulting, Ltd.
1100- 111 Dunsmuir Street
Vancouver, BC V6B 6A3

Phone: (604) 696-8272
Fax:
Received: 01/29/14 11:37 AM
Collected:

Project: 115614042

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

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
MB-P-01 Site: ROOFTOP Desc: GREY COLOUR	0001		1/31/2014	1700 ppm
MB-P-02 Site: ROOFTOP Desc: WHITE COLOUR	0002		1/31/2014	18000 ppm
MB-P-03 Site: PENTHOUSE Desc: CREAM COLOUR	0003		1/31/2014	990 ppm
MB-P-04 Site: PENTHOUSE Desc: SILVER COLOUR	0004		1/31/2014	960 ppm
MB-P-05 Site: PENTHOUSE Desc: RED COLOUR	0005		1/31/2014	7600 ppm
MB-P-06 Site: PENTHOUSE Desc: CREAM COLOUR	0006		1/31/2014	940 ppm
MB-P-07 Site: FLOOR Desc: GREY/BLUE COLOUR	0007		1/31/2014	630 ppm
MB-P-08 Site: WALLS/CEILING Desc: CREAM COLOUR	0008		1/31/2014	560 ppm
MB-P-09 Site: WALLS Desc: WHITE COLOUR	0009		1/31/2014	1600 ppm
MB-P-10 Site: DOORS/DOOR FRAMES Desc: RED COLOUR (YELLOW COLOUR BENEATH)	0010		1/31/2014	2800 ppm
MB-P-11 Site: BUILDING EXTERIOR Desc: GREY COLOUR	0011		1/31/2014	2800 ppm

Kevin Pang
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/04/2014 17:48:50



EMSL Canada Inc.

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CustomerID: 55JACQ30L
CustomerPO: 115614042
ProjectID:

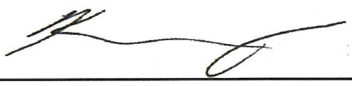
Attn: **Zack Kranjec**
Stantec Consulting, Ltd.
1100- 111 Dunsmuir Street
Vancouver, BC V6B 6A3

Phone: (604) 696-8272
Fax:
Received: 01/29/14 11:37 AM
Collected:

Project: 115614042

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B*/I7000B)

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
----------------------------------	---------------	------------------	-----------------	---------------------------



Kevin Pang
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/04/2014 17:48:50

**EMSL Canada Inc.**

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Vancouver, BC V6B 6A3

Phone: (604) 696-8272
 Fax:
 Received: 01/29/14 11:37 AM
 Collected:

Project: **115614042**

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

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
AD-P-01 Site: WALLS Desc: BEIGE COLOUR	0012		1/31/2014	<90 ppm
AD-P-02 Site: WALLS Desc: WHITE COLOUR	0013		1/31/2014	<90 ppm
AD-P-03 Site: DOOR TRIM Desc: OFF-WHITE COLOUR	0014		1/31/2014	2000 ppm
AD-P-04 Site: DOOR TRIM Desc: GREEN COLOUR	0015		1/31/2014	1800 ppm
AD-P-05 Site: DOOR TRIM Desc: YELLOW COLOUR	0016		1/31/2014	1100 ppm
AD-P-06 Site: WALLS Desc: BEIGE COLOUR	0017		1/31/2014	<90 ppm
AD-P-07 Site: WALLS Desc: GREY COLOUR	0018		1/31/2014	<90 ppm
AD-P-08 Site: DOOR TRIM Desc: GREY COLOUR	0019		1/31/2014	2400 ppm
AD-P-09 Site: VERTICAL DUCTS Desc: BEIGE COLOUR	0020		1/31/2014	460 ppm
AD-P-10 Site: VERTICAL DUCTS Desc: GREY COLOUR INSUFFICIENT SAMPLE TO REACH REPORTING LIMIT.	0021		1/31/2014	<470 ppm
AD-P-11 Site: PENTHOUSE Desc: WHITE COLOUR	0022		1/31/2014	210 ppm

Kevin Pang
 or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
 Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/04/2014 17:52:05



EMSL Canada Inc.

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EMSL Canada Or 551400528
CustomerID: 55JACQ30L
CustomerPO: 115614042
ProjectID:

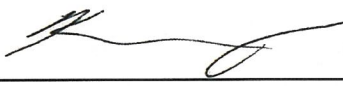
Attn: **Zack Kranjec**
Stantec Consulting, Ltd.
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Vancouver, BC V6B 6A3

Phone: (604) 696-8272
Fax:
Received: 01/29/14 11:37 AM
Collected:

Project: 115614042

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

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
AD-P-12 Site: EXTERIOR STAIRS-ROOFTOP Desc: WHITE COLOUR	0023		1/31/2014	<90 ppm
AD-P-13 Site: EXTERIOR SIDING Desc: GREY COLOUR	0024		1/31/2014	1200 ppm
AD-P-14 Site: EXTERIOR STRUCTURAL STEEL Desc: GREY COLOUR	0025		1/31/2014	520 ppm



Kevin Pang
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/04/2014 17:52:05



EMSL Canada Inc.

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Phone: (604) 696-8272
Fax:
Received: 01/29/14 11:37 AM
Collected:

Project: 115614042

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B*/I7000B)

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
HB-P-01 Site: WALLS Desc: BEIGE COLOUR	0026		1/31/2014	1800 ppm
HB-P-02 Site: FLOOR Desc: LIGHT GREY COLOUR	0027		1/31/2014	<90 ppm
HB-P-03 Site: POSTS/DOORS Desc: LIGHT GREEN COLOUR	0028		1/31/2014	3800 ppm
HB-P-04 Site: DOORS Desc: DARK GREEN COLOUR	0029		1/31/2014	27000 ppm

Kevin Pang
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/04/2014 17:55:04

**EMSL Canada Inc.**

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Phone: (604) 696-8272
 Fax:
 Received: 01/29/14 11:37 AM
 Collected:

Project: 115614042

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

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
AN-P-01 Site: WALLS Desc: BEIGE COLOUR	0030		1/31/2014	<90 ppm
AN-P-02 Site: DOORS/FRAMES Desc: YELLOW COLOUR INSUFFICIENT SAMPLE TO REACH REPORTING LIMIT.	0031		1/31/2014	<130 ppm
AN-P-03 Site: BUILDING EXTERIOR TRIM Desc: GREY COLOUR	0032		1/31/2014	1200 ppm
AN-P-04 Site: BUILDING EXTERIOR SIDING Desc: WHITE COLOUR	0033		1/31/2014	2300 ppm

Kevin Pang
 or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
 Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/04/2014 18:03:29



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CustomerID: 55JACQ30L
CustomerPO: 115614042
ProjectID:

Attn: **Zack Kranjec**
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Vancouver, BC V6B 6A3

Phone: (604) 696-8272
Fax:
Received: 01/29/14 11:37 AM
Collected:

Project: 115614042

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B*/I7000B)

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
S-P-01 Site: BUILDING EXTERIOR SIDING Desc: BROWN COLOUR	0034		1/31/2014	130 ppm
S-P-02 Site: MECHANICAL DUCTING Desc: BEIGE COLOUR	0035		1/31/2014	2400 ppm
S-P-03 Site: WALLS Desc: WHITE COLOUR	0036		1/31/2014	680 ppm

Kevin Pang
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/04/2014 18:03:29



EMSL Canada Inc.

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<http://www.EMSL.com> torontolab@emsl.com

EMSL Canada Or 551400528
CustomerID: 55JACQ30L
CustomerPO: 115614042
ProjectID:

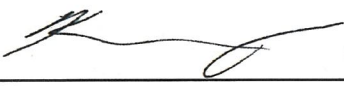
Attn: **Zack Kranjec**
Stantec Consulting, Ltd.
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Phone: (604) 696-8272
Fax:
Received: 01/29/14 11:37 AM
Collected:

Project: 115614042

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B*/I7000B)

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
SH-P-01	0037		1/31/2014	6700 ppm
Site: BUILDING EXTERIOR/INTERIOR SIDING Desc: WHITE COLOUR				



Kevin Pang
or other approved signatory

Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. The QC data associated with these results included in this report meet the method QC requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. * slight modifications to methods applied. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

Initial report from 02/04/2014 18:06:13

Appendix F
ODS-Containing Equipment List

NRCan's Ozone Depleting Substance Inventory (CFC/HCFC, Halon)

Last Updated: Feb. 26 2009

replaced or out of service

Current ODS Information											
Location Type	Room # /Area	Model	Equipment Type	Manufacturer	Year Installed	Refrigerant Type	Refrigerant Quantity (kg)	Charging Capacity	Serial Number	asset #	Comments
Room	14	401200Q	Freezer	KENMORE		R-12	245 Grams		723652FQ		
Room	17	WL-48-W		FOSTER		R-12	24 OZ		65535 /		
Room	17	WL-48-F		FOSTER		R-12	20 OZ		65536 /		
Room	17	WL-38-C		FOSTER		R-12	14 OZ		65535 /		
Room	18	406937	Freezer	CELCOLD		R-134A	210 Grams		95164116		
Room	18	N/A	Cooler	TRUE		?	?		N/A		
Room	18	QFDRT		QUEST		R-12	18 OZ		139 /		
Room	40	G 30	GC8	CONVIRON		R-12	18 OZ		8B6048U		
Room	40	G 30	GC9	CONVIRON		R-12	18 OZ		9B0055U		
Room	40	G 30	GC16	CONVIRON		R-401A	13 OZ		7F7097U		
Room	40	G 30	GC15	CONVIRON		R-12	18 OZ		7F6178U		
Room	40	FV001		COPELAND		R-22	80 OZ		11D97		
Room	40	SL27-17	GC17	HOFFMAN		R-12	18OZ		C1322361		
Room	40	ST-181	GC22	HOFFMAN		401-A	18 OZ		2001010441		
Room	40	SL27-17	GC18	HOFFMAN		R-12	18 OZ		C1322339		
Room	40	82210-20		KENMORE		R-12	280 Grams		625430LP		
Room	40	82210-20		KENMORE		R-12	305 Grams		393559-MN		
Room	40	QEA060		KENMORE		R-12	10 OZ		625451LP		
Room	40	253-21741100	Freezer	KENMORE		R-134A	7.3 OZ		WB12002205		
Room	40	QF0406A		MANITOWAC		R-404A	16 OZ		20464447		
Room	40		GC (Red)	HOTPACK					73929		
Room	40	815		PRECISION		R-12	9 OZ		29AS/3		

Current ODS Information											
Location Type	Room # /Area	Model	Equipment Type	Manufacturer	Year Installed	Refrigerant Type	Refrigerant Quantity (kg)	Charging Capacity	Serial Number	asset #	Comments
Room	40	ULT-1386-9-D35	ULT5	REVCO		BLENDED	32 OZ		P06M572231-PM		
Room	40	ULT-1386-9-D36	ULT3	REVCO		BLENDED	32 OZ		019N622234-ON		
Room	40	ULT-1386D-O-B	ULT1	REVCO		BLENDED	32 OZ		V V 3706		
Room	40	ULT-1386-9-D34	ULT4	REVCO		BLENDED	32 OZ		P05L519996-PL		
Room	40	ULT-13867-D12	ULT2	REVCO		BLENDED	32 OZ		P02D-158965-PD		
Room	41	6D21-929	Cold Room 5	Carrier	1963	CFC- 12	22.00	2.00	4527074	Updated	
Room	41	CF06K6E-TF5-253	Cold Room 4	Copeland	2002	R401A	5.00	3	04J54285H	Updated	
Room	41	3RK1-310-TAC	Cold Room 6	Copeland	1963	R401A	7.00	3	79D375100	Updated	
Room	43	PGV-36	GC1	Convion	1990	HCFC-22	12.00	10	9J0273	Updated	
Room	43	E8VH	GC11	Convion	1970	R401A	5.00	3.00	7B1045F	Updated	
Room	43	E8VH	GC12	Convion	1970	R401A	10.00	10.00	7B1044F	Updated	
Room	43	E8VH	GC13	Convion	1970	R401A	10.00	10.00	713179U	Updated	
Room	43	E8VH	GC14	Convion	1970	R401A	10.00	10.00	7B3891U	Updated	
Room	43	PGV-36	GC2	Convion	1991	R404A	5.00	5.50	9J0292	Updated	
Room	43	PGV-36	GC3	Convion	1989	HCFC-22	12.00	10	8C9085	Updated	
Room	43	PGV-36	GC4	Convion	1990	HCFC -22	10.00	10.00	8C9084	Updated	
Room	43	PGV-36	GC5	Convion	1990	HCFC -22	7.00	7.30	8K9509	Updated	
Room	43	PGV-36	GC6	Convion	1990	HCFC -22		10.00	8B9035	Updated	
Room	43	PGV-36	GC7	Convion	1990	HCFC -22		10.00	8C0066	Updated	
Room	47	EWVA-021ETAC	Cold Room 1	Copeland	1995	R404A	15.00	3	CCH9513353	Updated	
Room	47	EWVA-021ETAC	Cold Room 2	Copeland	1996	R404A	15.00	3	CCI9413982	Updated	
Room	47	CS14K6E	Cold Room 3	Copeland	2005	R404A	5.00	2.00	04C16897H	Updated	
Room	51	CRA-105-OPFV270	Cold Room 7	Copeland	2006	R-404A	?		92F33892	Updated	
Room	64	CRTW-4800-TL		CONCEPT		R-134A	3.5 OZ		2R322120Y		
Room	65	31213		PRECISION		R-12	8 OZ		28AK-3		
Room	67	WL183NRW7		WESTING H		R-12	6.5 OZ		860406129		
Room	69	F3WD-0151TFC		COPELAND		R-22	128 OZ		26C85		
Room	69	F3WD-0201TFC		COPELAND		R-22	96 OZ		04J91		

Current ODS Information											
Location Type	Room # /Area	Model	Equipment Type	Manufacturer	Year Installed	Refrigerant Type	Refrigerant Quantity (kg)	Charging Capacity	Serial Number	asset #	Comments
Room	72	C106-7391080		KENMORE		R-12	8.0 OZ		LE-10275		
Room	73	125L	GC	CONVIRON		R-12	24 OZ		9L0221		
Room	73	123L	GC	CONVIRON		R-12	24 OZ		8B6034U		
Room	73	123L	GC	CONVIRON		R-12	24 OZ		8F1876U		
Room	73	118L	GC	CONVIRON		R-12	24 OZ		7J0264F		
Room	73	AB00146	Fridge	VIKING		R-12	8 OZ		FR-1-FV1314-W		
Room	74	31213-35	GC	PRECISION		R-12	8 OZ		35AY-3		
Room	104	DCR41WE	Bar Fridge	DANBY		R-22	3.4 OZ		C9300412		
Room	129	YRF1712W-M1	Fridge	McCLARY		R-12	4.25 OZ		KG160599		
Room	146	970-22204140		KENMORE		R-134A	8.0 OZ		WB-3401-21933		
Room	148	D1705AR	Fridge	DANBY		R-12	8.0 OZ		01329450DT		
Room	150	N/A		LAB LINE		R-12	10 OZ		N/A		
Room	154	TLJJ30		WESTING H		R-12	6.0 OZ		745D180A12		
Room	165	L8M-70	Centrifuge	BECKMAN		R-12	15 OZ		7C421		
Room	171	LT755925		INGLIS		R-12	8.0 OZ		KM1053		
Room	173	ET-73000R		INGLIS		R-12	8.0 OZ		369100		
Room	173	K-500		KELVINATOR		R-12	6.0 OZ		ZA-09501		
Room	176	R090	Bar Fridge	WOODS		R-22	6.0 OZ		NA00A0		
Room	181	N/A		ADMIRAL		R-12	8.5 OZ		N/A		
Room	187	K500R		KELVINATOR		R-12	8.5 OZ		2A-06293		
Room	207	815		PRECISION		R-12	16 OZ		29AU-11		
Room	207	N/A		VIKING		R-12	8.0 OZ		N/A		
Room	207	P146N1R05		WESTING H		R-12	8.0 OZ		870404677		
Room	221	DCR412W	Bar Fridge	DANBY		R134A	1.59 OZ		1.0306E+11		
Room	225	51832-0L	Bar Fridge	BIG ROCK		R-12	8.0 OZ		800016-LL		Alec McBeath
Room	230	307		FISHER		R-134A	7.0 OZ		3288		
Room	230	FFU20F9FW0		FISHER		R-134A	9 OZ		WB70610520		
Room	230	0646-6086080		KENMORE		R-12	10 OZ		6DB03379		

Current ODS Information											
Location Type	Room # /Area	Model	Equipment Type	Manufacturer	Year Installed	Refrigerant Type	Refrigerant Quantity (kg)	Charging Capacity	Serial Number	asset #	Comments
Room	234	DMR1706WE		DANBY		R-12	8.0 OZ		03775293KA		
Room	234	F10102000		EDWARDS		R-502	16 OZ		5222		
Room	234	75003641-01	Centrifuge	HERAEUS		R-12	10 OZ		232641		
Room	234	N/A		KENMORE		R-12	10 OZ		N/A		
Room	234	N/A		LAB LINE		R-12	24 OZ		N/A		
Room	234	FV01512		VIKING		R-12	4.0 OZ		805901LQ		
Room	234	VCR449A20	2 Glass Doors	VWR		R-134A	20 OZ		N25M1566568-01		
Room	234	103NBR		W.S.		R-12	8.0 OZ		84728		
Room	234	YET20GKXBW00		WHIRLPOOL		R-12	8.0 OZ		ED1733684		
Room	242	YET18SKXBW00		WHIRLPOOL		R-12	10 OZ		EC4132679		
Room	244	3551		LAB LINE		R-12	7.0 OZ		N/A		Explosion Safe
Room	244	ET14MNXSW00		VWR		R-12	8.0 OZ		ST3225683		
Room	248	970-602120		KENMORE		R-134A	4.5 OZ		BA94807254		
Room	248	N/A		VWR		R-12	2.6 OZ		N/A		
Room	265	DC12-032W		DIPLOMAT		R-12	4.0 OZ		4AFTA-00249		
Room	268	N/A		KENMORE		R-12	8.0 OZ		N/A		
Room	268	N/A		PRECISION		R-12	14 OZ		N/A		
Room	268	R411FA16		VWR		R134A	5.5 OZ		N/A		
Room	272	VLITSMCL05911		GE		R-12	8.0 OZ		BY5-99497		
Room	274			KENMORE		R-134A	4.25 OZ				
Room	274			KENMORE		R-134A	4.25 OZ				
Room	281	N/A		FOSTER		R-12	32 OZ		p06S-618375-PS		Explosion Safe
Room	281	N/A		FRIGIDAIR		R-12	8.0 OZ		N/A		
Room	281	46042 /		G E		R-12	16 OZ		1086 /		

Current ODS Information											
Location Type	Room # /Area	Model	Equipment Type	Manufacturer	Year Installed	Refrigerant Type	Refrigerant Quantity (kg)	Charging Capacity	Serial Number	asset #	Comments
Room	281	46042		GE		R-12	16 OZ		1273		
Room	281	N/A		J S		R-12	16 OZ		N/A		
Room	281	815		PRECISION		R-12	14 OZ		29-AS-2		
Room	281	815		PRECISION		R-12	14 OZ		29-AS-6		
Room	281	815		PRECISION		R-12	14 OZ		29-AS-61		
Room	281	815 /		PRECISION		R-12	10 OZ		29-AS-63		
Room	281	815 /		PRECISION		R-12	10 OZ		29-AS-34		
Room	286	DCR-1216E4		DANBY		R-12	4.0 OZ		11970300		
Room	288	31213 /		PRECISION		R-12	14 OZ		2/14/2012		
Room	303	RM0511	Fridge	VIKING		R-12	3.8 OZ		04291902AX		
Room	304	ML-13-6-B-2-T1		McCLARY		R-12	8.0 OZ		L-239918-7		
Room	307	U-35-P		DANBY		R-12	8.5 OZ		720531FQ		
Room	310	N/A		COLDSPOT		R-134A	6.5 OZ		N/A		
Room	310	61912101 /		KENMORE		R-134A	4.5 OZ		EL5124322 /		
Room	310	67563682 /		KENMORE		R-134A	4.5 OZ		08281173 /		
Room	322	LW18JYRRW-1		G E		R-12	4.25 OZ		AM383330V		
Room	328	46190482	Fridge	KENMORE		R-134A	1.41 OZ		1.0512E+11		
Room	329	SVC100L		SAVANT		N/A	N/A		84-116-115		
Room	329	U2020GA-14		REVCO		R-134A	9.0 OZ		Y08K-504045-YK		
Room	330	WIN-84H		FOSTER		R-12	112 OZ		65874 /		
Room	338	N/A		ADMIRAL		R-12	10 OZ		N/A		
Room	347	C675265331M	Fridge	KENMORE		R-134A	3.2 OZ				
Room	349	OOO-6995		HAAK A81		R-12	12 OZ		860338 /		
Room	353	C12NAA	Freezer	WOODS		R-134A	10 OZ		07107141AG		
Room	367	P156N11205	Fridge	KELVINATOR		R-12	10 OZ		870805080		
Room	367	CC-100	Fridge	NES LAB		N/A	N/A		83A-10926-2		
Room	371	46042 /	Fridge	G E		R-12	6.5 OZ		1266 /		
Room	371	46042 /	Fridge	G E		R-12	6.5 OZ		1082 /		

Current ODS Information											
Location Type	Room # /Area	Model	Equipment Type	Manufacturer	Year Installed	Refrigerant Type	Refrigerant Quantity (kg)	Charging Capacity	Serial Number	asset #	Comments
Room	379	2010	Fridge	VWR		R-12	4.0 OZ		2010786		
Room	384	RPJ31L	Fridge	WESTING H		R-22	8.0 OZ		371181		
Room	"B" PENTHOUSE	F3WM-C105TFC020	Walk In 329	COPELAND	1985	R-22			06J07241D	Updated	Once Thru Water
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 1	ELECTROLU		R-134A	6.5 OZ		WB24140269		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 2	ELECTROLU		R-134A	6.5 OZ		WB14633159		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 4	ELECTROLU		R-134A	6.5 OZ		WB14633109		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 5	ELECTROLU		R-134A	6.5 OZ		WB24140284		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 6	ELECTROLU		R-134A	6.5 OZ		WB20541575		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 7	ELECTROLU		R-134A	6.5 OZ		WB20541577		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 9	ELECTROLU		R-134A	6.5 OZ		WB24524232		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 11	ELECTROLU		R-134A	6.5 OZ		WB20833204		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 12	ELECTROLU		R-134A	6.5 OZ		WB10714132		
Room	H 09	83 /		FISHER		R-12	14.5 OZ		10AL-0458		
Room	H 09	83 /		FISHER		R-12	14.5 OZ		10AL-0459		
Room	H 09	83 /		FISHER		R-12	14.5 OZ		10AL-0460		
Room	H 09	83 /		FISHER		R-12	14.5 OZ		10AL-0461		
Room	H 09	8359 /		FORMA		BLENDED	48 OZ		D8463 /		
Room	H 09	31213 /		GCA		R-12	10 OZ		21-AC-11		
Room	H 09	31213 /		GCA		R-12	10 OZ		21-AC-14		
Room	H 09	1-35D		PERCIVAL		R-12	13 OZ		88G3360-15		
Room	H 09	N/A		PSYCRO		R-12	45 OZ		N/A		
Room	H 11	RDA-13		WESTINGHOUSE		R-12	10 OZ		36299 /		
Room	H 14	RVG-01M	Fridge	G E		R-12	12 OZ		D65239 /		
Room	H 16	RDA-13	Fridge	WESTINGH		R-12	10 OZ		36884 /		
Room	H10	E-15		CONVIRON		R-22	88 OZ		9C-2073		

NRCan's Ozone Depleting Substance Inventory (CFC/HCFC, Halon)						2014	Jan					
Current ODS Information												
Location Type	Room # /Area	Model	Equipment Type	Manufacturer	Comm/Decomm Date	Refrigerant Type	Number of Cylinders (halon)	Refrigerant Quantity (kg) (total)	Charging Capacity (Tons)	Serial Number	Asset number	Comments
Room	4	RWC8	Water Cooler	SUNROC		R134A		405g		95334850		SCRAPPED
Room	4	ECH8 1 j	Water Cooler	ELKAY	10/4/2012	R134a		4.1 OZ		90518578		
Room	14	401200Q	Freezer	KENMORE		R12		245g		723652FQ	A066837	SCRAPPED
Room	17	WL-48-W	Fridge	FOSTER		R-12		24 OZ		65535 /	A066834	SCRAPPED
Room	17	WL-48-F	Fridge	FOSTER		414b		11 oz		65536 /	A066835	
Room	17	WL-38-C	Fridge	FOSTER		R-12		14 OZ		65535 /	A066834	SCRAPPED
Room	17	2RF	FRIDGE/FREEZER	CONTINENTAL	1/31/2012	R134A/401		8.5 / 9.0 OZ		151A9701	105162	1 unit ,2 systems
Room	18	V540VM	Pop Machine	VENDCO		134A		10.7 oz		S734640		
Room	18	406937	Freezer	CELCOLD		R134A		210g		95164116	A066838	
Room	18	QFDRT	Freezer	QUEST		R-12		18 OZ		139 /	A066833	
Room	18	GDM 12	Cooler	TRUE		134A		9oz		6644911		
Room	40	C67582210	FREEZER	KENMORE	2/5/2010	R-12		280 Grams		625430LP	A066401	Decommissioned
Room	40	82210-20	FREEZER	KENMORE	2/5/2010	R-12		305 Grams		393559-MN	A066400	Decommissioned
Room	40	OEA060	FREEZER	KENMORE		R-12		10 OZ		625451LP	A066393	Scrapped
Room	40	253-21741100	Freezer	KENMORE		R-134A		7.3 OZ		WB12002205	A066394	SCRAPPED
Room	40	G 30	GC15	CONVIRON		R-12		18 OZ		7F6178U	A066403	SCRAPPED
Room	40	G 30	GC16	CONVIRON		R-401A		13 OZ		7F7097U	A0066402	
Room	40	815	GC 8	PRECISION		R-12		9oz		29AS63	A066768	SCRAPPED
Room	40	317312	GC 9	HOTPACK						73929	A064099	Scrapped
Room	40	SL27-17	GC17	HOFFMAN	12/17/2009	R-12		18OZ		C1322361	A066399	SCRAPPED
Room	40	SL27-17	GC18	HOFFMAN	3/24/2010	R-12		18 OZ		C1322339	A066405	scrapped
Room	40	ST-181	GC22	HOFFMAN		401-A		18 OZ		2001010441	A066404	
Room	40	G 30	GC18	CONVIRON		R-12		18 OZ		8B6048U	A064037	
Room	40	G 30	GC17	CONVIRON		R-12		18 OZ		9B0055U	A064038	

Room	40	ULT-1386D-O-B	ULT1	REVCO	3/24/2010	BLEND		32 OZ		V V 3706	A066392	scrapped
Room	40	ULT-13867-D12		REVCO		BLEND		32 OZ		P02D-158965-PD	A064100	Scrapped
Room	40	ULT-1386-9-D36	ULT3	REVCO		BLEND		32 OZ		019N622234-ON	A064918	Scrapped
Room	40	ULT-1386-9-D34	ULT4	REVCO		BLEND		32 OZ		P05L519996-PL	A064122	
Room	40	UXF40086D63	ULT3	REVCO	2/17/2014	BLEND		32OZ		13269101140121	A105314	
Room	40	UXF40086D60	ULT2	Thermo /Scient	5/23/2012	Blended		32 oz		123948701120106	A105161	
Room	40	ULT-1386-9-D35	ULT5	REVCO		BLEND		32 OZ		P06M572231-PM	A066395	Scrapped
Room	40	ULT-1386-5-D42	ULT	VWR/THERMIO		BLEND		29.65 OZ		129628701110209	A105090	
Room	40	DW 86L628A	ULT1	VWR	12/1/2010	BLEND		790 Grams		BE06Q1E0200B294D0032	A066884	
Room	40	UXF40086D60	ULT	THERMO SC.	1/31/2012	BLEND		31.7 OZ		123948701120106	A105161	
Room	40	F3AHA101CFU001	Chiller	COPELAND		R-22		1lbs 7 oz				
Room	40	QF0406A	Ice maker	MANITOWAC	8/1/2002	R-404A		16 OZ		20464447	A066406	
Room	40	FFHT1826W5	Fridge	Frigidaire	12/7/2011	R134A		4.5 OZ		BA14239056	A105142	
Room	41	A6D24E7A-K	AC	FEDDERS		R22		36OZ		BS521588048F		Window Shaker
Room	41	AC067N1D1	AC	WESTING H		R22		13.5OZ				Window Shaker
Room	41	FJWL C200TFC020	Cold Room 4	Copeland	2002	R 404a		10 LBS	3	B24A05		
Room	41	6D21-104	Cold Room 5	Carrier	1963	R 414b		7 kg	2.00	40011		
Room	41	WDWM_0300-TFC-001	Cold Room 6	Copeland	1963	R401A		22kg	3	11D79		
Room	43	PGV-36	GC1	Conviro	1990	HCFC-22		12.00	10	9J0273	A064007	
Room	43	E8VH	GC11	Conviro	1970	R401A		5.00	3.00	7B1045F	A066396	
Room	43	E8VH	GC12	Conviro	1970	R401A		10.00	10.00	7B1044F	A066397	
Room	43	E8VH	GC13	Conviro	1970	R401A		10.00	10.00	713179U	A066398	
Room	43	E8VH	GC14	Conviro	1970	R401A		10.00	10.00	713198U	A066407	
Room	43	PGV-36	GC2	Conviro	1991	R404A		25KG	5.50	9J0292	A064008	
Room	43	PGV-36	GC3	Conviro	1989	HCFC-22		20KG	10	8C9085	A064004	
Room	43	PGV-36	GC4	Conviro	1990	HCFC -22		20KG	10.00	8C9084	A064005	
Room	43	PGV-36	GC5	Conviro	1990	HCFC -22		25 KG	7.30	8K9505	A064006	
Room	43	PGV-36	GC6	Conviro	1990	HCFC -22		20KG	10.00	5B9035	A064010	
Room	43	PGV-36	GC7	Conviro	1990	HCFC -22		20KG	10.00	8C0066	A064009	

Room	43	FFU21M7HWM	FREEZER	FRIGIDAIRE	41114	R134A		6.7OZ		WB20771530	A105222	
Room	47	EWVA-021ETAC	Cold Room 1	Copeland	1995	R404A		22 KG	3	CCH9513353	N/A	
Room	47	KM24L30-A	AC Unit	FRIEDRICH		R-22		53 OZ		LEBR12937		Window Shaker
Room	47	K20DF	AC	KOLDWAVE		R22		26OZ		F106654		
Room	47	WJWL0200TAC001	Cold Room 2	Copeland	1996	R404A		15KG	3	20194	N/A	
Room	47	FPWN-C225TFC020	Cold Room 3	Copeland	2005	R404A		22KG	2.00	B30C04	N/A	
Room	51	CRA-105-OPFV270	Cold Room 7	Copeland	2006	R-404A		3lbs 6oz		92F33892	A066769	
Room	60	INT34090	FRIDGE	INGLIS		R12		7.5OZ		3BD30229		
Room	60	FJWMC125CFV020	FRIDGE/UNIT	COPLAND		R404A		3lbs 4 oz		10A204214		FOSTER WALK IN
Room	60	QCH-024AA1	AC	THERMO P		R-22		61 OZ		W1557769D		Quarantine Room AC
Room	64	CRTW-4800-TL	FRIDGE	CONCEPT		R-134A		3.5 OZ		2R322120Y	A066772	SCRAPPED
Room	65	31213	GC 21	PRECISION		R-12		8 OZ		28AK-3	A066773	
Room	67	106.6797802	FRIDGE	KENMORE	3/2/2011	R134A		4OZ		EY4502121	A105089	
Room	67	WL183NRW7	FRIDGE	WESTING H		R-12		6.5 OZ		860406129	A066776	
Room	69	F3WD-0201CFV001	AIR HANDLER 9	COPELAND		R-22		4lbs 8oz				
Room	70	970-420624	FRIDGE	KENMORE	7/24/2012	R134a		4.25 OZ		BA22521624	A105219	
Room	71	KAC-030-H-4B	AC	THERMO P		R-22		40 OZ		B2003050132		
Room	72	106.6797802	FRIDGE	KENMORE	2011-0302	R134A		4OZ		EY4502389	A105085	
Room	72	C106-7391080	FRIDGE	KENMORE		R-12		8.0 OZ		LE-10275	A066783	SCRAPPED
Room	73	KAC-030-H-4B	AC Unit	THERMO P	8/15/2003	R-22		40 OZ		B2003035225		Ceiling
Room	73	AB00146	Fridge	VIKING		R-12		8 OZ		FR-1-FV1314-W	A066097	SCRAPPED
Room	73	125L	GC 10	CONVIRON		R-12		24 OZ		9L0221	A064039	Scrapped
Room	73	123L	GC 19	CONVIRON		R-12		24 OZ		8B6034U	A065735	Scrapped
Room	73	123L	GC 20	CONVIRON		R-12		24 OZ		8F1876U	A065736	Scrapped
Room	73	FFHT1826W5	FRIDGE	FRIGIDAIRE	12/7/2011	R134A		4.25OZ		BA14239089	A105145	
Room	73	118L	GC	CONVIRON	12/17/2009	R-12		24 OZ		7J0264F	A065737	SCRAPPED
Room	73	A1000- ADAPTIS	GC 31	CONVIRON	9/28/2009	R134a		4.6 LBS		99255	A066841	
Room	73	A1000- ADAPTIS	GC 32	CONVIRON	2/10/2010	R134a		4.6 LBS		99504	A066906	
Room	73	A1000- ADAPTIS	GC 33	CONVIRON	2/10/2010	R134a		4.6 LBS		99445	A066908	

Room	73	A1000- ADAPTIS	GC 34	CONVIRON	2/10/2010	R134a		4.6 LBS		99444	A066907	
Room	74	31213-35	GC 23	PRECISION		R-12		8 OZ		35AY-3	A066350	
Room	First Flr. Alcove	461.90192	Food Fridge	KENMORE	7/24/2012	R134a		4.06 OZ		1.1205E+11	A105216	
Room	104	HAC-013	AC UNIT	THERMO PLUS		R-22		2 lbs 6oz		840920778		Ceiling
Room	104	HAC-013	AC UNIT	THERMO PLUS		R-22		2lbs 6oz		840920775		Ceiling
Room	105	Model 9300	Fire Suppression	Fenwall	9/27/2012	FM 200	#1	168 lbs	N/A			Replaced
Room	105	Model 9300	Fire Suppression	Fenwall	9/27/2012	FM 200	#2	526 lbs	N/A			Replaced
Room	105	Model 9300	Fire Suppression	Fenwall	9/27/2012	FM 200	#3	177 lbs	N/A			Replaced
Room	106	DAG-0832	AC1	Data Air	1995	R-22		9lbs 10oz	8	841114		Updated
Room	106	DAG-0832	AC2	Data Air	1995	R-22		15lbs	8	841115		Updated
Room	114A	KAC012H4B	AC -UNIT	THERMO-PLUS		R-22		14oz		2001-10192		In Ceiling
Room	116	QCH-018AA1	AC	THERMO P		R-22		38.5 OZ		91W32516AA		In Ceiling
Room	118	KHC-012H4C	AC	THERMO P		R-22		42.5 OZ		0041B1294		In Ceiling
Room	120	Climate Master 024AA1	AC	TRANE		R-22		36 OZ		N/A		
Room	129	YRF1712W-M1	Fridge	McCLARY		R-12		4.25 OZ		KG160599	A066810	SCRAPPED
Room	130	KPC-6000	AC	KOLDWAVE		R-22		27.5oz		01-403389		
Room	140	KHC-024AA1	AC	MARKHOT		R-22		42.5 OZ		8812B1352		In Ceiling
Room	146	970-22204140	FRIDGE	KENMORE		R-134A		8.0 OZ		WB-3401-21933	A066095	
Room	148	D1705AR	FRIDGE	DANBY		R-12		8.0 OZ		01329450DT	A066078	
Room	148	FFHT1826W5	FRIDGE	FRIGIDAIRE		R134A		4.5OZ		BA14239079	A105143	
Room	150	A1201C1	AC	ELECTROHOME		R-22		24.5 OZ		J960904697		Window Shaker
Room	150	3559	Freezer	LAB LINE		R-12		10 OZ		1285-013	A066051	
Room	150	47747-222	FRIDGE	VWR/THERMO		R134A		4.9OZ		146000101111121	A105123	
Room	152	A1201B1	AC	ELECTROHOME		R-22		29 OZ		J931000907		Window Shaker
Room	154	106.6797802	FRIDGE	KENMORE	4/11/2011	R134A		4.0OZ		EY4502416	A105119	
Room	154	TLJJ30	Fridge	WESTING H		R12		6.0 OZ		745D180A12	A066063	SCRAPPED
Room	160	51ME1501	AC	CARRIER		R-22		40 OZ		4289724 /		
Room	165	2K16BF11	AC	KOLDWAVE		R-22		22oz		NZ_142218		
Room	165	L8M-70	CENTRIFUGE	BECKMAN		R-22		15oz		7C421	A064056	

Room	171	970447820	Fridge	KENMORE	10/29/2009	R134A		3.8oz /107g		WA92802177	A066846	
Room	171	LT755925		INGLIS	12/17/2009	R-12		8.0 OZ		KM1053	A066808	SCRAPPED
Room	173	ET-73000R		INGLIS	12/17/2009	R-12		8.0 OZ		369100	A066806	SCRAPPED
Room	173	K-500		KELVINATOR	12/17/2009	R-12		6.0 OZ		ZA-09501	A066807	SCRAPPED
Room	173	970447820	Fridge	KENMORE	10/22/2009	R134A		3.8oz /107g		WA92802235	A066848	
Room	173	970429022	Fridge	KENMORE	10/22/2009	R134A		4.25oz		BA94016088	A066847	
Room	176	R090	Bar Fridge	WOODS		R-12		90G		NA00A0	A066670	
Room	178	2K14DB11	AC	KOLDWAVE		R-22		24 OZ		Q1-15-205G		
Room	181	NTD 1474L		ADMIRAL	3/24/2010	R-12		8.5 OZ		523852	A066111	SCRAPPED
Room	181	970 429122	Fridge	Kenmore		R134A		4.25oz		BA00919924	A066956	
Room	185	2K16DF11	AC #27	KOLDWAVE		R-22		22 oz		L3134338		
Room	187	970429122	Fridge	Kenmore		R134A		4.25oz		BA94123445	A066849	
Room	187	K500R		KELVINATOR	12/17/2009	R-12		8.5 OZ		2A-06293	A066805	SCRAPPED
ROOM	2ND ALCOVE	461.90192	FOOD FRIDGE	KENMORE	7/24/2012	R134a		4.06 OZ		112050200006	A105217	
CHASE	204	RWC8	WATER COOLER	SUNROC		R12		5.5OZ		94350297		
Room	205	K20DF	AC	KOLDWAVE		R-22		26 OZ		F106694		Wall Mounted
Room	205	RF11700rw1	Fridge	VIKING		R-12		8.0 OZ		NA94106094	A066804	SCRAPPED
Room	205	D46M40242	Refrigerator	KENMORE	3/2/2011	R134A		4.25OZ		4A01802265	A105082	
Room	207	CCHWHW015	AC	McQUAY		R-22		24 OZ		75-G01415		IN CEILING
Room	207	ATB2232MRW00	Fridge	Amana	3/1/2009	R-134a		4 OZ		EW3803777	A066511	
Room	207	815	GC 41-LTI	PRECISION		R12		9 OZ		29-AS-62	A064420	
Room	207	ATB2232MRW00	Fridge	Amana	3/1/2009	R-134a		4 OZ		EW3803778	A066510	
Room	207	815		PRECISION	3/24/2009	R-12		16 OZ		29AU-11	A064220	SCRAPPED
Room	210	HS019G222R	AC	CLIMATE		R-22		30 OZ		92DW755		IN CEILING
CHASE	212	RWC8	WATER COOLER	SUNROC		R12		5.5OZ		94528276		
Room	218	HS014G222R	AC	CLIMATE		R-22		28 OZ		92JW702		IN CEILING
Room	221	KAC007A070	AC	THERMO P	4/29/2003	R-22		60.8 OZ		B20030010213		IN CEILING
Room	221	DCR412W	Bar Fridge	DANBY		134a		1.59oz		103060000000		
Room	225	CCHWHW024	AC	McQUAY		R-22		42 OZ		72H962305		IN CEILING

Room	225	51832-0L	Bar Fridge	BIG ROCK		R-12		8.0 OZ		800016-LL		Alec McBeath
Room	230	WCDO02611J00AA01	AC	TRANE		R-22		48 OZ		W96B02960		IN CEILING
Room	230	307	GC 24	FISHER		R-134A		7.0 OZ		3288	A066550	
Room	230	FFU20F9FW0	GC 25	FISHER		R-134A		9 OZ		WB70610520	A066536	
Room	230	0646-6086080		KENMORE		R-12		10 OZ		6DB03379	A066535	SCRAPPED
Room	230	106.6797802	FRIDGE	KENMORE	3/2/2011	R134A		4OZ		EY4502396	A105086	
Room	234	28042	FREEZER	KENMORE	3/2/2011	R134A		6.7OZ		WB04161561	A105081	
Room	234	VCR449A20	2 Glass Doors	VWR		R-134A		20 OZ		N25M1566568-01	A064496	COOLER
Room	234	CCH/WHW024	AC	McQUAY		R-22		42 OZ		72H0962205		IN CEILING
Room	234	75003641-01	Centrifuge	HERAEUS		R-12		10 OZ		232641	A064050	
Room	234	D123LGGAA	Freezer	KENMORE		R-12		10 OZ		SQH5581650	A066200	SCRAPPED
Room	234	DMR1706WE	Fridge	DANBY		R-12		8.0 OZ		03775293KA	A066199	SCRAPPED
Room	234	F10102000		EDWARDS		R-502		16 OZ		5222	A064053	
Room	234	3752FS	FREEZER	FISHER	12/1/2011	R134A		3.5OZ		168835901110128	A105139	
Room	234	N/A	GC 26	LAB LINE		R-12		24 OZ		N/A	A064786	
Room	234	FV01512		VIKING		R-12		4.0 OZ		805901LQ	A066803	SCRAPPED
Room	234	103NBR	CENTRIFUGE	WESTERN S.		R-12		8.0 OZ		84728	A064777	
Room	234	FF421M7HW	FREEZER	FRIGIDAIRE	12/7/2011	R134A		6.7OZ		WB13862409	A105141	
Room	234	FFHT1826W5	FRIDGE	FRIGIDAIRE	12/7/2011	R134A		4.5OZ		BA14239080	A105140	
Room	234	YET20GKXBW00		WHIRLPOOL		R-12		8.0 OZ		ED1733684	A066201	SCRAPPED
Room	235	DCR34W	FRIDGE	DANBY		134a		1.84OZ		1061001...	A066232	
Room	238	WCHD02611J00AA01	AC	TRANE		R-22		48 OZ		3		IN CEILING
Room	241	WCHD01911J10AA01	AC	TRANE		R-22		34 OZ		W95L38877		IN CEILING
Room	241	970-415324	FRIDGE	KENMORE	7/24/2012	R134A		4.25OZ		BA21414883	A105226	
Room	242	YET18SKXBW00		WHIRLPOOL		R-12		10 OZ		EC4132679	A066802	SCRAPPED
Room	244	28042	FREEZER	KENMORE	3/2/2011	R134A		6.7OZ		WB04161544	A105080	
Room	244	CCH/WHW030	AC	McQUAY		R-22		54 OZ		72H0671705		IN CEILING
Room	244	3551-10	FRIDGE	Thermo scientific	3/24/2010	R134a		4.9oz		1440100252142	A105035	Explosion Safe
Room	244	3551	FREEZER	LAB LINE		R-12		7.0 OZ		FE91602071	A066608	SCRAPPED

Room	244	ET14MNXSW00		VWR		R-12		8.0 OZ		S73325683	A066609	SCRAPPED
Room	248	970-602120	fridge	KENMORE		R-134A		4.5 OZ		BA94807254	A066621	SCRAPPED
Room	248	2005	GC 29 - LTI	VWR/Sheldon		R-12		2.6 OZ		1200299	A066640	
Room	248	970-420624	FRIDGE	KONMORE	7/24/2012	R134A		4.25OZ		BA22521620	A105223	
Room	253	KAC-024-V-4	AC	THERMO-PLUS		R-22		25OZ		99120061		
Room	257	WCHD01911J10AA01	AC	TRANE		R-22		34 OZ		W95L38882		IN CEILING
Room	259	WCHD02611J00AA01	AC	TRANE		R-22		48 OZ		W96B02962		IN CEILING
Room	265	DC12-032W	MINI FRIDGE	DIPLOMAT		R-12		4.0 OZ		4AFTA-00249	A066801	Food
Room	268	42005GA14	FREEZER	VWR		R134a		2.5OZ		S12H-381938	A066302	
Room	268	N/A	Fridge	KENMORE		R-12		8.0 OZ		NA93703093	A066306	SCRAPPED
Room	268	N/A	GC30 - LTI	PRECISION		R-12		14 OZ		29AU-1	A066307	
Room	269	50QXH018-311	AC	CARRIER		R-22		40OZ		4493V09511		SCRAPPED
Room	269	KAC018H4C	AC	Thermoplus		R22		20OZ		B2009050048		IN CEILING
Room	272	VLITSMCL05911	Fridge	GE		R-12		8.0 OZ		BY5-99497	A066323	
Room	272	106.6797802	FRIDGE	KENMORE	3/2/2011	R134A		4.0OZ		EY4502425	A105084	
Room	274	A6D24E7AK	AC	FEDDERS		R22		36OZ		BS521682049F		
Room	274	660320000W1	FRIDGE	KENMORE		R-134A		4.25 OZ		KW4928194	A066324	
Room	274	50165012	FRIDGE	KENMORE		R-134A		4.25 OZ		802MRXX17850	A066285	
Room	281	TH-6-B-0	FRIDGE	FOSTER		R12		32OZ		8613	A066800	scrapped
Room	281	815	GC 35 - LTI	PRECISION		R-12		14 OZ		29-AS-2	A066799	
Room	281	815	GC 36 - LTI	PRECISION		R-12		14 OZ		29-AS-6	A066798	
Room	281	815	GC 37 - LTI	PRECISION		R-12		14 OZ		29-AS-61	A066797	
Room	281	815 /	GC 38 - LTI	PRECISION		R-12		10 OZ		29-AS-63	A064422	
Room	281	GBSCOHBXCRWW	Fridge	GE		R-134a		5.4 oz		304405	A066927	
Room	281	FD 13 L		FRIGIDAIR	3/24/2010	R-12		8.0 OZ		IC 158864	A066795	scrapped
Room	281	46042 /	FRIDGE	G E		R-12		16 OZ		1086 /	A066794	scrapped
Room	281	46042	FRIDGE	GE		R-12		16 OZ		1273	A066796	Scrapped
Room	281	21520	GC 39 - LTI	J S		R-12		16 OZ		1000988	A064419	
Room	286	DAR-340W	FRIDGE	DANBY		R-12		4.0 OZ		110040100270		

Room	288	31213		PPRECISION	3/24/2010	R12		14OZ		40951	A066590	scrapped
ROOM	3rd ALCOVE	461.90192	FOOD FRIDGE	KENMORE	7/24/2012	R134a		4.06 OZ		112030201243	A105218	
Room	303	RM-0511	Fridge	Viking		R12		3.8 OZ		2491902AX	A066790	SCRAPPED
Room	304	R411FA16	FRIDGE	VWR		R134A		5.5OZ			A065625	
Room	304	KAC024B*	A/C	Thermoplus		R22		2lbs 6oz				IN CEILING
Room	304	ML-13-6-B-2-T1		McCLARY	3/24/2010	R-12		8.0 OZ		L-239918-7	A066789	Scrapped
Room	304	106.6797802	FRIDGE	KENMORE	3/2/2011	R134A		4OZ		EY4502397	A105088	
Room	306	N/A	AC	KOLDWAVE		R-22		24 OZ		N/A		WALL MOUNT
Room	306	N/A	AC	KOLDWAVE		R22		24OZ		N/A		WALLMOUNT
Room	307	U-35 P		Danby woods		R-12		8.5 OZ		720531FO	A066791	
Room	310	N/A		COLDSPOT	12/17/2009	R-134A		6.5 OZ		N/A	A065904	SCRAPPED
Room	310	KAC048-H4B	AC	THERMOPLUS		R-22		46 OZ		B2004-100064		In Ceiling
Room	310	67563682 /		KENMORE		R-134A		4.5 OZ		08281173 /	A065906	SCRAPPED
Room	310	LW18JYRRW-1		G E	2/10/2010	R-12		4.25 OZ		AM383330V	A065974	SCRAPPED
Room	310	3566-10A	Freezer	VWR		R134a		8OZ		201709124908	A066905	SCRAPPED
Room	310	10660912101	FRIDGE	KENMORE		R134A		4OZ		EL5124322 /	A065905	
Room	310	1.1101E+13	CHILLER	THERNO S.		R134A		19OZ		108032015	A065874	
Room	310	970-447823	FRIDGE	KENMORE	7/24/2012	R134A		3.8oz		WA21102417	A105220	
Room	310	FFU21M7HWM	FREEZER	FRIGIDAIRE	7/24/2012	R134A		6.7OZ		WB21265242	A105224	
Room	322	FFHT1826W5	FRIDGE	FRIGIDAIRE	12/7/2011	R134A		4.5OZ		BA14239060	A105144	
Room	322	KAC-018-H-4C	AC	THERMOPLUS		R22		20OZ		B2008080141		In Ceiling
Room	328	46190482	Fridge	KENMORE		R-134A		1.41 OZ		105120100315	A066125	
Room	329	RT100L	CONDENSOR	SAVANT		R12		N/A		84-098-115	A066148	
Room	329	FFU21M7HWM	FREEZER	FRIGIDAIRE	2012/05/16	R134a		6.7 oz		WB21655917	A105214	
Room	329	U2020GA-14	FREEZER	VWR		R-134a		9 OZ		Y08K-504045-YK	A066151	SCRAPPED
Room	338	970 429122	Fridge	KENMORE	3/22/2010	R134a		4.25oz/121g		BA00919930	A066955	
Room	338	KAC030H4B	A/C	THERMOPLUS	7/8/2004	R22		34OZ		BZ003050139		In Ceiling
Room	338	N/A		ADMIRAL	3/24/2010	R-12		10 OZ		N/A	A066675	scrapped
Room	347	C675265331M	Fridge	KENMORE		R-134A		3.2 OZ		60093529LM	A066788	

Room	348	CC-100	WATER BATH	NES LAB		N/A		N/A		83A-10926-2	A066008	
Room	349	OOO-6995	WATER BATH	HAAK- A81		R12		12OZ		860338	A064217	
Room	353	C12NAA	FREEZER	WOODS		R-134a		10OZ		07141AG	A064414	
Room	353	970-C155025	FREEZER	KENMORE	7/24/2012	R-134a		6.0 OZ		WB22149714	A105221	
Room	364	229100	MMERTION COOLEF	NES LAB						83F11363-2		
Room	364	106.6797802	FRIDGE	KENMORE	3/2/2011	R134A		4OZ		EY4502364	A105087	
Room	364	P156N11205	Fridge	KELVINATOR		R-12		10 OZ		870805080	A066012	SCRAPPED
Room	373	1304590	AC Unit	FOREST AIR	2009	R-22		14.11 OZ		10475-13-04590		
Room	373	46042	FRIDGE	GE/CENCO	3/24/2010	R12		6.5 OZ		1082	A066015	SCRAPPED
Room	373	46042 /	Fridge	G E		R-12		6.5 OZ		1266 /	A066016	SCRAPPED
Room	373	GSBCOHBXARWW	Fridge	GE	25/03/2010	R134a		4.5oz		HR 302930	A066964	
Room	373	3766A	FRIDGE	THERMO S.	3/2/2011	R134A		4.2OZ		119949201110104	A105057	
Room	384	RPJ31L	Fridge	WESTING H	3/24/2010	R-22		8.0 OZ		371181	A066713	scrapped
Room	383	ACS088PW	AC	WHIRLPOOL	2010-	R22		21.9OZ		MQB02S30322		Window Shaker
Room	383	970429122	Fridge	Kenmore	3/23/2010	R134a		4.25oz/121g		BA00919727	A066957	
Room	397	2010	Fridge	VWR		R-12		4.0 OZ		2010786	A066787	
Mech. Space	"A" PENTHOUSE	RP-10-A	Water Cooler	HALSEY		R-12		16 OZ		63-274090		SCRAPPED
Mech. Space	A PENTHOUSE	ERW32-1D	WATER COOLER	ELKAY	9/28/2012	R134A		8.5 OZ		120614921		
Mech. Space	A PENTHOUSE	RP10Q	WATER COOLER	HALSEY		R12		16OZ		63274065		
Mech. Space	A PENTHOUSE	A0412RLS	AC	FUJISU		R410A		2LBS 9OZ		HSN004778		ROOM 156
Mech. Space	"B" PENTHOUSE	A 4210-5	Air Drier	JOHNSON		R-12		13 OZ		LR21933		Not in Service
Mech. Space	"B" PENTHOUSE	F3AM-A102TFC001	Walk In 329	COPELAND	2011	R-22		2Lbs 8 oz				
Room	"B" PENTHOUSE	M35	Air Drier	AIRTEK	1992	R-22		?		92-7103		
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 1	ELECTROLU		R-134A		6.5 OZ		WB24140269	A066822	
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 2	ELECTROLU		R-134A		6.5 OZ		WB14633159	A066823	
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 11	ELECTROLU		R-134A		6.5 OZ		WB20833204	A066829	
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 12	ELECTROLU		R-134A		6.5 OZ		WB10714132	A066830	
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 4	ELECTROLU		R-134A		6.5 OZ		WB14633109	A066824	
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 5	ELECTROLU		R-134A		6.5 OZ		WB24140284	A066825	

Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 6	ELECTROLU		R-134A		6.5 OZ		WB20541575	A066826	
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 7	ELECTROLU		R-134A		6.5 OZ		WB20541577	A066827	
Greenhouse	GH 7	FFC07C3AWZ	Propagator Unit 9	ELECTROLU		R-134A		6.5 OZ		WB24524232	A066828	
Room	H09	D116S	Low Temp Inc	FISHER		R-12		14.5 OZ		22AB2488	A066812	scrapped
Room	H09	D116S	Low Temp Inc	FISHER		R-12		14.5 OZ		10AL-0459	A066813	scrapped
Room	H 09	Cenco Lever	Fridge	Centco	3/24/2010	R-12		12 OZ		N8HB	A066821	scrapped
Room	H 09	D116S	Low Temp Inc	FISHER		R-12		14.5 OZ		10AL-0460	A066814	scrapped
Room	H 09	D116S	Low Temp Inc	FISHER		R-12		14.5 OZ		22AB2866	A066816	scrapped
Room	H 09	8458	ULT	FORMA	3/24/2010	BLENDED		48 OZ		83175-429	A064109	scrapped
Room	H 09	FU178RRW2	L.T.Inc.	Westinghouse		R-12		10 OZ		B11210	A066815	scrapped
Room	H 09	FU017RRW6	L.T.Inc.	Westinghouse		R-12		10 OZ		21-AC-14	A066817	scrapped
Room	H 09	1-35D	GC54	PERCIVAL		R-12		13 OZ		8803360	A066811	
Room	H 09	G-27	GC43	PSYCRO		R-12		45 OZ		66207	A066818	
Room	H16	RVG-13		WESTINGHOUSE	3/24/2010	R-12		10 OZ		36299 /	A066819	scrapped
Room	H.11	RDA-13	Fridge	WESTINGH	3/24/2010	R-12		10 OZ		36884 /	A066820	scrapped
Room	H11	970 429122	Fridge	Kenmore	3/22/2010	R134a		4.25oz/121g		BA00919925	A066953	
Room	H 10	E-15	GC44	CONVIRON		R-22		88 OZ		9C-2073	A064137	
Room	H16	970 429122	Fridge	Kenmore	3/22/2010	R134a		4.25oz/121g		BA00919923	A066954	
Room	H10	EEH036JK110K	AC	YORK		R-22		104 OZ		EWDF00692J		
Room	S7	Model 9300	Fire Suppression	Rowall	9/27/2012	FM 200	F	13.00	N/A		Replaced	1815
Room	Mo HALLWAY	EWA4-1G	Water Cooler	ELKAY	10/4/2012	R134a		4.3oz		120211451		
Room	M01	DCR41WE	Bar Fridge	DANBY		R-22		3.4OZ		C9300412	A066809	
Room	M07	GHGD24S21S1	Heat Pump	JOHNSON	7/17/2013	R22		85 oz		W1D3613957	N/A	
Room	M08	MCBR360WF	food Bar Fridge	Magic Chef		R-134a		1.4 oz				
Room	Library	50T FQ012-A-121	Heat Pump	CARRIER		R-22		7.3 KG		0806G50739		Roof Mount
Room	Library	RM023	Bar Fridge	Viking		R-12		1.94 OZ.		30905111		
GYM	ANNEX	DCR29WE	BAR FRIDGE	DANBY		R12		2.65OZ		J9306323		