

**QUEENSBOROUGH  
COMMUNITY CENTRE  
FLOORING DEMOLITION  
+ ASBESTOS ABATEMENT  
NEW WESTMINSTER, BC**

**PROJECT MANUAL**

Issued for Tender: 10 September, 2012

**00 PROCUREMENT AND CONTRACT REQUIREMENTS**

SECTION 00 01 01  
**PROJECT CONTACT LIST**

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**PROJECT CONTACT LIST**

| ROLE              | FIRM & ADDRESS  | CONTACT  |
|-------------------|---|--|
| <b>PROJECT:</b>   | <b>QUEENSBOROUGH COMMUNITY CENTRE EXPANSION</b><br>New Westminster, BC              |  |
| <b>OWNER:</b>     | <b>City of New Westminster</b><br>511 Royal Ave<br>New Westminster, BC              | Wayne Werbovetski, MAIBC<br>Building Management Coordinator<br>T: 604.527.4597 |
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END OF SECTION 00 01 01

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**00 PROCUREMENT AND CONTRACT REQUIREMENTS**

SECTION 00 01 15  
**LIST OF DRAWING SHEETS**

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ARCHITECTURAL:

A.100 FLOORING DEMOLITION + ASBESTOS ABATEMENT

END OF SECTION 00 01 15

## 1 GENERAL REQUIREMENTS

SECTION 01 10 00  
**SUMMARY OF WORK**  
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### 1 GENERAL

#### 1.1 SUMMARY

- .1 General description of the scope of work at the wood-framed building located at 920 Ewen Avenue, New Westminster, BC, and known as Queensborough Community Centre as follows:
  - .1 Removal of Existing Flooring + Base:
    - .1 Removal of existing flooring + base in the following rooms:
      - .1 Room 701- Royal/ Port Room
      - .2 Room 702- Storage
      - .3 Room 703- Storage
      - .4 Room 704- Wreck Room
      - .5 Room 705- Storage
      - .6 Room 706- Storage
      - .7 Room 707- Wreck Room closet
      - .8 Room 708- Pantry
      - .9 Room 709- Catering
    - .2 Contract method: CCDC 2 – 2008 Stipulated Price with Supplementary Conditions.
    - .3 Owner's Occupancy: Fully Occupied
    - .4 This section provides only a general description of the scope of the work and process. This section is not definitive and the Work must be completed in accordance with all of the Contract Documents.

#### 1.2 RELATED SECTIONS

- .1 Bid Documents
  - .1 All bid documents are relevant to this section.
- .2 Technical Specification
  - .1 All technical specifications are relevant to this section.

## 1 GENERAL REQUIREMENTS

SECTION 01 10 00  
**SUMMARY OF WORK**  
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### 1.3 PROJECT COORDINATION

- .1 Co-ordinate progress of the Work, progress schedules, use of site.
- .2 Maintain at the job site, one copy of each of the following:
  - .1 Contract Drawings, attachments and specifications
  - .2 Project manual
  - .3 Addenda
  - .4 Reviewed Shop Drawings
  - .5 Change Orders
  - .6 Other Modifications to Contract
  - .7 Field Test Reports
  - .8 Standards of Workmanship
  - .9 WorkSafe BC approved safety program.

## 1 GENERAL REQUIREMENTS

SECTION 01 10 00  
**SUMMARY OF WORK**  
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### 1.4 SCOPE OF WORK

- .1 Contractual Requirements
- .2 The Contractor shall provide all labour, materials, products, equipment, services, and incidentals required to complete the Contract Work as indicated in the Contract Documents and amendments. The Contractor shall coordinate and direct the execution of the work, including directing the subcontractors.
- .3 The Project shall be known as the **Queensborough Community Centre Flooring Demolition + Asbestos Abatement**.
- .4 The Contractor shall execute a CCDC-2 2008 – Stipulated Sum Contract with the Owner. The General Conditions of the Contract, and these General Requirements, together with all Drawings and Details, form an integral part of all Specification Sections.
- .5 Complete the Work so as to be certifiable by the Consultant as having attained Substantial Performance on or before the date and time proposed on the Bid Form.
- .6 The Contractor is required to take the leading role in the organizing, scheduling and coordinating all of the work for an efficient and speedy completion. Scheduling of the Work is the responsibility of the Contractor.
- .7 Provide sufficient labour and materials to complete the Work within the time required for each construction phase, as well as to meet overall completion within the Contract Time. Any required overtime and similar costs to complete the project by the agreed completion date is included in the Contract Price.
- .8 These General Requirements as well as the related Sections of the Specification shall form part of all sub-trade contracts and agreements.
- .9 The Contractor shall maintain liability insurance as specified in the Contract in good standing throughout the term of the Contract with the Owner. The Consultant shall be notified immediately if for whatever reasons the insurance policy is in jeopardy. The Owner, Consultant and sub-consultants shall be named in the liability as co-insured.
- .10 Supply for distribution a minimum of every month a written description of the project status and specific information about the work that will affect the Owner. Increase the frequency of the submissions as necessary to keep the Owner informed. Liaise with Owner's representative and Consultant with respect to all issues impacting the building occupant's use of the site and building.
  - .1 Prepare for and attend all project progress meetings.
- .11 Construction Requirements
  - .1 Maintain all code required means of egress from the buildings at all times during work.
  - .2 Note that the Queensborough Community Centre is to remain open to the public for the duration of the construction period.
  - .3 Work to be completed by October 21, 2012.

**1 GENERAL REQUIREMENTS**

SECTION 01 10 00  
**SUMMARY OF WORK**

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.12 Start- Up

- .1 Make all submittals as described in the Contract Documents and ensure project schedules are submitted and accepted at project start-up.
- .2 Clearly identify the value of the work in each area as a percentage of the total project value and break each area into tasks, attaching the value of the work of each task as a percentage of the total project value for the purpose of evaluating applications for payment and change orders. Submit these completed schedules prior to commencing with the work.

.2 PROJECT WORK

- .1 Remove all existing flooring + base in area as indicated in Contract Documents.
  - .1 Hazardous materials, including asbestos-contaminated material, to be disposed of in accordance with Specifications.
  - .2 Protect all adjacent existing flooring not included in scope of work.
  - .3 Clean site of materials and debris created by the Demolition.

END OF SECTION 01 10 00



**1 GENERAL REQUIREMENTS**

SECTION 01 14 00  
**WORK RESTRICTIONS**  
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**1 USE OF SITE**

1.1 GENERAL

- .1 Construction activities to occur in areas of work only.
- .2 Assume full responsibility for protection and safekeeping of products under this Contract. Refer to CCDC General Conditions.
- .3 The Contractor shall at all times keep the site orderly and, as work allows, generally clean. Remove all trash and debris daily. Sweep clean all floor areas in, and adjacent to, the work area on a daily basis. See Section 01 74 00.
- .4 Contractor and his employees are to refrain from use of offensive language within the Work area.
- .5 No alcohol consumption is allowed on site

1.2 ACCESS

- .1 Coordinate with City staff prior to commencing work. Parking is available on site, in locations as designated by owner.
- .2 The Contractor shall not close or obstruct streets, sidewalks, lanes or other public rights of way without having first obtained permission from the City of New Westminster.
- .3 The Fire Fighting Access Road, at the southwest side of the site, must be kept clear and free from obstructions at all times. No parking allowed.

1.3 SITE STORAGE/LOADING

- .1 Confine the Work and operations of employees to limits agreed with Owner. Do not unreasonably encumber premises with Products.

1.4 HOURS OF WORK

- .1 The contractor shall carry out all work from 7:30 am through 7:00 pm, Monday through Friday.
- .2 The Contractor shall coordinate schedule with the applicable City staff. City staff must approve the schedule prior to the commencement of work. No workers can be on site outside of pre-approved hours.

1.5 SMOKING

- .1 The City does not permit smoking in or on the premises at any time. No smoking is permitted within 10'-0" of operable windows, doors and mechanical air intakes.

**1 GENERAL REQUIREMENTS**

SECTION 01 14 00  
**WORK RESTRICTIONS**  
page 2 of 2

1.6 WASTE MANAGEMENT

- .1 The Contractor shall remove all waste from the site within forty-eight (48) hours after demolition IN COMPLIANCE WITH SECTION 01 74 00.
- .2 The waste bins shall be located in construction work area only.
- .3 The City does not permit the use of existing on-site waste receptacles by the Contractor.

1.7 SECURITY

- .1 The security of the building occupants is of paramount importance. The contractor shall take all reasonable measure to prevent unauthorized access to the site.
- .2 The contractor's employees are to wear photo identification (provided by the City) at all times when in the work area inside the building.

1.8 DANGEROUS MATERIALS

- .1 No gasoline or other dangerous materials shall be stored on the site.
- .2 The Contractor shall separate any dangerous or hazardous materials removed from the site and take to the appropriate recycling or disposal station(s).

END OF SECTION 01 14 00

## 1 GENERAL REQUIREMENTS

SECTION 01 30 00  
**ADMINISTRATIVE REQUIREMENTS**  
page 1 of 2

### 1 GENERAL

#### 1.1 SITE MEETINGS

- .1 The Contractor shall coordinate and attend regular site meetings at such intervals as may be deemed necessary for the purpose of coordinating and expediting the progress of the work.
- .2 An authorized representative of the City will attend these meetings, as and when required. The Contractor agrees to attend in person or send an authorized representative to any such meetings that the City may call. The Contractor's subcontractors shall attend meetings as required to expedite the Work.
- .3 The Consultant shall record and distribute the minutes of any such meetings.

#### 2.1 PRE-CONSTRUCTION CONFERENCE

- .1 The City shall advise the Contractor of the time and location of a pre-construction meeting that representatives of the Contractor and his trades shall attend prior to the start of any construction of this contract. The purpose of the meeting is to review site conditions, scheduling and other contractual items.
- .2 The Contractor to review + accept conditions of the City of New Westminster Prime Contractor designation document. (Attached). In addition the owner will advise the Contractor of known risks + hazards. Review the city's pre-job communication policy. (Attached).

#### 3.1 RECTIFY DAMAGES

- .1 The Contractor shall make good any damage or spillage to adjacent buildings, areas, grounds, or vehicles at no cost to the City and leave the site in the same state as it was prior to commencement of the contract and to the satisfaction of the City. The Contractor shall perform all work in a manner that ensures the minimum interference with normal use of public spaces and facilities.

#### 4.1 CONSULTATION WITH OWNER

- .1 The Contractor shall contact the City immediately:
  - .1 For clarification regarding the Contract Work for information in addition to what is provided in the Contract Documents;
  - .2 If any conflicts or inaccuracies are discovered in the Contract Documents;
  - .3 If any site conditions become apparent that require revisions to the project design and Contract Documents.
  - .4 For coordination and approval of shutdowns of building systems, the City prohibits any shutdown of building systems during normal working hours as follows:
    - .1 Monday through Thursday, from 9:00 a.m. through 9:00 p.m.
    - .2 Friday through Sunday, from 9:00 a.m. through 5:00 p.m.
    - .3 Extended hours may be required.
    - .4 Provide 48 hours notice for all building systems shutdowns.
    - .5 Parking lot lighting may only be shutdown during daylight hours.

**1 GENERAL REQUIREMENTS**

SECTION 01 30 00  
**ADMINISTRATIVE REQUIREMENTS**  
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5.1 RECORD DOCUMENTS

- .1 The contractor is to keep on site at all times the following documentation:
  - .1 DAILY REPORT
    - 1. From the date of commencement of the Work, maintain a careful daily record of the progress of the work with all applicable trades listed.
    - 2. The report shall record all pertinent data including:
      - 1. Daily weather conditions and temperature
      - 2. Commencement, progress, and completion of various portions of the Work.
      - 3. Dates of all site meetings.
      - 4. Dates of visits or inspections by government authorities, inspectors, utility companies, and any other visitors to the site.
      - 5. Record of work force employed.
      - 6. Information required by Contractor or Subcontractors.
      - 7. Materials, actions, or events causing delay.
      - 8. Clarifications or questions, and answers received.
  - .2 Copies of Site Instructions, Change Orders, Payment Certificates, and all other contractual correspondence relevant to the Work.

END OF SECTION 01 30 00

**1 GENERAL REQUIREMENTS**

SECTION 01 33 00  
**SUBMITTAL REQUIREMENTS**  
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**1 GENERAL**

1.1 ADMINISTRATIVE

- .1 Submit to Consultant submittals listed for review in accordance with schedule so as to not cause delay in the Work.
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of the Work and Contract Documents.
- .4 Verify field measurements and affected adjacent Work are co-ordinated.

1.2 PRE-CONSTRUCTION SUBMITTALS:

- .1 The following submittals shall be provided by the contractor for the City's review within seven (7) days of award of the contract:
  - .1 Construction Progress Schedule;
  - .2 Proof of Insurance (see Supplementary Conditions and CCDC2-2008);
  - .3 Clearance Letter from WorkSafe BC

1.3 SCHEDULES

- .1 Schedules Required:
  - .1 Construction Progress Schedule.
  - .2 Schedule of Values of the Work

**1 GENERAL REQUIREMENTS**

SECTION 01 33 00  
**SUBMITTAL REQUIREMENTS**  
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- .2 Submission
  - .1 Submit final construction progress schedule,
  - .2 Submit values of work schedule, and submittals schedule for acceptance a minimum of 14 days prior to submitting the first application for payment.
  - .3 Submit 2 copies to be retained by Consultant.
  - .4 Include value of total contract for each phase and component of the work described in the project schedule.
  - .5 Consultant will review schedule and return reviewed copy within 7 days after receipt.
  - .6 Resubmit finalized schedule within 7 days after return of reviewed copy.
- 1.4 SUBMITTALS FOR SUBSTANTIAL PERFORMANCE:
  - .1 The following submittals shall be provided by the contractor for the Consultant's review upon the Contractor's request for Certificate of Completion of the Contract:
    - .1 Final inspection certificates from the authorities having jurisdiction;
    - .2 Deficiency list, complete with a cost estimate of the value of remaining deficiencies;

END OF SECTION 01 33 00

**1 GENERAL REQUIREMENTS**

SECTION 01 41 00

**REGULATORY AND STANDARDS REQUIREMENTS**

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**1 GENERAL**

**1.1 RELEVANT STANDARDS**

- .1 It is the responsibility of the Contractor to:
  - .1 Execute work in accordance with the 2006 BC Building Code, the 2006 BC Fire Code, the Uniform Building Code (UBC), the City of New Westminster Building By-Law, and all codes and standards specified within the text of this specification.
  - .2 Conform to the latest issue of codes and standards specified.
  - .3 In case of any conflict or discrepancy between codes and standards, the more stringent requirement shall apply.
  - .4 Materials and workmanship must conform to or exceed applicable standards of American National Standards Institute (ANSI), Construction Specification Institute (CSI), Materials and Methods Standards Association (MMSA), American Society for Testing and Materials (ASTM) and other referenced organizations.
  - .5 All specifications contained in these Contract Documents are in essence abbreviated or outline specifications. Where further information is required both at the time of tender, in the performance and supervision of the Project, the above standards and codes shall apply and will be enforced.

**1.2 SAFETY REQUIREMENTS**

- .1 The Contractor shall take adequate measures to protect the public, City of New Westminster staff, and others on site from injury, damage, or other loss resulting from construction and related activities. The City shall have complete jurisdiction over entry of Contractor's workers and vehicle access to site and existing buildings. The Contractor shall make building access arrangements in consultation with applicable staff.
- .2 All Contractors and Subcontractors must be registered employers with WorkSafe BC and must conform to all WorkSafe BC requirements for construction safety.
- .3 In the event of conflict between any provisions of above authorities, the most stringent provision will apply.
- .4 First Aid:
  - .1 The Contractor shall arrange for the provision of first aid facilities and an Accident Prevention Program to the requirements of the Workers' Compensation Board of B.C.
- .5 Fire Protection during Construction & Demolition
  - .1 Refer to Part 8 of the BC Building Code and the requirements of the Fire Services Act, Regulations and Bulletins.

END OF SECTION 01 41 00

**1 GENERAL REQUIREMENTS**

SECTION 01 43 00  
**QUALITY ASSURANCE**  
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1.1 WORKMANSHIP

- .1 Workmanship shall be best quality, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ any unfit person or anyone unskilled in their required duties.
- .3 Decisions as to quality or fitness of workmanship in cases of dispute rest solely with Consultant, whose decision is final.

END OF SECTION 01 43 00



**1 GENERAL REQUIREMENTS**

SECTION 01 74 00

**CLEANING AND WASTE MANAGEMENT**

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**1 GENERAL**

**1.1 WASTE MANAGEMENT GOALS FOR THE PROJECT**

- .1 Recycle: All waste materials that are generated and not suitable for reuse shall be recycled. All Metro Vancouver materials banned from disposal shall be recycled.

**1.2 CODE OF PRACTICE**

- .1 In addition to other requirements specified herein it is a requirement for the Work of this project that the Contractor comply with Metro Vancouver's "3Rs Code of Practice for the Building Industry". Refer also to "Construction Waste Management: A Guide for Builders and Developers" and "Demolition & Salvage: A Guide for Project Managers and Contractors." All documents are available from Metro Vancouver, Sustainable Business Services Division, Telephone: 604-451-6575. Website address: [www.metrovancouver.org/buildsmart](http://www.metrovancouver.org/buildsmart).

**1.3 REGULATORY REQUIREMENTS**

- .1 The following materials are banned or prohibited from the garbage within Metro Vancouver:
  - .1 Banned Materials:
    - .1 Corrugated cardboard
    - .2 Recyclable Paper
    - .3 Green waste
    - .4 Containers made of glass, metal or Banned Recycled Plastic (1, 2, 4 & 5)
    - .5 Beverage containers (all except milk cartons)
  - .2 Prohibited Materials:
    - .1 Agricultural waste;
    - .2 Asbestos;
    - .3 Automobile bodies and parts;
    - .4 Batteries;
    - .5 Barrels or drums in excess of 205 litres (45 gallons) whether full or empty;
    - .6 Biomedical waste;

**1 GENERAL REQUIREMENTS**

SECTION 01 74 00  
**CLEANING AND WASTE MANAGEMENT**  
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- .7 Clean or treated wood exceeding 2.5 m in length;
- .8 Dead animals;
- .9 Electronics and electrical products;
- .10 Excrement;
- .11 Fluorescent lights;
- .12 Gypsum
- .13 Hazardous waste;
- .14 Hospital office waste;
- .15 Inert fill materials including soil, sod, gravel, concrete and asphalt in quantities exceeding 0.5 cubic metres per load;
- .16 Lead acid batteries;
- .17 Liquids and sludge;
- .18 Mattresses;
- .19 Oil containers, oil filters, paint products, solvents and flammable liquids;
- .20 Metal household or commercial appliances;
- .21 Pesticide products;
- .22 Pharmaceuticals;
- .23 Propane tanks;
- .24 Radioactive and reactive waste;
- .25 Refuse that is on fire, smoldering, flammable or explosive;
- .26 Refuse that would cause undue risk of injury or occupational disease to any person at the Disposal Site or that would otherwise contravene the Occupational Health and Safety Regulations;
- .27 Single objects longer than 2.5 m in length or weighing more than 100 kilograms;
- .28 Thermostats;
- .29 Tires;
- .30 Any other Refuse that the Manager considers unsuitable for handling at the Disposal Site.

**1 GENERAL REQUIREMENTS**

SECTION 01 74 00  
**CLEANING AND WASTE MANAGEMENT**  
page 3 of 3

- .2 Licensed facilities: Only those brokerage, storage, transfer and disposal facilities which comply with the requirements of the “Greater Vancouver Sewerage and Drainage District Municipal Solid Waste and Recyclable Material Regulatory Bylaw No. 181, 1996 as amended by Bylaw 183, 1996” and those licensed by other jurisdictions shall be used by the Contractor for the recycling and disposal of waste materials generated at deconstruction and renovation projects. For a listing of licensed facilities, contact the Metro Vancouver Solid Waste Regulatory program at 604-436-6777.

**1.4 PROJECT CLEANLINESS**

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste material and debris from site and deposit in contractor’s waste container at end of each working day.
- .3 Provide and pay for all disposal.
- .4 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
- .5 Clean the interior and exterior of windows immediately following removal and replacement or after undertaking any work that affects those surfaces.
- .6 In addition to .4 above, clean the inside of all windows affected by or adjacent to work at the completion of interior repairs.

**1.5 FINAL CLEAN-UP**

- .1 When the work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining work.
- .2 Remove all rubbish and waste material from site as per this Section’s requirements.

END OF SECTION 01 74 00

**1 GENERAL REQUIREMENTS**

SECTION 01 77 00  
**CLOSEOUT PROCEDURES**  
page 1 of 1

1.1 FINAL CLEANING

- .1 Flush clear all drains affected by the work;
- .2 Clean site of materials and debris created by the Demolition.

1.2 DOCUMENTS

- .1 Submit a final statement of accounting.

1.3 INSPECTIONS/TAKEOVER PROCEDURES

- .1 Prior to application for certificate of Substantial Performance, carefully inspect the Work and ensure it is complete, that major and minor construction deficiencies are complete, defects are corrected and building is clean and in condition for occupancy. Notify Consultant in writing, of satisfactory completion of the Work and request an inspection.
- .2 The Consultant will review completion of deficiencies during one review only. Additional reviews required to check un-rectified deficiencies or incomplete work will be back-charged by the Owner on the Contractor's progress payments and paid from those funds.
- .3 When Consultant considers deficiencies and defects have been corrected and it appears requirements of Contract have been performed, make application for certificate of Substantial Performance. Refer to General Conditions GC 5.4 for specifics to application.

END OF SECTION 01 77 00

**02 EXISTING CONDITIONS**

SECTION 02 40 00  
**DEMOLITION OF EXISTING**  
page 1 of 4

**1 GENERAL**

1.1 SUMMARY

- .1 Work Included:
  - .1 Labour, materials, equipment and services necessary for the following:
    - .1 Removal and disposal of existing building materials as indicated
    - .2 Removal, identification and storage of existing building materials as indicated.

1.2 REFERENCES

- .1 Municipal Building By-laws
- .2 WorkSafe BC Regulations
- .3 Environmental Management Act and Hazardous Waste Regulation
- .4 CSA S350 Code of Practise for Safety in Demolition of Structures.
- .5 CAN/CSA-S269.2 Access Scaffolding for Construction Purposes

1.3 RELATED SECTIONS

- .1 Section 01 74 19 Construction Waste Management and Disposal
- .2 Section 02 82 13 Hazardous Material Abatement

1.4 PROTECTION

- .1 Do not close or obstruct safety exits, adjacent sidewalks, hydrants, parking or storage areas without prior approval of Owner.
- .2 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
- .3 Protect all adjacent surfaces and glazing.

1.5 QUALIFICATIONS

- .1 Salvage or Demolition Firm: Company(ies) experienced and specializing in performing the Work of this Section with documented experience in similar types of deconstruction work.
- .2 Qualifications of Workers: Provide a Supervisor who shall be present at all times during the deconstruction work and who shall be thoroughly familiar with the work required and who shall direct all work.
- .3 Licensed facilities: Only those brokerage, storage, transfer and disposal facilities which comply with the requirements of the "Greater Vancouver Sewerage and Drainage District Municipal Solid Waste and Recyclable Material Regulatory Bylaw No. 181, 1996 as amended by Bylaw 183, 1996" and those licensed by other jurisdictions shall be used by the Contractor for the recycling and disposal of waste materials generated at deconstruction and renovation projects.

**02 EXISTING CONDITIONS**

SECTION 02 40 00  
**DEMOLITION OF EXISTING**  
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1.6 EXISTING CONDITIONS

- .1 The Contractor shall accept the site as it exists and will be responsible for all deconstruction work as required.
- .2 The Contractor shall visit the site at his own expense prior to the submission of tenders and must take whatever time is required to ascertain existing site conditions and surrounding features related to the proposed deconstruction, and ensure himself that conditions are suitable for execution of the work.
- .3 Where non-visible (ie. concealed by other materials) conditions upon exposure, are revealed to be other than those indicated in the Contract Documents, the Contractor shall immediately inform the Consultant, should such variance of conditions result in a contemplated change to the cost of the work. Should an alternate method of deconstruction or change of materials be appropriate, the Consultant shall immediately give his decision before the Work proceeds.
- .4 If during the course of deconstruction Work, the Contractor observes or suspects the existence of hazardous materials in areas of the structure or components of the buildings not previously noted, the Contractor shall immediately stop Work in the immediate area and notify the Owner. See Section 02 08 00 Hazardous Material Abatement.

1.7 COORDINATION AND COOPERATION

- .1 The contractor shall take every common and reasonable precaution to avoid damage and minimize interruption to adjacent property and services. All costs associated with making good any damage and/or providing temporary service or protection shall be borne by the contractor.
- .2 Cooperate and coordinate with the work of other related trades on which the work of this section depends, in order that the work may proceed in an orderly and timely basis in accordance with the contractor's schedule and to avoid duplication of costs and work.
- .3 Obtain written permission from Owner when deconstruction equipment will traverse, infringe upon, or limit access to other areas of the facility.

**2 EXECUTION**

2.1 INSPECTION

- .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.

**02 EXISTING CONDITIONS**

SECTION 02 40 00  
**DEMOLITION OF EXISTING**  
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2.2 PROTECTION

- .1 SCHEDULING: Coordinate construction activities to minimize or eliminate disruption of operations in the occupied portions of the building:
  - .1 If necessary, conduct activities with high-pollution potential during off-hours.
  - .2 Provide and maintain all legal and necessary guards, railings and warning signs during the execution of the work to fully protect all persons and Owner from loss, damage, death or injury through the neglect, carelessness or incompetence of the Contractor or his employees or the condition or handling of equipment.
  - .3 Protect site improvements such as sidewalks, curbs, existing landscaped and asphalt areas, and all existing decking and all interior finishes that lie along the path of removal.
  - .4 Protect existing fixtures and services during the work. Any fixtures that need to be removed to complete the work shall be removed carefully and stored by the Contractor. The Contractor shall clean and have items reinstalled as noted, required or as directed.
  - .5 Where applicable the Contractor shall separate the work being done in existing buildings from the remainder of the building by using dustproof screens.

2.3 DISMANTLING AND SALVAGE REQUIREMENTS

- .1 Perform work in a safe manner at all times in accordance with WorkSafe BC, project, and reference standard safety requirements and protocols.
- .2 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .3 Do not sell, burn or bury materials on site.
- .4 Wherever and whenever the Contractor removes more material than required, directed or intended to be removed as shown on the Drawings or as directed by the Consultant, the replacement of that amount of material will be at the Contractor's expense. Unnecessary damage to parts of the structure forming part of the completed work shall be repaired by the Contractor at the Contractor's expense.
- .5 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
- .6 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
- .7 Maintain adequate ventilation when using cutting torches.

**02 EXISTING CONDITIONS**

SECTION 02 40 00  
**DEMOLITION OF EXISTING**

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2.4 PATCHING AND REPAIRS

.1 General:

- .1 Promptly repair damage to adjacent construction caused by selective demolition operations.
- .2 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .3 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

.2 Repairs:

- .1 Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

2.5 CLEANUP

- .1 At the end of each day's work, leave work in clean and safe condition so that no part is in danger of toppling or falling. Protect interiors of parts, and adjacent elements not be demolished from exterior demolition at all times.

**3 SCHEDULES**

3.1 SELECTIVE DEMOLITION SCHEDULE

- .1 Remove existing base and flooring.

END OF SECTION 02 40 00



Section 02 82 13

12.06.22

## **HAZARDOUS MATERIALS ABATEMENT**

Article      Heading

### **1.0      GENERAL**

- 1.1      DOCUMENTS
- 1.2      SCOPE OF WORK
- 1.3      DESCRIPTION OF WORK
- 1.4      RELATED WORK
- 1.5      TERMINOLOGY (Definitions)
- 1.6      APPLICABLE REGULATIONS AND GUIDELINES
- 1.7      SUBMITTALS AND NOTICES
- 1.8      SITE SECURITY
- 1.9      EMERGENCY PLANNING
- 1.10     PERSONNEL PROTECTION

### **2.0      PRODUCTS**

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- 2.2      TOOLS AND EQUIPMENT

### **3.0      EXECUTION**

- 3.1      HIGH RISK EXECUTION
  - 3.1.1      High Risk Work Area Preparation
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  - 3.1.10     Asbestos Enclosure Procedures
  - 3.1.11     Clean Up
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- 3.2      MODERATE RISK EXECUTION
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  - 3.2.3      Asbestos Abatement
  - 3.2.4      Pipe Insulation Removal Using Glove Bag Method
  - 3.2.5      Entry and Exit Procedures
  - 3.2.6      Asbestos Enclosure Procedures
  - 3.2.7      Clean Up
  - 3.2.8      Air Monitoring
- 3.3      DISPOSAL
- 3.4      RE-ESTABLISHMENT OF WORK AREA SYSTEMS AND OBJECTS

## **1.0 GENERAL**

### **1.1 DOCUMENTS**

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

### **1.2 SCOPE OF WORK**

1.2.1 Work under this Contract covers all work activities including but not limited to the removal, disposal, encapsulation, enclosure, handling of, or work activities in close proximity to building materials that contain asbestos or are likely to be contaminated with asbestos.

1.2.2 During the time of hazardous material handling (work at risk of disturbing hazardous building materials), the Abatement Contractor shall coordinate work, and take full responsibility for the health and safety of all personnel working in the contracted areas.

1.2.3 Workers must wear appropriate respiratory protection while performing work activities that are at risk of disturbing asbestos containing materials or other hazardous materials . Consequently, workers within the work area will be required to wear respiratory protection acceptable to the Workers' Compensation Board of British Columbia and Astech Consultants Ltd.

1.2.4 All scaffolding systems, used on this project, shall be designed by a professional engineer, registered in the province of British Columbia. Once the scaffolding has been erected, and prior to use by other trades, the scaffolding engineer shall inspect the scaffolding and issue a signed and sealed letter to Astech Consultants Ltd., stating that the scaffolding has been erected in accordance with his design, is structurally sound, and in accordance with the Workers' Compensation Board of British Columbia requirements.

### **1.3 DESCRIPTION OF WORK**

The Work under this Contract shall be performed as described in the Technical Specifications and Contract Documents. The Work shall include but not necessarily be limited to the following:

1.3.1 Supply all labour, materials, services, and equipment, necessary to safely remove and dispose of all hazardous materials, and materials that are likely to be contaminated with hazardous materials from the designated areas of the building as described below, and associated activities. The Contractor and his sub-trades shall work multiple shifts and weekends, if necessary to ensure completion on schedule. Cost of multiple shifts and weekends shall be included within the tendered price.

Client: CITY OF NEW WESTMINSTER  
Project: HAZMAT ABATEMENT PROJECT for the  
FLOORING REPLACEMENT PROJECT  
Location: QUEENSBOROUGH COMMUNITY CENTRE  
920 EWEN AVENUE  
NEW WESTMINSTER, BC

#### **1.3.2 BASE BID**

##### **1.3.2.1 General Notes**

- a) It is the intent of this specification to remove all hazardous materials and materials that are contaminated with hazardous materials from the Contracted Areas, some of which are concealed and multi-layered. The Contractor shall be responsible for determining the quantities of concealed and/or multi-layered materials prior to submission of their Tender. This Section of the Specification must be read in conjunction with all other parts of the Contract Documents.

- b) The Abatement Contractor shall carry at least five (5) million dollars of Environmental Pollution and Contamination Insurance **with asbestos inclusion**, and General Liability Insurance in the amount of five (5) million dollars, unless there is a more stringent requirement in the Tender Documents. Evidence of such insurance in such form as may be required by the Owner shall be lodged with the Owner prior to the commencement of any work.
- c) Destructive testing was not performed during the asbestos materials survey. If potential asbestos containing materials are exposed during demolition activities, potential asbestos containing materials shall be considered to be asbestos containing until laboratory analysis or further investigation determines otherwise.

If the Contractor, during work activities, should discover hazardous materials, asbestos containing materials, or potential asbestos containing materials not included in the Description of Work for this project, he shall immediately cease all work in that area and contact Astech Consultants Ltd., who will initiate immediate appropriate action.

- d) Air sampling in accordance with the Workers' Compensation Board of British Columbia requirements during asbestos abatement activities will be performed by the Owner's Consultant.
- e) The Owner shall provide the Contractor with access to an existing electrical panel (non GFI) for the Abatement Contractor's use during the project. The Contractor shall only utilize the provided breaker for his electrical requirements during the project. (see article 3.1.1.3 & 3.2.1.4)
- f) The Owner shall provide potable cold water for construction purposes. The Contractor shall connect to Owner's existing water system. Connection location must be agreeable by Owner.

**1.3.2.2 Ground Floor - Royal and Port Rooms 701,  
Ground Floor - Royal Room Storage Room 702, and  
Ground Floor - Port Room Storage Room 703**

- a) Remove and dispose of as asbestos waste, the asbestos contaminated rubber cove base.
- b) Remove and dispose of as asbestos waste, all paper backed sheet floorings and paper residue.
- c) Where the paper backed sheet flooring extends beneath existing wood stud walls to adjoining rooms, cut even with the wood studs and apply a liberal coat of encapsulating sealer (Bakor 120-19 or equivalent) to the exposed edges at the conclusion of removal.

**1.4 RELATED WORK**

1.4.1 Not Applicable.

**1.5 TERMINOLOGY (Definitions)**

1.5.1 Air Monitoring - The process of measuring the fibre content of a known volume of air collected during a specific period of time, in accordance with the Workers' Compensation Board of British Columbia Occupational Health and Safety Regulation.

1.5.2 Airlock - A system for permitting ingress or egress without permitting air movement between a contaminated area and a non-contaminated area, typically consisting of two curtained doorways at least six (6) feet (1.83 metres) apart. Proper use of an airlock dictates that one passes through the first doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

1.5.3 Asbestos - A term used to identify a group of fibrous silicates. The most common types of asbestos are, Chrysotile, Amosite, and Crocidolite. Other types of asbestos are Actinolite, Anthophyllite, and Tremolite.

- 1.5.4 Asbestos Banner Tape - A pre-manufactured three (3) inch wide white polyethylene banner tape imprinted (red and black) with "DANGER - ASBESTOS - Cancer and Lung Disease Hazard - Authorized Personnel Only - HEPA Respirators And Protective Clothing Are Required In This Area"
- 1.5.5 Asbestos Containing Materials - A manufactured material containing one percent (1%) or more asbestos by weight at time of manufacture, or other materials that contain one percent (1%) or more asbestos as determined by X-ray diffraction or optical polarizing analytical techniques.
- 1.5.6 Asbestos Warning Sign - A sign, readable from twenty-five feet, stating: WARNING ASBESTOS, Cancer and Lung Disease Hazard, Authorized Personnel Only, HEPA Filtered Respirators and Protective Clothing are Required in This Area.
- 1.5.7 Amended Water - Water with a non-ionic surfactant added for the purpose of reducing surface tension to allow thorough wetting of asbestos containing materials.
- 1.5.8 Authorized Visitor - The Owner, the Owner's authorized representative, or a representative of any regulatory or other agency having jurisdiction over the project.
- 1.5.9 Clean Room - A non-contaminated area or room which is part of the worker decontamination enclosure facility, with provisions for storage of workers' street clothes and clean protective equipment.
- 1.5.10 Consultant (Asbestos Abatement Consultant and/or Hazardous Materials Consultant) - Astech Consultants Ltd.
- 1.5.11 Containment - An isolation system designed to effectively contain asbestos fibres within a designated work area where asbestos-containing materials are handled, removed, encapsulated, or enclosed.
- 1.5.12 Crated - Plywood self supporting structure built over equipment or materials of sufficient strength to protect such equipment or materials from damage or contamination for the duration the project.
- 1.5.13 CSA - Canadian Standards Association.
- 1.5.14 Curtained Doorway - A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of polyethylene sheeting over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway, and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Two curtained doorways spaced a minimum of six (6) feet (two metres) apart form an airlock.
- 1.5.15 DOP Test - Dioctyl Phthalate aerosol challenge of a HEPA filter. A DOP test is used to establish the integrity and effectiveness of a HEPA filter to collect particles greater than or equal to 0.3 microns in diameter with 99.97% efficiency.
- 1.5.16 Decontamination Enclosure Facility - A series of connected rooms, separated from the work area and from each other by airlocks, for the decontamination of workers, materials, and equipment.
- 1.5.17 Disposal Bag - A minimum 6 mil (0.15 mm) thick polyethylene bag that is labelled with the following information: hazardous materials; health hazards; and respirator and/or clothing protection required.
- 1.5.18 Dispose Of - As defined by the latest edition of the British Columbia Environmental Management Act, Hazardous Waste Regulation, and the latest edition of Transport Canada's - Transportation of Dangerous Goods Regulations.
- 1.5.19 Duct Tape - Minimum two (2) inch wide cloth reinforced duct tape.
- 1.5.20 Encapsulant (Sealant) - A liquid material which can be applied to asbestos containing material which controls the possible release of asbestos fibres from the material either by creating a membrane over the surface

(bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).

1.5.21 Encapsulation - The application of an encapsulant to asbestos containing materials to control the release of asbestos fibres into the air.

1.5.22 Enclosure - The construction of an airtight, impermeable, permanent barrier around asbestos containing materials to control the release of asbestos fibres into the air.

1.5.23 Equipment Decontamination Enclosure System - That portion of a decontamination enclosure facility designed for controlled transfer of materials and equipment into or out of the work area, typically consisting of a washroom, holding area, and non-contaminated area.

1.5.24 Equipment Room - An area or room which is part of the worker decontamination enclosure facility, with provisions for storage of contaminated clothing and equipment.

1.5.25 Fibre Concentration - The number of fibres per volume (ml) of air collected.

1.5.26 Fibre Density - The number of fibres per area (mm<sup>2</sup>) of filter.

1.5.27 Fixed Object - A unit of equipment or furniture in the work area which cannot be removed.

1.5.28 Friable Material - A material, when dry, that can easily be crumbled or powdered by hand pressure.

1.5.29 Glove Bag Technique - A method with limited applications for removing small amounts of asbestos containing material from HVAC ducts, pipe runs, valves, joints, elbows, and other non-planar surfaces in a non-contained (isolated) work area. The glove bag assembly is a manufactured device consisting of glove bag (typically constructed of six (6) mil transparent polyethylene or polyvinyl chloride plastic), two (2) inward projecting long sleeves, and internal tool pouch, and an attached labelled receptacle for asbestos waste. The glove bag is constructed and installed in such a manner that it surrounds the object or material to be removed and contains all asbestos fibres released during the process. All workers who are permitted to use the glove bag technique must be highly trained, experienced, and skilled in this method.

1.5.30 Ground Fault Interrupt Electrical Panel (GFI) - An Electrical panel, outside the work area, equipped exclusively with "Class A" ground fault circuit interrupter breakers of sufficient capacity to provide for lighting and equipment used during work.

1.5.31 HEPA (High Efficiency Particulate Air) Filter - A throw-away extended-media dry-type filter in a rigid frame, having minimum particle-collection efficiency of 99.97% for 0.3 micrometer (micron) thermally-generated dioctyl phthalate (DOP) particles or specified alternate aerosol, and a maximum clean-filter pressure drop of 1.0" WG when tested at rated air flow capacity.

1.5.32 HEPA Vacuum Equipment - A vacuum system equipped with HEPA filtration.

1.5.33 High Risk Work Procedures - As defined by the latest edition of the Workers' Compensation Board of British Columbia Occupational Health & Safety Regulation.

1.5.34 Holding Area - A chamber between the washroom and an non-contaminated area in the equipment decontamination enclosure system. The holding area comprises an airlock.

1.5.35 HVAC System - Heating Ventilation & Air Conditioning system.

1.5.36 Moderate Risk Work Procedures - As defined by the latest edition of the Workers' Compensation Board of British Columbia Occupational Health & Safety Regulation.

1.5.37 Movable Object - A unit of equipment or furniture in the work area which can be removed from the work area.

- 1.5.38 Negative Pressure Ventilation Unit - A portable exhaust system equipped with HEPA filtration capable of maintaining a constant low velocity air flow into contaminated areas from adjacent non-contaminated areas. The minimum acceptable negative air pressure differential between the work area and adjacent non-contaminated areas is 0.02 inches of water column.
- 1.5.39 NIOSH - National Institute for Occupational Safety and Health (U.S.).
- 1.5.40 Owner - The Owner, building Owner, or his authorized representative.
- 1.5.41 Permissible Concentration (for Asbestos) - The time-weighted eight hour maximum level of exposure that is considered to be a safe level for unprotected personnel.
- 1.5.42 Removal - All herein specified procedures necessary to strip all asbestos containing materials from the designated areas and to dispose of these materials in an acceptable manner.
- 1.5.43 Respirator - A device worn by a person which prevents that person from inhaling harmful airborne substances.
- 1.5.44 Risk of Exposure to Asbestos Fibres - The likelihood of being exposed to airborne asbestos fibres when asbestos containing materials are used or handled.
- 1.5.45 Scaffold - A temporary elevated or suspended work unit and its supporting structure used for supporting worker(s) or materials, or both.
- 1.5.46 Shower Room - A room between the clean room and the equipment room in the workers decontamination enclosure facility, with hot and cold running water controlled and regulated at the shower head, and suitably arranged for complete showering during the decontamination sequence.
- 1.5.47 Surfactant - A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
- 1.5.48 Tape - Minimum two (2) inch wide cloth reinforced duct tape.
- 1.5.49 Trades Person - A worker who has received proper and adequate training in his or her particular field, is fully qualified, and of which 80% of the work force has a minimum of one year experience.
- 1.5.50 WCB - Workers' Compensation Board of British Columbia (WorkSafeBC).
- 1.5.51 Waste Transfer Airlock - A decontamination system utilized for transferring containerized waste from the inside to the outside of the work area.
- 1.5.52 Wet Cleaning - The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with water and afterwards thoroughly decontaminated or disposed of as asbestos contaminated waste.
- 1.5.53 Work Area - Designated rooms, spaces or areas of the project in which asbestos abatement procedures are to be undertaken or which may become contaminated as a result of such abatement procedures. A "High Risk Work Area" is a work area which has been sealed, isolated with polyethylene and equipped with a worker decontamination facility. A "Moderate Risk Work Area" is a controlled access work area which has not been isolated or equipped with a worker decontamination facility.
- 1.5.54 Worker Decontamination Facility - A decontamination enclosure facility for workers, typically consisting of a connected clean room, shower room, and equipment room, separated by airlocks.

## 1.6 APPLICABLE REGULATIONS AND GUIDELINES

1.6.1 All work under this contract shall be done in strict accordance with all applicable Federal, Provincial, Local regulations, and other standards and codes governing asbestos abatement and any other trade work done in conjunction with the abatement.

1.6.2 The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict between the requirements and these specifications exists, the most stringent requirements shall apply.

1.6.3 Codes and Standards:

- a) Canadian Standards Association (CSA)
- b) Underwriters Laboratories, Canada (ULC)
- c) American Society for Testing and Materials (ASTM)
- d) National Building Code
- e) British Columbia Building Code
- f) Canadian Electrical Code
- g) Requirements for High Voltage Installation
- h) Workers' Compensation Board of British Columbia "Occupational Health & Safety Regulation"
- i) British Columbia Environmental Management Act, Hazardous Waste Regulation
- j) Transport Canada - Transportation of Dangerous Goods Regulations

## 1.7 SUBMITTALS AND NOTICES

Prior to Commencement of Work the Contractor shall:

1.7.1 Send written notification of proposed work activities involving asbestos, to the applicable Occupational Hygiene Officer at the Workers' Compensation Board of British Columbia (standard "Notice of Project for Employment Involving Asbestos" forms are available for this purpose) including site specific work procedures and an exposure control plan, not fewer than three (3) normal working days prior to the commencement of any on site work activity. Provide Astech Consultants Ltd. with a copy of this notice, at the same time that it is sent to the Workers' Compensation Board of British Columbia.

1.7.2 When applicable, send written notification of proposed work activities involving asbestos, to the regional office of Labour Canada, not fewer than five (5) working days prior to the commencement of any on site work activity. Provide Astech Consultants Ltd. with a copy of this notice.

1.7.3 Submit proof satisfactory to the Owner and Astech Consultants Ltd. that all required permits, site location, and arrangements for transport and disposal of asbestos contaminated materials, PCB's, and Mercury, have been obtained.

1.7.4 Submit to Astech Consultants Ltd., a copy of the carriers "Licence to Transport Hazardous Waste" (a copy of this licence must be kept in each transport vehicle/trailer).

1.7.5 Submit a Critical Path Work Schedule to Astech Consultants Ltd. prior to delivering equipment or materials to the site.

1.7.6 Submit to Astech Consultants Ltd., shop drawings for layout and construction of the worker decontamination facilities and barriers for isolation of the work areas in compliance with these specifications and applicable regulations.

1.7.7 Submit to Astech Consultants Ltd., shop drawings for scaffolding and/or exterior hoarding or hoarding/enclosures, if required for this project, in compliance with these specifications and applicable regulations.

1.7.8 Submit to Astech Consultants Ltd., a copy of the "DOP" (Diocetyl Phthalate) test results for all HEPA filtered equipment on site.

"DOP" testing of negative air units used for High Risk work must be conducted after installation on site but prior to use on this project.

"DOP" testing of negative air units used for Dust Control for non-asbestos related demolition work must be conducted after installation on site but prior to use on this project.

"DOP" testing of negative air units used for Moderate Risk work must be conducted within sixty (60) calendar days prior to use on this project.

"DOP" testing of HEPA filtered vacuum systems designed to convey bulk materials (eg. Vec-Loader) used for High Risk, Modified Moderate Risk, or Moderate Risk work, must be conducted on site prior to use on this project.

Other HEPA equipment must be "DOP" tested within sixty (60) calendar days prior to use on this project.

Additional DOP testing of all HEPA filtered equipment shall be conducted and documented every ninety (90) calendar days from the last test date, for the duration of the project or when HEPA filters are replaced.

1.7.9 Submit to Astech Consultants Ltd., and post on site, a list containing the names and telephone numbers of the Contractor's key personnel.

1.7.10 Submit to Astech Consultants Ltd., and post on site, a list containing the names, addresses, and telephone numbers, of emergency response personnel. The list shall include, but not be limited to, ambulance, hospital, fire department, police department, and building security.

1.7.11 Submit documentation to Astech Consultants Ltd., that the Contractor's employees, including foreman, supervisors, and any other personnel or agents who may be exposed to airborne asbestos fibres, have received adequate training in the safe handling of asbestos containing materials.

1.7.12 Submit documentation of NIOSH approvals for all respiratory protective equipment utilized on site, include manufacturers certification of HEPA filtration capabilities for all cartridges and filters.

1.7.13 Submit copies of all "Hazardous Waste Manifest" forms for the transportation and disposal of all contaminated waste materials removed from the work area during the abatement process. Registered "Waste Generator Number" will be provided by the Owner and must be listed on each manifest prior to transport of waste.

1.7.14 Submit documentation of respirator fit-testing for all Contractor employees and agents who must enter the work area. This fit-testing shall be in accordance with CSA Standard Z94.4 1982.

1.7.15 Submit manufacturer's specification data sheets and material safety data sheets, for all products and materials prior to use on this project.

1.7.16 Submit manufacturer's certification that vacuums, portable ventilation equipment, and other equipment required to contain airborne fibres are equipped with HEPA filtering systems as specified.

1.7.17 Submit documentation to Astech Consultants Ltd., signed by a certified electrician, stating that all electrical power within the work area has been isolated or identified, the Ground Fault Interrupt (GFI) electrical panel has been installed properly and is in good working order, and that all temporary power cables and electrical lighting cables have an operational ground wire and are in good working condition, in accordance with article 3.1.1.3 and article 3.2.1.4 of this Section.

1.7.18 When rental equipment is to be used in asbestos abatement areas or to transport asbestos contaminated waste, a written notification concerning intended use of the rental equipment must be provided to the rental agency with a copy issued to Astech Consultants Ltd.



1.7.19 With the Owner, inspect the premises wherein all abatement and abatement related activities will occur and submit a statement signed by both, agreeing on building and fixture condition prior to the commencement of work. If this document is not submitted to Astech Consultants Ltd., it is assumed that the Contractor is reporting no damage to the building prior to the start of work.

1.7.20 If required, submit to Astech Consultants Ltd., a copy of the Contractor's Confined Space Entry procedures, in accordance with the Workers' Compensation Board of BC "Occupational Health & Safety Regulations" for Confined Spaces.

## **1.8 SITE SECURITY**

1.8.1 Work area access shall be restricted to authorized, trained, and protected personnel. Authorized personnel are limited to the Contractor's employees, employees of Subcontractors, the Owner and his representatives, representatives of Astech Consultants Ltd., and representatives of Federal and Provincial regulatory agencies having jurisdiction over the project. A list of authorized personnel shall be established prior to project start and posted in a conspicuous location near the entrance to the work area.

1.8.2 Entry into the work area by unauthorized individuals shall be reported immediately to the Owner and Astech Consultants Ltd.

1.8.3 Access to "High Risk" work areas shall be through a single worker decontamination enclosure system. All other means of access (doors, windows, hallways, corridors, etc.) shall be blocked or locked so as to prevent entry to or exit from the work area. The only exceptions for this rule are the waste pass-out airlock which shall be sealed except during the removal of containerized asbestos waste from the work area, and emergency exits in case of fire or accident. Emergency exits shall not be locked from the inside, however, they shall be sealed with polyethylene and tape until needed.

1.8.4 The Contractor shall be responsible for site security for the duration of the project.

## **1.9 EMERGENCY PLANNING**

1.9.1 Emergency procedures shall be in written form and prominently posted in a conspicuous location at the entrance to the work area. Everyone prior to entering the work area must read and sign these procedures to acknowledge receipt and understanding of work site layout, location of emergency exits and emergency procedures.

1.9.2 Emergency planning shall include considerations of fire, explosion, toxic atmospheres, electrical hazards, heat stress, confined spaces, and general injury situations.

1.9.3 Fire extinguishers shall be placed strategically throughout the work area enclosure at the rate of; two ten pound (10 lb.) ABC dry chemical fire extinguishers for the first one thousand (1000) square feet of floor area, or portion thereof; and one ten pound (10 lb.) ABC dry chemical fire extinguisher per every additional two thousand (2000) square feet of floor area, or portion thereof. In addition to the fire extinguishers inside the work area enclosure, a minimum of two ten pound (10 lb.) ABC dry chemical fire extinguishers shall be placed outside the work area enclosure, preferably in the Clean Room.

1.9.4 Employees shall be trained in evacuation procedures in the event of workplace emergencies.

1.9.5 For non life threatening situations, employees injured or otherwise incapacitated, shall decontaminate following normal procedures, with assistance from fellow workers if necessary, before exiting the work area to obtain medical treatment.

1.9.6 Where a life threatening medical emergency arises in an asbestos work area, usual protective measures should be temporarily ignored if they would otherwise cause an immediate threat to the workers' life or recovery, e.g. removal of respirators for mouth to mouth resuscitation, or leaving worker fully clothed if spinal injury is suspected. Where protective equipment and clothing can be left in place without interfering with the emergency management of the injured worker in a contaminated work area, it should not be removed until a non-contaminated area has been reached. On site decontamination procedures should only be carried out if they do

not interfere with medical emergency procedures. When first aid, ambulance, or other emergency personnel are required to enter a contaminated work area, they shall be informed of the hazards, provided with and instructed in the use of respirators and protective clothing, and instructed in entry and exit procedures. If it is not possible to decontaminate the injured worker, he shall be covered in such a way to minimize contaminating clean areas. The cover should not hinder access to the patient by first aid or ambulance personnel. If the injured worker is contaminated with asbestos on arrival at hospital, the hospital staff must be informed and advised of the hazards related to asbestos, the appropriate disposal of contaminated clothing, and decontamination procedures.

1.9.7 Telephone numbers of all emergency response personnel, and Contractor's key personnel shall be prominently posted at the entrance to the work area, along with the location of the nearest telephone.

1.9.8 The Contractor shall provide and maintain first-aid services, equipment, and supplies according to the requirements of Part 33 of the Occupational Health and Safety Regulation. For the purpose of determining the level of first aid required, the number of workers on site shall include the Owner's representatives and employees of the Consultant.

## 1.10 PERSONNEL PROTECTION

1.10.1 Prior to commencement of asbestos abatement activities, all personnel MUST have received adequate training in the handling of asbestos containing materials, and MUST be able to read and fully understand the written (and posted) Site Specific Work Procedures and Emergency Procedures for the project. Astech Consultants Ltd. reserves the right at any time to test all personnel to ensure adequacy of asbestos training.

1.10.2 Workers shall be provided with personally issued, individually identified (marked with waterproof designations) respirators.

1.10.3 Respirators shall be suitable for the asbestos exposure level in the work area in accordance with this specification and the requirements of the Workers' Compensation Board of British Columbia. Where respirators with disposable filters are employed, provide sufficient filters for replacement as recommended by the manufacturer, and applicable regulations.

1.10.4 Provide authorized visitors with suitable protective clothing, applicable safety equipment and footwear, and respiratory protection complete with new filters or cartridges, as described within this specification, so as they may safely access the work area whenever required.

1.10.5 Workers and authorized visitors must be trained in the maintenance, use and limitations of their respirators. Workers and authorized visitors must also be fit tested on personally issued and individually marked respirators, using a protocol acceptable to the Workers' Compensation Board of British Columbia and Astech Consultants Ltd. Fit testing is to be conducted and documented prior to the start of asbestos related work activities and on a weekly basis for the duration of the project.

1.10.6 Workers and authorized visitors must perform positive and negative air pressure fit tests each time a respirator is worn. Powered air purifying respirators shall be tested for adequate flow in accordance with the manufacturers' written instructions.

1.10.7 No supervisors, authorized visitors, or workers shall wear facial hair that could interfere with the respirator to face seal.

1.10.8 Workers and authorized visitors shall be provided clean dry socks, or clean dry disposable Tyvek booties, for each entry into the work area.

1.10.9 Provide workers with sufficient suits of protective full body clothing. Such clothing shall consist of full body coveralls and headgear, that fits snugly at the neck, wrists and ankles. Provide eye protection and hard hats as required by applicable safety regulations. Non disposable type protective clothing and footwear shall be left in the "Work Area" or "Equipment Room", until the end of the asbestos abatement work shift, at which time such items shall be disposed of as asbestos waste, or shall be thoroughly cleaned of all asbestos or asbestos containing material. Disposable type protective clothing, headgear, and footwear may be provided.

1.10.10 Provide and post, at the entrance to the "Work Area", the site specific entry, exit, and work procedures to be followed by workers, as described within this specification.

1.10.11 The Abatement Contractor's designated Site Superintendent must remain on site at all times while asbestos abatement activities are being performed. Since there may be a requirement for two work crews, it is therefore required that the Contractor state in the Tender Documents, the names of the site superintendents that the Contractor is proposing to use on this project.

## 2.0 PRODUCTS

### 2.1 MATERIALS

2.1.1 Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name.

2.1.2 Store all materials subject to damage off the ground, away from wet or damp surfaces, and under cover sufficient to prevent damage or contamination. Replacement materials shall be stored outside the work area until asbestos abatement is completed.

2.1.3 Damaged, deteriorating or previously used materials shall not be used and shall be removed from the premises. Material that becomes contaminated with asbestos shall be disposed of in accordance with the applicable regulations.

2.1.4 Polyethylene sheeting for walls and stationary objects shall be a minimum of 6 mil (0.15 mm) thick. Floors and all other applications shall incorporate sheeting of at least 12 mil (0.30 mm) and 10 mil (0.25 mm) thickness, as specified, in widths selected to minimize the frequency of joints.

2.1.5 Method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and Astech Consultants Ltd., and selected to minimize damage to equipment and surfaces. Method of attachment may include any combination of cloth reinforced duct tape, furring strips, spray glue, staples, nails, screws or other effective procedures capable of sealing adjacent sheets of polyethylene and capable of sealing polyethylene to dissimilar finished or unfinished surfaces under both wet and dry conditions (including the use of amended water).

2.1.6 Polyethylene sheeting utilized for worker decontamination facility shall be black, or other non transparent colour.

2.1.7 Asbestos waste receptor: each waste receptor shall consist of two separate impermeable containers. The first (inner) container shall consist of a 6 mil (0.15 mm) minimum thickness polyethylene bag. If the waste being placed into the first container is abrasive or has sharp edges that may cut the first container, the debris shall be placed into a cardboard box or burlap sack (or similar device) prior to being placed within the first (inner) container. The second (outer) container shall consist of a 6 mil (0.15 mm) polyethylene bag. The second (outer) container shall be such to prevent any perforating rips, or tears in the container during transport or disposal. The outer container must bear a pre-printed label and otherwise be acceptable to the disposal site, BC Ministry of Environment - Environmental Management Act - Hazardous Waste Regulation, and the Workers' Compensation Board of British Columbia.

2.1.8 Asbestos Warning signs shall be displayed at all conceivable locations where access to the work area is possible. Such signs shall be conspicuously located and shall read:

**W A R N I N G • A S B E S T O S**  
**Cancer and Lung Disease Hazard**  
**Authorized Personnel Only**  
**HEPA Filtered Respirators and**  
**Protective Clothing Required in this Area**

2.1.9 Surfactant [wetting agent] shall be mixed with water in a concentration to provide complete penetration and saturation of asbestos containing material.

2.1.10 Slow drying sealer: glue or sealer which remains tacky on surface for minimum of 8 hours under ideal conditions for purpose of trapping residual airborne fibre during settling period. Sealer applied to substrate surfaces scheduled for re-insulation to be compatible with the latter product.

2.1.11 Spray or Trowel Applied Fire Resistant Materials: ULC labelled and listed, asbestos free mineral fibre or cementitious material to provide the degree of fire protection required by the applicable building codes. Fire resistant materials shall be evaluated and approved by Astech Consultants Ltd., prior to the materials being delivered to the project site.

2.1.12 Spray or trowel applied thermal insulation or acoustical material shall be asbestos free and shall provide performance characteristics equivalent to or better than the original material. Thermal and acoustical materials shall be evaluated and approved by Astech Consultants Ltd. prior to the materials being delivered to the project site.

2.1.13 Encapsulation materials shall comply with CGSB 1-GP-205M requirements, and be approved by the Owner prior to the materials being delivered to the project site.

2.1.14 Enclosure systems shall be constructed of materials so that when the enclosure is completed there is limited potential for impact damage to the barrier, and no potential for fibre release. Enclosure materials shall be evaluated and approved by Astech Consultants Ltd. prior to the materials being delivered to the project site.

2.1.15 Provide all other materials, such as lumber, nails and hardware, which may be required to construct and dismantle the decontamination area and the barriers that isolate the work area.

## 2.2 TOOLS AND EQUIPMENT

2.2.1 A sufficient quantity of negative air pressure ventilation units equipped with HEPA filtration shall be utilized so as to provide a minimum of one (1) workplace air change every fifteen (15) minutes. Negative air pressure units shall be exhausted outside the building, in such a manner so as not to allow exhaust air to migrate back into the building or near occupied areas.

2.2.2 Provide local exhaust ventilation with exhaust air discharged through a HEPA filter for all dust producing operations **outside** a containment where asbestos or asbestos containing dust is handled or used.

2.2.3 Respiratory protection during all stages of the project must be in compliance with the latest edition of the Workers' Compensation Board of British Columbia Occupational Health & Safety Regulation.

2.2.4 Full bodied impermeable disposable coveralls complete with attached head covering, designed to fit snugly at the neck, wrists, and ankles. Standard of acceptance - Dupont Tyvek or equivalent. Disposable coveralls shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing.

2.2.5 Non skid laceless rubber boots that are to remain in the work area until the completion of the asbestos abatement phase of the project, at which time they shall be disposed of as contaminated waste, or be thoroughly decontaminated with soap and water.

2.2.6 Additional safety equipment (e.g. hard hats, eye protection, safety shoes, gloves etc.), as necessary, shall be provided to all workers and authorized visitors.

2.2.7 A sufficient supply of scaffolds, ladders, lifts, and hand tools (e.g. scrapers, wire cutters, brushes, utility knives, wire saws, mops, rags, and sponges, etc.) shall be provided as required.

2.2.8 Suitable spray equipment shall be provided for the application of amended water, and sealer as required.

2.2.9 A sufficient supply of HEPA filtered vacuum systems shall be available during all stages of the project.

2.2.10 Encapsulant shall be sprayed using airless spray equipment. Airless equipment and tip size shall be in accordance with the encapsulant manufacturer's recommendations.

2.2.11 All water hoses used by the Contractor shall be 250 psi industrial grade rubber water hose with factory installed fittings. The water supply shall be turned off at the tie-in to the Owner's water source, when the water is not in use, or at the end of each work shift. The water hose lines shall not be under pressure when the Abatement Contractor is not on site. The water hose lines shall be secured and made safe if they pass through an occupied area of the building.

2.2.12 A two stage water filtration pumping system designed to filter contaminants from decontamination shower water shall be utilized in conjunction with the worker decontamination shower units. The water filtration system shall be capable of pumping sufficient quantities of water to insure that the worker decontamination shower units do not overflow. The first stage water filter of the water filtration system shall be capable of removing particles 100 microns or larger, and the second stage filter shall be capable of removing particles 5 microns or larger.

## **3.0 EXECUTION**

### **3.1 HIGH RISK EXECUTION**

#### **3.1.1 High Risk Work Area Preparation**

3.1.1.1 Asbestos Warning signs (advising: Warning Asbestos, Cancer and Lung Disease Hazard, Authorized Personnel Only, HEPA Filtered Respirators And Protective Clothing Are Required In This Area), shall be posted at all conceivable approaches to work areas and other location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit all personnel to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of workplace enclosure barriers.

3.1.1.2 Shut down, isolate, and lock out all heating, cooling and air conditioning system (HVAC) components that are in, supply, or pass through the work area. Seal all intake and exhaust vents and ducts in the work area where applicable, with 26 gauge sheet metal mechanically fastened and caulked. Also seal any seams in system components that pass through the work area. Remove all HVAC system filters and place in labelled polyethylene bags for disposal as asbestos contaminated waste.

3.1.1.3 Shut down and physically lock out ALL existing electric power and equipment within the work area enclosure, and other areas wherever and whenever there is a danger of electrical shock. Coordinate this activity with the local engineering supervisor to ensure that essential services are maintained. If it is essential that non-GFI electrical cables must remain energized within the work area, the Contractor shall isolate the energized electrical lines in the work area by double wrapping the lines with 6 mil polyethylene and sealing the joints of the polyethylene with duct tape, and clearly identify the energized electrical lines with brightly coloured fluorescent orange flagging tape spirally wrapped around the electrical lines (outerface of polyethylene wrap), and the identification method included in the Contractor's Site Specific Work Procedures to the Workers' Compensation Board of British Columbia. Provide temporary power and lighting sources with "Class A" Ground Fault Circuit Interrupters (GFI). All temporary power cables and electrical light cables shall have ground wires. Ensure safe lock out of existing electrical power and installation (including ground faulting) of temporary power sources and equipment in compliance with all applicable electrical code, and regulatory board requirements. Prior to Astech Consultants pre-contamination inspection, the Contractor shall have his electrical Subcontractor provide written documentation on company letterhead, to Astech Consultants Ltd., stating that all electrical power within the work area has been isolated, the Contractor's GFI panel has been installed properly and is in good working order, and that all temporary power cables and electrical lighting cables have an operational ground wire (two wire brewery cables will not be allowed in the work area). See article 1.7.17 of this Section.

3.1.1.4 Pre-clean all movable objects within the work area using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the work area and carefully stored in a non-contaminated location.

3.1.1.5 Pre-clean all fixed objects in the work area using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate. After pre-cleaning, enclose fixed objects in polyethylene sheeting and seal securely in place with tape. Sensitive or easily damaged objects or equipment which must remain in the work area will require crating prior to sealing with polyethylene.

3.1.1.6 Pre-clean all surfaces in the work area using HEPA filtered vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters shall not be used. Do not disturb asbestos containing materials during the pre-cleaning phase.

3.1.1.7 Cover the work area side of constructed isolation partitions with 3/8 inch thick (10 mm) plywood sheathing material prior to installation of a double layer of polyethylene sheeting sealed with tape.

3.1.1.8 Walls shall be constructed of wood or metal framing to support barriers in all openings larger than three (3) feet by seven (7) feet (915 mm x 2134 mm).

3.1.1.9 Seal off all windows, doorways, elevator openings, corridor entrances, drains, ducts, grills, grates, diffusers, skylights and any other openings between the work area and non-contaminated areas outside of the work area (including the outside of the building, tunnels and crawl spaces) with polyethylene sheeting and duct tape.

3.1.1.10 Cover doorways with plywood prior to sealing with polyethylene. Special care shall be taken to maintain emergency exits from the work area in the event of fire or other emergency.

3.1.1.11 Cover floors and walls in the work area with polyethylene sheeting. Cover floors first so that sheeting extends at least 12 inches (305 mm) up the walls of the work area. Minimum floor covering shall consist of one top layer of fibre reinforced 12 mil (0.30 mm) polyethylene sheeting, and one bottom layer of 10 mil (0.25 mm) polyethylene sheeting. It is recommended that additional layers of polyethylene sheeting be utilized as drop sheets to aid in clean up of bulk materials.

3.1.1.12 Apply layers of floor polyethylene separately with seams taped in position. Polyethylene sheeting shall be sized to minimize seams. If the floor area necessitates seams, those on successive layers of sheeting shall be staggered to reduce the potential for water to penetrate to the flooring material. A distance of at least 6 feet (1829 mm) between seams is sufficient. DO NOT locate seams at wall/floor joints.

3.1.1.13 Floor sheeting shall be installed in a fashion so as to prevent slippage between successive layers of material.

3.1.1.14 Wall sheeting shall be secured adequately to prevent it from falling away from the walls. This will require additional support/attachment when negative pressure ventilation systems and amended water are utilized.

3.1.1.15 Emergency exits shall be established and clearly marked with duct tape arrows or other effective designations to permit easy location from anywhere within the work area. They shall be secured to prevent access from non-contaminated areas and still permit emergency exiting. These exits shall be properly sealed with polyethylene sheeting which can be cut to permit egress if needed. These exits may be the worker decontamination enclosure, the waste pass-out airlock and/or other alternative exits satisfactory to fire officials and Astech Consultants Ltd.

3.1.1.16 Ducts, mechanical and electrical equipment, and other ceiling mounted fixtures which interfere with the removal of asbestos materials shall be removed or lowered by qualified trades persons. The Contractor shall reinstall all fixtures and items removed during the contract.

### 3.1.2 **Worker Decontamination Facility**

3.1.2.1 Plans for the construction of the worker's decontamination enclosure, including materials and layout, shall be submitted as a shop drawing, and approved by Astech Consultants Ltd. prior to work initiation. Worker decontamination enclosure systems constructed at the work site shall utilize black or opaque polyethylene sheeting

or other acceptable materials for privacy. Detailed descriptions of portable pre-fabricated units, if used, must be submitted to Astech Consultants Ltd. for approval, prior to arrival on site.

3.1.2.2 Construct a worker decontamination enclosure system contiguous to the work area consisting of three totally enclosed chambers separated from each other and the work area by air locks as follows:

- a) An equipment room with two curtained doorways, one to the work area and one to the shower room.
- b) A walk-through shower room with two curtained doorways, one to the equipment room and one to the clean room. The walk-through shower facility with hot and cold water that can be regulated at the shower head, shall contain at least one shower head for every five (5) workers or portion thereof. Careful attention shall be paid to the shower enclosure to insure against leaking of any kind. Ensure an adequate supply of soap, shampoo, and clean dry towels at all times in the shower room.
- c) A clean room with one curtained doorway into the shower and one entrance or exit to non-contaminated areas of the building. The clean room shall have sufficient space for storage of the workers' street clothes, towels, and other non-contaminated items. If the entrance/exit door to the non-contaminated areas of the building, enters an occupied area of the building, an additional solid wood (minimum 1/2" thick plywood) locking door shall be installed to keep the building occupants from entering the clean room.

3.1.2.3 Clean room shall be sized to adequately accommodate the work crew. Benches shall be provided as well as hooks or lockers for the storage of street clothes. Clean disposable clothing, replacement filters for respirators, clean dry towels and other necessary items shall be provided in adequate supply and stored on shelves in the clean room. Install a mirror in the clean room to assist workers in the fitting of respiratory protection. Where required, the clean room shall be outfitted with a lockable door in order to restrict access by unauthorized personnel. Lighting, heat, and electricity shall be provided as necessary for worker comfort. The clean room shall not be used for storage of tools, equipment or materials (except as specifically designated), or as an office space.

3.1.2.4 The equipment room shall be used for storage of equipment and tools at the end of a shift after they have been decontaminated using a HEPA filtered vacuum and/or wet cleaning techniques as appropriate. Replacement filters (in sealed containers until used) for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement may also be stored here as needed. A waste container consisting of a labelled 6 mil polyethylene disposal bag for collection of disposable clothing shall be located in this room. Contaminated footwear (e.g. rubber boots, other reusable footwear) shall be stored in this area for reuse the following work shift.

3.1.2.5 Passage through all airlocks and decontamination enclosure system chambers shall be through curtained doorways consisting of two sheets of overlapping polyethylene sheeting. One sheet shall be secured at the top and left side, the other at the top and right side. Both sheets shall have weights attached to the bottom to ensure that they hang straight and maintain a seal over the doorway when not in use.

### 3.1.3 **Equipment and Waste Transfer Decontamination Enclosure**

3.1.3.1 Provide or construct a waste and equipment decontamination and transfer enclosure system contiguous to the work area consisting of two totally enclosed chambers separated by air locks, constructed as follows:

- a) A washroom, constituting an airlock, with a curtained doorway to a designated area of the work area and a curtained doorway to the holding area.
- b) A holding area, constituting an airlock, with a curtained doorway to a non-contaminated area outside the work area. Wherever possible, the equipment and waste transfer enclosure shall be located where there is direct access from the work area to the outside of the building.

3.1.3.2 The equipment and waste transfer enclosure shall be constructed in similar fashion to the worker decontamination enclosure facility using similar materials as well as airlock and curtain doorway design.

3.1.3.3 The equipment and waste transfer enclosure shall not be used to enter or exit the work area.

**3.1.4 Isolation of the Work Area**

3.1.4.1 The contaminated work area shall be separated from non-contaminated, or occupied areas of the building by the construction of air tight barriers.

3.1.4.2 During asbestos abatement activities all polyethylene barriers inside the workplace, in the worker decontamination enclosure facility, in the waste transfer enclosure, and at partitions constructed to isolate the work area from occupied areas shall be inspected at least twice daily by the Contractor; prior to the start of each day's abatement activities and following the completion of the day's abatement activities. The Contractor shall record these inspections in his site log book.

3.1.4.3 Damage and defects in the isolation barrier enclosure system are to be repaired immediately upon discovery.

3.1.4.4 Use smoke tubes to test the effectiveness of the barrier system daily, or when directed by Astech Consultants Ltd.

3.1.4.5 If at any time during abatement activities air monitoring or visual inspection indicates that areas outside the work area enclosures are contaminated with asbestos, or if damage occurs to the work area barriers, work shall immediately stop, and the cause of the problem shall be rectified. Clean up of surfaces outside of the work area using HEPA vacuums or wet cleaning techniques may be necessary.

3.1.4.6 Install and initiate the operation of negative pressure ventilation equipment as needed to provide a minimum of one (1) air change in the work area every fifteen (15) minutes. Minimum acceptable negative air pressure differential is 0.02 inches of water column. Openings made in the isolation barrier system to accommodate negative air units shall be made airtight with tape and/or caulking as required. Ensure that adequate power supply is available at all times to satisfy the requirements of the negative air pressure ventilating units. Exhaust ducts of negative air pressure ventilation units shall be sealed and mechanically fastened to the exhaust port of the unit(s). Negative pressure ventilation units shall be exhausted to the outside of the building, in such a manner so as not to allow exhausted air to migrate back into the building or near occupied areas. Negative pressure ventilation equipment shall be DOP tested in accordance with Article 1.7.8.

The exhaust ducts from the negative air pressure ventilation units to the exterior of the building, shall be aluminized mylar flexible spiral duct with a 6 mil polyethylene tube insert on the inside the spiral duct. The exhaust ducts, when passing through areas of the building occupied by the public or building staff, shall be enclosed by a solid barrier of 3/8" plywood, painted off-white. The wood enclosure shall be constructed and located to suit current National Building Code requirements regarding headroom and means of egress.

To facilitate the exhausting of air from the negative air pressure ventilation exhaust ducts to the exterior of the building, glazing units may be removed from windows. The glazing units shall be replaced with a plywood infill panel, cut to suit the window and exhaust duct, and of sufficient thickness to provide complete security to the building. The thickness of the plywood infill panel (depending upon location and security requirements), and the location of the glazing units that are to be removed, shall be pre-approved by the Owner. The Contractor shall be responsible for building security for the duration of the project, especially during the time that the glazing units are removed. The windows shall be replaced by the Contractor, utilizing qualified glazing trades persons.

3.1.4.7 Once constructed, sealed, and reinforced as necessary, the work area enclosure may be smoke tested for leakage by Astech Consultants Ltd. prior to the commencement of abatement activities. Required repairs or reconstruction shall be initiated to ensure absolute isolation of the work area.

3.1.4.8 Commencement of work at risk of disturbing asbestos shall not occur until:

- a) Enclosure systems have been constructed, tested and approved by Astech Consultants Ltd.
- b) Negative pressure ventilation systems are functioning adequately, and specified negative air pressure differential has been established.



- c) If and as required, local exhaust systems are functioning adequately.
- d) All pre-abatement submissions, notifications, posting and permits have been provided and are satisfactory to Astech Consultants Ltd.
- e) Approved Asbestos Warning signs are displayed at all conceivable entrances to the work area.
- f) An adequate supply of equipment and materials for abatement, clean-up, and disposal are on hand.
- g) All worker training, and respirator fit testing is completed and documented.
- h) Contractor receives written permission from the Owner to proceed with abatement activities.

### **3.1.5 Disturbance of Asbestos in Order to Complete Final Seal**

3.1.5.1 Workers shall be provided full protective measures for contaminated conditions in order to perform work that is likely to disturb asbestos containing materials.

3.1.5.2 Where removal of a suspended ceiling is necessary to complete the isolation barrier, remove minimum sections of the ceiling required to access areas above the ceiling which must be sealed to prevent the escape of airborne fibres or water to unprotected areas of the building. Areas requiring sealing include but are not limited to: holes, pipe penetrations, electrical penetrations, duct penetrations, service ways, and above ceiling spaces that have no physical barrier at the edge of the work area.

3.1.5.3 In any area where asbestos containing materials must be disturbed, or removed to complete the seal, the asbestos containing material must be saturated with amended water applied from a low pressure hand sprayer prior to removal in conjunction with HEPA vacuuming. This procedure will only be approved when absolutely necessary, and when all persons in the vicinity are equipped with appropriate respiratory protection. Any area which requires the disturbance of asbestos containing materials in order to complete the isolation of the work area shall be sealed last, in order to gain full benefit of the negative air system. Work procedures of this nature shall be conducted under the supervision of Astech Consultants Ltd.

### **3.1.6 Removal of Contaminated Building Components**

3.1.6.1 Where building components such as mechanical systems, electrical systems, and heat activated devices, etc., must be removed to perform the abatement, remove components carefully, HEPA vacuum and/or wet-sponge each component prior to its removal. Wrap clean components in polyethylene sheeting and seal with tape. Store as designated by the Owner.

### **3.1.7 Asbestos Removal**

3.1.7.1 Wetting and removal of asbestos containing materials shall not proceed until the work area has been inspected and approved by Astech Consultants Ltd.

3.1.7.2 Wet all asbestos containing material with an amended water solution using equipment capable of providing a fine spray mist, in order to reduce airborne fibre concentrations when the material is disturbed. Saturate the material to the substrate, however, do not allow excessive water to accumulate in the work area. Keep all removed material wet enough to prevent fibre release until it can be containerized for disposal. Maintain a high humidity in the work area by misting or spraying to assist in fibre settling and reduce airborne concentrations. Wetting procedures are not equally effective on all types of asbestos containing materials but, shall however, be used in all cases.

3.1.7.3 Saturated asbestos containing material shall be removed in manageable sections. Removed material should be containerized before moving to a new location for continuance of work. Surrounding areas shall be periodically sprayed and maintained in a wet condition until all visible material is cleaned up.

3.1.7.4 Where Astech Consultants Ltd. decides that removal of asbestos material is impossible due to obstructions such as structural members or major service elements, and provides written direction, the material

shall be fully enclosed with 24 gauge galvanized sheet metal mechanically fastened (or other materials approved in writing by Astech Consulting Ltd.) and caulked to make the enclosure completely air tight.

3.1.7.5 Containers (labelled 6-mil polyethylene bags) shall be sealed when full. Double bagging of waste material is necessary. Disposal bags shall be decontaminated on exterior surfaces by wet cleaning and HEPA vacuuming before being placed in a second disposal bag in the waste decontamination enclosure.

3.1.7.6 Large components removed intact may be wrapped in two separately sealed layers of 6 mil (0.15 mm) polyethylene sheeting, secured with tape, and, labelled prior to transport to the landfill site.

3.1.7.7 Asbestos containing or contaminated waste with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) will tear the polyethylene bags and sheeting and shall be placed into suitable tear proof impermeable containers for disposal.

3.1.7.8 As work progresses, and to prevent exceeding available storage capacity on site, removed sealed and labelled asbestos waste and transport to authorized disposal area in accordance with requirements of disposal authority, BC Ministry of Environment - Environmental Management Act - Hazardous Waste Regulation, the Workers' Compensation Board of British Columbia, and these specifications.

3.1.7.9 After completion of all stripping work, surfaces from which asbestos containing materials have been removed shall be wet brushed, sponged or cleaned by some equivalent method to remove all visible residue. During this work the surfaces being cleaned shall be kept wet.

3.1.7.10 After the work area has been rendered free of all visible residues, and following the inspection and acceptance by Astech Consultants Ltd., apply a coating of slow drying sealer to all surfaces within the work area including structural members, building components and polyethylene sheeting on walls, floors, and coverings on non-removable items, to seal in non-visible residue. Allow a minimum of eight (8) hours for fibre settling with no activity in the work area. If insulation or acoustical materials are to be re-applied to the abated area, be certain that the encapsulant selected will permit good adhesion to the substrate and is compatible with the replacement product. Sealer must be pre-approved by Astech Consultants Ltd. prior to use.

### 3.1.8 **Entry and Exit Procedures**

3.1.8.1 All workers and authorized visitors, before entering the "Work Area", shall be trained in and familiar with all regulations, personal protection requirements (including workplace entry and exit procedures) and emergency procedures.

3.1.8.2 Workers and authorized visitors shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos containing or contaminated materials and until final clean up is completed.

3.1.8.3 All workers and authorized visitors shall enter and exit "Work Area", through the workers' decontamination facility.

3.1.8.4 All workers and authorized visitors shall, prior to entering the work area, remove all street cloths in the clean room, put on appropriate respiratory protection (as deemed adequate for the project conditions), clean disposable coveralls, head covering and foot covering. Hard hats, eye protection, and gloves shall also be utilized if required. Clean respirators and protective clothing shall be provided and utilized by each person for each separate entry into the work area.

3.1.8.5 Personnel wearing designated personal protective equipment shall proceed from the clean room, through the shower room and equipment room, to the asbestos abatement work area. In order to prevent flow through contamination, personnel entering the work area should carefully pass through one curtained doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second curtained doorway.

3.1.8.6 Before leaving the work area, and prior to entering the equipment room all personnel shall remove gross contamination from the outside of respirators and protective clothing, with particular attention devoted to

the bottoms of footwear. Personnel shall then proceed to the equipment room where they shall remove all protective equipment except respirators. Deposit disposable clothing into appropriately labelled containers for disposal.

3.1.8.7 Reusable, contaminated footwear shall be stored in the equipment room when not in use in the work area. Upon completion of abatement it shall be disposed of as asbestos contaminated waste (rubber boots may be decontaminated at the completion of the abatement for reuse).

3.1.8.8 Still wearing the respirator, proceed naked to the shower; still wearing the respirator, clean the outside of the respirator with soap and water; while showering, remove the respirator; personnel shall then shower and shampoo to remove residual asbestos contamination.

3.1.8.9 Various types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered disconnect protection may be disconnected in the equipment room immediately prior to entering the shower. If Powered Air Purifying Respirator are used, care must be taken to prevent water from entering the filter/power pack assembly which is not waterproof.

3.1.8.10 After showering and drying off, proceed to the clean room and dress in street clothes.

3.1.8.11 Eating, drinking, chewing, and smoking, are not permitted in the work area or decontamination facility. Smoking on the Owner's property will only be allowed in designated areas if approved by the Owner.

### 3.1.9 **Equipment Removal and Waste Transfer Procedures**

3.1.9.1 Clean external surfaces of contaminated containers and equipment thoroughly by wet sponging or HEPA vacuum before moving such items into the equipment decontamination enclosure system washroom for final cleaning and removal to non-contaminated areas. Ensure that personnel do not leave work areas through the equipment decontamination enclosure system.

3.1.9.2 Asbestos contaminated waste that has been containerized shall be transported out of the work area through the waste container pass-out airlock.

3.1.9.3 Waste pass-out procedures shall utilize two teams of workers, an "inside" team and an "outside" team.

3.1.9.4 The inside team wearing appropriate protective clothing and respirators for inside the work area shall clean the outside, including bottoms, of properly labelled containers (bags or wrapped components) using HEPA vacuums and wet wiping techniques and transport them into the waste container pass-out airlock. No worker from the inside team shall further exit the work area through this airlock.

3.1.9.5 The outside team, wearing appropriate protective clothing and assigned respirators, shall enter the airlock from outside the work area, enclose the bags in clean, labelled, 6 mil polyethylene bags, and remove them from the airlock to the outside. No worker from the outside team shall further enter the work area through this airlock.

3.1.9.6 When not in use, the doorway to the waste transfer enclosure shall be secured to prevent unauthorized entry.

### 3.1.10 **Asbestos Enclosure Procedures**

3.1.10.1 Clean, prepare and isolate the work area in accordance with these specifications.

3.1.10.2 Spray areas that will be disturbed during the installation of hangers or other support/framing materials for the enclosure with water. Keep these areas damp to reduce airborne fibre concentrations.

3.1.10.3 Remove loose or hanging asbestos containing materials in accordance with these specifications.

3.1.10.4 After installation of hangers and other fixing devices and before installation of enclosure barrier, repair damaged areas of fireproofing/thermal insulation materials as required using a non-asbestos containing replacement material. Prepare surfaces and apply replacement material in accordance with manufacturer's written instructions.

3.1.10.5 Use hand tools equipped with HEPA filtered local exhaust ventilation, to drill, cut into, or otherwise disturb asbestos containing materials during the installation of support systems for the enclosures. (Alternatively, these areas of material could be removed prior to installation of supports.)

3.1.10.6 Enclosure barrier materials shall be impact resistant and provide an air-tight barrier once construction is complete.

3.1.10.7 Lower utilities as necessary and reinstall using qualified trades persons, in a manner which permits proper utilization and does not disturb the integrity of the enclosure barrier. Utility maintenance shall not require the enclosure to be opened or disturbed.

3.1.10.8 Enclosed asbestos containing materials shall be designated appropriately with Asbestos Warning signs in order to warn building maintenance personnel and general occupants of the potential asbestos hazard in the event that they are required to disturb the enclosure. One Asbestos Warning sign shall be installed for every twenty (20) lineal feet (6 metres) of enclosure surface or portion thereof.

### 3.1.11 **Clean Up**

3.1.11.1 Remove the cleaned polyethylene sheeting from walls and floors. When removing polyethylene sheeting, the material shall be carefully rolled away from the walls to the centre of the work area. As polyethylene is removed from the work area, all surfaces shall be HEPA vacuumed or wet cleaned. Windows, doors, HVAC system vents and all other openings shall remain sealed. The negative pressure ventilation units shall remain in continuous operation until clean up is complete.

3.1.11.2 Decontaminate all tools and equipment and remove at the appropriate time in the cleaning sequence.

3.1.11.3 Place polyethylene, tape, cleaning materials, and other contaminated debris in disposal bags for transport to the landfill site. All waste, including non-asbestos insulation overspray, shall be treated as asbestos containing materials and disposed of as asbestos waste.

3.1.11.4 At the completion of the clean up operation the Contractor and Astech Consultants Ltd. shall inspect the work area to ascertain that no dust or debris remains on surfaces as a result of dismantling or clean up operations.

### 3.1.12 **Air Monitoring**

3.1.12.1 From commencement of work until completion of the clean up operation, the Owner will be conducting air monitoring both inside and outside the work area enclosure.

3.1.12.2 Air sampling collection and analysis shall be conducted in accordance with the Workers' Compensation Board of British Columbia Occupational Health and Safety Regulation.

3.1.12.3 The fibre level in areas outside the High Risk work areas, where there has been no disturbance of asbestos containing materials, shall not be permitted to exceed the following action level:

Asbestos (all forms) . . . . 0.05 fibres/ml (based on a Permissible Concentration of 0.1 fibre/ml)

3.1.12.4 The fibre level in the Clean Room shall not be permitted to exceed the following level:

Asbestos (all forms) . . . . 0.05 fibres/ml (based on a Permissible Concentration of 0.1 fibre/ml)

3.1.12.5 The fibre level in a High Risk Work Area shall not be permitted to exceed the following levels as applicable for different types of respiratory protection, without the written authorization of Astech Consultants Ltd.:

|   |                 |
|---|-----------------|
| Powered Air Purifying (negative pressure) . . . . . | 3.7 fibres/ml   |
| Powered Air Purifying (positive pressure) . . . . . | 7.5 fibres/ml   |
| Air Supplying Continuous Flow . . . . .             | 7.5 fibres/ml   |
| Air Supplying Pressure Demand . . . . .             | 75.0 fibres/ml  |
| Air Supplying SCBA Pressure Demand . . . . .        | 750.0 fibres/ml |

3.1.12.6 Prior to air clearance monitoring, allow a minimum of eight (8) hours for fibre settling with no activity in the work area, following application of the spray applied sealer.

3.1.12.7 Notify Astech Consultants Ltd. that the work area is ready for air clearance monitoring.

3.1.12.8 Air clearance monitoring will be conducted by Astech Consultants Ltd. If air sampling determines that asbestos levels in the work area are equal to or less than the level listed below, and as stipulated by the Workers' Compensation Board of British Columbia, the Contractor may proceed with the final clean up:

|                                |                |
|--------------------------------|----------------|
| Asbestos (all forms) . . . . . | 0.02 fibres/ml |
|--------------------------------|----------------|

3.1.12.9 If applicable, re-insulation and retrofit may be carried out at this time subject to the approval of the Owner.

3.1.12.10 Dismantling of high risk work area enclosures shall be performed utilizing Moderate Risk Work Procedures as outlined in article 3.2 of this section.

**3.2 MODERATE RISK EXECUTION**

**3.2.1 Moderate Risk Work Area Preparation**

3.2.1.1 Clearly mark the boundary of the Work Area by placing Barrier Tape or fences around the Work Area.

3.2.1.2 Post Asbestos Warning signs at all conceivable approaches to work areas and other location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit all personnel to read the sign and take the necessary protective measures to avoid exposure.

3.2.1.3 Shut down, isolate, and lock out all heating, cooling and air conditioning system (HVAC) components that are in, supply, or pass through the work area. Seal all intake and exhaust vents in the work area with tape and polyethylene. Also seal any seams in system components that pass through the work area.

If the mechanical system cannot be shut down and isolated, obtain approval from the Owner to cut the ducts at the perimeter of the work area enclosure and cap the ends of the ducts with sheet metal and seal with tape. Seal all ends of ducts and/or vents in the work area with tape and polyethylene. Also seal seams in system components that pass through the work area.

3.2.1.4 Shut down and physically lock out all existing electric power and equipment within the work area enclosure and other areas wherever and whenever there is a danger of electrical shock. Coordinate this activity with the local engineering supervisor. Provide temporary power and lighting sources with "Class A" Ground Fault Circuit Interrupters (GFI). All temporary power cables and electrical light cables shall have ground wires. Ensure safe lock out of existing electrical power and installation (including ground faulting) of temporary power sources and equipment in compliance with all applicable electrical code, and regulatory board requirements. Prior to Astech Consultants pre-contamination inspection, the Contractor shall have his electrical Subcontractor provide written documentation on company letterhead, to Astech Consultants Ltd., stating that all electrical power within the work area has been isolated, the Contractor's GFI panel has been installed properly and is in good working order, and that all temporary power cables and electrical lighting cables have an operational ground wire (two wire brewery cables will not be allowed in the work area). See article 1.7.17 of this Section.

3.2.1.5 Establish a decontamination area at one or more entrances to the Moderate Risk Work Area. The decontamination area (also called washout facility) shall contain a polyethylene drop sheet, polyethylene disposal bag, bucket of warm water and sponge, and/or a HEPA filtered vacuum cleaner.

3.2.1.6 Commencement of work at risk of disturbing asbestos shall not occur until:

- a) All pre-abatement submissions, notifications, posting and permits have been provided and are satisfactory to Astech Consultants Ltd..
- b) Approved Asbestos Warning signs are displayed at all conceivable entrances to the work area.
- c) An adequate supply of equipment and materials for abatement, clean-up, and disposal are on hand.
- d) All worker training, and respirator fit testing is completed, documented and copies have been submitted to Astech Consultants Ltd..
- e) Contractor receives written permission from Astech Consultants Ltd. to proceed with abatement activities.
- f) If and as required, local exhaust systems are functioning adequately.

### 3.2.2 **Isolation of the Work Area for Modified Moderate Risk Work**

3.2.2.1 The work area shall be separated from non-contaminated, or occupied areas of the building by the construction of air tight barriers.

3.2.2.2 During asbestos abatement activities all polyethylene barriers enclosing the work area shall be inspected at least twice daily by the Contractor; prior to the start of each day's abatement activities and following the completion of the day's abatement activities. The Contractor shall record these inspections in his site log book.

3.2.2.3 Damage and defects in the isolation barrier enclosure system are to be repaired immediately upon discovery.

3.2.2.4 Use smoke tubes to test the effectiveness of the barrier system daily, or when directed by Astech Consultants Ltd.

3.2.2.5 If at any time during abatement activities air monitoring or visual inspection indicates that areas outside the work area enclosures are contaminated with asbestos, or if damage occurs to the work area barriers, work shall immediately stop, and the cause of the problem shall be rectified. Clean up of surfaces outside of the work area using HEPA vacuums or wet cleaning techniques may be necessary.

3.2.2.6 Install and initiate the operation of negative pressure ventilation equipment as needed to provide a minimum of one (1) air change in the work area every fifteen (15) minutes. Minimum acceptable negative air pressure differential is 0.02 inches of water column. Openings made in the isolation barrier system to accommodate negative air units shall be made airtight with tape and/or caulking as required. Ensure that adequate power supply is available at all times to satisfy the requirements of the negative air pressure ventilating units. Exhaust ducts of negative air pressure ventilation units shall be sealed and mechanically fastened to the exhaust port of the unit(s). Negative pressure ventilation units shall be exhausted to the outside of the building, in such a manner so as not to allow exhausted air to migrate back into the building or near occupied areas. Negative pressure ventilation equipment shall be DOP tested in accordance with Article 1.7.8.

The exhaust ducts from the negative air pressure ventilation units to the exterior of the building, shall be aluminized mylar flexible spiral duct with a 6 mil polyethylene tube insert on the inside the spiral duct. The exhaust ducts, when passing through areas of the building occupied by the public or building staff, shall be enclosed by a solid barrier of 3/8" plywood, painted off-white. The wood enclosure shall be constructed and located to suit current National Building Code requirements regarding headroom and means of egress.

To facilitate the exhausting of air from the negative air pressure ventilation exhaust ducts to the exterior of the building, glazing units may be removed from windows. The glazing units shall be replaced with a plywood infill panel, cut to suit the window and exhaust duct, and of sufficient thickness to provide complete security to the building. The thickness of the plywood infill panel (depending upon location and security requirements), and the location of the glazing units that are to be removed, shall be pre-approved by the Owner. The Contractor shall be responsible for building security for the duration of the project, especially during the time that the glazing units are removed. The windows shall be replaced by the Contractor, utilizing qualified glazing trades persons.

3.2.2.7 Once constructed, sealed, and reinforced as necessary, the work area enclosure may be smoke tested for leakage by Astech Consultants Ltd. prior to the commencement of abatement activities. Required repairs or reconstruction shall be initiated to ensure absolute isolation of the work area.

3.2.2.8 Commencement of work at risk of disturbing asbestos shall not occur until; enclosure systems have been constructed, tested and approved by Astech Consultants Ltd.; negative pressure ventilation systems are functioning adequately, and specified negative air pressure differential has been established; and approved Asbestos Warning signs are displayed at all conceivable entrances to the work area.

### 3.2.3 **Asbestos Abatement**

3.2.3.1 Before beginning work, remove visible dust from surfaces in the work area where dust is likely to be disturbed during the course of the work. Use HEPA vacuum, or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate. Do not use compressed air to clean up or remove dust from any surface.

3.2.3.2 Prevent the spread of dust from the work area using measures appropriate to the work to be done. Use polyethylene drop sheets over flooring and objects that are to remain in the work area.

3.2.3.3 Other than loose material which shall be removed by HEPA vacuum, friable material containing asbestos to be removed or disturbed shall be thoroughly wetted before and during work. Use garden reservoir type low velocity fine mist sprayer. Perform work in a manner to reduce dust creation to lowest levels practicable.

3.2.3.4 For the abatement of gypsum board filling compounds or other types of materials that will generate high fibre levels, a full height 6 mil polyethylene curtain shall be installed at the perimeter of the work area, and the work area subjected to a negative air pressure differential with the use of a HEPA filtered negative air unit, in order to control the non asbestos (gypsum board fibres) fibres from migrating outside the work area, contaminating ambient air samples and the adjacent areas. HEPA filtered Powered Air Purifying Respirators (PAPR) shall be utilized by personnel performing gypsum board demolition. A Worker Decontamination Enclosure with shower may be required.

3.2.3.5 Asbestos containing floor tiles, asbestos cement board, or other asbestos containing materials that may cut or puncture the polyethylene disposal bag, shall be placed in cardboard boxes or burlap sacks prior to being double bagged.

3.2.3.6 Place waste containing asbestos in sealed impermeable disposal bags. Drop sheets and disposable protective clothing shall be treated as asbestos waste and shall be wetted and folded to contain dust, then placed in disposal bags.

3.2.3.7 Large components removed intact may be wrapped in two separately sealed layers of polyethylene sheeting, sealed and secured with duct tape, and labelled prior to transport to the landfill site.

### 3.2.4 **Pipe Insulation Removal Using Glove Bag Method**

3.2.4.1 Not applicable.

### 3.2.5 **Entry and Exit Procedures**

3.2.5.1 All workers and authorized visitors, before entering the work area, shall be trained in and familiar with all regulations, personal protection requirements (including workplace entry and exit procedures) and emergency procedures.

3.2.5.2 Workers and authorized visitors shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos containing or contaminated materials and until final clean up is completed.

3.2.5.3 All workers and authorized visitors shall, prior to entering the work area, put on appropriate respiratory protection (as deemed adequate for the project conditions), clean disposable coveralls, head covering and foot covering. Hard hats, eye protection, and gloves shall also be utilized if required. Clean respirators and protective clothing shall be provided and utilized by each person for each separate entry into the work area.

3.2.5.4 Eating, drinking, chewing, and smoking, are not permitted in the work area or decontamination facility. Smoking on the Owner's property will only be allowed in designated areas if approved by the Owner.

3.2.5.5 Before leaving the work area workers shall decontaminate their protective clothing using a HEPA vacuum or by damp wiping. Store clean protective clothing in clean plastic bag for reuse, or, if protective clothing is not to be reused, dispose of as contaminated waste.

3.2.5.6 Workers shall wash hands and face immediately upon leaving the work area.

### 3.2.6 **Asbestos Enclosure Procedures**

3.2.6.1 Clean, prepare and isolate the work area in accordance with these specifications.

3.2.6.2 Spray areas that will be disturbed during the installation of hangers or other support/framing materials for the enclosure with water. Keep these areas damp to reduce airborne fibre concentrations.

3.2.6.3 Remove loose or hanging asbestos containing materials in accordance with these specifications.

3.2.6.4 After installation of hangers and other fixing devices and before installation of enclosure barrier, repair damaged areas of fireproofing/thermal insulation materials as required using a non-asbestos containing replacement material. Prepare surfaces and apply replacement material in accordance with manufacturer's written instructions.

3.2.6.5 Use hand tools equipped with HEPA filtered local exhaust ventilation, to drill, cut into, or otherwise disturb asbestos containing materials during the installation of support systems for the enclosures. (Alternatively, these areas of material could be removed prior to installation of supports.)

3.2.6.6 Enclosure barrier materials shall be impact resistant and provide an air-tight barrier once construction is complete.

3.2.6.7 Lower utilities as necessary and reinstall using qualified trades persons, in a manner which permits proper utilization and does not disturb the integrity of the enclosure barrier. Utility maintenance shall not require the enclosure to be opened or disturbed.

3.2.6.8 Enclosed asbestos containing materials shall be designated appropriately with Asbestos Warning signs in order to warn building maintenance personnel and general occupants of the potential asbestos hazard in the event that they are required to disturb the enclosure. One Asbestos Warning sign shall be installed for every twenty (20) lineal feet (6 metres) of enclosure surface or portion thereof.

### 3.2.7 **Clean Up**

3.2.7.1 Frequently during the work and immediately after completion of the work clean up dust and waste containing asbestos using a HEPA vacuum or by damp mopping.

3.2.7.2 Place asbestos containing waste in sealed disposal bags. Drop sheets and disposable protective clothing shall be treated as asbestos waste and shall be wetted and folded to contain dust and then placed in disposal bags.

3.2.7.3 Immediately before their removal from the work area, and disposal, clean each filled disposal bag using damp cloths or HEPA vacuum and place in second clean disposal bag.



3.2.7.4 Seal and remove double-bagged waste from site. Dispose of waste asbestos in accordance with requirements of Provincial and Federal authority having jurisdiction.

3.2.7.5 Place polyethylene, tape, cleaning materials, and other contaminated debris in disposal bags for transport to the landfill site.

3.2.7.6 When removing polyethylene sheeting, the material shall be carefully rolled away from the walls to the centre of the work area. As polyethylene is removed from the work area, all surfaces shall be HEPA vacuumed or wet cleaned.

3.2.7.7 Perform final thorough clean up of work areas and adjacent areas affected by the work using HEPA vacuum.

3.2.7.8 At the completion of the clean up operation, the Contractor and Astech Consultants Ltd. shall inspect the work area to ascertain that no dust or debris remains on surfaces as a result of dismantling or clean up operations.

**3.2.8 Air Monitoring**

3.2.8.1 From commencement of work until completion of the clean up operation, Astech Consultants Ltd. will be conducting air monitoring both inside and outside the work area.

3.2.8.2 Air sampling collection and analysis shall be conducted in accordance with the Workers' Compensation Board of British Columbia Occupational Health and Safety Regulation.

3.2.8.3 The fibre level in areas outside the Moderate Risk work areas, where there has been no disturbance of asbestos containing materials, shall not be permitted to exceed the following action level:

Asbestos (all forms) . . . . 0.05 fibres/ml (based on a Permissible Concentration of 0.1 fibre/ml)

3.2.8.4 With the exception of gypsum board removal (where a polyethylene enclosure, negative air unit, & PAPR are utilized) the fibre level in the Moderate Risk work area shall not be permitted to exceed the following action level:

Asbestos (all forms) . . . . . 0.50 fibres/ml

3.2.8.5 Respirators shall be selected in accordance with the following maximum airborne fibre level concentrations:

|   |               |
|---|---------------|
| Half Facepiece . . . . .                            | 0.7 fibres/ml |
| Full Facepiece . . . . .                            | 3.7 fibres/ml |
| Powered Air Purifying (negative pressure) . . . . . | 3.7 fibres/ml |
| Powered Air Purifying (positive pressure) . . . . . | 7.5 fibres/ml |

3.2.8.6 Notify Astech Consultants Ltd. that the work area is ready for post abatement air monitoring.

3.2.8.7 If required, post abatement ambient monitoring will be conducted by Astech Consultants Ltd. If air sampling determines that asbestos levels in the work area are equal to or less than the level listed below, and as stipulated by the Workers' Compensation Board of British Columbia, the Contractor may proceed with the final clean up:

Asbestos (all forms) . . . . 0.05 fibres/ml (based on a Permissible Concentration of 0.1 fibre/ml)

3.2.8.8 If air monitoring or visual inspection determines that areas outside the work area are contaminated, these areas shall be maintained and cleaned, in the same manner as that applicable to the work area.

**3.3 DISPOSAL**

3.3.1 Asbestos containing waste, contaminated building materials or equipment, and water used in the Work Area, shall be sealed and labelled in double 6 mil polyethylene bags, for transport to the landfill site.

3.3.2 As the work progresses, to prevent exceeding available storage capacity on site, sealed and labelled containers of asbestos containing waste shall be removed and transported to the pre-arranged disposal location.

3.3.3 Copies of all transportation manifests or other documentation of disposal shall be delivered to the Owner for his records. Copy 2 (green) of the waste manifest shall be provided to Astech Consultants Ltd. The waste manifest form shall be signed by the Contractor and the Disposal Site Operator, as the responsibility for the material changes hands. If a separate carrier is employed, his name, address, telephone number and signature shall also appear on the waste manifest form.

3.3.4 Personnel loading or off loading asbestos containing waste shall be protected by disposable clothing including head and body protection, and a minimum of a half facepiece, air-purifying, dual cartridge respirators equipped with HEPA filters.

3.3.5 Any debris or residue observed on containers or surfaces outside of the work area resulting from clean-up or disposal activities shall be immediately cleaned up using HEPA filtered vacuum equipment and/or wet methods as appropriate.

3.3.6 If large metal dumpsters are used for asbestos waste disposal, they shall be equipped with doors and tops that can be closed and locked to prevent vandalism and provide security during transportation. Unbagged material, or non asbestos waste, shall not be placed in these containers. Bags shall be placed, not thrown, into these containers to avoid splitting. Disposal bins shall not be filled more than one foot (305 mm) from the top of the bin. Disposal bins (doors) shall be sealed in order to prevent water leakage.

3.3.7 Following the removal of all containerized waste, the cargo area shall be decontaminated using HEPA vacuums and/or wet cleaning methods.

#### **3.4 RE-ESTABLISHMENT OF WORK AREA SYSTEMS AND OBJECTS**

3.4.1 In coordination with the local engineering supervisor, re-establish HVAC, mechanical and electrical systems in proper working order. Re-establish objects and fixtures that were moved to temporary locations. Decontaminate filter assembly using HEPA vacuums and wet cleaning techniques. Supply and install new filters in HVAC systems. Dispose of old filters as asbestos waste.

3.4.2 Repair all areas of damage that occurred as a result of abatement activities.

3.4.3 Where applicable, a qualified sub-trade shall re-install all safety equipment such as fire alarm systems, heat and/or smoke detectors, fire-fighting equipment, emergency lighting, and exit lighting.

**END OF SECTION**