



RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Public Works and Government Services Canada
ATB Place North Tower
10025 Jasper Ave./10025 ave. Jasper
5th floor/5e étage
Edmonton
Alberta
T5J 1S6
Bid Fax: (780) 497-3510

SOLICITATION AMENDMENT MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution
Public Works and Government Services Canada
ATB Place North Tower
10025 Jasper Ave./10025 ave Jasper
5th floor/5e étage
Edmonton
Alberta
T5J 1S6

| | |
|---|---|
| Title - Sujet Demolition, Banff Housing | |
| Solicitation No. - N° de l'invitation E0209-162048/A | Amendment No. - N° modif. 004 |
| Client Reference No. - N° de référence du client PARKS E0209-162048 | Date 2016-01-19 |
| GETS Reference No. - N° de référence de SEAG PW-\$PWU-183-10670 | |
| File No. - N° de dossier PWU-5-38302 (183) | CCC No./N° CCC - FMS No./N° VME |
| Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2016-01-26 | Time Zone Fuseau horaire Mountain Standard Time MST |
| F.O.B. - F.A.B. Specified Herein - Précisé dans les présentes Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input checked="" type="checkbox"/> | |
| Address Enquiries to: - Adresser toutes questions à: Tikhonovitch (RPC), Alex | Buyer Id - Id de l'acheteur pwu183 |
| Telephone No. - N° de téléphone (780) 901-7940 () | FAX No. - N° de FAX (780) 497-3510 |
| Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: | |

Instructions: See Herein

Instructions: Voir aux présentes

| | |
|---|--|
| Delivery Required - Livraison exigée | Delivery Offered - Livraison proposée |
| Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur | |
| Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur | |
| Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/de l'entrepreneur (taper ou écrire en caractères d'imprimerie) | |
| Signature | Date |

Cette modification à l'invitation a été soulevée pour effectuer les modifications suivantes:

Delete Construction Documents for Tender dated Jan 07, 2016 in its entirety and replace with the enclosed document entitled Construction Documents for Tender dated Jan 15, 2016.

Toutes les autres modalités et conditions de l'Appel d'offres restent inchangés.

PRE-TENDER MEETING Q&A

PROJECT NAME: BNP Staff Housing Demolition
PROJECT NUMBER: R075719.001

DATE: January 15 2016
PAGE : _1_ of _4_

This document is being issued as supplemental information to the Tender Documents and it is to be read, interpreted and coordinated with all other parts. Acknowledge receipt of this document in your bid proposal.

This document consists of (4) four pages.

GENERAL

1. Ensure that all parties submitting bids are aware of all items included in this supplemental information.
2. Full scope of work for both sites, except hydro seeding, need to be completed within 6 weeks from acceptance of the bid as per BA06 in Div00. Hydro seeding can be scheduled at a subsequent time when the ground is not frozen to accommodate the weather conditions.
3. Do we need to do our own air monitoring?
No. Third party air monitoring and inspections shall be arranged by the departmental representative (Amec Foster Wheeler). PWGSC has contacted with Amec Foster Wheeler to provide this service. The foregoing shall not limit the responsibilities of the contractor as outlined in the hazardous materials specification to maintain the condition of the work site.
4. Is asbestos abatement to be completed as part of this tenders scope of works?
Yes, the asbestos abatement to be completed as part of this tenders scope of works.
5. Who retains and pays for air monitoring?
Air monitoring is by AMEC Foster Wheeler.
6. Can the concrete be processed and used on site for backfill?
Crushed concrete is not to be used as backfill and shall be removed from site.

151 Cave Ave:

1. Will the current services (water/power) be shut down prior to demolition work?
*Refer to Specification Section 01 51 00.
Services will not be shutdown prior to demolition.
Contractor to coordinate timeline of utilities shut down with the utilities provider.*
2. Are the construction debris to be taken to the Landfill in Revelstoke or Banff Transfer?
*No. Construction debris are to be taken to the closest appropriate landfill. Specification section 01 35 43, item 1.4.3 should read:

.3 Contractor shall remove all demolition, construction, and trade waste from the site and dispose of materials at appropriate landfill on a regular basis or when directed by Departmental Representative. All users and vehicles must report to*

the transfer scales prior to the disposal of any material. Various rate schedules apply for unsorted waste, scrap metal, asphalt shingles, appliances, and painted wood.

3. What is the cut and fill rate for this site?
Refer to Appendix A – Construction Documents Narrative, item 2.3.1 – Site grading.
4. Is topsoil stripping required before construction procedures commence? It is all frozen and it will be difficult to remove.
*Refer to specification section 31 14 13, item 3.2.
Contractor to strip topsoil as there may be large pockets of topsoil at the two sites.*
5. Is topsoil required at finish grading?
*Refer to Appendix A - Construction Documents Narrative, item 2.4.2 – Landscape Rehabilitation.
No topsoil is to be imported for the seeding purposes.*
6. Is there any mastic underneath the floor tile?
Yes. Please refer to the Section 02 81 00 General Requirements in Part 1, Sub-section 1.3.4.3 and the EMC LABS, INC. Laboratory Report 0164437.
7. Is the mastic on the stairs to the basement asbestos-containing material?
No. Please refer to the supplementary document; EMC LABS, INC. Laboratory Report 0164437 as noted below.
8. Are there materials required to be disposed of at Class I landfill or waste facility?
Yes. Please refer to Parts 1 and 3 of Section 02 81 00 General Requirements.
9. Was there any additional testing done further to the DF Technical & Consulting Services Ltd. assessment report?
Yes. There was additional bulk sampling to confirm the presence of asbestos-containing materials at both locations. Sampling was completed by Amec Foster Wheeler. Testing was completed by EMC Labs. EMC LABS, INC. Laboratory Report 0164437, is attached as Appendix F for clarification.
10. What is the extent of asbestos-containing gypsum board joint compound?
All the gypsum board joint compound is asbestos-containing material, this includes all the gypsum board walls and ceilings located throughout the entire house.
11. Where are hazardous materials located at the site(s)?
Refer to the Section 02 81 00 General Requirements in Part 1, Sub-section 1.3 for the list of hazardous materials and locations.

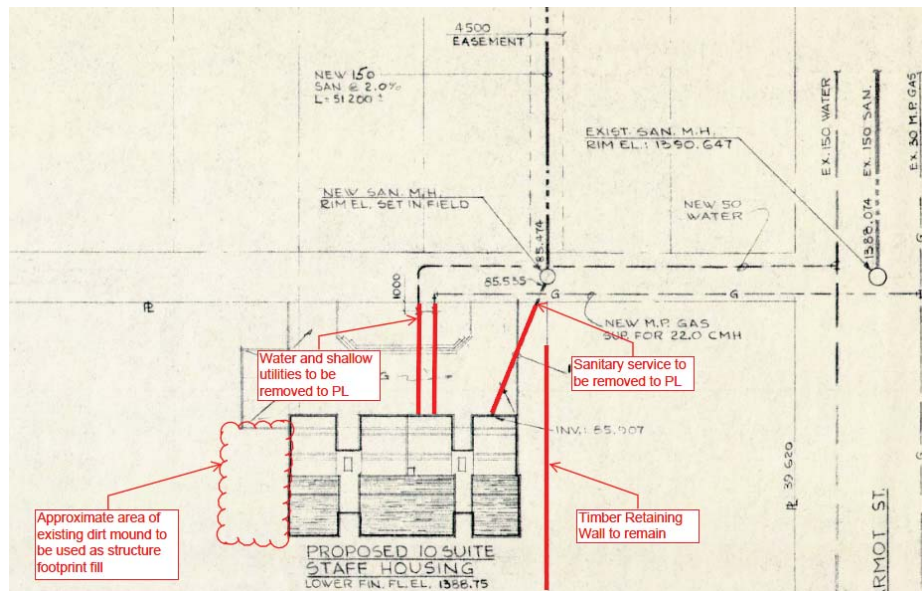
549 Deer Street:

1. Are the construction debris to be taken to the Landfill in Revelstoke or Banff Transfer?
No. Construction debris are to be taken to the closest appropriate landfill. Specification section 01 35 43, item 1.4.3 should read:

.3 Contractor shall remove all demolition, construction, and trade waste from the site and dispose of materials at appropriate landfill on a regular basis or when directed by Departmental Representative. All users and vehicles must report to the transfer scales prior to the disposal of any material. Various rate schedules apply for unsorted waste, scrap metal, asphalt shingles, appliances, and painted wood.

2. Are the utilities to be capped at property line?

Yes, utilities are to be capped at property line. Figure 7 in Appendix A, item 3.3.3 has been revised as follows:



3. Please clarify timelines for hydro seeding.

Refer to specification section 32 92 19.16 item 3.3.

The hydraulic seeding must be undertaken when there is no snow on the ground and when ground is not frozen. Contractor to coordinate timelines upon confirmation of ground conditions.

4. What is the purpose of the site survey?

Contractor is to survey both sites to identify the site existing conditions, determine extent of building demolition required, property lines, utilities locations and to define which trees need to be removed (that will conflict with the utilities).

5. Can a jackhammer be used on site?

As per specification section 01 35 43, item 1.13.3, large jackhammers are not permitted.

Small jackhammers can be used. Refer also to specification section 01 52 00, item 1.15.2.

6. Are drawings available?

Reference drawings of the tenplex are included as Appendix G, as supplementary information. They are not to be considered as-builts.

7. Is 3 to 1 an acceptable backfilling slope for this site?

Refer to specification Section 31 22 13 - 3.2 Common Excavation and 3.3 Placing to address this question.

Appendix A – Construction Documents Narrative also describes the backfilling as per section 3.3.1.

8. Is the stucco same as the parging materials?

Yes, for the purposes of abatement. Exterior parging (Refer to Section 02 81 00 General Requirements in Part 1, Sub-section 1.3) includes at least two types of cementitious coating or finishing materials. The coating or finishing materials may be applied directly to the building substrate or incorporate a reinforcement such as wire mesh (commonly referred to as stucco or stucco-like). Exterior parging is located on the concrete foundation and lower portions of the building exterior walls, as well as on the

exterior stairwell walls and inside the car ports. Based on the testing completed, the various types of parging may not be visually distinguishable.

9. Is there any mastic underneath the lino flooring?
Yes, based on the additional testing completed by Amec Foster Wheeler. Part 1.3.8 of Section 02 81 00 General Requirements shall read "Asbestos-containing vinyl sheet (linoleum) flooring and mastic located in the front entry, kitchen and bathrooms of each unit of 549 Deer Street."
10. Is there an assessment report for this site?
Yes, there was a hazardous materials assessment report completed by DF Technical & Consulting Services Ltd. Amec Foster Wheeler also conducted sampling as stated in this clarification document.
11. Do we need to remove and dispose the glycol from this site?
Yes. Fluid in the building heating/cooling systems (glycol) is considered a domestic or commercial chemical. Refer to Section 02 81 00 General Requirements in Part 1, Sub-section 1.3.
12. **Clarification:**

The exterior parging (Refer to Section 02 81 00 General Requirements in Part 1, Sub-section 1.3.) may remain in place for demolition provided the contractor obtains an acceptance from Section 34 of the Occupational Health and Safety Code from the Alberta ministry of Jobs, Skills, Training and Labour on behalf of Public Works and Government Services Canada.

Table below clarifies the asbestos-containing materials to be removed and disposed from this site. Refer to the project specifications.

| Materials | Location |
|---|---|
| Linoleum flooring and associated mastic | Front entry, kitchen and bathrooms of each unit |
| Parging cement (mudded mechanical insulation) from fittings | Mechanical Room and Storage/ Laundry Room |
| Parging (stucco) | Concrete foundation and lower portions of the building exterior walls, exterior stairwell walls and inside the car ports. |

End of Pre-Tender Meeting Q&A



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

Canada



Construction Documents for Tender

**Project No. R075719.001
BNP Staff Housing Demolition**

**Banff National Park (BNP)
Banff, Alberta**

Jan 15, 2016

www.pwgsc-tpsgc.gc.ca

Division 01 - General Requirements

| | |
|----------|---|
| 01 11 00 | Summary of Work |
| 01 14 00 | Work Restrictions |
| 01 29 83 | Payment Procedures for Testing Laboratory Services |
| 01 31 19 | Project Meetings |
| 01 31 29 | Electrical Coordination |
| 01 32 16 | Construction Schedule |
| 01 33 00 | Submittal Procedures |
| 01 35 43 | Environmental Procedures |
| 01 45 00 | Quality Control |
| 01 51 00 | Temporary Utilities |
| 01 52 00 | Construction Facilities |
| 01 56 00 | Temporary Barriers and Enclosures |
| 01 61 00 | Common Product Requirements |
| 01 71 00 | Examination and Preparation |
| 01 73 00 | Execution |
| 01 74 11 | Cleaning |
| 01 74 21 | Construction/Demolition Waste Management and Disposal |
| 01 77 00 | Closeout Procedures |
| 01 78 00 | Closeout Submittals |

Division 02 – Existing Conditions

| | |
|-------------|--|
| 02 41 99 | Demolition |
| 02 81 00 | General Requirements |
| 02 82 00.1 | Asbestos Abatement – Low Risk |
| 02 82 00.2 | Asbestos Abatement – Moderate Risk |
| 02 82 00.2a | Asbestos Abatement – Moderate Risk (Glovebag) |
| 02 82 00.3 | Asbestos Abatement – High Risk |
| 02 83 11 | Lead and Lead Paint – Intermediate Precautions |
| 02 85 00 | Mould – Moderate Risk Precautions |
| 02 90 00 | Removal of Ozone Depleting Substances |
| 02 95 00 | Removal of Mercury |

Division 03 – Concrete

| | |
|----------|------------------|
| 03 00 10 | Concrete Removal |
|----------|------------------|

Division 06 – Wood, Plastics, and Composites

| | |
|----------|-------------------------|
| 06 00 10 | Wood Structure Removals |
|----------|-------------------------|

Division 31 - Earthworks

| | |
|----------|-----------------------------------|
| 31 00 10 | Backfilling |
| 31 00 11 | Aggregates and Granular Materials |
| 31 14 13 | Soil Stripping and Stockpiling |
| 31 22 13 | Site Grading |

Division 32 – Exterior Improvements

32 00 10 Surface Works Removal
32 92 19.16 Hydraulic Seeding

Division 33 – Utilities

33 00 10 Underground Utility Removal

Appendix

Appendix 'A' – Construction Documents Narrative
Appendix 'B' – Location Maps
Appendix 'C' – Schematic Landscape Site Plans
Appendix 'D' – Environmental Assessments
Appendix 'E' – DF Technical & Consulting Services Ltd. Report
Appendix 'F' – EMC Laboratory Report
Appendix 'G' - 549 Deer Street - Reference Drawings

END OF SECTION

Part 1 General**1.1 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 The scope of work for 151 Cave Avenue site (Block 7, Lot 31B) includes the following:
 - .1 Demolition and removal from site of house, concrete foundations, wood deck, railings, stairs, associated wood structure and concrete below grade; the house is wood frame construction.
 - .2 Demolition of garage and foundations, upstands, slab on grade, overhead electrical service to garage, asphalt surface on driveway; the garage is wood frame construction on concrete foundations
 - .3 Removal of all man made appurtenances on site including pavers at patio, concrete wheel stops, wood post and entry feature (see 5.4.1.5 and 5.4.1.6) and outdoor fireplace
 - .4 Removal of site utilities and capping of utilities at or near property lines (see Civil Section 5.4 for location particulars)
 - .5 Landscaping of building site to match existing grades at property lines for future redevelopment (re-grade site to match adjacent grades).
 - .6 The house(main floor) is approximately 24'-6" x 34'-6" = 845 s.f. (78.5 m²)
 - .7 The house (basement) is approximately 24'-6" x 34'-6" = 845 s.f. (78.5 m²)
 - .8 The garage is approximately 12'-6" x 22'-6" = 281 s.f. (26 m²)
 - .9 The lot dimensions are as follows:
 - .10 North Property Line: 77.3' (23.56 m)
 - .11 East Property Line: 229.4' (69.92 m)
 - .12 South Property Line: 145.8' (44.44 m)
 - .13 West Property Line: 297.7' (90.74 m)
 - .14 The site will be returned to the town of Banff afterward.
 - .15 Site survey is required to be performed by a legal land surveyor to be retained by the Contractor.
- .2 The scope of work for 549 Deer Street site (Block 30, Lots 18-20) includes the following:
 - .1 Demolition and removal from site of apartment building, concrete foundations, wood patio/deck, asphalt driveway, exterior stair at North boundary of property, and selected retaining walls; the Tenplex is wood frame construction.
 - .2 Removal of all man made appurtenances on site including metal slide, concrete planters, metal barrel and picnic table
 - .3 Removal of site utilities and capping of utilities at or near property lines (see Civil Section 6.3.3 for location particulars)
 - .4 Landscaping of building site to match existing grades at property lines for future redevelopment (re-grade site to match adjacent grades).
 - .5 The Tenplex footprint is approximately 40'-0" x 90'-6" = 3,260 s.f. (336.3 m²), Three floors = 10,860 s.f. (1009 m²)
 - .6 The lot dimensions are as follows:
 - .1 North Property Line: 130'- 0" (39.62 m)

- .2 East Property Line: 150'- 0" (45.72 m)
- .3 South Property Line: 130'- 0" (39.62 m)
- .4 West Property Line: 150'- 0" (45.72 m)
- .7 The site will be returned to the town of Banff afterward.
- .8 Site survey is required to be performed by a legal land surveyor to be retained by the Contractor.
- .3 Refer to Contract Documents Narrative (Appendix 'A') and Location Maps (Appendix 'B') for more detailed information.

1.2 CONTRACT METHOD

- .1 Construct Work under single, stipulated price contract with unit pricing for various landscaping items as noted in specification sections.

1.3 CONSTRUCTION SCHEDULE

- .1 Provide and maintain a work schedule as described in section 01 32 16 and the final completion date must be met as a requirement of this contract.
 - .1 Inability on the part of the Contractor to meet the scheduled milestones could result in penalties as stipulated in contract, and could result in the work being taken out of the Contractor's hands.
 - .2 Time is of the essence in the execution of this contract.
 - .3 Expected Contractor award date is by end of January 2016.

1.4 WORK SEQUENCE

- .1 Commence Work immediately after award of contract.
- .2 Coordinate Progress Schedule during construction.
- .3 Obtain Substantial Completion of the Work by March 15, 2016.
- .4 Obtain Final Completion of the Work by March 31, 2016.

1.5 SITE SUPERINTENDENT

- .1 Prior to commencing the Work, the Contractor shall designate a Site Superintendent as outlined in Contract.
- .2 Should the Site Superintendent be deemed not qualified to perform the required duties of a Site Superintendent, the Contractor will be responsible for providing a Site Superintendent who is acceptable to the Departmental Representative. Refer to Contract.

1.6 WORK SITE SAFETY - THIS CONTRACTOR IS "PRIME CONTRACTOR"

- .1 The Contractor shall, for the purposes of the Occupational Health and Safety Act (Alberta), and for the duration of the Work of this Contract:
 - .1 be the "prime contractor" for the "work site", and do everything that is reasonably practicable to establish and maintain a system or process that

will ensure compliance with the Act and its regulations, as required to ensure the health and safety of all persons at the "work site".

- .2 The Contractor shall direct all Subcontractors, Sub-subcontractors, Other Contractors, employers, workers and any other persons at the "work site" on safety related matters, to the extent required to fulfill its "prime contractor" responsibilities pursuant to the Act, regardless of:
 - .1 whether or not any contractual relationship exists between the Contractor and any of these entities, and
 - .2 whether or not such entities have been specifically identified in this Contract.

1.7 CONTRACTOR USE OF PREMISES

- .1 Construction site shall be closed to general public.
- .2 Unrestricted use of site until Substantial Performance within boundaries indicated at start up meeting.
- .3 Maintain continued access to parking lot and public washroom facilities during construction.
- .4 Maintain fire access/control.
- .5 Co-ordinate use of premises under direction of Departmental Representative.
- .6 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

1.8 CONTRACTOR ACCOMODATIONS

- .1 There is no work camp area located within the National Parks. Contractor must make private accommodation arrangements.
- .2 Contractor, subcontractors and their worker shall not set up their travel trailer, RV, motorhome, tent or any other type of mobile accommodation on or near the work site. Parks' campgrounds may be available for fee as indicated at each campground.

1.9 DEPARTMENTAL REPRESENTATIVE FURNISHED ITEMS

- .1 Departmental Representative Responsibilities:
 - .1 Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions, and certificates to Contractor.
 - .2 Deliver supplier's bill of materials to Contractor
 - .3 Arrange and pay for delivery to site in accordance with Progress Schedule.
 - .4 Inspect deliveries jointly with Contractor.
 - .5 Submit claims for transportation damage.
 - .6 Arrange for replacement of damaged, defective or missing items.

- .7 Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties and bonds to Contractor.
- .2 Contractor Responsibilities:
 - .1 Designate submittals and delivery date for each product in progress schedule.
 - .2 Review shop drawings, product data, samples, and other submittals. Submit to Departmental Representative notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
 - .3 Receive and unload products at site as indicated in 1.9.3 below.
 - .4 Inspect deliveries jointly with Departmental Representative; record shortages, and damaged or defective items.
 - .5 Handle products at site, including uncrating and storage.
 - .6 Protect products from damage, and from exposure to elements.
 - .7 Assemble, install, connect, adjust, and finish products.
 - .8 Provide installation inspections required by public authorities.
 - .9 Repair or replace items damaged by Contractor or subcontractor on site (under his control).

1.10 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Documents.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Permits
 - .12 Survey
 - .13 Other documents as specified.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 INTENT**

- .1 The Work shall be designed, constructed, and commissioned in a manner which is compliant with the Canada National Parks Act and Parks Canada Agency Regulations, Directives, and Guidelines.
- .2 Permits are required from Parks Canada and the authority having jurisdiction.

1.2 ACCESS AND EGRESS

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

1.3 USE OF SITE AND FACILITIES

- .1 Site is limited by existing buildings and access.
- .2 Execute work with least possible interference or disturbance to normal use of area. Make arrangements with Departmental Representative to facilitate work as stated.
- .3 Security fencing is required to ensure public protection in accordance with OH & S guidelines. Security fencing is required around building being demolished to create a secure perimeter.
- .4 Closures: protect work temporarily until permanent enclosures are completed.

1.4 HOURS OF WORK

- .1 Follow Town of Banff bylaws for hours of work, unless otherwise authorized by the Departmental Representative.

1.5 WORK BY OTHERS

- .1 Co-ordinate work with that of other Contractors.

1.6 EXISTING SERVICES

- .1 Notify Departmental Representative, Parks Canada Representative, and private and public utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative and Parks Canada Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for vehicular traffic control as needed.

- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.7 BUILDING SMOKING ENVIRONMENT

- .1 Smoking is prohibited on site during construction.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE**

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.

1.2 APPOINTMENT AND PAYMENT

- .1 Departmental Representative will appoint and pay for services of testing laboratory except follows:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work for inspection and testing.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
- .2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

Part 2 Products**2.1 NOT USED****Part 3 Execution****3.1 NOT USED**

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the work as requested by the Departmental Representative.
- .2 Departmental Representative shall prepare agenda for meetings.
- .3 Departmental Representative shall distribute written notice of each meeting four days in advance of meeting date to all parties.
- .4 Contractor to provide physical space and make arrangements for meetings in coordination with Departmental Representative.
- .5 Departmental Representative to preside at meetings.
- .6 Departmental Representative shall record the meeting minutes and include significant proceedings and decisions with identification of actions by parties.
- .7 Departmental Representative shall reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .8 Departmental Representative and representatives of Consultant, Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of Departmental Representative, Consultants, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants and Reporting Relationships in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16 - Construction Progress Schedules.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

- .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .8 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Monthly progress claims, administrative procedures, photographs, hold backs.
- .11 Appointment of inspection and testing agencies or firms by Contractor.
- .12 Insurances, transcript of policies.
- .13 Review of Health and Safety Plan and appointment of Health and Safety Co-ordinator.

1.3 PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings every two weeks.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum 7 days prior to meetings.
- .4 Departmental Representative to record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Review health and safety issues.
 - .13 Review environmental issues.
 - .14 Other business.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 DEFINITIONS**

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 15 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

1.4 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Hazardous Materials Abatement
 - .6 Demolition of Structures
 - .7 Excavation.
 - .8 Backfill.
 - .9 Final Contouring of Site
 - .10 Revegetation of Site

1.5 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule every two weeks reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.6 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .4 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .5 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .7 Keep one reviewed copy of each submission on site.

1.2 SAMPLES

- .1 Submit for review samples in duplicate or as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples to Departmental Representative at bi-weekly site meetings.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 DEFINITIONS**

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

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 Environmental protection plan include:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
 - .6 Drawings showing locations of proposed temporary excavations or embankments for material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
 - .7 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans

- include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
 - .9 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
 - .12 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .13 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
 - .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
 - .15 Pesticide treatment plan: to be included and updated, as required.
 - .16 Include an equipment access plan.

1.3 FIRE PREVENTION AND CONTROL

- .1 Carry fire extinguisher for use on each machine and at locations as required in the event of fire. (Basic fire fighting equipment recommended includes three shovels, two pulaskis, and two five gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to Contractors' staff. Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".
- .2 Construction equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.
- .3 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so and call 911. The ESO and the Departmental Representative shall be notified of any fire immediately. If not available, Banff Dispatch shall be contacted at (403) 762-4506.
- .4 Fires and burning of rubbish on site not permitted.

1.4 DISPOSAL OF WASTES

- .1 All garbage must be stored and handled in conformance with the National Parks Garbage Regulations.
- .2 All surplus and waste materials shall be removed from the job site to approved sites outside of the National Parks. Disposal of all wastes shall be in compliance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .3 Contractor shall remove all demolition, construction, and trade waste from the site and dispose of materials at appropriate landfill on a regular basis or when directed by Departmental Representative. All users and vehicles must report to the transfer scales prior to the disposal of any material. Various rate schedules apply for unsorted waste, scrap metal, asphalt shingles, appliances, and painted wood.
- .4 No food, domestic garbage or hazardous wastes may be deposited in the trade waste site. Obtain bear proof garbage containers on-site for domestic garbage generated on-site by Contractor's personnel.
- .5 Dispose of all hazardous wastes in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments. Take hazardous waste to Class 1 and 2 landfill .
- .6 Maintain the site in a tidy condition, free from the accumulation of waste products, debris and litter.
- .7 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .8 No separate payment will be made for waste disposal. Costs of this work shall be considered incidental to the contract.
- .9 Do not burn or bury rubbish and waste materials on-site.
- .10 Remove all demolition, construction, and trade waste from the site and dispose outside of Parks' land to a provincial approved landfill. Other salvaged or dispose materials to location as directed herewithin this document.

1.5 NATIONAL PARKS REGULATIONS

- .1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules and regulations set out in the Canada National Parks Act and Regulations.
- .2 The Contractor and all sub-Contractors, each, shall obtain a business license from the Parks Canada Administration Office, Banff, Alberta, prior to commencement of the contract.

- .3 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained free of charge at Parks Administration Office.

1.6 CANADIAN ENVIRONMENTAL ASSESSMENT ACT

- .1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act Guidelines Order of 2003 and subsequent amendments. This project and its components, has been subject to an environmental assessment.
- .2 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the work being suspended pending rectification of the problem.

1.7 WILDLIFE

- .1 Avoid or terminate activities on-site that attract, disturb or harass wildlife and vacate the area and stay away from the immediate location if sheep, bears, cougars display aggressive behaviour or persistent intrusion. Wildlife must be allowed to pass through the site freely.
- .2 Notify the Departmental Representative and Parks Environmental Surveillance Officer (ESO) immediately of bear, snake or cougar activity, dens, nests, or wildlife encounters on or around the site. Other wildlife encounters should be reported within 24 hours.
- .3 During the Environmental Briefing all personnel shall be instructed by the ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.
- .4 Pets will not be permitted on site.

1.8 DRAINAGE

- .1 Prepare erosion and sediment management plan that identifies type and location of erosion and sediment controls to be provided. The desired end result is to allow no release into watercourses of sediments or deleterious substances. Similarly there is to be no sediment or deleterious substance release into areas of vegetation growth or sensitive areas that would adversely alter growing or hydraulic conditions. This plan shall be to the satisfaction of the Departmental Representative. The plan will include monitoring and reporting to assure that control measures are in compliance with erosion and sediment control plan, federal, provincial and municipal laws and regulations.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sedimentations control plan.
- .3 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

- .4 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Parks Canada requirements and in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.

1.9 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees on site and adjacent properties where indicated or as directed by the Departmental Representative. Any materials that inadvertently fall outside the work limits is to be removed promptly in a manner that does not damage trees or vegetation in that location.
- .2 Coordinate with written narrative for tree protection.
- .3 When working adjacent to existing trees the Contractor shall exercise all possible care to avoid injury to existing vegetation that is to be protected. Where roots or limbs over 25 mm in diameter and bark are damaged during operations, trim damaged portion. The Departmental Representative will inspect all trimmed areas and approve them.
- .4 Tree removal shall be limited to trees that interfere with the removal of site utilities and only after approval from Departmental Representative. Provide a survey to identify the location of utilities and to define which trees need to be removed. After approval from Departmental Representative, take downed tree trunks to Peyto Pit, and chip and haul away branches. Tree removal must happen before March 15, 2016.
- .5 Provide unit rate on bid form per tree for removal.
- .6 For tree removal associated with services lines removal at 151, Cave Avenue site, Contractor shall exercise all possible care to avoid injury to the intricate network of underground tree roots of adjacent trees. Area of excavation i.e. depth of excavation and setback from the services lines for services lines removal is to be limited to the area approved by Departmental Representative.
- .7 For any other approved tree removal, the tree cutting is to be limited to 150 mm above ground i.e. 150 mm high tree stump left above ground. Tree root system and associated ground is not to be disturbed.
- .8 Protect roots of trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .9 No stripping or vegetation removal shall occur outside the designated areas or as directed by Departmental Representative or ESO.
- .10 Any contamination found during demolition will be tested, removed and disposed of in accordance with regulatory requirements including being hauled to a

licensed landfill facility outside the park. Contaminated sites must be cleaned up to meet the standards established by the CCME Environmental Quality Guidelines for Soil and Water 2007 (with updates to 2012) and CCME Canada-Wide Standards for Petroleum Hydrocarbons in Soil 2008 for Residential/Parkland use.

1.10 CONTRACTOR'S EMPLOYEE BRIEFING

- .1 Conduct briefing sessions for all employees and subcontractor employees highlighting the requirements of this section, including operation of equipment strictly.
- .2 An initial site meeting with Contractor, Departmental Representative, Park Project Manager, and Park Surveillance Officer will take place prior to construction commencing.
- .3 Parks Surveillance Officer will conduct approximately 40 minute briefing sessions for all employees and sub-contractor employees highlighting the requirements of this specification section, and other requirements of the Parks Surveillance Officer including operations of equipment strictly within confines of the site; harassment or attraction of wildlife; pollution and garbage management; vehicle access and parking; and care of the environment in the work area.

1.11 CONTRACTOR'S OPERATIONS

- .1 The contract documents have been developed in accordance with Park Canada's policy for application of Canadian Environmental Assessment Act (2012). Construction methods which are directly affected by this policy and CEAA will be reviewed at the initial site meeting. The Contractor will be expected to comply with and ensure his construction practice meets the Parks Canada standards. Failure to comply may lead to cessation of work.
- .2 Confine all operations to the work limits as staked or designated by the Departmental Representative. No activities of any kind may be carried out beyond these work limits without Departmental Representative's written approval.
- .3 The Contractor shall prepare an EPP which details how the work limits will be marked and what procedures will be employed to ensure protection or trespass outside these limits does not occur, to the satisfaction of the Departmental Representative and ESO.
- .4 Do not store or stockpile construction materials in the trees bordering or being preserved on-site. Do not unreasonably encumber the site with products.
- .5 Storage areas shall be located within the project boundaries on disturbed or hardened areas. Storage locations to be approved by Departmental Representative.
- .6 Storage locations shall be completely cleaned up and returned to original condition prior to Contractor de-mobilization and finishing the project.

- .7 Equipment maintenance shall only be carried out in designated areas or as approved by the Departmental Representative and Park Surveillance Officer. The use of on-site areas for equipment oil changes and other servicing will not be permitted.
- .8 Obtain permit from Park Surveillance Officer for on-site storage of fuel or other inflammable liquids. Observe all restrictions and conditions imposed by the permit regarding special protection and berming to control spills and tank damage, fire protection considerations, provisions for the disposal of fouled material and used petroleum products.
- .9 Conduct operations at all times in such a manner as to preserve the natural features and vegetation in the area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes will not be permitted to sluff or roll into surrounding tree cover or to bury any plant material designated to be retained.
- .10 When, in the opinion of the Departmental Representative, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the staked or designated work area, the Contractor shall be responsible, at his expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc., to the satisfaction of the Departmental Representative.
- .11 Failure to comply with or observe environmental protection measures as identified in these specifications and the environmental assessment report may result in work being suspended pending rectification of the problems and operators of equipment being charged under the National Park Act.
- .12 As no non-native vegetation is allowed in Park, all construction equipment shall be thoroughly washed before entering Banff National Park.
- .13 All wash from equipment and tools from concrete pour operations such as tools, concrete pumper and delivery trucks to be contained in such a manner not to dispose debris, cement and fines onto a hard surface or other surfaces that would allowed it to eventually enter the storm system, sanitary system, body of water or water course.
- .14 Review construction access requirements with the Departmental Representative both at start-up and an ongoing bases.
- .15 The contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by worker's vehicles or machinery and shall instruct workers so that the 'footprint' of the project is kept within defined boundaries. Areas around buildings requiring excavator or equipment access in natural areas should confine access as close to the edge of the walls as possible. Access requirements, once approved, will be flagged by the Environmental Surveillance Officer.

1.12 EQUIPMENT MAINTENANCE, FUELING, AND OPERATION

- .1 Provide, operate, and maintain equipment as indicated in Environmental Assessment Amendment, as indicated in Appendix A of this Project Manual and as follows:
- .2 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside the Banff National Park before delivery to the work site.
- .3 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 metres to any streams, wetlands, water bodies or waterways shall require the authorization and oversight of the Departmental Representative.
- .4 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 100 metres from any streams, wetlands, water bodies or watercourses. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain presence at and immediate attention to the fuelling operation.
- .5 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times.
- .6 Equipment used on the project shall be fuelled with E10, and low sulphur diesel fuels and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of vehicles is avoided.
- .7 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations approved by the ESO or the Departmental Representative. Waste lubrication products (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc anywhere within Banff National Park.
- .8 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order.
- .9 Fuel containers and lubricant products shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight in Banff National Park.

1.13 NOISE AND VIBRATION CONTROL

- .1 Low impact demolition equipment and methodologies shall be employed that do not generate significant noise or vibration levels in proximity to the sensitive wildlife habitat.

- .2 Demolition activities shall take place with the use of low noise and low ground vibration inducing equipment and techniques for the project site. For example, equipment could include but is not limited to a processor or pulverizer attached to an excavator.
- .3 High impact equipment known to cause higher noise levels and potential for higher ground vibrations shall be prohibited. Blasting, portable rock crushers and large jackhammers are not permitted.
- .4 Contractor to submit for review a written procedure for concrete demolition at least 2 weeks prior to commencement of site work. Written procedure shall include descriptions of equipment, methods, and tools.

1.14 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material without Departmental Representative's approval.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.

1.15 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for the Work. The Contractor shall prepare a dust management plan as part of their EPP to be approved by the Departmental Representative.
- .5 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 metres from any watercourse.
- .6 A Spill Response Plan will be prepared as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative and the ESO and in accordance with all applicable federal and provincial legislation. The EPP

shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, sealer, grout, cement, concrete finishing agents, adhesives and sand blasting agents.

- .7 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 metres from any watercourse.
- .8 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative and the ESO before start-up. Measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double-lined fuel tanks can prevent spills into the environment.
- .9 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work by methods that are approved by the Departmental Representative or ESO.
- .10 The Contractor shall provide spill kits at re-fuelling, lubrication, and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The ESO and Departmental Representative prior to project start-up must approve these spill kits. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
- .11 Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative and the ESO shall be notified immediately of any spill. If not available, Banff Dispatch will be contacted at (403) 762-4506 or call 911. Spill response cards will be distributed during the initial Environmental Briefing with basic instructions and phone numbers.
- .12 In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.
- .1 The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the expected standard and to the satisfaction of the Departmental Representative and ESO.

1.16 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 INSPECTION**

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Contractor.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative, pay costs for retesting and reinspection.

1.3 PROCEDURES

- .1 Notify appropriate agency in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.4 REJECTED WORK

- .1 Refer to Departmental Representative/Contractor Contract.
- .2 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .3 Make good other Contractor's work damaged by such removals or replacements promptly to the satisfaction of the Departmental Representative.
- .4 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.5 REPORTS

- .1 Submit electronic copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to Contractor of work being inspected or tested and manufacturer or fabricator of material being inspected or tested.

Part 2 Products**2.1 NOT USED****Part 3 Execution****3.1 NOT USED**

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

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

1.4 DEWATERING

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

1.5 WATER SUPPLY

- .1 Provide continuous supply of potable water for construction use.
- .2 Arrange for connection with Parks owned water systems and pay costs for installation, maintenance and removal.

1.6 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
- .5 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Permanent heating system of building is not available for use.
- .7 Pay costs for maintaining temporary heat.
- .8 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .9 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 TEMPORARY POWER AND LIGHT

- .1 The Contractor shall be responsible for all temporary power during construction for temporary lighting and operating of power tools.
- .2 Provide and maintain temporary lighting throughout project as required to maintain safe working conditions.

1.8 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary cell phone and data device lines necessary for own use.

1.9 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.
- .3 Parks Canada do not provide or have any fire protection services.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-08, Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, and platforms.

1.5 HOISTING

- .1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists cranes to be operated by qualified operator.

1.6 SITE STORAGE/LOADING

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

1.7 CONSTRUCTION PARKING

- .1 Limited parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site for authorized personnel.
- .3 Follow vehicle parking limitations and permit requirements when within the park.
- .4 Personal vehicles shall not be parked on any natural or undisturbed areas. Parking will be confined to parking lots and roads or as approved by the Departmental Representative.

1.8 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.

1.9 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.10 SANITARY FACILITIES

- .1 Provide portable sanitary facilities.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.11 CONSTRUCTION SIGNAGE

- .1 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .2 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.
- .3 Company signage is allowed on trailers or vehicles, not elsewhere on site.

1.12 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .2 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .3 Protect travelling public from damage to person and property.
- .4 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .6 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .7 Dust control: adequate to ensure safe operation at all times.
- .8 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .9 Snow Removal. Contractor is responsible for snow clearing within their work site including parking lots, and sidewalks.

1.13 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.

1.14 FIRE PROTECTION FACILITIES

- .1 Provide fire extinguisher and other equipment on site and maintain emergency vehicle access at all times.

1.15 DISRUPTION

- .1 Provide dust protection and schedule noisy work accordingly, as not to affect general public, traffic, and adjacent facilities.
- .2 No excessive noise will be permitted. Demolition methods that contribute to excessive noise will not be permitted. Low vibration and noise demolition equipment shall be used throughout the project. Best management practices will be followed by the Contractor to reduce noise on site. Equipment and vehicles shall be in good working condition and fitted with proper noise suppressing devices. Combine noisy operations to occur in the same time period. The Contractor is to take care when dropping materials from a height, for example,

when dumping concrete material into the basement. Minimize drop heights at material transfer locations. Shut or throttle down equipment (e.g. backhoes, loaders, generators, bobcats) whenever they are not in actual use. If in the opinion of the Departmental Representative or Parks Canada there is excessive noise, the Contractor will adjust the work schedule of the activity, reduce the sound levels (e.g. use of sound barriers), or implement alternative demolition processes or quieter equipment.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of Parks Canada.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA O121-08, Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

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

1.3 HOARDING

- .1 Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121.
 - .1 Apply plywood panels vertically flush and butt jointed.
 - .2 Paint public side of site enclosure in selected colours with one coat primer to CAN/CGSB 1.189 and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.
- .2 Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.
- .3 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
- .4 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.4 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations and open edges of floors and roofs.
- .2 Provide as required by governing authorities.

1.5 ACCESS TO SITE

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

1.6 PUBLIC TRAFFIC FLOW

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

1.7 FIRE ROUTES

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

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.9 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

1.3 AVAILABILITY

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

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store products subject to damage from weather in weatherproof enclosures.
- .3 Store cementitious products clear of earth or concrete floors, and away from walls.
- .4 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.5 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by licensed or qualified workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative whose decision is final.

1.6 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

1.7 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.8 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities including Parks owned utilities, with minimum of disturbance to Work, and/or building occupants. Make arrangements with Departmental Representative.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 EXISTING SERVICES**

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

1.2 SUBSURFACE CONDITIONS

- .1 Promptly notify Departmental Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Departmental Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products**2.1 NOT USED****Part 3 Execution****3.1 NOT USED**

END OF SECTION

Part 1 General**1.1 SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Departmental Representative or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Departmental Representative or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.2 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.

- .3 Remove and replace defective and non-conforming Work.
- .4 Remove samples of installed Work for testing.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Restore work with new products in accordance with requirements of Contract Documents.
- .7 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions "C", In Effect as Of: May 14, 2004.

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Departmental Representative.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of outside of National Park. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building including parking lot and sidewalks, bank/pile snow in designated areas only as directed by Departmental Representative.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris including that was caused by Departmental Representative.
- .5 Remove waste materials from site at regularly scheduled times or dispose of outside of National Park. Do not burn waste materials on site.

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

.7 Sweep and wash clean paved areas.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General**1.1 WASTE MANAGEMENT GOALS**

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Waste Management Plan and Goals and prepare a waste management plan.
- .2 Waste Management Goal: as much as possible of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.

1.2 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Inert Fill: inert waste - exclusively asphalt and concrete.
- .3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .4 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .5 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .6 Separate Condition: refers to waste sorted into individual types.
- .7 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

1.3 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be removed from site to recycling facility without storing on site. Materials to be recycled on site are to be placed in final location with minimum of rehandling.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Transport and deliver non-salvageable items to licensed disposal facility. Transport and deliver recyclable items to recycling facilities.
- .4 Protect surface drainage, mechanical and electrical from damage and blockage.
- .5 Separate and store materials produced during dismantling of structures in designated areas.
- .6 Prevent contamination of materials to be recycled and handle materials in accordance with requirements for acceptance by designated facilities.

- .1 On-site source separation is recommended.
- .2 Remove co-mingled materials to off-site processing facility for separation.

1.4 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, and paint thinner into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

1.5 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.

1.6 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 APPLICATION

- .1 Handle waste materials not reused, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

- .1 On-site sale of recyclable materials is not permitted.

3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

- .1 Schedule G - Government Chief Responsibility for the Environment:

Project No. R.075719.001

| Province | Address | General Inquires | Fax |
|----------|--|------------------|--------------|
| Alberta | Alberta Environmental Protection Petroleum Plaza, South Tower 9915 - 108 th Street Edmonton AB T5K 2G8 | 780-427-2739 | |
| | Alberta Special Waste Management Corporation Pacific Plaza, Suite 610 10909 Jasper Avenue NW Edmonton AB T5J 3L9 | 780-422-5029 | 780-428-9627 |

END OF SECTION

1.1 General**1.2 INSPECTION AND DECLARATION**

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

1.3 CLEANING

- .1 In accordance with Section 01 74 11 - Cleaning.
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products**2.1 NOT USED****Part 3 Execution****3.1 NOT USED****END OF SECTION**

Part 1 General**1.1 SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3 Copy will be returned after final inspection, with Departmental Representative's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .6 Pay costs of transportation.

1.2 RECORDING ACTUAL SITE CONDITIONS

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

1.3 STORAGE, HANDLING AND PROTECTION

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

1 General

1.1 SUMMARY

- .1 This Section includes the following:
 - .1 Demolition and removal of buildings and structures.
 - .2 Demolition and removal of site improvements adjacent to a building or structure being demolished.
 - .3 Demolition and removal of concrete foundations.
 - .4 Removing below-grade construction.
 - .5 Disconnecting, capping or sealing, and abandoning in place or removing site utilities.

1.2 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.

1.3 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI):
 - .1 ANSI A10.8-2001, Safety Requirements for Scaffolding
- .2 Canadian Federal Legislation:
 - .1 Canadian Environmental Protection Act (CEPA), 1999
 - .2 Canadian Environmental Assessment Act (CEAA), 2012
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992
 - .4 Motor Vehicle Safety Act (MVSA), 1993
 - .5 Hazardous Materials Information Review Act, 1985
- .3 Canadian Standards Association (CSA):
 - .1 CSA S350- M1980 (R2003), Code of Practice for Safety in Demolition of Structures
- .4 National Fire Protection Association (NFPA):
 - .1 NFPA 241-2013, Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Materials Ownership:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Departmental

- Representative's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- .2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Departmental Representative that may be encountered during demolition remain Departmental Representative's property:
 - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Departmental Representative.
 - .2 Coordinate with Departmental Representative's archaeologist or historical adviser, who will establish special procedures for removal and salvage.
 - .2 Pre-Demolition Meeting: Conduct a pre-demolition meeting at Project site in accordance with requirements as follows:
 - .1 Inspect and discuss condition of construction being demolished.
 - .2 Review structural load limitations of existing structures.
 - .3 Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - .4 Review and finalize protection requirements.

1.5 SUBMITTALS

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Schedule of Demolition Activities: Coordinate with Section 01 32 16 – Construction Progress Documentation, and indicate the following:
 - .1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity
 - .2 Interruption of utility services
 - .3 Coordination for shutoff, capping, and continuation of utility services
 - .4 Locations of temporary partitions and means of egress
 - .2 Demolition Plan: Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction, and as follows:
 - .1 Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
 - .2 Pre-demolition Photographs or Videotape: Submit photographs or videotape indicating existing conditions of adjoining construction and site improvements prior to starting Work. Include finish surfaces that may be misconstrued as damage caused by demolition operations.

1.6 QUALITY ASSURANCE

- .1 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- .2 Regulatory Requirements: Comply with Authority Having Jurisdiction's regulations before beginning demolition.
- .3 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
- .4 Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 SITE CONDITIONS

- .1 Buildings being demolished will be vacated and their use discontinued before start of Work.
- .2 Departmental Representative assumes no responsibility for buildings and structures being demolished:
 - .1 Conditions existing at time of inspection for bidding purpose will be maintained by Departmental Representative as far as practical.
- .3 Hazardous Materials: Hazardous materials are present in building to be selectively demolished. A report on the presence of hazardous materials is attached as an information document for review and use:
 - .1 Examine report to become aware of locations where hazardous materials are present.
 - .2 Coordinate with Section 02 81 00.
 - .3 Do not disturb hazardous materials or items suspected of containing hazardous materials.
- .4 Storage or sale of removed items or materials on site will not be permitted.
 - .1 Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
 - .2 Maintain fire-protection facilities in service during demolition operations.

Part 2 Products**2.1 TEMPORARY SUPPORT STRUCTURES**

- .1 Design temporary support structures required for demolition work and underpinning and other foundation supports necessary for the project using a qualified professional engineer registered or licensed in province of the Work.

2.2 EQUIPMENT

- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

2.3 SOIL MATERIALS

- .1 Satisfactory Soils: Provide soil in accordance with Division 31

Part 3 Execution**3.1 EXAMINATION**

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.
- .2 Review Project Record Documents of existing construction provided by Departmental Representative.
- .3 Departmental Representative does not guaranty that existing conditions are the same as those indicated in Project Record Documents.
- .4 Inventory and record the condition of items being removed and salvaged.
- .5 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.
- .6 Promptly submit a written report to Departmental Representative.
- .7 Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- .8 Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 PREPARATION

- .1 Refrigerant: Remove and store refrigerant according regulations of Authority Having Jurisdiction.
- .2 Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures being demolished:
 - .1 Arrange to shut off indicated utilities with utility companies.
 - .2 If utility services are required being removed, relocated, or abandoned, before proceeding with building demolition provide temporary utilities that bypass buildings and structures being demolished and that maintain continuity of service to other buildings and structures.
 - .3 Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- .3 Existing Utilities: Refer to report for shutting off, disconnecting, removing, and sealing or capping utilities.
- .4 Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing:

- .1 Remove refrigerant from air-conditioning equipment before starting demolition.
- .5 Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished:
 - .1 Strengthen or add new supports when required during progress of demolition.

3.3 PROTECTION

- .1 Existing Facilities: Protect adjacent walkways and other building facilities during demolition operations.
- .2 Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations:
 - .1 Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Departmental Representative and Authority Having Jurisdiction.
 - .2 Provide temporary services during interruptions to existing utilities, as acceptable to Departmental Representative and to Authority Having Jurisdiction:
- .3 Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by Authority Having Jurisdiction and as indicated.
- .4 Comply with requirements in Section 01 51 00 – Temporary Facilities and Controls:
 - .1 Protect existing site improvements, appurtenances, and landscaping to remain.
 - .2 Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - .3 Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - .4 Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.

3.4 DEMOLITION, GENERAL

- .1 General: Demolish indicated existing buildings and structures and site improvements completely.
- .2 Use methods required to complete the Work within limitations of governing regulations and as follows:
 - .1 Do not use cutting torches until work area is cleared of flammable materials.
 - .2 Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 - .3 Maintain adequate ventilation when using cutting torches.

- .4 Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- .3 Engineering Surveys: Perform surveys as the Work progresses to detect hazards that may result from building demolition activities.
- .4 Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities:
 - .1 Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Departmental Representative and Authority Having Jurisdiction.
 - .2 Provide alternate routes around closed or obstructed traffic ways if required by Authority Having Jurisdiction.
 - .3 Use water mist and other suitable methods to limit spread of dust and dirt.
 - .4 Comply with governing environmental-protection regulations.
 - .5 Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.5 DEMOLITION, ACTUAL

- .1 Remove buildings and structures and site improvements intact when permitted by Authority Having Jurisdiction.
- .2 Proceed with demolition of structural framing members systematically, from higher to lower level.
- .3 Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- .4 Remove debris from elevated portions by chute, hoist, or other device that will convey debris to grade level in a controlled descent:
 - .1 Remove structural framing members and lower to ground by method suitable to minimize ground impact or dust generation.
- .5 Concrete: Cut concrete full depth at junctures with construction indicated to remain, using power-driven saw, then remove concrete between saw cuts.
- .6 Concrete Slabs-on-Grade and Sidewalks: Saw-cut perimeter of area being demolished at junctures with construction indicated to remain, then break up and remove.
- .7 Do not use flame-cutting torches unless otherwise authorized by Departmental Representative:
 - .1 Transport steel trusses and joists as whole units without dismantling them further.
- .8 Carpet and Pad: Remove in large pieces and roll tightly after removing demolition debris, trash, adhesive, and tack strips.

- .9 Equipment: Disconnect equipment at nearest fitting connection to services, complete with service valves; Remove as whole units, complete with controls.
- .10 Below-Grade Construction: Demolish foundation walls and other below-grade construction:
 - .1 Remove below grade construction, including basements, foundation walls, and footings, completely.
- .11 Existing Utilities: Abandon existing utilities and below-grade utility structures as indicated in Report and Division 33.

3.6 EXPLOSIVE DEMOLITION

- .1 Explosives: Use of explosives is not permitted.

3.7 SITE RESTORATION

- .1 Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 31.
- .2 Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes.
- .3 Provide a smooth transition between adjacent existing grades and new grades.

3.8 REPAIRS

- .1 General: Promptly repair damage to adjacent construction caused by building demolition operations.
- .2 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.9 RECYCLING DEMOLISHED MATERIALS

- .1 General: Separate recyclable demolished materials from other demolished materials to the maximum extent possible.

3.10 DISPOSAL OF DEMOLISHED MATERIALS

- .1 Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill:
 - .1 Do not allow demolished materials to accumulate on-site.
 - .2 Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- .2 Burning: Do not burn demolished materials.

- .3 Disposal: Transport demolished materials off Departmental Representative's property and legally dispose of them.

3.11 CLEANING

- .1 Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations.
- .2 Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This specification outlines the basic requirements for the handling and/or disposal of select hazardous building materials prior to demolition of the Banff Staff Housing buildings located at 151 Cave Avenue and 549 Deer Street in Banff, Alberta (the sites).
- .2 Hazardous building materials covered by this specification include asbestos containing materials (ACMs), Ozone depleting substances (ODS), lead and lead containing paint (LCP), mercury associated with fluorescent lamps and thermostats, smoke detectors and suspect visual mould growth. If the buildings are being demolished and none of the material repurposed, mould remediation is not required.
- .3 These specifications are intended to provide Contractors invited to bid on the project with the general procedures and standards of workmanship which are expected to be followed and defines the Contractors' responsibilities. It is the Contractor's responsibility to determine the magnitude of work. The intent of the information contained in this document is to provide guidance to the successful Contractor in the performance of that work.
- .4 The Contractor is to abide by all applicable Federal, Provincial/Territorial and Municipal regulations and is to complete the work to the satisfaction of Public Works and Government Services Canada (the "Department") or their consultant (hereby referred to as the Departmental Representative).

1.2 REFERENCES

- .1 DF Technical Consulting Services Ltd.
 - .1 Hazardous Materials Assessment. 10 Plex Banff. 24 July 2015
 - .2 Hazardous Materials Assessment. 151 Cave Avenue Banff. 19 August 2015.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.205-94, Sealer for Application to Asbestos-Fibre-Releasing Materials.
- .3 Canadian Standards Association (CSA International).
- .4 Department of Justice Canada.
 - .1 Canadian Environmental Protection Act (CEPA), 1999.
 - .2 Transportation of Dangerous Goods Act, 1992 (TDGA).
 - .3 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .6 Human Resources and Special Development Canada (HRSDC).
 - .1 Canada Labour Code Part II, - SOR 86-304 – Occupational Health and Safety Regulations.

- .7 Government of Alberta.
 - .1 Occupational Health and Safety Code. 2009.
 - .2 Alberta Asbestos Abatement Manual. October 2012.
 - .3 Alberta Occupational Health and Safety Bulletin. Asbestos Containing Materials in Building to be Demolished. Revised October 2014
 - .4 Alberta Occupational Health and Safety Bulletin. Lead at The Work Site. November 2013.
- .8 Government of Alberta, Department of the Environment
 - .1 Guideline for Disposal of Asbestos Waste.
- .9 National Research Council Canada Institute for Research in Construction (NRC-IRC).
 - .1 National Fire Code of Canada (2010).
- .10 Underwriters' Laboratories of Canada (ULC).
- .11 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention (CDC)/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113-August 1994, NIOSH Manual of Analytical Methods (NMAM), 4th Edition.

1.3 **SITE CONDITIONS**

- .1 The site located at 151 Cave Avenue consists of a single storey residential dwelling with an unfinished basement, and a detached garage. The dwelling has an area of approximately 75 m².
- .2 The site located at 549 Deer Street consists of a three storey, 10 unit apartment style building. Two floors are tenant spaces with the ground floor consisting of car ports. Each unit has an area of approximately 75 m².
- .3 This section identifies the known conditions at the site with respect to select hazardous building materials. This information is provided for reference purposes only and the contractor must confirm existing conditions within the work area(s) as a part of this contract.
- .4 The presence and/or suspected presence of ACMs, lead and LCP, mercury containing lamps and thermostats, ODS, suspect visual mould growth (SVG) and other substances have been identified at the site. Identified materials which have specified disposal and/or handling requirements under this specification include the following except where noted:
 - .1 Asbestos-containing attic insulation (vermiculite and grey loose fill material above the vermiculite, presumed cellulose) located in the attic of the home at 151 Cave Avenue.
 - .2 Asbestos-containing floor tile located underneath the surface layer of various flooring materials in the living room, bedroom, kitchen and dining room of the home at 151 Cave Avenue.
 - .3 Asbestos-containing mastic associated with floor tiles located at 151 Cave Avenue.

- .4 Asbestos-containing plaster located in the stairwell of the dwelling at 151 Cave Avenue.
- .5 Asbestos-containing gypsum board joint compound located at 151 Cave Avenue.
- .6 Lead containing paint (white) on the garage located at 151 Cave Avenue.
- .7 Lead containing paint (grey on the garage, grey and beige on house exterior, beige/green on house interior) located at 151 Cave Avenue.
- .8 Asbestos-containing vinyl sheet (linoleum) flooring located in the front entry, kitchen and bathrooms of each unit of 549 Deer Street.
- .9 Asbestos-containing mechanical insulation (parging cement) from fittings in the mechanical room of 549 Deer Street.
- .10 Asbestos containing exterior parging located at 549 Deer.
- .11 Lead containing paint (interior white and exterior brown) located at 549 Deer Street.
- .12 Mercury associated with thermostats located at 549 Deer Street.
- .13 Mercury associated with fluorescent bulbs at 151 Cave Avenue and 549 Deer Street.
- .14 Lead solder in the plumbing system was not identified at the sites but is likely present at the 151 Cave Avenue and 549 Deer Street.
- .15 Ozone depleting substances (refrigeration units at 151 Cave Avenue and refrigerators at 549 Deer Street).
- .16 SVG is present in units and the mechanical room of 549 Deer Street.
- .17 Domestic or commercial chemicals (paint, cleaning chemicals, etc.) present at 151 Cave Avenue and 549 Deer Street.
- .18 Smoke detectors present at 151 Cave Avenue and 549 Deer Street.
- .19 Hidden ACMs associated with mechanical systems hidden within walls, ceiling and other enclosed spaces which require removal prior to demolition.
- .5 Examine local conditions affecting work under this contract. No allowance will be made for necessary changes, unless notification of interferences has been brought to the Departmental Representative's attention, in writing, prior to closing of tenders.
- .6 All materials which may contain hazardous building materials indicated in this specification shall be considered as a hazardous building material unless proven otherwise by laboratory analysis or other means approved by the Departmental Representative.
- .7 Where material is encountered by the Contractor that is suspected of containing asbestos, lead, PCBs or mercury not identified in this Section or other hazardous substances, the Trade or Contractor is to immediately stop work in the area and notify the Departmental Representative. Do not resume work in the area until further follow-up has been completed and authorization granted by the Departmental Representative.

1.4 **OUTLINE OF WORK**

- .1 Refer to other Sections of this specification for a specific outline of work.

- .2 Procedures in addressing hazardous building materials known to be present within the building are identified in this section. Hidden or unidentified materials are present and shall be removed in accordance with the procedures stated for similar materials subject to the approval of the Departmental Representative.
- .3 Where unknown or suspect hazardous building materials are encountered that cannot be handled in accordance with the below procedures, the Departmental Representative shall provide direction.
- .4 All hazardous building materials identified in this specification shall be removed prior to demolition of the building with the following exceptions:
 - .1 Asbestos-containing floor tile located underneath the surface layer of various flooring materials in the living room, bedroom, kitchen and dining room of the home at 151 Cave Avenue. These can remain in place if an acceptance from Section 34 of the Occupational Health and Safety Code is obtained by the contractor from the Alberta ministry of Jobs, Skills, Training and Labour.
 - .2 Residual mastic associated with the floor tiles at 151 Cave Avenue may remain in place once scraped smooth.
 - .3 Lead containing paint (white) on the garage located at 151 Cave Avenue. The LCP is anticipated to remain in place for mechanical demolition with disposal of paint and substrate to Class 1 landfill. Contractor to confirm disposal requirements and obtain approval from the Departmental Representative.
 - .4 Lead containing paint (grey on the garage, grey and beige on house exterior, beige/green on house interior) located at 151 Cave Avenue. The LCP is anticipated to remain in place for mechanical demolition with disposal of paint and substrate to regular Class 2 landfill. Contractor to confirm disposal requirements and obtain approval from the Departmental Representative.
 - .5 Lead containing paint (interior white and exterior brown) located at 549 Deer Street. The LCP is anticipated to remain in place for mechanical demolition with disposal of paint and substrate to regular Class 2 landfill. Contractor to confirm disposal requirements and obtain approval from the Departmental Representative.
 - .6 The removal of lead solder from the plumbing systems (if present) is not expected. Rather these impacted building materials shall be recycled during demolition.
 - .7 SVG is present in units and the mechanical room of 549 Deer Street. Contractors shall notify workers of this site condition. Removal of SVG is not anticipated prior to demolition provided it is not disturbed except by mechanical demolition.
- .5 Asbestos containing loose fill attic insulation (vermiculite and associated grey insulation) shall be removed following high risk asbestos abatement procedures.
- .6 If required, asbestos containing floor tile and associated mastic shall be removed following low risk asbestos abatement procedures.
- .7 Asbestos containing plaster shall be removed following moderate risk asbestos abatement procedures.

- .8 Asbestos containing gypsum board joint compound shall be removed using moderate risk asbestos abatement procedures.
- .9 The removal of the asbestos – containing vinyl sheet flooring shall be completed using moderate risk asbestos abatement procedures.
- .10 Asbestos-containing mechanical pipe fitting insulation shall be removed using moderate risk (glovebag) asbestos abatement procedures.
- .11 Asbestos containing exterior parging shall be removed following low risk asbestos abatement procedures.
- .12 Building materials with lead and lead-containing paint that are to be disturbed shall be handled in accordance with Section 02 83 11.
- .13 All mercury containing thermostats and other suspect mercury containing equipment shall be removed in accordance with this specification.
- .14 The Contractor shall recycle and reclaim all mercury and associated metals associated with fluorescent lamps.
- .1 The contractor shall confirm the costs for the recycling option chosen as this may be removed from the project requirements at the discretion of the Departmental Representative.
- .15 Contractor shall remove and observe all lamp ballasts for the presence of PCBs. If PCBs are encountered, they shall be brought to the attention of the Departmental Representative and the Contractor shall await further instruction.
- .16 Decommission all refrigeration equipment and recover all ODSs as specified.
- .17 Building materials with mould and working in a building or area with mould issues shall be handled with Moderate Risk Precautions.
- .18 Domestic or commercial chemicals (paint, cleaning chemicals, etc.) present at the sites shall be removed from the buildings and disposed of in accordance with provincial, federal and local regulations prior to demolition.
- .19 Smoke detectors present at 151 Cave Avenue and 549 Deer Street shall be removed from the buildings and disposed in accordance with provincial, federal and local regulations prior to demolition.
- .20 Hidden hazardous materials may be present. If hazardous building materials are observed that are not identified in Section 1.4, they shall be brought to the attention of the Departmental Representative and removed in accordance with this specification.
- .21 The Contractor shall isolate the exterior work area by means of fencing, hording or other measures approved by the Departmental Representative to restrict access to the area and minimize potential public safety issues.
- .22 The Contractor shall work shall be completed when the building is vacant.
- .23 The Contractor shall refer to the DF Technical and Consulting Services Ltd. reports (see Section 1.3) for further information and precautions. In the event a discrepancy between the specifications and the reports occurs, these shall be identified to the Departmental Representative at the time of tender and further direction received.

- .24 Do not remove any materials not specifically identified by the Departmental Representative. Any removal of unauthorized materials shall be at the cost of the Contractor including the cost of repairs or re-insulation subject to the satisfaction of the Departmental Representative.

1.5 **SITE EXAMINATION**

- .1 Prior to commencing actual work, check field conditions, obtain and confirm actual site dimensions, examine surface conditions, site restrictions, etc., as required, to ensure correct execution of work. Notify the Departmental Representative in writing of all matters which could prejudice proper execution of work.
- .2 Determination of quantities, location, and nature of asbestos and other regulated work activities including, but not limited to, considerations for transportation, disposal, handling and storage of materials, availability of labour, worker and visitor protection, water, electric power, roads, uncertainties of weather or physical conditions at the site, is the responsibility of the Contractor.
- .3 Commencement of construction or any part thereof constitutes acceptance of existing conditions and means all dimensions and the scope of work has been considered, verified and is acceptable.

1.6 **SCHEDULE**

- .1 Work is to be carried out during hours agreed upon with the Departmental Representative.
- .2 The Contractor is to assume that all work is to be performed when the area is unoccupied as determined by the Departmental Representative. Removal of hazardous building materials must not delay the performance of other trades.
- .3 Prior to any on-site activities, the Contractor shall submit a proposed schedule showing phasing and proposed workforce related to each work area enclosure or repair operation.
- .4 Modifications to the project schedule would only be granted on approval by the Departmental Representative.

1.7 **GENERAL REQUIREMENTS**

- .1 Supply all labour, material, services (electricity, water, etc.) and equipment necessary to safely execute and complete all work specified, required, or implied under Section 02 81 00.
- .2 Prepare and isolate the specified work area(s) from adjoining occupied and unoccupied areas.
- .3 Shut down and/or isolate any air moving equipment that could contribute to the dispersal of contaminants, including asbestos, from the work area.
- .4 Under no circumstances shall existing service or utility lines be disconnected, shut off, or otherwise removed from service without prior consent of the Departmental Representative.

- .5 Construct worker and waste decontamination facilities at the perimeter of the work area as further specified.
- .6 As required, allow for access to security and other alarm panels at all times.
- .7 Securing the work site is the responsibility of the Contractor. Any damage to the work site or unauthorized access during or after normal working hours resulting from contractor negligence will be the responsibility of the Contractor to make right.
- .8 After preparation and approval of the work areas and decontamination facilities, remove and dispose of all required materials.
- .9 The Contractor will be responsible for the general upkeep of the site.
- .10 All work will be subject to inspection inside and outside work area by the Departmental Representative as further specified.
- .11 All containment structures, such as hoardings, platforms, etc., that are used to segregate the work area are to remain in place until directed by the Departmental Representative.
- .12 When directed by the Departmental Representative, decommission the work area and decontamination facilities.
- .13 Exercise care and caution in operations relative to the site. Any unnecessary destruction or damage of the site will not be permitted.
- .14 All hazardous building materials removed shall be transported and disposed as further specified in the sections listed in Part 3.0 of this Section.

1.8 DEFINITIONS

- .1 **Airlock:** System for permitting ingress or egress without permitting air movement between contaminated area and uncontaminated areas, typically consisting of two (2) curtained doorways spaced minimum of 2 m apart.
- .2 **Amended Water:** Water with a non-ionic wetting agent added to reduce water tension to allow wetting of fibres.
- .3 **Asbestos-Containing Material (ACM):** Materials identified under Site Conditions including fallen materials and settled dust.
- .4 **Asbestos or Hazardous Building Materials Contaminated Waste:** Materials identified under Site Conditions that have been removed as specified including fallen materials, debris, rubble, and settled dust, and materials and/or equipment deemed to be contaminated under this specification and/or by the Departmental Representative.
- .5 **Asbestos or Hazardous Building Materials Work Area(s):** Area(s) where work takes place which will or may disturb asbestos containing material or other hazardous building materials, including fallen material or settled dust that may contain asbestos.
- .6 **Authorized Visitor(s):** Departmental Representative, Consultant or person(s) representing regulatory agencies, and person(s) authorized by them.
- .7 **Competent Worker:** in relation to specific work, means a worker who:
 - .1 Is qualified because of knowledge, training and experience to perform the work.
 - .2 Is familiar with the applicable laws and with the provisions of the regulation that apply to the work.
 - .3 Has knowledge of all potential or actual danger to health and safety in the work.
 - .4 Has successfully completed a two day asbestos abatement course approved by Alberta ministry of Jobs, Skills, Training and Labour, and is issued a training card, if the worker will enter a restricted area.
- .8 **Curtained doorway:** arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:
 - .1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway.
 - .2 Reinforce free edges of polyethylene with duct tape and weight bottom edge to ensure proper closing.
 - .3 Overlap each polyethylene sheet at openings not less than 1.5 m on each side.
- .9 **Department:** Public Works and Government Services Canada (PWGSC).
- .10 **Departmental Representative:** A PWGSC employee or its designated consultant.

- .11 **DOP/PAO Test:** A testing method used to determine the integrity of the negative pressure unit using dioctyl phthalate (DOP) or poly alpha olefin (PAO) HEPA filter leak test.
- .12 **Fitting:** Individual segments of a mechanical service line which may include hangers, tees, elbows, joints, valves, unions, etc.
- .13 **Friable Material:** Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered during removal.
- .14 **Glovebag:** Prefabricated polyvinylchloride Glovebag with a minimal thickness of 0.25 mm with integral gloves and elastic ports, equipped with a reversible double pull throw zipper on top, securing straps and an internal closure strip if intended to be used at multiple locations.
- .15 **Ground Fault Panel:** Portable electrical panel equipped with ground fault circuit interrupters (5 mA protection) of sufficient capacity to power all electrical equipment and lights in asbestos work enclosure. Panel complete with ground fault interrupter lights, test switch to ensure unit is working, and reset switch. Panel is to be installed by licensed technician and meet applicable CSA standards.
- .16 **Hazardous Building Material:** Materials identified under Site Conditions including fallen materials and settled dust.
- .17 **HEPA Filter:** High Efficiency Particulate Aerosol filter at least 99.97 percent efficient in collecting 0.3 micrometer aerosol.
- .18 **HEPA Vacuum:** HEPA filtered vacuum with all necessary fittings, tools and attachments. Air must pass HEPA filter before discharge.
- .19 **Knife:** Knife with fully retractable blade for use inside glove bag.
- .20 **Negative Pressure:** Reduced pressure within specified work area(s) established by extracting air directly from work area, and discharging directly to exterior of building. Discharged air first passes through HEPA filter. Extract sufficient air to ensure constant reduced pressure at perimeter of work area with respect to surrounding areas. Air volume extracted should be sufficient to provide four (4) air changes per hour and maintain a reduced pressure of 5 Pascals (0.02 inches water column) within the work area in relation to the surrounding areas.
 - .1 Negative pressure system shall be equipped with an instrument to continuously monitor and automatically record pressure differences.
- .21 **Negative Air Unit:** Portable air handling system, which extracts air directly from asbestos work area and discharges air outside building. Unit shall be fitted with pre-filter and HEPA final filter. Air shall pass HEPA filter before discharge. Unit shall have pressure differential gauge to monitor filter loading. Unit shall have warning system for HEPA filter failure. HEPA filter shall have separate hold down clamps to retain filter in place.
- .22 **Non-Friable Materials:** material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

- .23 **Occupied Area:** Any area of the site building or work site that is outside the work area.
- .24 **Polyethylene sheeting sealed with tape:** polyethylene sheeting of type and thickness specified sealed with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through sheeting into clean area.
- .25 **Presumed Asbestos-Containing Material (PACM):** Materials presumed to contain asbestos as identified under Site Conditions including fallen materials and settled dust. Materials are considered PACM as limited or no sampling and analytical testing of these materials was completed.
- .26 **Restricted Area:** an area of a work site where there is reasonable chance of the concentration of airborne asbestos exceeding the eight-hour Occupational Exposure Limit.
- .27 **Securing Straps:** For glove bag, reusable nylon straps at least 25 mm (1") wide with metal tightening buckle for sealing ends of bags around pipe and/or insulation.
- .28 **Sprayer:** Garden reservoir type portable manual sprayer or airless spray equipment capable of producing mist or fine spray. Must be of appropriate capacity for scope of work.

1.9 REGULATIONS AND GUIDELINES

- .1 Comply with, the most stringent requirements of Provincial Building Code, National Building Code as well as Federal, Provincial, Territorial and local requirements, with specified standards and codes and this specification. Work shall be performed under regulations in effect at the time work is performed.
- .2 Provide necessary notices, obtain permits and pay all fees, in order that work specified may be carried out. Charges and alterations required by authorized inspector of any authority having jurisdiction, to be carried out
- .3 Alberta Occupational Health and Safety Code, 2009.
- .4 Alberta Asbestos Abatement Manual, October 2012.
- .5 Alberta Occupational Health and Safety Bulletin. Lead at The Work Site, November 2013.
- .6 The Contractor shall ensure that:
 - .1 Measures and procedures prescribed under the Health and Safety Act and regulations are carried out.
 - .2 Every employee and every worker under their control complies with applicable Acts and Regulations.
 - .3 Health and Safety of workers and public are protected.
 - .4 Policies and procedures of the Departmental Representative are complied with including site specific safety, health and environment requirements.

- .5 Notify sanitary landfill or waste disposal site as per Municipal and Provincial/Territorial requirements.
- .7 Laws of the Province of Alberta shall govern this work. The Contractor shall observe all such laws and shall obtain and/or pay all permits, notices, fees, taxes, duties as may be required. Likewise, it is the responsibility of the contractor to comply with Occupational Health and Safety Act and applicable regulations.
- .8 If no regulations exist, follow guidelines most widely accepted by recognized professional organizations such as occupational hygienists, health professionals or environmental engineers as listed in References.

1.10 **QUALITY ASSURANCE**

- .1 Ensure work proceeds to schedule and meets all requirements of this section.
- .2 Perform work so airborne contaminants or wastewater run-off does not contaminate areas outside specified work areas.
- .3 Any contamination of surrounding areas, indicated by visual inspection or air monitoring, shall necessitate the enclosure of these areas and complete cleanup of affected areas in same manner as that applicable to work areas, at no cost to the Department. The Departmental Representative shall be notified as soon as possible following such an occurrence and informed of the measures being implemented to correct the situation.
- .4 Pay cost to Departmental Representative of inspection and air monitoring performed as result of failure to perform work satisfactorily.
- .5 Protect and maintain work until work has been completed and accepted. Protect work against damage during installation. Repair all damage to existing facilities without expense to Department.
- .6 Coordinate work with other sections to avoid conflict and ensure proper installation of all materials.
- .7 On completion of work, remove all tools, surplus and waste material and leave work in a clean condition.
- .8 Use only skilled and qualified workers for all trades required for this work.

1.11 **SUBMITTALS**

- .1 The Contractor shall ensure that the following has been submitted to the Departmental Representative prior to commencing work:
 - .1 Contractor health & safety records.
 - .2 Before commencing any work, Contractor shall submit, in writing, confirmation of good standing with Worker's Compensation Board.
- .2 The Contractor shall ensure that the following has been submitted to the Departmental Representative at least seven (7) days prior to commencing work:

- .1 Proof that notification of asbestos work has been submitted to the Occupational Health and Safety province-wide Contact Centre 72 hours before workers may be exposed to airborne fibres, or the start of clean site preparation, whichever comes first.
- .2 Necessary permits for transportation and disposal of asbestos waste. Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to receive and properly dispose of asbestos waste.
- .3 Provide a written plan indicating the methods of waste containment during transportation of removed hazardous materials from the site to the designated waste disposal location for acceptance by the Departmental Representative.
- .4 Names of supervisory personnel who will be responsible for the specified work area(s).
- .5 Satisfactory proof that supervisory personnel have received adequate training and have performed supervisory function on at least two other projects of similar nature.
- .6 Satisfactory proof that every worker has had instruction and training in the hazards of asbestos and other hazardous building materials (as appropriate), in personal hygiene and work practices, and in the use, cleaning, and disposal of respirators and protective clothing.
- .7 Satisfactory proof that every worker who will enter a restricted area has successfully completed a two day asbestos abatement course approved by Alberta Ministry of Jobs Skills Training and Labour, and has a valid training card.
- .8 A proposed schedule showing phasing and proposed workforce related to each work area enclosure or removal operation.
- .9 Negative air unit performance data and results of DOP/PAO test as required.
- .10 Recording manometer calibration data as required.
- .11 Documentation for materials used in the course of the project including MSDS sheets or other data documenting compliance with specifications for such materials as, but not limited to sealants, encapsulants, wetting agents, and polyethylene sheeting.
- .12 Provide a written emergency access/egress plan for the work area for acceptance by the Departmental Representative.
- .13 Provide a written visitor entrance procedure for the work area for acceptance by Departmental Representative.
- .14 If requested, submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative on a weekly basis.
- .15 Copies of any reports or directions issued by Federal and Provincial health and safety inspectors.
- .16 Copies of incident and accident reports.

- .17 Manifests, waybills, bills of lading etc. as applicable for each type of waste on completion of the work or as requested by the Departmental Representative.

1.12 SUPERVISION

- .1 A minimum of one (1) supervisor is required for every ten (10) workers unless otherwise approved by the Departmental Representative.
- .2 An approved supervisor must remain within the designated work area at all times during the disturbance, removal, or other handling of hazardous materials.
- .3 Site supervision must only be replaced by approved replacement on approval by the Departmental Representative. The Departmental Representative reserves the right to request the replacement of the supervisor without explanation.

Part 2 Products

2.1 MATERIALS

- .1 Materials and equipment specified and acceptable manufactures are named in this specification for the purposes of establishing the standard of materials and workmanship to which the Contractor shall adhere. Tender price shall be based on the use of materials and equipment as specified.
- .2 **Encapsulant:** Type 2 surface film forming or Type 1 penetrating type Class A water based conforming to CAN/CGSB-1.205 and approved by the Fire Commissioner of Canada. Encapsulant used to meet requirements for fire resistance, flame spread or acoustical characteristics as required. Accepted material and approved manufactures include Bakor, Childers and Fosters.
- .3 **Flexible ducting:** Metal reinforced flexible ductwork, 300 mm (12") diameter minimum.
- .4 **Polyethylene Sheeting:** 0.15 mm (6 mil) minimum thickness unless otherwise specified. Sheet size shall be such to minimize joints.
- .5 **Protective Coveralls:** Disposable full body coveralls complete with elasticized hoods made of spun polyolefin material or non-woven material and must be rated for asbestos and lead abatement applications by the manufacturer.
- .6 **Rip-Proof Polyethylene:** 0.15 mm (6 mil) woven fibre reinforced fabric bonded both sides with polyethylene. Sheet size shall be such to minimize joints.
- .7 **Sealer (Lock down agent):** Sealer for purpose of trapping residual fibre debris. Product must have flame spread and smoke development ratings both less than 25. Product, such as TC-55 (clear) or equivalent, shall leave no stain when dry. For mechanical equipment, pipes, boilers, etc. use high temperature sealer only, such as Chil-Abate CP210 or equivalent.
- .8 **Tape:** Tape suitable for sealing polyethylene to surface encountered under both wet conditions using amended water, and dry conditions. Standard of acceptance, Nashua 300 polyethylene coated cloth tape, Tyco Adhesives, or equivalent.
- .9 **Waste Containers:** contain waste in two separate containers.

- .1 Inner container: 0.15 mm (6 mil) thick sealable polyethylene bag or where glove bag method is used, glove bag itself.
- .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm (6 mil) thick sealable polyethylene bag.
- .3 Containers must be acceptable to disposal site selected and the Ministry of Environment. Other containers may be acceptable as approved by the Departmental Representative.
- .4 Labelling requirements: affix preprinted cautionary asbestos warning, that is visible when ready for removal to disposal site. Label in both official languages if required.
- .5 Labelling shall be as per the following:

CAUTION CONTAINS [ASBESTOS FIBRES or WASTE NAME] (25 mm high)
Do Not Mishandle (19 mm high).

- .10 **Wetting Agent:** Non-foaming surface active agent; mixed with water in concentration to provide thorough wetting of asbestos fibre: Standard of acceptance, Asbesto-Wet, or equivalent.

Part 3 **Waste Management and Disposal**

3.1 GENERAL REQUIREMENTS AND PROCEDURES

- .1 Separate waste materials for recycling as required.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Provincial/Territorial and Municipal regulations. All hazardous materials shall be shipped from the site to an approved and licensed recycling or disposal facility and transported by a licensed hauler.
- .4 Check with landfill operator or waste disposal site to determine type of waste containers acceptable.
- .5 Ensure shipment of containers to landfill or waste disposal site is by a waste hauler properly licensed to transport the specified waste materials.
- .6 The Contractor shall ensure that all waste is contained and transported in accordance with the written plan prepared by the Contractor and approved by the Departmental Representative
- .7 Transportation of all waste and materials through occupied areas shall be covered and must never be left unattended. Clean-up waste route and loading area after each load. Use appropriate worker protection as required.
- .8 All waste containing hazardous materials removed as part of this specification must be removed from the work area at the end of each work shift unless approved by the Departmental Representative.

- .9 Each load requires completion of bill of lading showing type and weight of hazardous waste being transported. Provide proof (copies of all waste manifests or other approved documentation) of proper disposal to the Departmental Representative on a weekly basis (at a minimum) and on completion of the project.
- .10 Cooperate with Provincial/Territorial or Federal inspectors and immediately carry out instructions for remedial work at landfill or waste disposal site to maintain environment, at no additional cost to the Departmental Representative.
- .11 Ensure landfill or waste facility operator is fully aware of substances being disposed.
 - .1 The Contractor shall dispose of all waste at the facility indicated in their submittal documentation and approved by the Departmental Representative.
 - .2 Lead and materials with lead-containing paint must be disposed of at a Class 1 and/or Class 2 landfill as specified.
 - .3 Asbestos waste must be disposed of at a Class 1 or Class 2 landfill which is approved to accept asbestos waste by the Local Board of Health and/or Alberta Environment.
 - .4 The Contractor shall dispose of all other waste streams at the facility indicated in their submittal documentation and approved by the Departmental Representative.
- .12 Ensure that containers used for disposal are locked and covered at all times.

Part 4 **Inspection and Air Monitoring**

4.1 GENERAL INSPECTION

- .1 The following general inspection specifications shall be followed for all abatement activities.
- .2 From commencement of work until completion of clean-up operations, the Departmental Representative is to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos and other work area(s).
- .3 The Departmental Representative is empowered to shut-down all work activities when leakage of asbestos or other hazardous building materials from the work area has occurred or is likely to occur.
- .4 The Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Department.
- .5 If the designated work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Department.
- .6 The Contractor is to pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.
- .7 The Contractor is to provide written notice to the Departmental Representative of any request for scheduling milestone inspections.

- .8 Do not proceed with next phase of work until written approval of each inspection is received from the Departmental Representative.

4.2 GENERAL AIR MONITORING

- .1 The following general air sampling specifications shall be followed for all projects.
- .2 Baseline air sampling shall be performed prior to the start of site preparations.
- .3 Air sampling may include occupational and area samples including those areas within and immediately adjacent to each work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Project Coordinator, applicable Health & Safety Officer and the Contractor.
- .4 All air samples must be collected and analysed in accordance with Provincial/Territorial Regulations and Guidelines.
- .5 If air monitoring or visual inspection indicates that areas outside current work area enclosures are contaminated above the designated action level of one half the Occupational Exposure Limit, clean these areas in same manner as that applicable to asbestos work areas, at no cost to Department.
- .6 If air monitoring in work areas shows that removal procedures are not sufficient to maintain airborne levels of specified substances below that appropriate for the level of personal protective equipment employed by the Contractor, all work is to stop within the work area and removal procedures re-assessed.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following work:
 - .1 Generally low risk asbestos abatement specifications shall apply to activities that pose a low risk of exposure to airborne asbestos.
 - .2 Removing non-friable asbestos-containing materials, other than ceiling tiles, if the material can be removed without being broken, cut, drilled, abraded, ground, sanded or vibrated.
 - .3 Break, cut, grind, sand, drill, scrape, vibrate or abrade non-friable asbestos containing materials using non-powered hand-held tools, and the material is wetted to control the spread of dust or fibres.
 - .4 Removing or disturbing less than 1 m² of gypsum wallboard in which asbestos-containing joint-filling compounds have been used.
 - .5 This specification shall apply to the removal of asbestos-containing floor tiles and mastic from 151 Cave Avenue unless an acceptance from Section 34 of the Occupational Health and Safety Code is obtained by the contractor from the Alberta ministry of Jobs, Skills, Training and Labour.
 - .6 Asbestos containing exterior parging located at 549 Deer Street.

1.2 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person shall provide instruction.
- .2 **Respirators:** Provide appropriate respiratory equipment for all persons entering asbestos work area including authorized visitors. The following shall apply to the use of respirators for Low risk activities:
 - .1 During Low risk removal all workers, supervisors, and authorized visitors should wear, at minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements.
 - .2 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed as asbestos waste.
 - .3 Respiratory protective equipment used shall be approved by NIOSH or by another standards setting and equipment testing organization, or combination of organizations, approved by a Director of Occupational Hygiene under Section 246 of the Alberta Occupational Health and Safety Code.
 - .4 Provide instruction to workers and visitors in use of respirators including qualitative or quantitative fit testing.
 - .5 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
 - .6 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be provided to and reviewed with each worker who is required to wear a respirator.

- .7 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.
- .8 Maintain respiratory protection equipment in proper functioning and clean condition. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors in asbestos work area with:
 - .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls are to be provided by the employer and worn by every worker who enters the work area. Coveralls are to consist of a head covering and full body covering that covers the feet and fits snugly at the wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing. If the use of coveralls that cover the feet creates a slip hazard, coveralls that fit snugly at the ankles may be used in conjunction with dedicated footwear.
 - .2 Once coveralls are worn in the asbestos work area, treat and dispose as asbestos contaminated waste.
 - .3 Workers and visitors shall also wear other body protection and safety equipment appropriate to other hazards present at the worksite.
 - .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.
- .4 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.
- .5 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.
- .6 Before entering asbestos work area(s), don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access area(s) or asbestos work area(s).
- .7 Persons leaving asbestos work area(s) shall:
 - .1 HEPA vacuum or wet wipe clothing and respirator prior to leaving the asbestos work area.
 - .2 Remove contaminated coveralls and place in receptacles for disposal with other asbestos-contaminated materials prior to leaving the asbestos work area.
 - .3 Still wearing appropriate respirator, proceed out of the established asbestos work area to the decontamination facility.
 - .4 Clean using soap and warm water wash and remove respirator then thoroughly wash hands and face. Remove filters and dispose as asbestos waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator.
 - .5 Upon completion of asbestos abatement, dispose of footwear as contaminated waste or clean before removing from equipment and access room, or carry in sealed plastic bag to next site.
- .8 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.

- .9 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the asbestos work area. Procedures shall be in both official languages.
- .10 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
- .11 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

Part 2 Preparation

2.1 SITE PREPARATION

- .1 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.
- .2 Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.
- .3 Erect appropriate worker and waste decontamination facilities at locations approved by the Departmental Representative.
- .4 Complete isolation measures between the asbestos work area and occupied areas using tape barriers, saw-horses, or other barriers, or by closing any door, windows, etc. at the perimeter of the Asbestos Work area.
- .5 Install worker decontamination facilities at locations approved by the Departmental Representative.
- .6 Set-up clear warning signs at each entry point to the work area and at a distance from the work area if required. Signs shall be in both official languages (if required) and shall read (unless otherwise approved):

CAUTION

Asbestos Dust Hazard

Avoid Breathing Dust

Wear Protective Equipment

Breathing Asbestos Dust May
Cause Cancer

Entry is Prohibited
Except to Authorized Persons

Eating, Drinking and Smoking
are Prohibited in this Area

- .7 Clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.

- .8 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.
- .9 If appropriate, use polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.
- .10 Locate required tools, equipment, and waste receptors within the asbestos work area.
- .11 Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remaining areas of building. Provide ground fault electrical system in accordance with applicable CSA standard prior to applying water to asbestos-containing materials. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
- .12 Provide temporary lighting in asbestos work area to levels that will permit work safely.
- .13 Provide fire extinguisher at the asbestos work area. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Departmental Representative.

2.2 WORKERS' DECONTAMINATION FACILITIES

- .1 Set-up an isolated worker decontamination area adjacent to the asbestos work area consisting of a HEPA filtered vacuum, bucket of warm water, soap, rags, and disposal container for asbestos contaminated disposable coveralls.

Part 3 Execution

3.1 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL:

- .1 Arrangements have been made for disposal of waste.
- .2 Asbestos work areas are effectively segregated.
- .3 Tools, equipment and waste materials receptors are on hand.
- .4 Arrangements have been made with the Departmental Representative for work area security.
- .5 Signs are displayed in areas where access to asbestos work area is possible.
- .6 The Departmental Representative has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 ASBESTOS-CONTAINING MATERIAL REMOVAL

- .1 Before removing asbestos, prepare site as described previously.
- .2 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the asbestos work area.
- .3 Pre-clean / remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.

- .4 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
- .5 Do not use compressed air to clean up or remove dust from any surface.
- .6 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
- .7 Spray using sprayer or otherwise wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.
- .8 Remove the saturated asbestos-containing material in small sections with minimal breakage and place directly into waste containers. Do not allow saturated asbestos to dry out or fall to the floor. As it is being removed, pack the material in sealable polyethylene bags or other appropriate sealable container and place in labelled containers for transport.
- .9 When removing materials adhered to substrate with mastic or other adhesives, mastic or adhesive is to be scraped smooth with the substrate surface unless otherwise directed by the Departmental Representative.
- .10 Perform work to reduce dust creation to lowest levels practicable.
- .11 Frequently and at regular intervals during work and immediately on completion of work:
 - .1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and
 - .2 Drop sheets to be wetted and placed in a waste container as soon as practicable.
- .12 If required, apply sealer to all surfaces of from which asbestos-containing materials have been removed.
- .13 If required, apply heavy coat of encapsulant to exposed ends of asbestos material to remain.
- .14 Cleanup:
 - .1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.
 - .2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.
 - .3 Seal waste bags and remove from site. Dispose in accordance with requirements of Provincial/Territorial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that the appropriate guidelines and regulations for asbestos disposal are followed.
 - .4 Perform final thorough clean-up of work areas and adjacent areas affected by work using HEPA vacuum.

Part 4 Decommissioning

4.1 Dismantling Of Protection

- .1 A final review will be carried out by the Departmental Representative to confirm that no dust or debris remains and that the required work has been completed. Air monitoring may be considered as part of the final review at the discretion of the Departmental Representative.
- .2 On written approval of the Departmental Representative, the Contractor may proceed with final dismantling of the asbestos work area.

Part 5 Inspection and Air Monitoring

5.1 Inspection

- .1 From commencement of work until completion of clean-up operations, the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- .2 The Departmental Representative will inspect both inside and outside the work area during active abatement.
- .3 The Departmental Representative is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.
- .4 The Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Department.
- .5 If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Department.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.2 Air Monitoring

- .1 Baseline air sampling (two samples) shall be performed prior to the start of site preparations.
- .2 Air sampling may be performed within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Departmental Representative, the Contractor for the Project (if present) and the Abatement Contractor.
- .3 All air samples must be collected in accordance with NIOSH Analytical Method 7400.
- .4 If air monitoring or visual inspection indicates that areas inside or outside the asbestos work area are contaminated above the action level of 0.05 fibres/mL , clean these areas in same manner as that applicable to asbestos work areas and review work procedures, at no cost to the Department.

- .5 If air sampling by Departmental Representative show that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of asbestos work area.
- .6 The air clearance concentration must not exceed 0.01 fibres/mL unless otherwise approved by the Departmental Representative.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- 1.1** Generally Moderate Risk or moderate risk asbestos abatement specifications shall apply to the removal or disturbance of less than 1 m² of friable asbestos containing materials located outside a Type 3 and can not be effectively removed using Moderate Risk Glovebag procedures.
- 1.2** This specification applies to the removal of gypsum board joint compound from 151 Cave Avenue.
- 1.3** This specification shall apply to the removal of vinyl sheet flooring and mastic from 549 Deer Street.
- 1.4** This specification shall apply to the removal of plaster in the stairwell of 151 Cave Avenue.

1.2 WORKER AND VISITOR PROTECTION

- .1 Instructions:** Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person, as defined by Ontario Occupational Health and Safety Act (OHSA), shall provide instruction.
- 1.5 Respirators:** Provide appropriate respiratory equipment for all persons entering asbestos work area enclosure including authorized visitors. The following shall apply to the use of respirators for Moderate Risk activities:

Workers, supervisors, and authorized visitors shall wear, at a minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements. Use of other types of respiratory protection can only be used on written approval by the Departmental Representative.

Where airborne fibre levels are expected to be greater than 1 fibres/ml, minimum powered air-purifying full-face respirator (PAPR) with P-100 filter cartridges shall be used.

Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed as asbestos waste.

Respiratory protective equipment used shall be approved by NIOSH or by another standards setting and equipment testing organization, or combination of organizations, approved by a Director of Occupational Hygiene under Section 246 of the Alberta Occupational Health and Safety Code.

Provide instruction to workers and visitors in use of respirators including qualitative fit testing.

- .1 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.**

- .2 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be provided to and reviewed with each worker who is required to wear a respirator.

No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.

Maintain respiratory protection equipment in proper functioning and clean condition.

The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.

1.6 Protective Clothing: Provide workers and visitors in asbestos work area with:

- .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls are to be provided by the employer and worn by every worker who enters the work area. Coveralls are to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing.
- .2 Once coveralls are worn in the asbestos work area, treat and dispose as asbestos contaminated waste.
- .3 Workers and visitors shall also wear other body protection and safety equipment appropriate of other hazards present at the worksite.
- .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.

1.7 Before entering full-enclosure or other asbestos work area(s), remove street clothes in clean change room and don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access areas or asbestos work area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.

1.8 To leave the asbestos work area(s), all persons shall:

- .1 HEPA vacuum or wet wipe clothing and respirator prior to leaving the asbestos work area.

Enter the Staging Area, remove contaminated coveralls, and place in receptacles for disposal with other asbestos-contaminated materials.

Still wearing appropriate respirator, proceed to the Clean Room or designated wash area.

Using soap and clean, warm water wash and remove respirator then thoroughly wash hands and face.

1.9 Upon completion of asbestos abatement, dispose footwear as contaminated waste or clean before removing from equipment and access room, or carry in sealed plastic bag to next site.

1.10 Do not eat, drink, smoke or chew gum or tobacco in Asbestos Work Area.

1.11 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.

- 1.12** A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the asbestos work area. Procedures shall be in both official languages.
- 1.13** Maintain one visitor/emergency access kit equipped with a respirator, protective clothing, etc. and post emergency access procedures at the decontamination facility access point to the asbestos work area for use by the Departmental Representative or authorized visitors.
- 1.14** Visitor Protection:
- .1 Provide protective clothing and approved respirators to Authorized Visitors to enter work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

Part 2 **Preparation**

2.1 CLEAN SITE PREPARATION FOR FULL-ENCLOSURE ASBESTOS WORK AREAS

- .1 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.
- 1.15** Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.
- 1.16** Erect appropriate worker and waste decontamination facilities at locations approved by the Departmental Representative.
- 1.17** Complete isolation measures between the asbestos work area and occupied areas. Where required, erect hoarding walls and complete other isolation measures between asbestos work area and occupied areas. The hoarding walls shall be constructed as follows:
- .1 Build walls of 39 mm x 89 mm (2" x 4") wood framing, 400 mm (16") o.c. with continuous top and sill plates. Cover both side walls with polyethylene sheeting.
 - .2 If hoarding walls do not extend to the underside of the ceiling construct a 'roof' to completing isolate the asbestos work area.
 - .3 Construct roof as follows: Size of joists shall be determined by span, loads, use and Building Codes. Use as a minimum 39 mm x 138 mm (2" x 4") joists. Cover joists facing the asbestos work area with one layer of polyethylene sheeting, overlapping the perimeter walls at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls.

- .4 Where required, cover existing wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of polyethylene sheeting. Separately seal floor drains or openings. Use sufficient layers (2) and necessary sheathing for walking surface to protect floors which may be damaged. Cover floors first so that polyethylene extends at least 300 mm (12") up walls then cover walls to overlap floor sheeting.
- 1.18** All wall and horizontal surfaces shall be pre-cleaned using damp cloth or sponge techniques prior to placement of polyethylene sheeting to any wall or floor surfaces. HEPA equipped vacuum cleaners may also be used to perform this task.
- 1.19** Seal off all openings including but not limited to doorways, hatch openings, windows, vents, service holes in walls and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.
- On approval of the Departmental Representative, seal joints and holes in HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene to make airtight.
- 1.20** Establish negative pressure in asbestos work area. Negative pressure units shall have total rated capacity with filters in place sufficient to provide a minimum of four air changes every hour. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area.
- 1.21** Vent units to outside of building. Locate vents to discharge air away from building access points or sidewalks. Discharge vents a minimum of 5 m away from building entrances, open windows or air intakes. Do not discharge air into building interior. The location of venting must be approved by the Departmental Representative.
- 1.22** If requested, leak test negative air units prior to commencement of abatement at operating position, using DOP method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment.
- 1.23** Operate negative pressure units continuously from this time until completion of final air monitoring. Replace pre-filters as necessary to maintain airflow. Maintain negative air pressure of 5 Pascals (0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.
- 1.24** The system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- 1.25** Pre-clean and cover with polyethylene sheeting all items that are to remain within the enclosure during the abatement work including but not limited to motors, heating units, fire apparatus, door closers, fans, tanks, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings within enclosure. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.
- 1.26** Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.
- 1.27** Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remaining areas of building. Provide ground fault electrical system in accordance with applicable CSA standard prior to applying water to asbestos-containing materials. A minimum of one (1) ground fault electrical panel shall be

provided for every 300 m² of asbestos work area. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.

1.28 Provide temporary lighting in asbestos work area to levels that will permit work safely.

1.29 Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of Departmental Representative.

2.2 CLEAN SITE PREPARATION FOR OTHER ASBESTOS WORK AREAS

.1 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the Asbestos Work Area enclosure(s). Ensure air-handling systems remain shut off for duration of work.

.2 Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.

.3 Erect appropriate worker and waste decontamination facilities at locations approved by the Departmental Representative.

.4 Complete isolation measures between the asbestos work area and occupied areas using tape barriers, saw-horses, or other barriers, or by closing any door, windows, etc. at the perimeter of the Asbestos Work area.

.5 Install worker decontamination facilities at locations approved by the Departmental Representative.

.6 Seal off all openings, including but not limited to: doorways, hatch openings, windows, vents, service holes in walls and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.

.7 If necessary, caulk and seal ducts and duct shafts within work area which are to remain in service, as required, to make airtight.

.8 On approval of the Departmental Representative and Departmental Representative, seal joints and holes in HVAC ductwork to remain operational through an Asbestos Work Area, using tape and rip-proof polyethylene to make airtight.

.9 Pre-clean and cover with polyethylene sheeting all items that are to remain within the enclosure during the abatement work including but not limited to motors, heating units, fire apparatus, door closers, fans, tanks, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings within enclosure. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.

1.30 Where required, cover existing wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of polyethylene sheeting. Separately seal floor drains or openings. Use sufficient layers (2) and necessary sheathing for walking surface to protect floors which may be damaged. Cover floors first so that polyethylene extends at least 300 mm (12") up walls then cover walls to overlap floor sheeting.

1.31 Supply sufficient HEPA vacuums on-Site.

- 1.32 If requested, leak test negative air units prior to commencement of abatement at operating position, using DOP method. Provide reports for unit efficiency test results within 48 hours of testing, including calibration certificates for testing equipment.
- 1.33 Operate HEPA vacuums continuously from this time until completion of final air monitoring.
- 1.34 Maintain emergency and fire exits from Asbestos Work Area, or establish alternative exits satisfactory to authorities having jurisdiction.
- 1.35 Ensure existing power supply to the Asbestos Work Area is isolated and disconnected where necessary. Do not disrupt power supply to remaining areas of building. Use GFI extension cords. Provide and install ground fault electrical system. A minimum of one (1) ground fault electrical panel shall be provided for every 300m² of the Asbestos Work Area. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
- 1.36 Provide temporary lighting in Asbestos Work Area to levels that will permit work to be done safely.
- 1.37 Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Departmental Representative.

2.3 DECONTAMINATION ENCLOSURE SYSTEM FOR FULL – ENCLOSURE ASBESTOS WORK AREAS

- .1 Where required by the Departmental Representative, construct worker and waste decontamination facilities at entrance to each asbestos work area as approved by the Departmental Representative. Decontamination Facility shall be comprised of a minimum one room which serves as and air lock as described below.
- 1.38 Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.
- 1.39 **Clean Room:** Build Clean Room to be used as change room (to and from street clothes) with washing facilities for hands and face. Install waste receptor, and storage facilities for worker's shoes and any protective clothing to be re-worn in asbestos work areas. Clean Room shall be large enough to accommodate at least one worker and allow sufficient space to undress comfortably. Room shall also be of sufficient size to accommodate largest item of equipment used and/or two (2) waste containers. Minimum size of room is to be 1.5 square metres with a minimum height of 1.9 m.
- 1.40 **Access Room / Container Cleaning Room:** When requested, build or establish a second chamber to serve as an Access Room / Container Cleaning Room between asbestos work enclosure and Clean Room. Room shall be of sufficient size to accommodate largest item of equipment used and/or two (2) waste containers. Access Room / Container Cleaning Room is to be used for gross removal of dust and debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal, as well as changing out of protective clothing and storage of contaminated protective clothing and equipment. Minimum size of room is to be 1.5 square metres with a minimum height of 1.9m.
- 1.41 **Staging Area:** When a separate Access Room / Container Cleaning Room has not been constructed, the area within the Moderate Risk containment closest to the entranceway shall be considered the Staging Area. The Staging Area shall be used for gross removal of dust and

debris from waste containers and equipment, labelling and sealing of waste containers, and temporary storage pending removal.

- 1.42** Where a separate clean room is not required by the Departmental Representative, a designated wash-up area must be provided within the work area. The wash-up area must be supplied with a HEPA filtered vacuum, wash basin with clean, warm water, soap, rags or towels, a disposal container for asbestos contaminated disposable coveralls and storage facilities for worker's shoes and any protective clothing to be re-worn in asbestos work areas.

2.4 CONSTRUCTION OF DECONTAMINATION ENCLOSURES (WHERE REQUIRED)

- .1 Floor:** Prior to erecting wall framing, lay one (1) sheet of rip-proof polyethylene sheeting over floor area to be covered by enclosures. The floor sheeting should extend at least 600 mm (24") beyond the outside perimeter of the planned enclosure on all sides. After the construction of the enclosure walls, wrap the excess floor sheeting up the outside of the enclosure, overlapping the polyethylene sheeting covering perimeter walls. Provide second layer of rip-proof polyethylene to all floors, extending 600 mm up inside of enclosure walls.
- 1.43 Walls:** Build load-bearing walls of 39 mm x 89 mm (2" x 4") wood framing, 400 mm (16") o.c. with continuous top and sill plates. Cover both sides of walls with polyethylene sheeting.
- 1.44 Roof:** Size of joists shall be determined by span, loads, use and Code. Use as a minimum 39 mm x 89 mm (2" x 4") joists. Cover with two (2) layers of rip-proof polyethylene, overlapping the perimeter walls by at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls. At underside of joists install one (1) layer of polyethylene sheeting.
- 1.45 Doorways:** Build curtain doorways designed so that when workers or drums and equipment move through doorway, one (1) of two (2) barriers comprising doorway always remains closed.

2.5 MAINTENANCE OF ENCLOSURES

- .1** Maintain enclosures and work areas in tidy condition. Thoroughly clean decontamination facilities at the end of each work shift.
- 1.46** Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
- 1.47** Visually inspect enclosures and work areas at beginning and end of each working period.
- 1.48** The negative air system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- 1.49** Use smoke methods to test the effectiveness of the isolation barriers when directed by the Departmental Representative.

Part 3 Execution

3.1 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL:

- .1** Arrangements have been made for disposal of waste.
- 1.50** Asbestos work areas and decontamination enclosures are effectively segregated.

- 1.51 Negative pressure equipment is operating continuously (where required).
- 1.52 Tools, equipment and waste materials receptors are on hand.
- 1.53 Arrangements have been made with Departmental Representative for work area security.
- 1.54 Signs are displayed in areas where access to sealed asbestos work area is possible. Signs shall be in both official; languages and shall read:

CAUTION (25 mm high)

Asbestos Hazard Area (19 mm high)

Unauthorized Entry Prohibited (19 mm high)

Wear Assigned Protective Equipment (19 mm high)

Breathing Asbestos Dust May Cause Serious Bodily Harm (19 mm high).

- 1.55 The Departmental Representative has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 CONTAMINATED SITE PREPARATION

- .1 Before performing any contaminated work, prepare site as previously described.
- 1.56 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.
- 1.57 Seal holes or penetrations to provide airtight enclosure around asbestos work area(s).
- 1.58 Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene and tape.

3.3 ASBESTOS-CONTAINING MATERIAL REMOVAL OR HANDLING

- .1 All individuals involved with any portions of the removal or handling process shall be equipped with appropriate respirators and protective equipment while working within the enclosure.
- .2 Clean and protect from damage all ceiling and wall components that are to remain including but not limited to furring, channels, hangers, wires and clips.
- .3 Before removing suspended ceilings, remove friable material on upper surfaces using HEPA vacuum equipment.
 - .1 Remove and clean surfaces of ceiling panels using HEPA vacuum, wrap clean panels in 0.10 mm thick polyethylene, and store in building as directed by Departmental Representative.
 - .2 Clean "T" grid suspension system.
- .4 Spray asbestos-containing materials with amended water using airless spray equipment. Dampen asbestos to prevent release of airborne fibres during removal or handling.
- 1.59 Where required, remove the saturated asbestos-containing material in small sections and place directly into waste containers. Do not allow saturated asbestos to dry out or fall to the floor.

- 1.60** If asbestos debris falls to the floor or drop sheet, spray asbestos debris on floor with amended water to prevent it from drying out and immediately remove from the floor or drop sheet and put in waste containers.
- 1.61** Perform work to reduce dust creation to lowest levels practicable.
- 1.62** Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.
- 1.63** After completion of removal of asbestos-containing materials, clean surfaces from which asbestos has been removed with stiff bristle brushes, vacuum, or wet-sponge (as appropriate) to remove all visible material.
- 1.64** Remove asbestos waste containers and decontaminated equipment and materials from the asbestos work area through the decontamination enclosure as follows:

In the Staging Area, remove gross contamination from the surface of the item to be removed. The item shall then be cleaned, wet wiped, and double bagged and/or sealed in polyethylene prior to transferring to a second worker present in the Clean Room. Wash water shall be treated as asbestos-contaminated waste.

The worker present in the Clean Room shall transfer the clean items outside the waste decontamination enclosure. Workers present in the work enclosure must not leave the asbestos work area until decontaminating as specified in Para. 1.3 of this section.

Treat all removed materials exposed to asbestos, as asbestos-contaminated waste unless such materials can be properly decontaminated and are specified to be re-used.

- 1.65** Apply approved encapsulate to all exposed edges of the ACM, including around ceiling hangers and screw holes.
- 1.66** After removing all visible asbestos, wet clean entire work area including but not limited to pipes, pipefittings, ducts, and similar items not covered with polyethylene sheeting and request visual inspection and acceptance.
- 1.67** Following inspection and acceptance, apply heavy coat of slow drying sealer to all surfaces from which asbestos has been removed. Apply thinned coat (sufficient to coat all surfaces) to interior of polyethylene enclosure. The work area shall not be disturbed for a minimum of 12 hours after application of sealer. If present, operate negative air units during this period.

Part 4 Decommissioning

4.1 DISMANTLING OF PROTECTION

- .1** All containment structures, such as hoardings, platforms, etc., which are used to segregate the work area, are to remain in place until directed by the Departmental Representative.
- 1.68** A final review may be carried out by the Departmental Representative to ensure that no dust or debris remains and that the required work has been completed. Air monitoring may be considered as part of the final review at the discretion of the Departmental Representative.
- 1.69** On written approval of the Departmental Representative, the Abatement Contractor may proceed with final dismantling of enclosures affected by asbestos abatement as follows.

- 1.70** Remove polyethylene sheeting exposed during contaminated work including upper surfaces plus any underlying sheeting contaminated by water leaks, rips, tears, or exposed by failure of upper layer. Wear appropriate respirator and disposable coveralls during removal of sheeting. Carefully roll sheeting away from walls to centre of asbestos work area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.
- 1.71** Place polyethylene sheeting, seals, tape, cleaning material, clothing, and other contaminated waste in asbestos waste receptors for transport. Remove with HEPA vacuum any debris which may have fallen behind sheeting.
- 1.72** Remove hoardings, temporary lighting, equipment and facilities provided for asbestos work which are not to be used by other trades.
- 1.73** Complete final general cleaning of worksite and ensure no dust and debris remain.

Part 5 **Inspection and Air Monitoring**

5.1 INSPECTION

- 1.1** From commencement of work until completion of clean-up operations, the Departmental Representative is empowered by the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- 1.74** The Departmental Representative may inspect both inside and outside the work area during active abatement or disturbance.
- 1.75** The Departmental Representative is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.
- 1.76** The Abatement Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Abatement Contractor shall make good on any work disturbed by the inspection at no cost to the Departmental Representative.
- 1.77** If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Departmental Representative.
- 1.78** Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.
- 1.79** Provide a minimum of 24 hours written notice to the Departmental Representative of any request for scheduling milestone inspections or transportation of asbestos waste through an occupied area.
- 1.80** The following milestone inspections are to take place during work:

Clean Site Preparation: Inspection of site preparations and set-up prior to contaminated work.

Visual Clearance: Inspection of asbestos work area after removal of asbestos but before the application of sealer.

Final Air Sampling Clearance: Inspection and air sampling after application of sealer but prior to the removal of hoarding and perimeter seals from within the asbestos work area.

Department Representative Joint Visual Clearance: Inspection of asbestos work area by Departmental Representative and Contractor's site supervisor following Final Air Sampling Clearance but before the removal of hoarding and perimeter seals from within the asbestos work area.

- 1.81** Do not proceed with next phase of work until written approval of each inspection is received from the Departmental Representative.

5.2 AIR MONITORING

- .1 Baseline air sampling (two samples) shall be performed prior to the start of site preparations.
- .2 Air sampling shall be performed within and immediately adjacent to each active asbestos work area (downwind in the case of outdoor work). Results obtained from all test monitoring shall be posted at the work site and provided to the Departmental Representative, the Contractor for the Project (if present) and the Abatement Contractor.
- .3 The following air sampling shall be completed during the project:
 - Baseline air sampling (minimum two) prior to start of site preparations.
 - On days when active abatement is conducted, minimum of one personal air sample on worker(s) engaged in abatement activities.
 - On days where active abatement is conducted, minimum of one air sampling at perimeter of the work area (downwind for outdoor work).
 - One final air clearance sample at the completion of project.
- .4 All air samples must be collected in accordance with NIOSH Analytical Method 7400.
- .5 If air monitoring or visual inspection indicates that areas inside or outside the asbestos work area are contaminated above the action level of 0.05 fibres/mL (one half of the occupational exposure limit), clean these areas in same manner as that applicable to asbestos work areas and review work procedures, at no cost to Department.
- .6 If final air sampling by Departmental Representative show that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of asbestos work area.
- .7 The air clearance concentration shall not exceed 0.01 fibres/mL unless otherwise approved by the Departmental Representative

END OF SECTION

Part 1. General

1.1 SUMMARY

- .1 Moderate risk glovebag asbestos abatement specifications shall apply to the removal of asbestos-containing mechanical insulation outside of a sealed moderate risk or high risk enclosure.
- .2 This specification shall apply to the removal of insulation from pipe elbows in the mechanical room located at 549 Deer Street.

1.2 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person shall provide instruction.
- .2 **Respirators:** Provide appropriate respiratory equipment for all persons entering asbestos work area including authorized visitors. The following shall apply to the use of respirators for moderate risk glovebag activities:
 - .1 During glovebag removal all workers, supervisors, and authorized visitors shall wear, at minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements.
 - .2 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed of as asbestos waste.
 - .3 Respiratory protective equipment used shall be approved by NIOSH or by another standards setting and equipment testing organization, or combination of organizations, approved by a Director of Occupational Hygiene under Section 246 of the Alberta Occupational Health and Safety Code.
 - .4 Provide instruction to workers and visitors in use of respirators including qualitative or quantitative fit testing.
 - .5 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
 - .6 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be provided to and reviewed with each worker who is required to wear a respirator.
 - .7 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.
 - .8 Maintain respiratory protection equipment in a proper functioning and clean condition. The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, is to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors in asbestos work area with:

- .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls are to be provided by the employer and worn by every worker who enters the work area. Coveralls are to consist of a head covering and full body covering that covers the feet and fits snugly at the wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing. If the use of coveralls that cover the feet creates a slip hazard, coveralls that fit snugly at the ankles may be used in conjunction with dedicated footwear.
- .2 Once coveralls are worn in the asbestos work area, treat and dispose as asbestos contaminated waste.
- .3 Workers and visitors shall also wear other body protection and safety equipment appropriate to other hazards present at the worksite.
- .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.
- .4 Do not eat, drink, smoke or chew gum or tobacco in asbestos work area.
- .5 At no time shall the Contractor use existing furnishings or mechanical equipment (including piping) to support personal.
- .6 Before entering asbestos work area(s), don appropriate respirator with new or tested filters, new disposable coveralls and head covers and all other appropriate personal protective equipment before entering asbestos work area.
- .7 To leave the asbestos work area(s), all persons shall:
 - .1 HEPA vacuum or wet wipe clothing and respirator prior to leaving the asbestos work area.
 - .2 Remove contaminated coveralls, and place in receptacles for disposal with other asbestos-contaminated materials.
 - .3 Still wearing appropriate respirator, proceed to the Worker Decontamination Facility.
 - .4 Clean using soap and warm water wash and remove respirator then thoroughly wash hands and face. Remove filters and dispose as asbestos waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose filters as necessary. Wet clean inside of respirator.
- .8 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.
- .9 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the asbestos work area. Procedures shall be in both official languages (if required).
- .10 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to enter work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

Part 2. Preparation

2.1 SITE PREPARATION

- .1 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.
- .2 Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.
- .3 Erect appropriate worker and waste decontamination facilities at locations approved by the Departmental Representative.
- .4 Complete isolation measures between the asbestos work area and other occupied areas (including those within the isolation containment) using tape barriers, saw-horses, or other barriers, or by closing any door, windows, etc. at the perimeter of the asbestos work area.
- .5 Set-up clear warning signs at each entry point to the work area and at a distance from the work area if required. Signs shall be in both official languages (if required) and shall read:

CAUTION

Asbestos Hazard

Avoid Breathing Dust

Wear Protective Equipment

Breathing Asbestos Dust May

Cause Cancer

Entry is Prohibited

Except to Authorized Persons

Eating, Drinking and Smoking are

Prohibited in this Area

- .6 Clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.
- .7 Cover with polyethylene sheeting any furnishings or equipment that will remain in the asbestos work area. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.
- .8 As appropriate, seal off all openings including but not limited to doorways, hatch openings, windows, vents, service holes in walls, and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.
- .9 Lay polyethylene sheeting directly underneath piping from which insulation is to be removed.
- .10 Locate required tools, equipment, and waste receptors within the asbestos work area.

- .11 Provide fire extinguisher at the asbestos work area. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Departmental Representative.

2.2 WORKERS' DECONTAMINATION FACILITIES

- .1 Set-up an isolated worker decontamination area adjacent to the asbestos work area consisting of a HEPA filtered vacuum, bucket of warm water, soap, rags, and disposal container for asbestos contaminated disposable coveralls.

Part 3. Execution

3.1 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL:

- .1 Arrangements have been made for disposal of waste.
- .2 Asbestos work areas are effectively segregated.
- .3 Tools, equipment and waste materials receptors are on hand.
- .4 Arrangements have been made with the Departmental Representative for work area security.
- .5 Signs are displayed in areas where access to asbestos work area is possible.
- .6 The Departmental Representative has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 ASBESTOS-CONTAINING MATERIAL REMOVAL

- .1 Before removing asbestos, prepare site as described previously.
- .2 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the asbestos work area.
- .3 Pre-clean surface of pipe or fitting to remove fallen or damaged insulation by HEPA vacuuming or damp wiping.
- .4 Before beginning work, wet all insulation to be removed with amended water.
- .5 Wet areas of damaged jacketing with amended water and tape over damage, or wrap with polyethylene sheeting, to provide temporary repair.
- .6 Place tools necessary to remove insulation in tool pouch. Zip glovebag onto pipe and/or fitting and seal all openings to fitting with cloth securing straps. For valve bags seal valve cover with wire tie or equivalent.
- .7 Upon installation of the glove bag, inspect bag for any damage or defects. If any damage or defects are found, the glove bag is to be repaired or replaced. The glove bag to be inspected at regular intervals for damage and defects, and repair or replaced, as appropriately. The asbestos containing contents of the damaged or defective glove bag found during removal are to be wetted and the glove bag and its contents are to be removed and disposed in an appropriate waste disposal container. Any damaged or defective glove bags are not be reused.
- .8 Insert nozzle of sprayer into bag through valve and thoroughly wet insulation and interior of glovebag.

- .9 Spray asbestos-containing materials with amended water using airless spray equipment. Where impermeable materials exist, slowly remove impermeable layer while wetting underlying layers. Saturate asbestos to prevent release of airborne fibres during removal.
- .10 Place hands into gloves and use necessary tools to remove insulation. Roll jacketing carefully to minimize possibility of ripping or puncturing bags. Preformed insulation block should be cut at joints to minimize fibre release.
- .11 Arrange insulation to obtain full capacity of glovebag.
- .12 Wet freshly exposed insulation frequently during work.
- .13 After insulation has been removed, wash down fitting and/or exposed pipe and interior of glovebag thoroughly. Use one hand to aid washing process. Wet surface of insulation in lower section of glovebag and exposed end of asbestos insulation remaining on fitting by spraying with water prior to moving glovebag.
- .14 If glovebag is to be moved along fitting, evacuate air from bag using a HEPA vacuum through the valve opening, move glovebag along pipe and re-seal. Use double-pull zipper to pass hangers. Repeat insulation removal procedures specified above.
- .15 If glovebag is to be removed from cleaned pipe and/or fitting for use on new pipe and/or fitting, seal interior zip lock and evacuate air from glovebag using a HEPA vacuum through the valve opening. Re-install in new location before opening zip lock. Repeat insulation removal procedures specified above.
- .16 If glovebag is ripped, cut or opened in any way, cease work and repair with tape before continuing work. Immediately clean spilled material with HEPA vacuum or wet washing.
- .17 To remove glovebag once filled, wash top section and tools thoroughly. Place tools in one hand (glove), pull hand out inverted and twist to create a separate pouch. Tape in two locations to seal separate pouch from glovebag and cut between two tape locations to remove separated pouch. Place pouch with tools in next glove bag, or into a water bucket. Open the pouch underwater to remove and clean tools.
- .18 Pull waste disposal bag over glovebag before removing from pipe and/or fitting. Remove securing straps. Unfasten zipper.
- .19 After removal of glovebag, ensure newly exposed pipe and/or fitting is clean of residue by HEPA vacuuming or wet wiping surfaces. Ensure that surfaces are kept free of wet sludge.
- .20 Before completion of shift, apply sealer to all surfaces of freshly-exposed pipes and/or fittings.
- .21 Apply heavy coat of encapsulant to exposed ends of asbestos insulation to remain.
- .22 Dispose removed glovebags as contaminated waste.
- .23 Remove drop sheet and dispose as contaminated waste.
- .24 On completion of removal activities, clean asbestos work area with HEPA vacuum or by wet wiping or mopping and request inspection.

Part 4. Decommissioning

4.1 DISMANTLING OF PROTECTION

- .1 A final review may be carried out by the Departmental Representative to ensure that no dust or debris remains and that the required work has been completed. Air monitoring may be considered as part of the final review at the discretion of the Departmental Representative.
- .2 On written approval of the Departmental Representative, the Contractor may proceed with final dismantling of the asbestos work area.

Part 5. Inspection and Air Monitoring

5.1 INSPECTION

- .1 From commencement of work until completion of clean-up operations, the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- .2 The Departmental Representative may inspect both inside and outside the work area during active abatement or disturbance.
- .3 The Departmental Representative is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.
- .4 The Abatement Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Department.
- .5 If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Department.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.
- .7 Provide a minimum of 24 hours written notice to the Departmental Representative of any request for scheduling milestone inspections or transportation of asbestos waste through an occupied area.
- .8 The following milestone inspections are to take place during work:
 - .1 Clean Site Preparation: Inspection of site preparations and set-up prior to contaminated work.
 - .2 Visual Clearance: Inspection of asbestos work area after removal of asbestos but before the application of sealer.
 - .3 Final Air Sampling Clearance: Inspection and air sampling after application of sealer but prior to the removal of hoarding and perimeter seals from within the asbestos work area.
 - .4 Department Representative Joint Visual Clearance: Inspection of asbestos work area by Departmental Representative and Contractor's site supervisor following Final Air Sampling Clearance but before the removal of hoarding and perimeter seals from within the asbestos work area.
- .9 Do not proceed with next phase of work until written approval of each inspection is received from the Departmental Representative.

5.2 AIR MONITORING

- .1 Baseline air sampling (two samples) shall be performed prior to the start of site preparations.
- .2 Air sampling shall be performed within and immediately adjacent to each active asbestos work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Departmental Representative, the Contractor for the Project (if present) and the Abatement Contractor.
- .3 The following air sampling shall be completed during the project:
 - .1 Baseline air sampling (minimum two) prior to start of site preparations.
 - .2 On days when active abatement is conducted, minimum of one personal air sample on worker(s) engaged in abatement activities.
 - .3 On days where active abatement is conducted, minimum of one air sampling at perimeter of the work area.
 - .4 One final air clearance sample at the completion of project.
- .4 All air samples must be collected in accordance with NIOSH Analytical Method 7400.
- .5 If air monitoring or visual inspection indicates that areas inside or outside the asbestos work area are contaminated above the action level of 0.05 fibres/mL (one half of the occupational exposure limit), clean these areas in same manner as that applicable to asbestos work areas and review work procedures, at no cost to Department.
- .6 If final air sampling by Departmental Representative show that levels in asbestos work area do not exceed the action level of 0.05 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of asbestos work area.
- .7 The air clearance concentration shall not exceed 0.01 fibres/mL unless otherwise approved by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Generally high risk asbestos abatement specifications shall apply to activities that pose a high risk of exposure to airborne asbestos and a corresponding higher risk of health effects if handled improperly.
- .2 Removal or disturbance of greater than 0.09 m² of friable asbestos containing materials.
- .3 This specification shall apply to the removal of loose fill insulation (vermiculite and grey loose insulation above the vermiculite) from the attic of the home located at 151 Cave Avenue.

1.2 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before entering asbestos work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate asbestos awareness and/or abatement training. A competent person shall provide instruction.
- .2 **Respirators:** Provide appropriate respiratory equipment for all persons entering asbestos work area enclosure including authorized visitors. The following shall apply to the use of respirators for high risk activities:
 - .1 During wet removal and clean-up in enclosed asbestos work area workers, supervisors, and authorized visitors shall wear, as a minimum, powered air-purifying full-face respirator (PAPR) with P-100 filter cartridges in accordance with NIOSH Part 84 requirements. Use of other types of respiratory protection can only be used on written approval by the Departmental Representative.
 - .2 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed as asbestos waste.
 - .3 Respiratory protective equipment used shall be approved by NIOSH or by another standards setting and equipment testing organization, or combination of organizations, approved by a Director of Occupational Hygiene under Section 246 of the Alberta Occupational Health and Safety Code.
 - .4 Provide instruction to workers and visitors in use of respirators including qualitative or quantitative fit testing.
 - .5 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
 - .6 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be provided to and reviewed with each worker who is required to wear a respirator.
 - .7 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.

- .8 Maintain respiratory protection equipment in proper functioning and clean condition. The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, is to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors in full-enclosure asbestos work area with:
 - .1 New disposable type protective coveralls that do not readily retain or permit penetration of asbestos fibres. Coveralls are to be provided by the employer and worn by every worker who enters the work area. Coveralls are to consist of a head covering and full body covering that covers the feet and fits snugly at the wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing. If the use of coveralls that cover the feet creates a slip hazard, coveralls that fit snugly at the ankles may be used in conjunction with dedicated footwear.
 - .2 Once coveralls are worn in the asbestos work area, treat and dispose as asbestos contaminated waste.
 - .3 Workers and visitors shall also wear other body protection and safety equipment appropriate to other hazards present at the worksite.
 - .4 Footwear shall be of a suitable type that will prevent fibre penetration and able to be wet wiped.
- .4 At no time shall the Abatement Contractor use existing furnishings or mechanical equipment (including piping) to support personal.
- .5 Before entering full-enclosure asbestos work area(s), remove street clothes in clean change room and don appropriate respirator with new or tested filters, new disposable coveralls and head covers before entering equipment and access areas or asbestos work area. Store street clothes, uncontaminated footwear, towels etc. in clean change room.
- .6 Persons leaving full-enclosure asbestos work area(s) shall:
 - .1 Remove gross contamination from clothing before leaving asbestos work area.
 - .2 Proceed to dirty room and remove all clothing except respirator. Place contaminated work suit in receptacles for disposal with other asbestos contaminated materials. Footwear, clothing, hardhats, protective eyewear, etc., shall be left in equipment and access room to dry for later use.
 - .3 Still wearing appropriate respirator, proceed naked to shower room.
 - .4 Clean respirator to ensure that visible contamination is removed. After having thoroughly washed hair and body with shampoo and soap, remove respirator. Remove filters and dispose as asbestos waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator.
 - .5 Upon completion of asbestos abatement, dispose footwear as contaminated waste or clean before removing from equipment and access room, or carry in sealed plastic bag to next site.

- .6 Following showering, proceed to clean room, dry off and dress in street clothes. Store respirators in such a fashion to allow them to be put on prior to entering asbestos work area at start of next shift without contaminating clean area. If re-entry to asbestos work area is to take place, follow procedures in Para. 1.3.5.
- .7 Removal of waste and equipment shall be completed through the waste decontamination enclosure system. No worker shall use this system as means to leave or enter asbestos work area.
- .8 Do not eat, drink, smoke or chew gum or tobacco in enclosures.
- .9 Workers and visitors shall be protected at all times when a possibility of asbestos disturbance exists.
- .10 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the asbestos work area. Procedures shall be in both official languages.
- .11 Maintain one emergency access kit equipped with a respirator, protective clothing, etc. and post emergency access procedures at the decontamination chamber access point to the asbestos work area for use by Departmental Representative or authorized visitors. The emergency access respirator shall be a PAPR Full Face Respirator during hours of active asbestos abatement work and, at a minimum, a half face respirator with minimum P100 filter cartridges after shift-end when active abatement is not being conducted.
- .12 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to enter work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

Part 2 Preparation

2.1 CLEAN SITE PREPARATION FOR FULL-ENCLOSURE ASBESTOS WORK AREAS

- .1 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.
- .2 Pre-clean and remove equipment, tools, furnishings, and stored materials that can be moved without disturbing asbestos-containing materials.
- .3 Set-up clear warning signs at each entry point to the work area and at a distance from the work area if required. Signs shall be in both official languages (if required) and shall read (unless otherwise approved):

Caution

Asbestos Dust Hazard

Avoid Breathing Dust
Wear Protective Equipment

Breathing Asbestos Dust May
Cause Cancer

Entry is Prohibited
Except to Authorized Visitors

Eating, Drinking and Smoking
Are Prohibited in this Area

- .4 Erect appropriate worker and waste decontamination facilities at locations approved by the Departmental Representative
- .5 Complete isolation measures between the asbestos work area and occupied areas. Where required, erect hoarding walls and complete other isolation measures between asbestos work area and occupied areas. The hoarding walls shall be constructed as follows:
 - .1 Build walls of 39 mm x 89 mm (2" x 4") wood framing, 400 mm (16") o.c. with continuous top and sill plates. Cover both side walls with polyethylene sheeting.
 - .2 If hoarding walls do not extend to the underside of the ceiling construct a 'roof' to completely isolate the asbestos work area.
 - .3 Construct roof as follows: Size of joists shall be determined by span, loads, use and Building Codes. Use as a minimum 39 mm x 138 mm (2" x 4") joists. Cover joists facing the asbestos work area with one layer of polyethylene sheeting, overlapping the perimeter walls at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls.
 - .4 Where required, cover existing wall and floor surfaces with polyethylene sheeting sealed with tape. Provide two separately sealed layers of polyethylene sheeting. Separately seal floor drains or openings. Use sufficient layers (2) and necessary sheathing for walking surface to protect floors which may be damaged. Cover floors first so that polyethylene extends at least 300 mm (12") up walls then cover walls to overlap floor sheeting.
- .6 All wall and horizontal surfaces shall be pre-cleaned using damp cloth or sponge techniques prior to placement of polyethylene sheeting to any wall or floor surfaces. HEPA equipped vacuum cleaners may also be used to perform this task.
- .7 Seal off all openings including but not limited to doorways, hatch openings, windows, vents, service holes in walls, and grilles to non-operating ducts with two (2) layers of rip-proof polyethylene sheeting sealed with tape or with polyurethane foam as appropriate.
- .8 If necessary, caulk and seal ducts and duct shafts to remain in service as required, to make airtight. Cut and cap supply ducts with rigid sheet metal caps and seal. Perform work at appropriate time under contaminated conditions if necessary.
- .9 On approval of the Departmental Representative, seal joints and holes in HVAC ductwork to remain operational through an asbestos work area, using tape and rip-proof polyethylene to make airtight.
- .10 Establish negative pressure in asbestos work area. Negative pressure units shall have total rated capacity with filters in place sufficient to provide a minimum of four air changes every hour. Volume of air shall be sufficient to ensure airflow is maintained from clean areas into asbestos work area.

- .11 Vent units to outside of building. Locate vents to discharge air away from building access points or sidewalks. Discharge vents a minimum of 5 m away from building entrances, open windows or air intakes. Do not discharge air into building interior. The location of venting must be approved by the Departmental Representative.
- .12 Leak test negative air units prior to commencement of abatement at operating position, using DOP/PAO method. Provide reports for unit efficiency test results within 48 hours of testing, including annual calibration certificates for testing equipment.
- .13 Operate negative pressure units continuously from this time until completion of final air monitoring. Replace pre-filters as necessary to maintain airflow. Maintain negative air pressure of 5 Pascals (0.02 inches water column) pressure reduction within asbestos enclosure with respect to surrounding areas.
- .14 The system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- .15 Pre-clean and cover with polyethylene sheeting all items that are to remain within the enclosure during the abatement work including but not limited to motors, heating units, fire apparatus, door closers, fans, tanks, benches, shelving, storage racks, valves, taps, controllers, lights, and other fixtures and furnishings within enclosure. Clean previously contaminated surfaces with HEPA vacuum before covering with sheeting.
- .16 Install plywood enclosures, covered with rip-proof polyethylene, to protect equipment or fixtures in asbestos work area(s) that may be damaged.
- .17 Remove, clean and turn over to Departmental Representative, all re-usable mechanical equipment, electrical equipment and building components that may interfere with the asbestos removal and associated clean-up. The removal of such materials is at the discretion of the Departmental Representative.
- .18 Ensure existing power supply to asbestos work area is isolated and disconnected where necessary. Do not disrupt power supply to remaining areas of building. Provide ground fault electrical system in accordance with applicable CSA standard where application of amended water is required for wetting asbestos-containing materials. A minimum of one (1) ground fault electrical panel shall be provided for every 300 m² of asbestos work area. Supply all electrical apparatus from this ground fault system. Ensure safe installation of electrical lines and equipment.
- .19 Provide temporary lighting in asbestos work area to levels that will permit work to be done safely.
- .20 Maintain emergency and fire exits from asbestos work area, or establish alternative exits satisfactory to authorities having jurisdiction.
- .21 Provide fire extinguisher at each emergency exit, and in decontamination facilities. Protect extinguishers with polyethylene sheeting in manner that will not hamper emergency use. Existing on-site extinguishers may not be used without prior approval of the Departmental Representative.

2.2 WORKERS' DECONTAMINATION ENCLOSURE SYSTEM

- .1 Construct a workers' decontamination enclosure at entrance to each asbestos work area as approved by the Departmental Representative. Worker decontamination enclosure system shall be comprised of three interconnecting rooms (chambers) as described below.

- .2 Provide a set of curtain doorways between each room, and at both dirty and clean entrances to enclosure systems.
- .3 **Dirty Room:** Build room between shower room and asbestos work area. Install waste receptor, and storage facilities for worker's shoes and any protective clothing to be re-worn in asbestos work areas. Make provisions for the decontamination of contaminated clothing and footwear (wet wiping or HEPA vacuuming). Dirty room shall be large enough to accommodate specified facilities and other equipment needed, and at least one worker allowing sufficient space to undress comfortably. Minimum size 3 m² with a minimum height of 1.9 m.
- .4 **Shower Room:** Build room between clean room and equipment and access room of suitable size (minimum height 1.9 m) and install one (1) shower for every five (5) workers. Provide constant separate supplies of hot and cold water capable of maintaining a water temperature of between 40 and 50 °C. Provide valves controllable at shower(s) to regulate water temperature. Provide rigid piping with watertight connections and connect to water sources and drains. Provide soap, clean towels and appropriate containers for disposal of used respirator filters. Direct wastewater to sanitary sewer drains. When requested or where required by Provincial or Municipal law, direct wastewater to sewer via water filtering system consisting of a minimum 2-stage filtering system (25-micron and minimum 10-micron filters) or other approved means of filtering.
- .5 **Clean Room:** Build room between shower room and clean areas outside of enclosures with a minimum height of 1.9 m. At doorway to clean room, provide secure doorway. Provide hangers for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment, mirror for assisting in donning respirator, separate bins for clean and dirty towels. Install water heater, if required.

2.3 WASTE AND EQUIPMENT DECONTAMINATION ENCLOSURE SYSTEM

- .1 Construct system comprised of three linked rooms: Purpose of this system is to provide means to decontaminate drums, scaffolding, material containers, vacuum and spray equipment; and other tools and equipment for which worker decontamination system is not suitable.
- .2 Provide curtain doorways between rooms and at both dirty and clean entrances to the Enclosure System.
- .3 **Staging Area:** Establish a staging area within the asbestos work area for gross removal of dust and debris from waste containers and equipment and temporary storage pending removal to container cleaning room. Minimum size of 3 m².
- .4 **Container Cleaning Room:** Build container cleaning room between the Staging Area and Holding Room. Room shall be of sufficient size to allow proper washing or otherwise decontaminating equipment, drums and other waste containers and double bagging and labelling of asbestos waste. Treat wash water as asbestos contaminated waste. Minimum size of 1.5 m² with a minimum height of 1.9 m.
- .5 **Holding Room:** Build Holding Room between Container Cleaning Room and Transfer Room. Room shall be of sufficient size to accommodate largest item of equipment used and two (2) rigid waste containers or five (5) waste bags. Minimum size of 1.5 m² with a minimum height of 1.9 m.
- .6 **Transfer Room:** Build Transfer Room between Holding Room and uncontaminated area with a secure doorway.

2.4 CONSTRUCTION OF DECONTAMINATION ENCLOSURES

- .1 **Floor:** Prior to erecting wall framing, lay one (1) sheet of rip-proof polyethylene sheeting over floor area to be covered by enclosures. The floor sheeting should extend at least 600 mm (24") beyond the outside perimeter of the planned enclosure on all sides. After the construction of the enclosure walls, wrap the excess floor sheeting up the outside of the enclosure, overlapping the polyethylene sheeting covering perimeter walls. Provide second layer of rip-proof polyethylene to all floors, extending 600 mm up inside of enclosure walls.
- .2 **Walls:** Build load-bearing walls of 39 mm x 89 mm (2" x 4") wood framing, 400 mm (16") o.c. with continuous top and sill plates. Cover both sides of walls with polyethylene sheeting with caulk sealed and taped joints or seams
- .3 **Roof:** Size of joists shall be determined by span, loads, use and Code. Use as a minimum 39 mm x 88 mm (2" x 4") joists. Cover joists with 19 mm (3/4") plywood sheeting and seal and tape joints. Cover with two (2) layers of rip-proof polyethylene, overlapping the perimeter walls at least 600 mm (24"). Wrap the excess sheeting over the polyethylene sheeting covering perimeter walls. At underside of joists install one (1) layer of polyethylene sheeting.
- .4 **Doorways:** Build curtain doorways designed so that when workers or drums and equipment move through doorway, one (1) of two (2) barriers comprising doorway always remains closed.

2.5 MAINTENANCE OF ENCLOSURES

- .1 Maintain enclosures and work areas in tidy condition. Thoroughly clean decontamination facilities at the end of each work shift.
- .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
- .3 Visually inspect enclosures and work areas at beginning and end of each working period.
- .5 The negative air system to be inspected and maintained by a competent person prior each use to ensure that there is no air leakage, and if the filter is found to be damaged or defective, it to be replaced before the ventilation system is used.
- .6 Use smoke methods to test the effectiveness of the isolation barriers when directed by the Departmental Representative.

Part 3 Execution

3.1 DO NOT COMMENCE ASBESTOS REMOVAL WORK UNTIL:

- .1 Arrangements have been made for disposal of waste.
- .2 Asbestos work areas and decontamination enclosures are effectively segregated.
- .3 Negative pressure equipment is operating continuously.
- .4 Tools, equipment and waste materials receptors are on hand.
- .5 Arrangements have been made with the Departmental Representative for work area security.
- .6 Signs are displayed in areas where access to asbestos work area is possible.
- .7 The Departmental Representative has been notified of intention to proceed, has reviewed enclosures, equipment, procedures, and other submitted materials, and has granted authorization to proceed.

3.2 CONTAMINATED SITE PREPARATION

- .1 Before performing any contaminated work, prepare site as previously described.
- .2 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from the asbestos work area enclosure(s). Ensure air-handling systems remain shut off for duration of work.
- .3 Seal holes or penetrations to provide airtight enclosure around asbestos work area(s).
- .4 Protect electrical, communication, life safety and control systems to remain in place in asbestos work area with polyethylene and tape.

3.3 ASBESTOS-CONTAINING MATERIAL REMOVAL

- .1 All individuals involved with any portions of the removal process shall be equipped with appropriate respirators and protective equipment while working within the enclosure.
- .2 Clean and protect from damage all ceiling and wall components that are to remain including but not limited to furring, channels, hangers, wires and clips.
- .3 Repeatedly mist the air throughout the performance of this work and maintain all surfaces within the asbestos work area in a damp state.
- .4 Spray asbestos-containing materials with amended water using airless spray equipment. Where impermeable materials exist, slowly remove impermeable layer while wetting underlying layers. Saturate asbestos to prevent release of airborne fibres during removal.
- .5 Remove the saturated asbestos-containing material in small sections. Do not allow saturated asbestos to dry out. As it is being removed, pack the material in waste containers.
- .6 Spray asbestos debris on floor with amended water to prevent it from drying out. Remove asbestos debris from the floor and put in waste containers at regular intervals as the work progresses and at the end of every shift.
- .7 Seal filled containers, clean external surfaces thoroughly, and remove from working area to staging area.

- .8 After completion of removal of asbestos-containing materials, clean surfaces from which asbestos has been removed with stiff bristle brushes, vacuum, or wet-sponge (as appropriate) to remove all visible material.
- .9 Removal of asbestos waste containers and decontaminated equipment and materials from the asbestos work area shall be removed through the waste decontamination enclosure as follows:
 - .1 Remove gross contamination from the surface of the item to be removed within the staging area.
 - .2 Pass the item to a second worker present in the container cleaning room. The item shall be cleaned, wet wiped and double bagged and/or sealed in polyethylene prior to transferring to a third worker present in the holding room. Wash water shall be treated as asbestos-contaminated waste.
 - .3 The worker present in the holding room shall transfer the clean items to a fourth worker located outside the waste decontamination enclosure. The fourth worker must not enter the waste decontamination enclosure. Those workers present in the enclosure must leave the asbestos work area through the worker decontamination chamber only.
 - .4 Treat all removed materials exposed to asbestos, as asbestos-contaminated waste unless such materials can be properly decontaminated and are specified to be re-used.
- .10 After removing all visible asbestos, wet clean entire work area including but not limited to pipes, pipefittings, ducts, and similar items not covered with polyethylene sheeting. Request visual inspection and acceptance.
- .11 Following inspection and acceptance, apply heavy coat of slow drying sealer to all surfaces from which asbestos has been removed. Apply thinned coat (sufficient to coat all surfaces) to interior of polyethylene enclosure. Do not disturb the work area for a minimum of 12 hours after the application of sealer. Operate negative air units during this period.

Part 4 Decommissioning

4.1 DISMANTLING OF PROTECTION

- .1 All containment structures, such as hoardings, platforms, etc., which are used to segregate the work area, are to remain in place until directed by the Departmental Representative.
- .2 If aggressive air sampling by the Departmental Representative shows that levels in asbestos work area do not exceed 0.01 fibres/mL as determined by NIOSH 7400 Analytical Method, A Counting Rules, and when approved in writing by the Departmental Representative, proceed with final dismantling of decontamination and work enclosures as follows:
- .3 Remove polyethylene sheeting exposed during contaminated work including upper surfaces plus any underlying sheeting contaminated by water leaks, rips, tears, or exposed by failure of upper layer. Wear appropriate respirator and disposable coveralls during removal of sheeting. Carefully roll sheeting away from walls to centre of asbestos work area. As sheeting is rolled away from walls and corners, HEPA vacuum visible debris.
- .4 While removing top layer of sheeting from surfaces protected by two (2) layers of sheeting, cut lower sheeting so as to expose horizontal surfaces that may be contaminated with asbestos debris. HEPA vacuum any visible debris.
- .5 Place polyethylene sheeting, seals, tape, cleaning material, clothing, and other contaminated waste in asbestos waste receptors for transport. Remove with HEPA vacuum any debris which may have fallen behind sheeting.
- .6 Remove hoardings, temporary lighting, equipment and facilities provided for work.
- .7 Visible debris discovered on the course of the site dismantlement is to be promptly cleaned using a damp cloth and/or HEPA vacuum.
- .8 Site inspections and air monitoring shall be conducted for all high risk asbestos work including a final review of the work area by the Departmental Representative to ensure that no dust or debris remains.

Part 5 Inspection and Air Monitoring

5.1 INSPECTION

- .1 From commencement of work until completion of clean-up operations, the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- .2 The Departmental Representative will inspect both inside and outside the work area a minimum of twice per 10 hour work shift during active abatement.
- .3 The Departmental Representative is empowered to shut-down all work activities when leakage of asbestos from the work area has occurred or is likely to occur.
- .4 The Abatement Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Department.

- .5 If asbestos work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Department.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.
- .7 Provide a minimum of 24 hours written notice to the Departmental Representative of any request for scheduling milestone inspections or transportation of asbestos waste through an occupied area.
- .8 The following milestone inspections are to take place during work:
 - .1 Clean Site Preparation: Inspection of site preparations and set-up prior to contaminated work.
 - .2 Contaminated Perimeter Preparation: Inspection of contaminated preparations at perimeter of asbestos work area prior to any bulk removal.
 - .3 Before Bulk Removal (Contaminated Site Preparation): Inspection of asbestos work area following Contaminated Perimeter Preparation but before start of main asbestos removal.
 - .4 Visual Clearance: Inspection of asbestos work area after removal of asbestos but before the application of sealer.
 - .5 Final Air Sampling Clearance: Inspection and air sampling after application of sealer but prior to the removal of hoarding and perimeter seals from within the asbestos work area.
 - .6 Departmental Representative Joint Visual Clearance. Inspection of asbestos work area by Departmental Representative and Contractor's site supervisor following Final Air Sampling Clearance and removal of non-critical barriers (i.e. non-perimeter seals such as floor) and seals (i.e. non-perimeter seals such as floor) but before the removal of hoarding and perimeter seals from within the asbestos work area.
 - .7 Final Dismantling Inspection: Inspection after the removal of hoarding, perimeter seals and decontamination facility from the asbestos work area.
- .9 Do not proceed with next phase of work until written approval of each inspection is received from the Departmental Representative.

5.2 AIR MONITORING

- .1 Baseline air sampling (two samples) shall be performed prior to the start of site preparations.
- .2 Air sampling shall be performed within and immediately adjacent to each active asbestos work area based on the requirements of the Departmental Representative. Results obtained from all test monitoring shall be posted at the work site and provided to the Departmental Representative, the Contractor for the Project (if present) and the Abatement Contractor.
- .3 The following air sampling shall be completed during the project:
 - .1 Baseline air sampling (minimum two) prior to start of site preparations.

- .2 On days when active abatement is conducted, minimum of one personal sample on worker(s) engaged in abatement work.
- .3 On days where active abatement is conducted, minimum of one sample in clean room which will cover half the shift duration and include at least one shift decontamination.
- .4 One final air clearance sample at the completion of project.
- .4 Air samples (except final clearance) must be collected in accordance with NIOSH Analytical Method 7400.
- .5 If air monitoring or visual inspection indicates that areas outside current asbestos work area enclosures are contaminated above the designated action level 0.05 fibre/mL (one half of the occupational exposure limit) clean these areas in same manner as that applicable to asbestos work areas, at no cost to Department.
- .6 Final clearance air samples will be collected in accordance with the Alberta Asbestos Abatement Manual.
 - .1 Place 51 cm fan(s) in the centre of the room set on low speed and directed towards the ceiling. Use a minimum of one fan per 283 m³ of room space.
 - .2 Start the sampling pump(s) and collect the sample(s).
 - .3 The Contractor will be responsible for providing on-Site a clean leaf blower and fans which comply with the above cited code of practice during all high risk clearance sampling. Both pieces of equipment must be approved by the Departmental Representative at the time of the sampling.
 - .4 In the presence of the Departmental Representative, immediately prior to air clearance sampling, use a leaf blower to dislodge loose fibre. Direct leaf blower against all walls, ceilings, floors, ledges, and other surfaces within the enclosure. Perform this for at least five minutes per 93 m² of Asbestos Work Area.
- .7 If final air sampling by Departmental Representative show that levels in Asbestos Work Area do not exceed the action level of 0.01 fibres/mL, as determined by NIOSH 7400 Analytical Method (A Counting Rules), proceed with dismantling of Asbestos Work Area.
- .8 Based on the project time frame and the discretion of the Departmental Representative, failed PCM cassettes may be sent for transmission electron microscope (TEM) analysis to pass an enclosure at no cost to Departmental Representative. TEM results must not exceed 0.01 fibres/mL.
- .9 The air clearance concentration shall not exceed 0.01 fibres/mL unless otherwise approved by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following Work:
 - .1 Disturbance of lead containing paint (LCP) by scraping or sanding or removing of materials with LCP coatings using non-powered hand tools.
 - .2 Manual demolition of lead-painted walls or building components by striking wall with sledgehammer or similar tool.
 - .3 Where hand tools cannot be effectively used or where more major disturbance is expected (i.e. use of power saw), disturbance of materials coated with LCP using a power tool with an effective dust collection system equipped with a HEPA filter.
 - .4 Handling of lead-containing materials such as plumbing with lead solder.

1.2 REFERENCES

- .1 Government of Alberta, Occupational Health and Safety Bulletin. Lead at The Work Site. November 2013.

1.3 DEFINITIONS

- .1 **Action level:** employee exposure, without regard to use of respirators, to airborne concentration of lead of 0.05 milligrams per cubic meter of air (0.05 mg/m³) calculated as 8-hour time-weighted average (TWA). This specification for lead abatement is based on airborne lead concentrations of >0.05 to 0.50 mg/m³ of air for the work specified.
- .2 **Lead dust or debris:** wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot or if visible particles are evident to the Lead Departmental Representative.
- .3 **Lead work area:** specific area or location where actual work is being performed which actively disturbs known or suspect lead materials or lead-containing paint.

1.4 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before entering lead work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate protective clothing, lead awareness and/or abatement training. A competent person, as defined by shall provide instruction.
- .2 **Respirators:** Provide appropriate respiratory equipment for all persons entering lead work area including authorized visitors. The following shall apply to the use of respirators:
 - .1 During active work where there is an airborne expose potential, all workers, supervisors, and authorized visitors shall wear, at minimum, non-powered half-face respirators with minimum N, R or P100 filter cartridges in accordance with NIOSH Part 84 requirements.
 - .2 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed as lead waste.

- .3 Respiratory protective equipment used shall be approved by NIOSH or by another standards setting and equipment testing organization, or combination of organizations, approved by a Director of Occupational Hygiene under Section 246 of the s shall be acceptable to Alberta Occupational Health and Safety Code.
- .4 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.
- .5 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
- .6 The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator.
- .7 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.
- .8 Maintain respiratory protection equipment in proper functioning and clean condition. The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.
- .3 **Protective Clothing:** Provide workers and visitors conducting lead work or present in the lead work area with:
 - .1 New disposable type protective coveralls and dermal protection (gloves) that do not readily retain or permit penetration of lead.
 - .1 Coveralls and dermal protection are to be provided by the employer and worn by every worker who enters the work area.
 - .2 Coveralls are to consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent lead from reaching the garments and skin under the protective clothing.
 - .3 Use impervious gloves suitable for the cleaning of lead surfaces and the use of any applicable lead cleaning agent.
 - .2 Once coveralls are worn, treat and dispose as lead contaminated waste.
 - .3 Workers and visitors shall also wear other protective apparel required by Alberta Occupational Health and Safety.
 - .4 Footwear shall be of a suitable type that will prevent dust penetration and able to be wet wiped.
- .4 Eating, drinking, chewing, and smoking are not permitted in Lead Work Area.
- .5 Before entering lead work area(s), don appropriate respirator with new or tested filters, new disposable coveralls and dermal protection.
- .6 Persons leaving lead work area(s) shall:
 - .1 HEPA vacuum or wet wipe clothing and respirator to remove gross contamination.
 - .2 Remove contaminated coveralls and place in receptacles for disposal with other lead-contaminated materials.
 - .3 Remove contaminated dermal protection and place in receptacles for disposal with other lead-contaminated materials.

- .4 Still wearing appropriate respirator (if using), proceed out of the established lead work area to the decontamination facility.
- .5 Clean using soap and warm water wash and remove respirator (if using) then thoroughly wash hands and face. Remove filters and dispose of as lead waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose of filters as necessary. Wet clean inside of respirator.
- .6 Upon completion of lead work, dispose of footwear as contaminated waste or clean.
- .7 Workers and visitors shall be protected at all times when a possibility of lead disturbance exists.
- .8 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the lead work area.
 - .1 Procedures shall be in both official languages if required.
- .9 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from lead work area.
- .10 Where other abatement or hazardous materials work is occurring the work area, the stricter of the specified Worker and Visitor Protection measures shall apply.

1.5 WORKERS' DECONTAMINATION FACILITIES

- .1 Set up an isolated worker decontamination area adjacent to the lead work area. The facilities must consist of a HEPA filtered vacuum, bucket of warm water, soap, rags, and disposal container for lead contaminated protective clothing.

Part 2 Products

2.1 MATERIALS

- .1 **Slow - drying sealer:** non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual lead paint residue.
- .2 **Lead waste containers:** Metal, polyethylene or fibre type acceptable to dump operator and Ontario Ministry of Environment with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
 - .1 Label containers with pre-printed cautionary Warning - Contains Lead clearly visible when ready for removal to disposal site. Bilingual warning labels shall be provided if requested.
 - .2 Materials such as wire or solder or covered with a lead coating which are to be recycled or otherwise disposed of may not require containers. Materials shall be segregated and denoted as lead-containing.

Part 3 Waste Management and Disposal

3.1 GENERAL REQUIREMENTS AND PROCEDURES

- .1 The removal of building materials with lead or lead-containing paint is not required prior to demolition. All building materials with lead shall be disposed of as general building waste or recycled.
- .2 Check with local landfill operator, waste disposal site or recycler to confirm disposal and handling requirements are acceptable.

Part 4 Preparation

4.1 PREPARATION OF LEAD WORK AREA

- .1 Lead Work Area and areas adjacent and around area to be unoccupied.
- .2 Complete isolation measures between the lead work area and occupied areas using tape barriers, saw-horses, fencing with polyethylene or other barriers, etc. at the perimeter of the lead work area.
 - .1 A sealed work enclosure is not expected to be required.
 - .2 Isolation of the work area using polyethylene sheeting may be considered to create a barrier between the work area and occupied spaces to minimize worker exposure.
- .3 If required, erect critical barriers around perimeter of Lead Contaminated Work Area before disturbance using two layers of 6 mil fibre reinforced polyethylene sheeting. For larger areas, a steel or wooden stud frame can be erected and fibre reinforced polyethylene sheeting attached to it.
- .4 Erect appropriate worker and waste decontamination facilities at locations approved by the Departmental Representative.
- .5 Shut off and isolate HVAC system or isolate air intakes and exhausts to prevent dust dispersal into other building areas.
- .6 Before beginning work, at each access to contaminated work area, install warning signs in both official languages (if required) in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used : CAUTION (25 mm high) / Lead Hazard Area (19 mm high) / Unauthorized Entry Prohibited (19 mm high) / Wear Assigned Protective Equipment (19 mm high) / Breathing Lead Dust May Cause Serious Bodily Harm (19 mm high).

Part 5 Execution

5.1 DISTURBANCE OF MATERIALS WITH LEAD

- .1 Using a HEPA vacuum, remove all loose LCP coatings or lead dust which may pose an increased worker exposure risk, prior to disturbing materials as appropriate.
- .2 Use sprayer (low-velocity, fine-mist) to mist (not wet) materials containing lead to be cut or scraped or removed. Perform work to reduce dust creation to lowest levels practicable.
 - .1 Do not use compressed air or dry sweep mould impacted materials or dust.

- .3 Removal of LCP coatings or disturbance of lead using power tools or non-powered hand tools to scrape, sand or otherwise remove the LCP by abrasive means without an effective HEPA dust collection system is prohibited.
 - .1 Use of HEPA filtered tools for the removal or disturbance of LCP or lead shall be approved by the Departmental Representative.
- .4 Where possible, minimize disturbance of lead materials.
- .5 During lead work, should Departmental Representative suspect contamination of areas outside the lead work area:
 - .1 Contractor to stop remediation work and immediately decontaminate affected areas and eliminate causes of such contamination.
 - .2 Prohibit individuals from entering these contaminated areas until a visual inspection determines area is acceptable for work.
 - .3 Departmental Representative to confirm work conditions and authorize continuation of work.
- .6 On completion of mould disturbance, where reasonably practicable, clean work area by removing debris and using HEPA vacuum and/or by damp to minimize potential worker exposure.
- .7 Leave areas reasonably free from contamination, debris and dust.
- .8 After clean-up within barrier dismantle, barrier and dispose if required.
- .9 If warranted, Contractor may leave barriers in place to isolate lead work areas and minimize worker exposure issues.

Part 6 Inspection and Air Monitoring

6.1 INSPECTION

- .1 From commencement of work until completion of clean-up operations, the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside asbestos work area(s).
- .2 The Departmental Representative may inspect both inside and outside the work area during active disturbance.
- .3 The Departmental Representative is empowered to shut-down all work activities when leakage of lead from the work area has occurred or is likely to occur.
- .4 The Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Departmental Representative.
- .5 If lead work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Departmental Representative.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

6.2 AIR AND SURFACE SAMPLING

- .1 Air and surface sampling may be performed within and immediately adjacent to each active lead work area. Results obtained from all test monitoring shall be posted at the work site and provided to the Departmental Representative, the Contractor for the Project (if present) and the Contractor.
 - .1 Air sampling may include occupational and area samples.
- .2 The requirement for air and surface sampling will be determined by the Departmental Representative.
- .3 All air samples must be collected and analysed in accordance with Ontario Ministry of Labour requirements.
- .4 If air monitoring or visual inspection indicates that areas outside current asbestos work area enclosures are contaminated above the designated action level of 0.05 mg/m^3 , clean these areas in same manner as that applicable to asbestos work areas, at no cost to Departmental Representative.
- .5 If air monitoring in work areas shows that removal procedures are not sufficient to maintain airborne levels of specified substances below that appropriate for the level of personal protective equipment employed by the Contractor, all work is to stop within the work area and removal procedures re-assessed.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Mould worker precaution shall be used for worker protection measures when working in a building or areas where mould growth is present.
- .2 This section may also be used when disturbance of intermediate isolated materials with 1 to 10 square metres (m²) of suspect visible mould in the process of removing other hazardous building materials.

1.2 RELATED SECTIONS

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.
- .2 Related work specified elsewhere:
 - .1 Section 02 81 00, General Requirements.

1.3 REFERENCES

- .1 Canadian Construction Association, Mould Guidelines for the Canadian Construction Industry, 2004.
- .2 Government of Alberta Employment and Immigration – Best Practices Mould at the Work Site (2009).

1.4 DEFINITIONS

- .1 **Cleaning solution:** detergent solution.
- .2 **Mould work area:** specific area or location where actual work is being performed which actively disturbs mould or other areas of facility where it has been determined that it may be hazardous to worker health as result of the presence or suspect presence of mould.

1.5 WORKER AND VISITOR PROTECTION

- .1 Workers must be medically fit to work with potential mould. Workers with a medical history of allergic disease, respiratory or are immune suppressed should consult with their medical professional to determine ability to conduct work.
- .2 **Instructions:** Before entering mould work area(s), instruct workers and visitors in use of respirators (including fit testing), entry and exit from enclosures and all aspects of work procedures and protective measures including appropriate mould awareness and/or remediation training. A competent person shall provide instruction.
- .3 **Respirators:** Provide appropriate respiratory equipment for all persons entering mould work area including authorized visitors. The following shall apply to the use of respirators for Moderate Risk activities:

- .1 Workers, supervisors, and authorized visitors shall wear, at a minimum, non-powered half-face respirators with minimum P100 filter cartridges in accordance with NIOSH Part 84 requirements. Use of other types of respiratory protection can only be used on written approval by the Departmental Representative.
- .2 Where airborne mould concentrations are expected to high such as in large scale mould contamination, minimum powered air-purifying full-face respirator (PAPR) with P-100 filter cartridges shall be used.
- .3 Filters shall be replaced daily or tested according to manufacturer's specifications and replaced as necessary. All waste filters shall be disposed of as mould waste.
- .4 Respirators shall be acceptable to Alberta Occupational Health and Safety.
- .5 Provide instruction to workers and visitors in use of respirators including qualitative fit testing.
- .6 A worker will not be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
- .7 The employer is to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures is to be provided to and reviewed with each worker who is required to wear a respirator.
- .8 No supervisor, worker or authorized visitor shall have facial hair which may affect the seal between the respirator and face.
- .9 Maintain respiratory protection equipment in a proper functioning and clean condition. The respirator is to be cleaned, disinfected and inspected after use on each shift, or more often if necessary. The respirator is to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location.
- .4 **Protective Clothing:** Provide workers and visitors in mould work area with:
 - .1 Dust impermeable gloves and chemical eye protection (goggles which will prevent infiltration of dust and mould spores).
 - .2 Disposable coveralls with foot and head coverings suitable for protection against mould shall be worn.
 - .3 Once coveralls are worn in the mould work area, treat and dispose as mould contaminated waste.
 - .4 Workers and visitors shall also wear other protective apparel required by Alberta Occupational Health and Safety.
- .5 Eating, drinking and chewing are not permitted in Mould Contaminated Work Area.
- .6 Before entering mould work area(s), don appropriate respirator with new or tested filters, new disposable coveralls and eye protection.
- .7 Persons leaving mould work area(s) shall:
 - .1 HEPA vacuum or wet wipe clothing and respirator to remove gross contamination.
 - .2 Remove contaminated coveralls and place in receptacles for disposal with other mould-contaminated materials.
 - .3 Still wearing appropriate respirator, proceed out of the established mould work area to the decontamination facility.

- .4 Clean using soap and warm water wash and remove respirator then thoroughly wash hands and face. Remove filters and dispose of as lead waste in container provided for this purpose or test filters according to manufacturer's recommendation. Dispose filters as necessary. Wet clean inside of respirator.
- .5 Upon completion of mould work, dispose footwear as contaminated waste or clean.
- .8 Workers and visitors shall be protected at all times when a possibility of mould disturbance exists.
- .9 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the mould work area.
 - .1 Procedures shall be in both official languages if required.
- .10 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to enter work areas.
 - .2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from lead work area.
- .11 Where other abatement or hazardous materials work is occurring the work area, the stricter of the specified Worker and Visitor Protection measures shall apply.

Part 2 Products

2.1 MATERIALS

- .1 **Cleaning solution:** detergent solution for damp wipe and/or mop.

Part 3 Waste Management and Disposal

3.1 GENERAL REQUIREMENTS AND PROCEDURES

- .1 The removal of mould impacted building materials is not required prior to demolition. All building materials with mould shall be disposed as general building waste.
- .2 Check with local landfill operator or waste disposal site to confirm disposal requirements are acceptable.

Part 4 Preparation

4.1 PREPARATION OF MOULD CONTAMINATED WORK AREA

- .1 Request that building personnel shut off air handling and ventilation systems supplying or exhausting from work area. Ensure air-handling systems remain shut off for duration of work
- .2 Erect appropriate worker and waste decontamination facilities at locations approved by the Departmental Representative.

- .3 Mould Contaminated Work Area and areas adjacent area to be unoccupied.
- .4 As mould remediation is not intended, a negative pressure isolation containment (critical barrier) is not required. Isolation of the work area using polyethylene sheeting may be considered to create a barrier between the work area and occupied spaces to minimize worker exposure.
- .5 If required, erect critical barriers around perimeter of Mould Contaminated Work Area before disturbance using two layers of 6 mil fibre reinforced polyethylene sheeting. For larger areas, a steel or wooden stud frame can be erected and fibre reinforced polyethylene sheeting attached to it.
- .6 Before beginning work, at each access to contaminated work area, install warning signs in both official languages (if required) in upper case 'Helvetica Medium' letters reading as follows, where number in parentheses indicates font size to be used : 'CAUTION MOULD HAZARD AREA (25 mm) / NO UNAUTHORIZED ENTRY (19 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) / BREATHING MOULD DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)'.

Part 5 Execution

5.1 DISTURBANCE OF MATERIALS WITH MOULD

- .1 Use sprayer (low-velocity, fine-mist) to mist (not wet) materials containing mould to be cut or scraped or removed. Perform work to reduce dust creation to lowest levels practicable.
 - .1 DO NOT wet or saturate materials which are not to be removed as this may cause additional mould impacts.
 - .2 Do not use compressed air or dry sweep mould impacted materials or dust.
- .2 Where possible, minimize disturbance of materials with visible mould growth.
- .3 On completion of mould disturbance, where reasonably practicable, clean work area by removing debris and using HEPA vacuum and/or by damp mopping with cleaning solution to minimize potential worker exposure.
- .4 Leave areas dry and reasonably free from contamination, debris and dust.
- .5 After clean-up within barrier, dismantle barrier and dispose if required.
- .6 If warranted, Contractor may leave barriers in place to isolate mould work areas and minimize worker exposure issues.

Part 6 Inspection and Air Monitoring

6.1 INSPECTION

- .1 From commencement of work until completion of clean-up operations, the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside mould work area(s).

- .2 The Departmental Representative may inspect both inside and outside the work area during active disturbance.
- .3 The Departmental Representative is empowered to shut-down all work activities when leakage of mould from the work area has occurred or is likely to occur.
- .4 The Abatement Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Abatement Contractor shall make good on any work disturbed by the inspection at no cost to the Departmental Representative.
- .5 If mould work area(s) or adjacent areas are found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Departmental Representative.
- .6 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

6.2 Air Sampling

- .1 None required.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following work:
 - .1 Removal and decommissioning of equipment with Ozone Depleting Substances (ODSs).

1.2 REFERENCES

- .1 Province of Alberta
 - .1 Alberta Reg. 132/2004, 2004 Ozone-Depleting Substance and Halocarbons Regulations
- .2 Federal Environmental Protection Act (1999)
 - .1 Halocarbon Regulations (SOR/2003-289 and amendment regulation SOR/2009-221.

1.3 DEFINITIONS

- .1 **Certified Technician:** a person who holds a valid certification as a trained service technician granted under Provincial and/or Federal regulation.
- .2 **Disposal:** transportation to specified disposal facility for permanent disposal, or to an approved site for temporary storage and subsequent transportation to the specified permanent disposal facility.
- .3 **Ozone Depleting Substance (ODS):** Chemical substances including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons typically used as refrigerants, propellants and in the manufacture of items such as packaging, insulation, solvents and halon based fire extinguishing agents.
- .4 **Removal:** detachment or removal of equipment with known or suspect ODS from applicable fixtures and includes preparation for disposal as described in this section.

1.4 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before handling any potential ODS-containing equipment, instruct workers and visitors in all aspects of prescribed work procedures and protective measures including appropriate awareness training. A competent person shall provide instruction.
- .2 Require workers to wear chemical resistant gloves in removing equipment with known or suspect ODSs where exposure risk is low.
- .3 Provide workers with additional protective clothing and equipment where contact with ODS may occur. Provide clothing and equipment appropriate for the potential level of exposure.

- .4 Establish a spill response plan to mitigate the release of any ODS-containing equipment occurs.
- .5 Persons employed for the removal of energized electrical equipment shall be or overseen by qualified electricians.
- .6 Workers and visitors shall be protected at all times when a possibility of ODS exposure exists.
- .7 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the work area.

Part 2 Preparation

2.1 Site Preparation

- .1 Before commencing any work, ensure that the power supply to the designated work area has been isolated and locked out to prevent re-energizing of electrical circuits.
- .2 Inspect all refrigeration, air-conditioning and fire extinguishing equipment to identify possible ODS content. Take care to accurately identify equipment as ODS-containing or non-ODS containing. All suspect ODS-containing equipment shall be considered as ODS-containing.
- .3 Erect appropriate worker and waste decontamination facilities, as appropriate, at locations approved by the Departmental Representative.
- .4 Provide emergency spill containment supplies in work area in accordance to approved emergency spill response plan.
- .5 Establish a storage area for all equipment with ODS until the materials can be transported off-site or decommissioned.

Part 3 Execution

3.1 ODS REMOVAL:

- .1 Do not commence work until:
 - .1 Arrangements have been made for disposal of waste.
 - .2 Tools, equipment and waste materials receptors are on hand.
- .2 Locate all ODS-containing equipment.
- .3 If ODS-equipment is to be removed from the site prior to inspection and appropriate decommissioning by a Certified Technician, protect and transport the equipment such that ODSs will not be released.
- .4 All ODS-containing equipment must be inspected by a Certified Technician who shall remove any ODSs from the equipment prior to disposal.

- .5 Any re-use or re-sale of ODS-containing equipment must be in compliance with the appropriate regulations.
- .6 In the event of a spill or release, isolate the work area, absorb any liquid materials with an appropriate absorptive material and ventilate area immediately.
- .7 Handle, store transport and recycle ODSs in accordance with Alberta and Federal legislation and regulations.

Part 4 Inspection and Air Monitoring

4.1 Inspection

- .1 From commencement of work until completion of clean-up operations, the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside work area(s).
- .2 The Departmental Representative will inspect both inside and outside the work area during work.
- .3 The Departmental Representative is empowered to shut-down all work activities when leakage of ODSs from the work area has occurred or is likely to occur.

The Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Departmental Representative.

- .4 If work is found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Departmental Representative.
- .5 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

4.2 Air Monitoring

- .1 None required.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following work:
 - .1 Removal and decommissioning of equipment with mercury including thermostats, switches and lamps.

1.2 REFERENCES

- .1 Canadian Council of Ministers of the Environment (CCME) "*Canada-Wide Standard for Mercury Containing Lamps*" (2001).
- .2 Government of Alberta, Occupational Health and Safety Code. 2009.

1.3 DEFINITIONS

- .1 **Disposal:** transportation to specified disposal facility for permanent disposal, or to an approved site for temporary storage and subsequent transportation to the specified permanent disposal facility.
- .2 **Recycling:** collection of mercury bulbs or other equipment for processing by an approved system which will collect mercury without loss to the environment. System may be used on or off-site with collected mercury recycled or disposed of according to Provincial and Federal regulations.
- .3 **Removal:** detachment or removal of equipment with known or suspect mercury from applicable fixtures and includes preparation for disposal as described in this section.

1.4 WORKER AND VISITOR PROTECTION

- .1 **Instructions:** Before handling mercury containing materials, instruct workers and visitors in all aspects of prescribed work procedures and protective measures including appropriate awareness and/or abatement training. A competent person shall provide instruction.
- .2 Require workers to wear mercury impervious gloves in addition to normal work clothing where exposure risk is low.
- .3 Provide workers with additional protective clothing and equipment where contact with liquid mercury may occur. Provide clothing and equipment appropriate for the potential level of exposure.
- .4 Establish a spill response plan to mitigate the release of any mercury should any breakage of mercury containing equipment occurs.
- .5 Persons employed for the removal of thermostats and other energized electrical equipment shall be or overseen by qualified electricians.
- .6 Do not eat, drink, smoke or chew gum or tobacco in designated work areas.

- .7 Workers and visitors shall be protected at all times when a possibility of mercury exposure exists.
- .8 A copy of the procedures described under Worker and Visitor Protection shall be posted at access points to the work area.
- .9 Maintain one set of protective clothing, etc. and post emergency access procedures at access point to the mercury work area for use by Departmental Representative or authorized visitors.

Part 2 Products

- .1 **Absorbent Material:** mercury absorbent material. Proof of suitability of the absorbent material as a mercury absorbent must be provided to the Owner or Owner's Departmental Representative on request.
- .2 **Impervious container:** an airtight, leakproof container suitable for the storage and transportation of mercury containing thermostats meeting Transportation of Dangerous Goods Regulations and applicable provincial requirements.

Part 3 Preparation

3.1 Site Preparation

- .1 Before commencing any work involving thermostats, ensure that the power supply to the designated work area has been isolated and locked out to prevent re-energizing of electrical circuits.
- .2 Inspect all thermostats and applicable equipment to identify possible mercury content. Take care to accurately identify thermostats as mercury type or non-mercury type. All suspect mercury containing thermostats and equipment shall be considered as mercury type.
- .3 All fluorescent lamps or bulbs shall be considered a mercury containing.
- .4 Erect appropriate worker and waste decontamination facilities, as appropriate, at locations approved by the Departmental Representative.
- .5 Provide emergency spill containment supplies in work area in accordance to approved emergency spill response plan.
- .6 Establish a storage area for all equipment with mercury until the materials can be transported off-site, recycled or decommissioned.

Part 4 Execution

4.1 MERCURY REMOVAL OR RECYCLING:

- .1 Do not commence work until:

- .1 Arrangements have been made for disposal of waste.
- .2 Tools, equipment and waste materials receptors are on hand.
- .2 Locate all mercury-containing equipment.
- .3 Wear personal protection at all times when disturbing lamps, equipment and items that contain mercury.
- .4 Place all mercury containing equipment into an impervious container packed with absorptive material.
- .5 Place contaminated materials into plastic bags. Close bags securely using ties. Handle bags containing material to prevent bag puncture.
- .6 Place absorbent material in bottom of container.
- .7 Package any mercury contaminated gloves, work clothes and rags in plastic bags and place in container.
- .8 Fill voids between mercury materials with absorbent material. Once container is full, cover materials with absorbent material.
- .9 Seal container and store in a designated storage area pending transportation and disposal.
- .10 Each container must be marked in accordance with the Dangerous Goods Transportation and Handling Act, showing the shipping name (mercury), the product identification number and proper waste class and hazard labels.
- .11 Fluorescent lamps and bulbs shall be collected for disposal in accordance with disposal site requirements or recycled by a means approved by the Departmental Representative.
- .12 Dispose of non-mercury containing equipment as construction waste.
- .13 Any re-use or re-sale of mercury-containing equipment must be in compliance with the appropriate regulations.
- .14 In the event of a spill or release, isolate the work area, absorb any liquid materials with an appropriate absorptive material and ventilate area immediately.
- .15 Handle, store transport and recycle mercury in accordance with Alberta and Federal legislation and regulations.
- .16 The facility used to process and recycle the mercury shall be approved by Alberta Environment, or local jurisdictional authority, and shall have valid Certificates of Approval to carry out the work outlined herein.

Part 5 Inspection and Air Monitoring

5.1 Inspection

- .1 From commencement of work until completion of clean-up operations, the Departmental Representative to inspect for compliance with the requirements of the governing authorities, adherence to specifications and to inspect for cleanliness and completion both inside and outside work area(s).
- .2 The Departmental Representative will inspect both inside and outside the work area during work.
- .3 The Departmental Representative is empowered to shut-down all work activities when leakage of mercury from the work area has occurred or is likely to occur.

The Contractor is to allow inspection by the Departmental Representative and provide full access to the work area. The Contractor shall make good on any work disturbed by the inspection at no cost to the Departmental Representative.

- .4 If work is found unacceptable in accordance with standards specified or required by authorities having jurisdiction, correct such deficiencies at no cost to the Departmental Representative.
- .5 Pay cost to provide re-inspection of work found not to be in accordance with these specifications and requirements of authorities having jurisdiction.

5.2 Air Monitoring

- .1 None required.

END OF SECTION

Part 1 General**1.1 REFERENCES**

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

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.3 SITE CONDITIONS

- .1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in DF Technical Consulting Services Ltd Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Do not proceed until written instructions have been received from Departmental Representative.
 - .2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products**2.1 NOT USED****Part 3 Execution****3.1 DISPOSAL**

- .1 Concrete is to be removed and transported in accordance with Section 01 74 21.

3.2 RESTORATION

- .1 Areas of disturbance shall be restored as per sections 31 22 13 – Rough Grading and 32 91 19 – Finish Grading.

END OF SECTION

Part 1 General**1.1 REFERENCES**

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

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.3 SITE CONDITIONS

- .1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in Environmental Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Do not proceed until written instructions have been received from Departmental Representative.
 - .2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products**2.1 NOT USED****Part 3 Execution****3.1 Wood Structure Removals**

- .1 House: Demolish the structures and remove from the site and dispose of. Refer to section 31 00 10 for backfilling and section 03 00 10 for removal of the foundation walls.
- .2 Apartment Complex: beams, columns, joists and sheathing exist in certain parts of the building. Remove and dispose of all of the wood structures within the limitations and governing regulations and as follows:
 - .1 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - .2 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

3.2 DISPOSAL

- .1 Dispose of removed materials, to appropriate recycling facilities or landfills except where otherwise specified, in accordance with approving authority.

END OF SECTION

Division 31 – Earthworks**Part 1 General****1.1 REFERENCES**

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

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.3 SITE CONDITIONS

- .1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in DF Technical & Consulting Services Ltd. Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Do not proceed until written instructions have been received from Departmental Representative.
 - .2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products**2.1 MATERIALS**

- .1 Refer to Section 31 00 11 – Aggregates and Granular Materials for specifications for approved granular materials and approved native materials. Execution

2.2 STOCKPILING

- .1 Stockpile fill materials in areas designated by the Departmental Representative. Stockpile granular materials in a manner to prevent segregation. Stockpile different types of fill material separately to avoid mixing.

2.3 BACKFILL AND COMPACTION

- .1 Approval: Proposed soils other than specified in section 31 00 11 are subject to approval by the Departmental Representative.
- .2 Subgrade Prep: not required for this scope of work
- .3 **151 Cave Avenue House and Structures:** Backfilling of the structure footprints should be completed with materials as per section 31 00 11 and should be placed in lifts with a maximum thickness of 250 mm depth lifts and compact. Compaction should consist of 8 passes with a minimum 5,000 lbs smooth drum compactor or as otherwise directed by the Departmental Representative. The Departmental

Representative shall be present to confirm adequate compaction and confirm the compaction regime with the contractor.

- .4 **549 Deer Street:** Backfilling of the structure footprint should be as per item 2.3.3 above.
- .5 **Common Excavation:** Backfilling of all common or general excavation should be as per item 2.3.3 above.
- .6 **Utilities Within the Lot:** Backfilling after the excavation and removal of utilities within the lot should be as per item 2.3.3 above.

2.4 COMPACTION TESTING

- .1 For all works within the project site, compaction testing will not be required. Backfilling and compaction is to be completed as per the above sections. The Departmental Representative is to be notified 48 hours prior to backfilling to review the compaction compliance.

END OF SECTION

Division 31 – Earthworks**Part 1 General****1.1 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 APPROVALS

- .1 Inform Departmental Representative of proposed source and provide samples or access for sampling at least 2 weeks prior to commencing production.
- .2 If materials from proposed source do not meet specified requirements, locate alternative source or demonstrate that materials from source in question can be processed to meet specified requirements.
- .3 Acceptance of material does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified.

Part 2 Products**2.1 MATERIALS GENERAL**

- .1 Gravel to be composed of inert, durable material, reasonably uniform in quality and free from soft or disintegrated particles.
- .2 All crushed gravel when tested according to ASTM C136 and ASTM C117, or latest revised issue, to have a generally uniform gradation and conform to following gradation limit and 60% of the material passing each sieve must have one or more fractured faces.

2.2 NATIVE MATERIAL

- .1 To be any workable soil obtained from the project limits, free of significant organic matter, frost, snow, frozen material or foreign debris; any material obtained within the limits of the contract may be deemed native material for purposes of payment and must be approved by the Departmental Representative. Native Material is not acceptable if it is impracticable to control its water content or compact to an approved density as specified by the Departmental Representative.

2.3 IMPORTED PITRUN MATERIAL SITE GRADING

- .1 To be well graded granular material, substantially free from clay lumps, organic matter and other extraneous material, screened to remove all stones in excess of maximum diameter specified in material description. Compact Material to specified density and conform to following gradations:

| Sieve Designation | Percent Passing | | |
|------------------------------|----------------------------|---|-----|
| 250 mm | 50 | - | 100 |
| 50 mm | 10 | - | 100 |
| 0.075 mm | 2 | - | 15 |

- .2 For cobbles and boulders greater than 250mm reference item 2.5 below.

2.4 IMPORTED DRAIN ROCK

- .1 To be consist of clean round stone or crushed rock conforming to following gradations:

| Sieve Designation | Percent Passing | | |
|------------------------------|----------------------------|---|-----|
| 50 mm | 60 | - | 100 |
| 19 mm | 25 | - | 100 |
| 4.75 mm | 0 | - | 10 |
| 0.075 mm | 0 | - | 2 |

- .2 Drain rock to be used only as specified by the engineer.

2.5 LARGE ROCK

- .1 Large cobbles and boulders (greater than 250 mm diameter) can be buried on site at a minimum of 200mm below finished grade elevation at the discretion of the Departmental Representative. They are to be placed and compacted around in such a way as to limit settlement and inconsistent compaction around the perimeter of the boulder/cobble. Multiple boulders should be placed in such a way as to avoid void spaces and settlement with backfilling.

Part 3 Execution

3.1 HANDLING

- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- .2 Do not use intermixed or contaminated materials. Remove and dispose rejected materials within 48 hrs or rejection.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 31 22 13 – Site Grading

1.2 REFERENCES

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

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 TEMPORARY EROSION CONTROL**

- .1 Provide temporary erosion control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 STRIPPING OF TOPSOIL

- .1 Remove topsoil before construction procedures commence to avoid intermixing of topsoil and subsoils.
- .2 Avoid mixing topsoil with subsoil.
- .3 Pile topsoil by mechanical hoe in berms in locations as directed by the Departmental Representative.
- .4 Dispose of unused topsoil in location as indicated by the Departmental Representative for later use.

3.3 PLACING

- .1 Upon completion of Section 31 22 13 – Site grading, spread stockpiled topsoil evenly over project area. Finished surface should be smooth, contoured, free of debris, and should not pose any tripping hazards.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 31 00 10 - Backfilling

1.2 EXISTING CONDITIONS

- .1 Known underground and surface utility lines and buried objects are the responsibility of the contractor to confirm in the field.

1.3 PROTECTION

- .1 Protect trees, natural features, bench marks, surface or underground utility lines which are to remain as directed by the Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

Part 2 Products**2.1 MATERIALS**

- .1 Aggregates and Granular Materials as per section 31 00 11.

Part 3 Execution**3.1 GENERAL**

- .1 Clear and grub limits of excavation and/or embankment in accordance with section 31 14 13 – Topsoil stripping and stockpiling.
- .2 Slope rough grade away from structures at 2%. Post-demolition site grades should generally slope away from the site at 2% or greater. No low spots or ponding should occur on site.
- .3 Provide positive drainage to nearby ditches and drainage courses where possible.
- .4 Do not disturb soil within branch spread of trees or shrubs to remain.

3.2 COMMON EXCAVATION

- .1 The Geotechnical engineer should be on site to review the in-situ soils as they are exposed to confirm their suitability for placement on the site.
- .2 151 Cave Ave: Since the house is situated on a relatively flat plateau and slopes down sharply to the driveway/road, fill can be cut and generated from this slope as necessary to average out the overall slope that will allow for a gentler overall

slope (back to front) and will better suit the natural pre-development topography. The existing gravel driveway should remain undisturbed.

- .3 549 Deer Street: Fill can be generated from the perimeter of the demolished structure to fill in the building footprint as described below. Additional fill may be required and can be imported from the 151 Cave Ave site or from offsite sources if approved by the geotechnical engineer.

3.3 PLACING

- .1 Place materials to full width in uniform layers and compact to the specifications in section 31 00 10 to the approval of the geotechnical engineer. Shape each layer to smooth contour and compact before the succeeding layer is placed.
- .2 Materials placed at the base of slopes, cut slopes, building footprints, or retaining walls, should not exceed a steepness of 3H:1V.

3.4 FINISH SURFACE PREPARATION

- .1 If topsoil remains onsite, it can be spread at uniform depth on the finish grade.
- .2 Eliminate uneven areas and low spots.
- .3 Remove debris, roots, branches, stones, in excess of 50 mm (2 inch) in size. Remove subsoil contaminated with petroleum products.
- .4 Scarify surface to depth of 75 mm (3 inches) where seeding is scheduled.

3.5 SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping off site, and or blend in remaining material throughout the site to discard of excess material.

END OF SECTION

Division 32 – Surface Works Removals**Part 1 General****1.1 REFERENCES**

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

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.3 SITE CONDITIONS

- .1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in DF Technical & Consulting Services Ltd. Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Do not proceed until written instructions have been received from Departmental Representative.
 - .2 Notify Departmental Representative before disrupting building access or services.

Part 2 Products**2.1 NOT USED****Part 3 Execution****3.1 PREPARATION**

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.

3.2 PROTECTION

- .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features to remain in place.
- .2 Keep noise, dust, and inconvenience to minimum.
- .3 Do Work in accordance with Section 01 35 29 - Health and Safety Requirements.

3.3 SITE REMOVALS

- .1 Remove items as indicated within this report.
- .2 Removal of Pavements:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials.
 - .4 Reshape and contour base gravels as per section 31 22 13 after pavement removal.
- .3 Removal all concrete sidewalk, footings, foundations, paving, paving stones etc. within the project area.
- .4 Removal all retaining walls except for the timber retaining wall remaining on 549 Deer Street North property line – which is to remain in place as to not disturb the adjacent lot or structure. Backfilling against any remaining cut slopes or retaining structures is to be completed as per section 31 00 10 – Backfilling and compaction, and section 31 22 13 – Site Grading.
- .5 All utility surface features such as valves, curbstops, cleanouts, transformers etc. within the lot boundaries are to be removed and disposed of.

3.4 DISPOSAL

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

END OF SECTION

Part 1 General

1.1 PAYMENT

- .1 Payment for seeding made as per bid price upon approval of the hydro seeding work by Departmental Representative.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, mulch, tackifier.
- .2 Submit in writing to Departmental Representative seven (7) days prior to commencing work:
 - .1 Volume capacity of hydraulic seeder in litres.
 - .2 Amount of material to be used per tank based on volume.
 - .3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, and installation instructions.

1.4 SCHEDULING

- .1 Schedule hydraulic seeding to coincide between dates recommended by the Departmental Representative. Contractor to coordinate timelines upon confirmation of ground conditions.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.

- .1 Grass mixture:
 - Mix #1B Open Coniferous**
 - Fringed brome 13%
 - Hairy wild rye 13%
 - Awned wheatgrass 13%
 - Northern wheatgrass 10%
 - Rocky Mtn fescue 10%
 - June grass 9%
 - Blue bunch wheatgrass 7%
 - Idaho fescue 7%
 - Foothills rough fescue 7%
 - Alpine bluegrass 6%
 - Spike trisetum 5%
- .2 Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:
 - .1 Type I mulch:
 - .1 Made from wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 Value of pH: 6.0.
 - .4 Potential water absorption: 900%.
- .3 Tackifier: water dilutable, liquid dispersion, water soluble vegetable carbohydrate powder.
- .4 Water: free of impurities that would inhibit germination and growth.

Part 3 Execution

3.1 EXAMINATION

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

3.2 PROTECTION OF EXISTING CONDITIONS

- .1 Protect structures, signs, guide rails, fences, plant material, utilities and other surfaces not intended for spray.
- .2 Immediately remove any material sprayed where not intended as directed by Departmental Representative.

3.3 PREPARATION OF SURFACES

- .1 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, frozen ground or ground covered with snow, ice or standing water.
- .2 Fine grade areas to be seeded free of humps and hollows.
 - .1 Ensure areas are free of deleterious and refuse materials.
- .3 Cultivated areas identified as requiring cultivation to depth of 25 mm.
- .4 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .5 Obtain Departmental Representative's approval of grade before starting to seed.

3.4 PREPARATION OF SLURRY

- .1 Measure quantities of materials by weight or weight-calibrated volume measurement satisfactory to Departmental Representative. Supply equipment required for this work.
- .2 Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
- .3 After materials are in seeder and well mixed, charge tackifier into seeder and mix thoroughly to complete slurry.

3.5 SLURRY APPLICATION

- .1 Hydraulic seeding equipment:
 - .1 Slurry tank.
 - .2 Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculation of slurry and or mechanical agitation method.
 - .3 Pumps capable of maintaining continuous non-fluctuating flow of solution.
 - .4 Supplied with not less than 6 spray pattern nozzles.
 - .5 Capable of seeding by 50 m hand operated hoses and appropriate nozzles.
 - .6 Tank volume to be certified by certifying authority and identified by authorities "Volume Certification Plate".
- .2 Slurry mixture applied per hectare.
 - .1 Seed: grass mixture 25 kg.
 - .2 Mulch: Type I 1250 kg.
 - .3 Tackifier: 20 kg.
 - .4 Water: Minimum 30,000 L.
- .3 Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - .1 Using correct nozzle for application.
 - .2 Using hoses for surfaces difficult to reach and to control application.

- .4 Blend application 300 mm into adjacent grass areas, previous applications to form uniform surfaces.
- .5 Re-apply where application is not uniform.
- .6 Remove slurry from items and areas not designated to be sprayed.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.

3.7 PROTECTION

- .1 Protect seeded areas from trespass until plants are established.
- .2 Remove protection devices as directed by Departmental Representative.

3.8 ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Hydro seeding work completed is compliant with the requirements outlined in Part 1 to Part 3 of this section.

END OF SECTION

Division 33 – Utilities**Part 1 General****1.1 REFERENCES**

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

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.3 SITE CONDITIONS

- .1 Should material resembling asbestos, contaminated soil or other designated substance listed as hazardous be encountered that is not identified in DF Technical & Consulting Services Ltd. Hazardous Material Report, stop work, take preventative measures, and notify Departmental Representative immediately.
 - .1 Do not proceed until written instructions have been received from Departmental Representative.
 - .2 Notify Departmental Representative before disrupting building access or services.

1.4 STANDARD OF WORK

- .1 All work and approvals should be carried out as per the Town of Banff's Water System and Sewer Bylaws.

Part 2 Products and Approvals

- 2.1 All fittings and materials to conform to Town of Banff Sewer and Water Bylaws.

Part 3 Execution**3.1 LIMITS OF REMOVAL**

- .1 **151 Cave Ave Site:** All utilities shall be removed on the lot as close to the existing (live) main as practically possible; For the 151 Cave Ave site, all utilities (Water/Sanitary/Electrical/Gas/Communications) shall be disconnected up to the property line unless specifically stated otherwise.
- .2 **549 Deer Street Site:** Electrical, gas and communications are to be removed to the property line unless specifically stated otherwise by their respective utility companies. The water service is to be removed to the property line. The Sanitary service shall be removed entirely up to the property line.

3.2 UNDERGROUND UTILITY REMOVALS AND ABANDONMENT

- .1 Sewer Mains and Sewer Services are to be removed entirely within the project area as stated in 3.1 of this section. Where the main or service is removed to the property line, the remaining pipe shall be capped and sealed with an appropriate sized manufactured compression/mechanical type plug. Abandonment of sewer infrastructure should be carried out as per section 403.14.00 in the City of Calgary Standard Specifications
- .2 Watermains and Services are to be removed entirely within the project area up to the property line as stated in 3.1 of this section. The water service curb stop shall be shut off with the curbstop stem being removed. The remaining service shall be capped/sealed with a brass plug 300mm into the lot from the remaining curbstop valve. Abandonment of water infrastructure should be carried out as per section 504.07.00 in the City of Calgary Standard Specifications
- .3 Shallow utilities infrastructure (Electrical/Gas/Communications) shall be removed from the project site up to the property line once decommissioned by their respective companies – i.e. Fortis Alberta and Atco Gas. It is the responsibility of the contractor to coordinate shallow utility disconnections.

3.3 DISPOSAL

- .1 Dispose of removed materials, to appropriate recycling facilities or landfills except where otherwise specified, in accordance with approving authority.

3.4 BACKFILLING, COMPACTION AND RESTORATION

- .1 Areas of disturbance shall be restored as per sections 31 22 13 – Site Grading.
- .2 Backfilling and Compaction is to be completed as per section 31 00 10 Backfilling and Compaction.

3.5 RECORD DRAWINGS

- .1 The contractor is to mark all abandoned utilities with a marker post and record dimensions and sizes of abandoned utility stubs.

END OF SECTION



Appendix A

Construction Documents Narrative

Project No. R075719.001
BNP Staff Housing Demolition

Banff National Park (BNP)
Banff, Alberta

Dec 22, 2015

TABLE OF CONTENTS

| | | |
|----------|---|-----------|
| 1 | Introduction | 3 |
| 2 | Construction Documents for 151 Cave Avenue..... | 3 |
| 2.1 | <i>Site</i> | 3 |
| 2.2 | <i>Buildings</i> | 5 |
| 2.3 | <i>Civil</i> | 6 |
| 2.3.1 | Site Grading | 6 |
| 2.3.2 | Surface Removals..... | 6 |
| 2.3.3 | Utilities..... | 8 |
| 2.4 | <i>Landscaping</i> | 9 |
| 2.4.1 | Landscape Decommissioning..... | 9 |
| 2.4.2 | Landscape Rehabilitation..... | 13 |
| 2.4.3 | Maintenance..... | 13 |
| 2.4.4 | Summary..... | 14 |
| 3 | Construction Documents for 549 Deer Street (Tenplex) | 14 |
| 3.1 | <i>Site</i> | 14 |
| 3.2 | <i>Buildings</i> | 18 |
| 3.3 | <i>Civil</i> | 19 |
| 3.3.1 | Site Grading | 19 |
| 3.3.2 | Surface Removals..... | 20 |
| 3.3.3 | Utilities..... | 21 |
| 3.4 | <i>Landscaping</i> | 23 |
| 3.4.1 | Landscape Decommissioning..... | 23 |
| 3.4.2 | Landscape Rehabilitation..... | 25 |
| 3.4.3 | Maintenance..... | 26 |
| 3.4.4 | Summary..... | 26 |
| 4 | Regulatory Analysis | 26 |
| 4.1.1 | Environmental Assessment..... | 26 |
| 4.1.2 | Hazardous Materials Assessment and abatement | 26 |
| 4.1.3 | Federal Government and Regulatory Bodies..... | 26 |



1 INTRODUCTION

The Construction Documents pertain to the demolition of 151 Cave Avenue (Block 7, Lot 31B) and 549 Deer Street (Block 30, Lots 18-20) located in the Town of Banff, Banff National Park, Alberta.

Location Maps can be found for each property in Appendix 'B'.

This document is to be read in conjunction with the Specifications.

2 CONSTRUCTION DOCUMENTS FOR 151 CAVE AVENUE

2.1 SITE

2.1.1



Site Plan – 151 Cave Avenue (Block 7, Lot 31B)

The Contractor is to identify property boundaries as necessary for removal of all utility infrastructure; this will require the Contractor to hire a legal surveyor to survey the property and locate corner pins, property lines, utilities, etc.



- 2.1.2** - Asphalt surface to be removed
 - O.H power line to be removed



- 2.1.3** - Wood deck, railing, gate, stairs and
 structure below to be removed
 - All sub-surface concrete footings
 associated with deck to be removed



- 2.1.4** - Gravel driveway to remain



- Gravel driveway to remain



2.2 BUILDINGS

- 2.2.1** - Garage to be removed. All concrete (slab, foundation and upstand) to be removed

(Garage photo – exterior)



(Garage photo – interior)



- 2.2.2** - House to be removed including concrete foundations
- Wood deck, railing, gate, stairs and structure below to be removed
- All sub-surface concrete footings associated with deck to be removed



- House to be removed including concrete foundations
- Wood deck, railing, gate, stairs and structure below to be removed
- All sub-surface concrete footings associated with deck to be removed



2.3 CIVIL

2.3.1 SITE GRADING

Once the bungalow, the garage, and their associated subsurface features such as footings and foundations are removed, the site will require regrading to fill in the exposed excavations. This will likely be a field fit exercise with fill generated from excess material on the site itself. Since the house is situated on a relatively flat plateau and slopes down sharply to the driveway/road, fill can be cut from this slope as necessary to average out the overall slope that will allow for a more consistent gradient (back to front) that will better suit the natural pre-development topography. Measured compaction testing is not required for the site, and backfilling and compaction within the project site shall be carried out as per Specification Section 31 00 10. Notice shall be given to the Departmental Representative (Civil Engineer) to review compliance to the backfilling specifications until directed otherwise.

Special care shall be taken when removing the rear garage foundation as it is embedded in the rear slope. Care shall be taken not to disturb the stability of the existing slope and backfilling is to take place immediately as to reduce the likelihood of disturbing the existing slope. This is to be completed under the review of the Departmental Representative (Civil Engineer). The slope shall be stabilized with appropriate compacted backfill to match the existing undisturbed natural slope. All site grading is to be completed as per Specification Section 31 22 13.

2.3.2 SURFACE REMOVALS

The existing gravel driveway will remain undisturbed to allow for future vehicle access. All pavement, concrete and masonry surface features are to be removed as well.





Figure 1: Slope to be backfilled and compacted once garage embedded in slope is removed.



Figure 2: All asphalt, concrete and masonry surface works to be removed.



Figure 3: Grassed landscape hill that is to be cut down and re-contoured to generate fill for backfilling building footprint of house, garage and tenplex.

2.3.3 UTILITIES

Services to the existing structure include a $\frac{3}{4}$ " copper water service, a 3" ABS sanitary service, Gas, underground electrical and communications (telephone/cable). All sanitary and water services shall be removed in their entirety up to the property line. The $\frac{3}{4}$ " copper water service shall be shutoff at the curbstop, with the curbstop stem and top box being completely removed. The service shall be cut and sealed at the property line.

The Sanitary service shall be removed to the property line and capped with an appropriately sized permanent cap.

Gas and electrical services shall be shutoff and decommissioned prior to demolition by the corresponding utility company (Fortis Alberta/Atco Gas). After decommissioning, the remaining gas lines and electrical conduits shall be removed and capped to the property lines, or a more suitable location as directed by the respective utility company.

Telephone and communications can be cut off at the property line.

All Services that are excavated and removed shall be backfilled with native existing backfill as per Spec Section 31 00 10. The contractor is to provide record drawings of all shallow and deep utility stub outs and cut off points for future development consideration. All Service removals are to be completed as per section 33 00 10.





Figure 4: 151 Cave Ave curbstop and water service to be decommissioned and removed.

2.4 LANDSCAPING

On-site landscape areas reviewed included: the gravel access road, earth berm on North side of bungalow, treed areas on North West, East and South side of existing bungalow, paver patio and fireplace on the south side of the house, a wood deck on the East and North sides of the house and a low retaining wall along part of the western property line. The retaining wall will NOT be removed as it will directly affect the soil structure of the existing trees on the neighbouring property. The gravel access road is to be maintained as is for future construction access purposes.

Re-vegetation efforts will be concentrated on the restoration of area of disturbance with Parks Canada approved seed mix.

2.4.1 LANDSCAPE DECOMMISSIONING

REMOVAL OF SURFICIAL FEATURES

Following human-made surficial landscape features shall be removed to a minimum of 150mm below finished grade for landscape areas without foundation e.g. paver patio and to the top of compacted gravel base for other extensive landscape features e.g. fire place. The remaining void shall be filled with onsite fill as per civil engineering specifications. Refer to specification section 32 00 10 for further details.

- Paver patio and fireplace. Any concrete footing associated with fireplace is to be entirely removed;



- Wood deck on East and North sides of bungalow. Posts, beams, railing, wood gate, stairs associated with wood deck and associated concrete footing is to be entirely removed;
- Miscellaneous landscape items as follows:

2.4.1.2 Remove paver patio and fireplace



2.4.1.3 Remove concrete wheel stops near garage



2.4.1.4 Remove barrels near site entrance



- 2.4.1.5** Remove wood post near garage



- 2.4.1.6** Remove entry feature located along gravel access road



TREE PROTECTION

Unless indicated otherwise, all trees within 15m of work shall be clearly flagged and delineated. No demolition/rehabilitation work shall occur around these trees' drip-line, including filling, scarifying, stripping, etc. Place protective fence and maintain the fence for the duration of the work, 4.0m from trunk or at the drip line, whichever is greater. Tree protection fence is to be installed at areas outlined in the site plan (Appendix C) defining Tree Protection Zones. Location of tree protection fence is to be confirmed with the Departmental Representative prior to installation.

Tree Protection Zones (TPZ)

Within a TPZ there must be:

- no construction;
- no altering of grade by adding fill, excavating, trenching, scraping, dumping or disturbance of any kind.
- no storage of construction materials, equipment, soil, construction waste or debris.



- no disposal of any liquids e.g. concrete sleuth, gas, oil, paint.
- no movement of vehicles, equipment or pedestrians.
- no parking of vehicles or machinery.
- open face cuts outside a TPZ that are consistent with direction provided by Departmental Representative and that require root pruning, require the services of a qualified arborist or approved tree professional. An exploratory dig, either by hand or using a low water pressure hydro vac method, must be completed prior to commencing with open face cuts outside the TPZ.

The above mentioned requirements are for area(s) designated as a TPZ. These requirements shall also be implemented outside the TPZ in areas where tree roots are located. The roots of a tree can extend from the trunk to approximately 2-3 times the distance of the dripline.

Tree Protection Barriers

- Plywood tree protection hoarding or steel fence tree protection hoarding shall be installed in locations as shown on the schematic landscape plans in Appendix C or as additionally required by Departmental Representative. Tree protection shall be installed to the satisfaction of Departmental representative. Within a Town road allowance where visibility is a consideration, 1.2m (4ft) high orange plastic web snow fencing on a 2"x 4" frame shall be used.

- All supports and bracing used to safely secure the barrier shall be located outside the TPZ. All supports and bracing shall minimize damage to roots.

- Where some fill or excavate must be temporarily located near a TPZ, a plywood barrier must be used to ensure no material enters the TPZ.

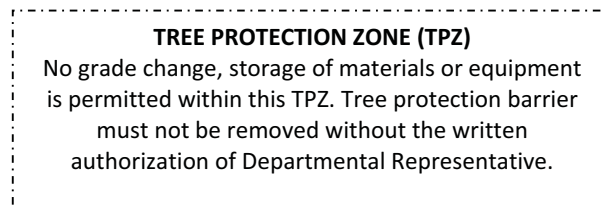
- Any area designated for stockpiling of excavated soil must be fenced with sediment control fencing. Sediment control fencing shall be installed in the locations as indicated by Departmental Representative. The sediment control fencing can be attached to the tree protection hoarding.

- Once all tree/site protection measures have been installed contractor must notify Departmental Representative to arrange for an inspection of the site and approval of the site protection requirements.

- Where changes to the location of the TPZ or where temporary access to the TPZ are proposed, contractor must contact Departmental Representative to obtain approval.

Tree Protection Signage

A sign that is similar to the illustration below will be required to be mounted on all sides of a Tree Protection Barrier for trees protected. The sign shall be a minimum of 40cm x 60cm and made of white gator board or equivalent material.



TREE REMOVAL

Given the location of services lines along property line is currently unknown, the impact of servicing lines removal on existing trees on the NW side of bungalow cannot be anticipated precisely at this time. It is estimated that approximately ± 10 trees would need to be removed in order to facilitate the removal of services lines i.e. water and sanitary. Upon confirmation of service lines location through survey to be done by Contractor, a suitable approach for removal and capping of services lines can be developed in order to minimize any tree removals and to minimize disturbance to existing trees.

Any trees identified for removal are to be flagged by Contractor for review; approval for removal by Departmental Representative. Any scheduled tree removal must be undertaken prior to March 15, 2016. Tree trunks of trees removed are to be taken to Peyto Pit (local) by the Contractor and small branches of trees removed are to be chipped and hauled away by Contractor. Refer to specifications section 01 35 43 for further details.

2.4.2 LANDSCAPE REHABILITATION

TOPSOIL & SEEDING

All disturbed areas are to be filled, evenly graded as per civil engineering specifications section 31 00 10, 31 22 13 and hydro seeded as per the hydro seeding specifications section 32 92 19.16 for the area outlined in the schematic landscape site plan (Appendix 'C'). No topsoil is to be imported for the seeding purposes.

Seed Mix to be used for hydro seeding:

Mix #1B Open Coniferous

Fringed brome 13%
Hairy wild rye 13%
Awned wheatgrass 13%
Northern wheatgrass 10%
Rocky Mtn fescue 10%
June grass 9%
Blue bunch wheatgrass 7%
Idaho fescue 7%
Foothills rough fescue 7%
Alpine bluegrass 6%
Spike trisetum 5%

All disturbed areas be hydro-seeded via hydro-mulch complete with a tackifier in lieu of an erosion control mat. Refer to the hydro seeding specifications 32 92 19.16 for further details.

VEGETATION

No tree or shrub planting is proposed for reclamation of this site.

2.4.3 MAINTENANCE

Parks Canada shall provide periodic maintenance to control non-native weeds for a period of three years after rehabilitation.



2.4.4 SUMMARY

In summary, all disturbed areas shall be rehabilitated with hydro-seeding with Parks Canada approved seed mix. All human-made surficial landscape features shall be removed with the exception of gravel access road and the retaining wall along the West property line.

3 CONSTRUCTION DOCUMENTS FOR 549 DEER STREET (TENPLEX)

3.1 SITE

3.1.1



Site Plan – 549 Deer Street (Block 30, Lots 18-20)

The Contractor is to identify property boundaries as necessary for removal of all utility infrastructure; this will require the Contractor to hire a legal surveyor to survey the property and locate corner pins, property lines, utilities, etc.

- 3.1.2**
- Wood retaining wall to be removed (SW corner)
 - Electrical outlets and conduit to be removed to source
 - Wood posts to be removed and any sub-surface concrete



- Wood retaining walls to be removed (SW corner)



- Wood retaining walls to be removed (SW corner)



- 3.1.3**
- Wood retaining wall to remain (at NW corner)
 - Concrete planter to be removed
 - Metal barrel to be removed
 - Signage to be removed



- Wood retaining wall to remain (at NW corner)
- Signage to be removed



- Wood retaining wall to remain (at north boundary)



- Wood retaining wall to remain (at north boundary)



- 3.1.4** - Wood retaining walls to be removed (SE corner)



- 3.1.5** - Wood stairs to be removed
- Retaining wall at north boundary to remain



- Wood stair and walkway to be removed



3.1.6 - Wood deck, railing, steps and associated posts and beams to be removed



- Wood deck, railing, steps and associated posts and beams to be removed



- Wood posts and beams to be removed
- All sub-surface concrete to be removed



3.1.7 - Asphalt in parking area to be removed



- Asphalt in parking area to be removed



3.1.8 - Slide to be removed



3.2 BUILDINGS

3.2.1 - Tenplex apartment building to be removed



(Tenplex – west elevation)



- Tenplex apartment building to be removed



(Tenplex – north elevation)

- Tenplex apartment building to be removed



(Tenplex - east elevation)

- Tenplex apartment building to be removed



(Tenplex – south elevation)

3.3 CIVIL

3.3.1 SITE GRADING

The structure is to be removed in its entirety including the foundations, foundation walls, footings, and slabs etc. This will leave approximately 8ft on the rear of the building and sides that will require backfill to provide a stable transition from grade difference from the rear of the building to front. This



transition is to be cut down and field fit once the structure is removed. Only fill and young vegetation shall be removed to cut the slope down to match the original pre-development topography.

Additional imported fill is required to provide an appropriate slope for the transition from the rear grade to the front. **Approximately 250 m³ of additional fill is required to fill and grade the building footprint at safe side slopes as per Specification Section 31 22 13.** Imported soils must conform to section 31 00 11.

In the event that excess native material is left over from the 151 Cave Ave site, it may be used as fill in place of offsite imported material. A minimum slope of 2% shall be maintained throughout the lot for positive drainage away from the building footprint. Backfilling and compaction within the project site shall be as per Specification Section 31 00 10. Backfilling, compaction and site grading are to be reviewed on site by the Departmental Representative (Civil Engineer). All site grading is to be completed as per Specification Section 31 22 13.

3.3.2 SURFACE REMOVALS

The treated lumber retaining wall on the North side of the project area shall remain in place as to not disturb the neighboring lot or structure; however, this is to be backfilled and sloped into the lot to increase long term durability and keep the retaining structure maintenance free. All asphalt, concrete, parking pedestals, retaining walls, and vehicle plug-ins are to be removed, leaving only the base gravels in place.



Figure 5: Timber retaining wall to remain in place as to not disturb the adjacent property.



Figure 6: Asphalt surface to be removed and fine graded to allow for positive drainage away from the structure.

3.3.3 UTILITIES

Services to the structure include a 2" copper water service and a 6" PVC sanitary sewer service that enter the building via the fronting lane which serves as a utility corridor connecting to the mains on Marmot St. and Banff Ave. Underground electrical, gas and communications service the structure in a similar fashion.

All sanitary and water services shall be removed in their entirety up to the property line. The 2" copper water service shall be shutoff at the curbstop, with the curbstop stem and top box being completely removed. The service shall be cut and sealed at the property line.

The Sanitary service shall be removed to the property line and capped with an appropriately sized permanent cap.

Gas and electrical services shall be shutoff and decommissioned prior to demolition by the corresponding utility company (Fortis Alberta/Atco Gas). After decommissioning, the remaining gas lines and electrical conduits shall be removed and capped to the property lines, or a more suitable location as directed by the respective utility company.

Telephone and communications can be cut off at the property line.

After being properly decommissioned, the shallow utilities are to be removed from the site up to the property line or to a more suitable location as specified by the associated utility provider. The contractor is to provide record drawings of all shallow and deep utility stub outs and cut off points for future development consideration.



4500' EASEMENT

NEW 150' SAN @ 2.0%
L=51200'

EXIST. SAN. M.H.
RIM EL.: 1390.647

NEW SAN. M.H.
RIM EL. SET IN FIELD

NEW 50' WATER

EX. 150' WATER

EX. 30' M.P. GAS

NEW M.P. GAS
SUP FOR 22.0 CMH

Sanitary service to be removed to PL

Timber Retaining Wall to remain

INV.: 65.907

PROPOSED 10 SUITE
STAFF HOUSING
LOWER FIN. FL. EL. 1388.75

Approximate area of existing dirt mound to be used as structure footprint fill

Water and shallow utilities to be removed to PL

12/30/20

ARMOT ST.

22



Figure 8: Fill material to be used to fill in building footprint excavation.

3.4 LANDSCAPING

On-site landscape areas reviewed included: treated wood retaining walls on the north and south sides of the parking area, wood stairs along north side of the building, a large wood deck and a steel playground slide along the eastern face of the building.

3.4.1 LANDSCAPE DECOMMISSIONING

REMOVAL OF SURFICIAL FEATURES

The following human-made surficial landscape features shall be removed to the top of compacted gravel base and the remaining void shall be filled with onsite fill as per civil engineering specifications. Refer to specifications section 32 00 10 for further details.

- Wood stairs and wooden pathways assembly along building perimeter;
- Low wood retaining walls on South side of parking lot;
- Wood deck and playground slide along Eastern face of building. Posts, beams of wood deck and associated concrete footing is to be entirely removed;
- Picnic table
- Concrete movable planters;
- Asphalt parking pad

TREE PROTECTION

Unless indicated otherwise, all trees within 15m of work shall be clearly flagged and delineated. No demolition/rehabilitation work shall occur around these trees' drip-line, including filling, scarifying, stripping, etc. Place protective fence and maintain the fence for



the duration of the work, 4.0m from trunk or at the drip line, whichever is greater. Tree protection fence is to be installed at areas outlined in the site plan (Appendix C) defining Tree Protection Zones. Location of tree protection fence is to be confirmed with the Departmental Representative prior to installation.

Tree Protection Zones (TPZ)

Within a TPZ there must be:

- no construction;
- no altering of grade by adding fill, excavating, trenching, scraping, dumping or disturbance of any kind.
- no storage of construction materials, equipment, soil, construction waste or debris.
- no disposal of any liquids e.g. concrete slush, gas, oil, paint.
- no movement of vehicles, equipment or pedestrians.
- no parking of vehicles or machinery.
- open face cuts outside a TPZ that are consistent with direction provided by Departmental Representative and that require root pruning, require the services of a qualified arborist or approved tree professional. An exploratory dig, either by hand or using a low water pressure hydro vac method, must be completed prior to commencing with open face cuts outside the TPZ.

The above mentioned requirements are for area(s) designated as a TPZ. These requirements shall also be implemented outside the TPZ in areas where tree roots are located. The roots of a tree can extend from the trunk to approximately 2-3 times the distance of the dripline.

Tree Protection Barriers

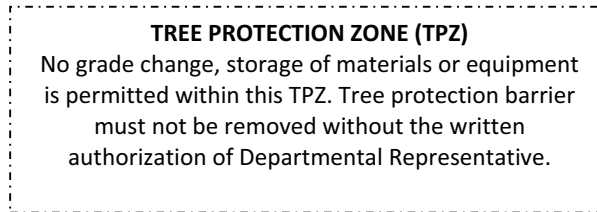
- Plywood tree protection hoarding or steel fence tree protection hoarding shall be installed in locations as shown on the schematic landscape plans in Appendix C or as additionally required by Departmental Representative. Tree protection shall be installed to the satisfaction of Departmental Representative. Within a Town road allowance where visibility is a consideration, 1.2m (4ft) high orange plastic web snow fencing on a 2"x 4" frame shall be used.

- All supports and bracing used to safely secure the barrier shall be located outside the TPZ. All supports and bracing shall minimize damage to roots.
- Where some fill or excavate must be temporarily located near a TPZ, a plywood barrier must be used to ensure no material enters the TPZ.
- Any area designated for stockpiling of excavated soil must be fenced with sediment control fencing. Sediment control fencing shall be installed in the locations as indicated by Departmental Representative. The sediment control fencing can be attached to the tree protection hoarding.
- Once all tree/site protection measures have been installed contractor must notify Departmental Representative to arrange for an inspection of the site and approval of the site protection requirements.
- Where changes to the location of the TPZ or where temporary access to the TPZ are proposed, contractor must contact Departmental Representative to obtain approval.



Tree Protection Signage

A sign that is similar to the illustration below will be required to be mounted on all sides of a Tree Protection Barrier for trees protected. The sign shall be a minimum of 40cm x 60cm and made of white gator board or equivalent material.



TREE REMOVAL

It is estimated that approximately ± 5 trees will need to be removed in order to facilitate the removal of patio spaces and building components.

Any trees identified for removal are to be flagged by Contractor for review; approval for removal by Departmental Representative. Any scheduled tree removal must be undertaken prior to March 15, 2016. Tree trunks of trees removed are to be taken to Peyto Pit (local) by the Contractor and small branches of trees removed are to be chipped and hauled away by Contractor. Refer to specifications section 01 35 43 for further details.

3.4.2 LANDSCAPE REHABILITATION

TOPSOIL & SEEDING

All disturbed areas are to be filled, evenly graded as per civil engineering specifications section 31 00 10, 31 22 13 and hydro seeded as per the hydro seeding specifications section 32 92 19.16 for the area outlined in the schematic landscape site plan (Appendix 'C'). No topsoil is to be imported for the seeding purposes.

Seed Mix to be used for hydro seeding:

Mix #1B Open Coniferous

Fringed brome 13%
Hairy wild rye 13%
Awned wheatgrass 13%
Northern wheatgrass 10%
Rocky Mtn fescue 10%
June grass 9%
Blue bunch wheatgrass 7%
Idaho fescue 7%
Foothills rough fescue 7%
Alpine bluegrass 6%
Spike trisetum 5%



All disturbed areas be hydro-seeded via hydro-mulch complete with a tackifier in lieu of an erosion control mat. Refer to the hydro seeding specifications section 32 92 19.16 for further details.

VEGETATION

No tree or shrub planting is proposed for reclamation of this site.

3.4.3 MAINTENANCE

Parks Canada shall provide periodic maintenance to control non-native weeds for a period of three years after rehabilitation.

3.4.4 SUMMARY

In summary, all disturbed areas shall be rehabilitated with hydro-seeding with Parks Canada approved seed mix. All human-made surficial landscape features shall be removed.

4 REGULATORY ANALYSIS

4.1.1 ENVIRONMENTAL ASSESSMENT

Environmental Assessment Reports have been received from PCA. See Appendix 'D'.

Any additional Environmental Assessments required for this project will be managed by PWGSC and PCA.

4.1.2 HAZARDOUS MATERIALS ASSESSMENT AND ABATEMENT

D.F. Technical Consulting Services Ltd. was contracted by PCA to perform hazardous materials assessments for both 549 Deer Street (July 2015) and 151 Cave Avenue (August 2015). See Appendix 'E' for complete reports.

Refer to Specifications Division 2 (Existing Conditions) for the full Hazardous Materials Abatement Scope of Work. The hazardous materials abatement procedure shall be completed before the demolition of the buildings occurs.

4.1.3 FEDERAL GOVERNMENT AND REGULATORY BODIES

- Parks Canada Agency
- Public Works and Government Services Canada
- Environmental Assessment Office
- Canada Occupational Health and Safety Regulations
- Canada Labour Code
- The NRC National Building Code of Canada 2010
- Canadian Environmental Assessment Act and Regulations
- National Fire Protection Association (NFPA) standards
- The NRC National Fire Code of Canada 2010
- Transportation of Dangerous Goods
- Land Use Bylaw, Town of Banff
- Parks Canada's Environment Practices for Banff National Park (Directive 17)





Appendix B Location Maps

**Project No. R075719.001
BNP Staff Housing Demolition**

**Banff National Park (BNP)
Banff, Alberta**

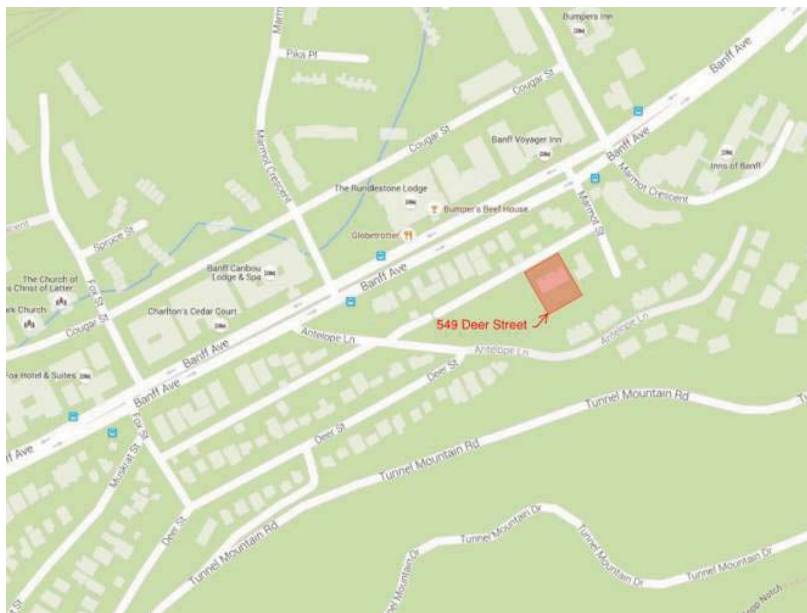
Dec 22, 2015

LOCATION MAPS

151 Cave Avenue (Map #1)



549 Deer Street (Map #2)





Appendix C

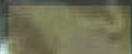

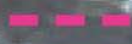
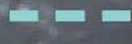
Schematic Landscape Site Plans

Project No. R075719.001
BNP Staff Housing Demolition

Banff National Park (BNP)
Banff, Alberta

Dec 22, 2015

LEGEND

-  APPROXIMATE EXTENT OF HYDROSEEDING
-  APPROXIMATE LOCATION OF TREE PROTECTION FENCE
* TO BE VERIFIED WITH CONSULTANT ON SITE PRIOR TO
-  APPROXIMATE LIMIT OF DISTURBANCE
-  APPROXIMATE LOCATION OF CONSTRUCTION FENCE

SCALE (APPROXIMATE)



*** IMPORTANT NOTE:
GIVEN THE LOCATION OF THE UNDERGROUND
UTILITIES IS CURRENTLY UNKNOWN FOR THE
151, CAVE AVENUE SITE, THE LIMIT OF
DISTURBANCE AND ASSOCIATED EXTENT OF
HYDROSEEDING AND LENGTH OF TREE
PROTECTION FENCE MAY VARY.

151 CAVE AVENUE



LEGEND

-  APPROXIMATE EXTENT OF HYDROSEEDING
-  APPROXIMATE LOCATION OF TREE PROTECTION FENCE
* TO BE VERIFIED WITH CONSULTANT ON SITE PRIOR TO INSTILLATION
-  APPROXIMATE LIMIT OF DISTURBANCE
-  APPROXIMATE LOCATION OF CONSTRUCTION FENCE

SCALE (APPROXIMATE)



549 DEER STREET



Appendix D Environmental Assessments

**Project No. R075719.001
BNP Staff Housing Demolition**

**Banff National Park (BNP)
Banff, Alberta**

Dec 22, 2015



Banff Environmental Assessment Office Environmental Screening Determination

Registration Information

| | | | |
|---------------------------------|--|-------------------------------|--------------|
| TITLE: | Parks Canada Demolition of Ten Plex and 151 Cave Ave Town of Banff | | |
| Field Site: | Banff National Park | Responsible Authority: | Parks Canada |
| BNP Registration Number: | BNP-001049 | | |
| EA Type: | Best Management Practices (BMPs) | | |
| Screening Done By: | Laurie Macdonald | | |
| EA Report Posted Date | 05-Sep-15 | | |
| | Land | | |

PROJECT TYPE: Either 1. or 2. but not both

| | |
|-------------------------------------|--|
| 1. Physical Work : | Buildings / Bâtiments |
| 2. Physical Activity (Code): | |
| Project Descriptors : | <input type="checkbox"/> 1 Decommissioning |
| | <input type="checkbox"/> 2 |
| | <input type="checkbox"/> 3 |

Project Description

| | |
|---------------------------------------|--|
| Project Description (English): | Parks Canada proposes to demolish two housing units that are beyond repair. Both units are no longer in full use and are considered of lowest value to the field unit. The Town of Banff is requesting lands to support low income rental property which is desperately needed. It is in Parks Canada's best interest to demolish the structures prior to land acquisition negotiations. |
| Geographic Location: | Banff National Park |
| Project Manager: | Laurie Macdonald |
| Project manager phone number: | |

Public Review

Project to Undergo Public Review: ☐

Review Locations:

| | |
|--|--|
| Deadline For Public Input(d/m/y): | |
| Contact Person: | |
| Public Concerns: | |

Determination

| | |
|--|--|
| Nature and Extent of Adverse Environmental Effects: | As per Environmental Screening Report |
| Mitigation Measures: | Mitigations as documented in Town of Banff model class screening report to apply provisions of Banff National Park Directive 17 notwithstanding. |
| Additional Mitigation or Instruction: | |

Note: If an appendix is referenced but not attached, notify document registrar..

| | |
|--|--|
| Monitoring Contact: | Anna Brown |
| Project Surveillance? <input checked="" type="checkbox"/> | Responsible Officers: Anna Brown |
| EA Determination: | Project not likely to cause significant adverse environmental effects |
| EA Determination Date (d/m/y): 02-Oct-15 | Follow-up/Monitoring Program? <input type="checkbox"/> |
| Project Status: | Project Assessed |
| Construction Status: | Complete |
| Comments: | Site assessment for bat roosting completed Sept 14, 2015, no sign of bat presence found. |

Signature of Responsible Centre Manager (RCM):

Sheila Luey, Manager of Integrated Land Use Planning

Signature of Superintendent:

Dave McDonough, Superintendent Banff Field Unit, Parks Canada Agency

BFU Process- Site Assessments for Bats

1. Undertake a Site Visit during time of residence in the region – May to September
2. Assess local habitat quality, standing dead trees and access to open flyways for feeding indicate higher likelihood of bat presence.
3. Assess building. Observe all eaves, basements, attics – interior and exterior of the house for:
 - Bat presence, they can be as small as a thumb, or small mouse.
 - Bat feces, which appear a bit like mouse feces but crush to a powder rather than a paste.
 - Detritus of beetle wings and carapaces from their feeding.
4. Interview residences or staff- ask if bats ever observed in or near the building.
5. If any indication of bat presence in or on the building install a passive bat detector (Anabat Express-available with EI Monitoring), near the indication of bat presence for approximately 2 weeks- monitor can be checked daily.

Fall 2015

Site Visit September 14, 2015

Anna Brown and Anne Forshner

The above survey was complete to assess 2 properties in the Town of Banff that are planned for demolition. 151 Cave Ave including the garage and 549 Deer St.

No sign of bat presence were found in either location.

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects

| Activity | Potential Impacts | Mitigation Measures |
|--|--|---|
| Pre-planning | | |
| Site investigation, including geotechnical investigation | Sensory disturbance, disturbance of archaeological resources, slope failure, sedimentation | <ul style="list-style-type: none"> • Conduct Phase I Environmental Site Assessment, if not already completed for the site, and additional site surveys, test pits, bore holes etc. if necessary. • Minimize the time boreholes remain open in order to reduce small terrestrial wildlife mortality. Properly seal boreholes and fit PVC pipes. • Use existing roadways or disturbed areas for site access and travel within the site. • Follow appropriate excavation mitigation measures for geotechnical investigation (see mitigations for “Trenching”). |
| General planning activities specific to all building projects. | Runoff / sedimentation; soil contamination | <ul style="list-style-type: none"> • Prepare an Emergency Response Plan for the worst case, i.e., heavy rainfall and runoff events, high winds, spills, fires, etc. • In the event of emergency operations (as defined in Section 4.11 of the MCSR), call 911. The Warden Dispatch can also be contacted (available 24 hours/day) at (403) 762-4506 or the Wardens Office at (403) 762-1470 to notify of any emergency procedures required. • Ensure all activities are conducted at least 30 m from waterbodies. |
| | Dust production | <ul style="list-style-type: none"> • Have a water source available to wet down exposed soil and dry areas. |
| | Wind and water erosion | <ul style="list-style-type: none"> • Prepare a satisfactory Sediment and Erosion Control Plan covering all construction and restoration periods. • Acquire necessary sediment control equipment (i.e., straw bales, landscaping fabric, sediment fences, etc.) and install prior to construction. • Extra planning should be used for areas with silty deposits (VL3 and VL4) and sloped areas with sandy deposits (see Figure 4.2). |
| | Compaction of soils | <ul style="list-style-type: none"> • Identify soils susceptible to compaction (fine textured and organic soils). • In sensitive areas, use equipment of low bearing weight, low PSI tires, or tracked vehicles. |
| | Slope failure | <ul style="list-style-type: none"> • Assess slope stability (based on slope length, soil texture, steepness, soil depth) and adjust activities to avoid these areas if possible. Use appropriate setbacks. • Pay particular attention when planning for slopes of Class 6 (15-30%) or greater, especially where soils are shallow and likely to move with disturbance. |
| | Habitat loss and fragmentation; or encroachment on wildlife movement corridor | <ul style="list-style-type: none"> • Identify wildlife habitat that may be impacted by activities and avoid sensitive areas, including wetlands. • Ensure only necessary vegetation is removed and delineate areas to be avoided with biodegradable flagging tape and/or temporary fences. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|---|---|---|
| General planning activities (continued) | Sensory disturbance and mortality of wildlife | <p>When working adjacent to natural areas:</p> <ul style="list-style-type: none"> • According to the wildlife that may be present, schedule high noise level activities and other intrusive construction activities to avoid critical life stages (breeding, nesting, rearing, migration). Consult with Parks Canada (403-762-1416) to discuss any localized wildlife concerns. • Confine “noise” activities to hours set out in Town of Banff Noise Bylaw. • Consider posting wildlife signs to reduce vehicle speeds and increase driver awareness near construction areas where wildlife mortality has or is likely to occur. • Educate workers to not harass or attract wildlife, keep the site free of food scraps, and dispose of garbage in bear proof containers. |
| | Disturbance of archaeological resources | <ul style="list-style-type: none"> • Consult with Parks Canada (403-762-1416) to discuss if consultation with the Park’s archaeologist is required (see Figure 4.1). • If it is deemed that potential archaeological sites may be subject to ground disturbance activities should be adapted to avoid them. • Educate workers to notify site supervisor upon finding any archaeological artefacts and to stop work immediately. |
| | Increased water and energy consumption | <ul style="list-style-type: none"> • Identify water and energy conservation opportunities for building design (e.g., low flow fixtures, low energy heating and lighting) and outdoor requirements (e.g., yard lighting, drip irrigation systems). |
| | Public safety | <ul style="list-style-type: none"> • Outline traffic control measures and assess the need for flagging personnel. • Call utility line companies to identify infrastructure locations (Alberta OneCall: 1-800-242-3447). |
| | Reduced aesthetics (noise and visual) | <ul style="list-style-type: none"> • Evaluate the site layout, access routes and construction activities to minimize their visual impact. • Plan work schedule to confine “noise” activities to hours set out in Town of Banff Noise Bylaw and, if possible, periods of low visitation. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|-------------------------|--|---|
| Site Preparation | | |
| Clearing of vegetation | Dust production | <ul style="list-style-type: none"> Wet down dry, exposed soils, particularly during windy periods. Ensure materials being stored or transported are covered with tarps or equivalent material. |
| | Runoff / sedimentation | <ul style="list-style-type: none"> Halt construction activity on exposed soil during events of high rainfall intensity and runoff and refer to the Sediment and Erosion Control Plan. Periodically inspect erosion control structures for effectiveness. |
| | Wind and water erosion | <p>Particularly in areas with silty deposits (VL3 and VL4) and sloped areas with sandy deposits (Figure 4.2):</p> <ul style="list-style-type: none"> Protect exposed soils with coarse granular materials, mulches, straw, or landscaping fabric along drainage pathways. Minimize grubbing. |
| | Damage to adjacent vegetation, loss of native vegetation | <p>To protect undeveloped areas adjacent to development site:</p> <ul style="list-style-type: none"> Minimize area cleared. Clearly mark area to be cleared with biodegradable flagging tape and/or temporary fences. Ensure vertical (Rocky Mountain) juniper, Douglas fir and limber pine are protected. For every tree removed, two native trees must be planted. Hoarding around trees to be retained must be installed beyond the tree's drip line prior to commencement of site work. A development permit from the Town of Banff Planning and Development Division (403-762-1215) is required before removing any trees. Ensure excavated material does not damage or bury plant material that is to be retained on the site or in adjacent areas. Trees are to be cut so that they fall inside the cleared perimeters. Care must be taken during grubbing and stripping to ensure that trees and roots on the edge of the cleared area are not disturbed. Grubbing and stripping may not be permitted on steep slopes to reduce the potential for erosion. |
| | Wildlife habitat loss and fragmentation; or encroachment on wildlife movement corridor | <p>When working adjacent to all undeveloped areas and areas bordering natural habitat, especially wildlife movement corridors and natural wetlands:</p> <ul style="list-style-type: none"> Clear only the minimum area required for construction activities. Retain vegetation barriers where possible, especially trees and shrubbery. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|------------------------------------|---|---|
| Clearing of vegetation (continued) | Reduced aesthetics | <ul style="list-style-type: none"> • Transport stockpiled material offsite immediately or stockpile cleared vegetation in an area out of view from public until it can be disposed of appropriately (see mitigations for “Disposal of cleared material”). • Dispose of cleared vegetation as soon as possible. |
| Grading and excavation | Dust production / aesthetics | <ul style="list-style-type: none"> • Wet down dry, exposed soils. • Ensure materials being stored or transported are covered with tarps or equivalent material. • Minimize grading and excavation on windy days to limit dust production. |
| | Runoff / sedimentation | <p>Halt construction activity on exposed soil during events of high rainfall intensity and runoff.</p> <ul style="list-style-type: none"> • All excavations will remain free of water (see mitigations for “Dewatering”). • Cover stockpiles of soil with polyethylene sheeting, tarps, or vegetative cover. <p>Sites close to waterbodies, but not closer than 30 m:</p> <ul style="list-style-type: none"> • To ensure that site run-off is minimized, control overland flow up gradient and down gradient of excavated areas by use of effective diversion ditches, bales, vegetation filter strips, or sediment traps. |
| | Wind and water erosion | <ul style="list-style-type: none"> • Particularly in areas with silty deposits (VL3 and VL4 - see Figure 4.2), and sloped areas with sandy deposits: • Protect exposed soils with coarse granular materials, mulches, or straw. • Cover stockpiles of soil with polyethylene sheeting, tarps, or vegetative cover. |
| | Loss of topsoil and/or topsoil-subsoil mixing | <ul style="list-style-type: none"> • Use separate lifts and storage of topsoil and subsoil horizons, replacing them in the same order after completion of activity, wherever practical. • Topsoil will be stored away from any slopes, subsoils, spoil material, construction activities and day-to-day operations. |
| | Slope failure | <ul style="list-style-type: none"> • Avoid work on steep slopes unless absolutely necessary. <p>Areas with slopes of Class 6 (15-30%) or greater, especially where shallow soils overlie bedrock:</p> <ul style="list-style-type: none"> • Use appropriate geo-technical control measures to stabilize slopes. Consult occupational health and safety guidelines. |
| Disposal of cleared material | Dust production | <ul style="list-style-type: none"> • Ensure cleared vegetation being stored or transported is covered with tarps or equivalent material. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|--|---|--|
| Disposal of cleared material (continued) | Reduced aesthetics (visual) | <ul style="list-style-type: none"> Minimize the time cleared vegetation remains at the work site. Large timber (trees larger than 15 cm DBH) shall be cut into blocks not to exceed 35 cm and stockpiled for re-use as firewood. Smaller trees and other woody material may be chipped and sent to the Cascade pit, or burned, if a burning permit is obtained. Dispose of diseased vegetation by burning. Dispose of trade waste at the Bow Valley Waste Management Commission's Class III landfill. |
| Construction | | |
| Dewatering | Sedimentation; Erosion; Damage to vegetation | <ul style="list-style-type: none"> Dewatering is not permitted into any waterbody, including the Bow River and Whiskey Creek. <p>Dewatering is permitted across previously disturbed vegetation or natural vegetation if the following conditions are met:</p> <ul style="list-style-type: none"> Sediment controls are used (i.e., silt fences, silt bags, etc.). Water velocity is controlled to dissipate energy, prevent soil erosion and allow for infiltration. Dewatering structures are continuously monitored to ensure no damage is being done to soil or vegetation. As an interim measure, the Town may allow silty water to be pumped into the sanitary system. A permit is required (403-762-1215). Parks Canada does not allow dewatering into storm sewers unless it can be demonstrated that the proponent has the methods and equipment to limit sediment entering the receiving waterbody. Sediment from the traps may be used as fill on the construction site. |
| | Damage to adjacent vegetation | <ul style="list-style-type: none"> For undeveloped areas adjacent to development site, ensure water and sediment is directed away from natural areas. |
| | Sensory disturbance and mortality of wildlife | <p>When working adjacent to natural areas:</p> <ul style="list-style-type: none"> According to the wildlife that may be present, schedule, high noise level activities and other intrusive construction activities to avoid critical life stages (breeding, nesting, rearing, migration). Consult with Parks Canada (403-762-1416) to discuss any localized wildlife concerns. Confine "noise" activities to hours set out in Town of Banff Noise Bylaw. Consider posting wildlife signs to reduce vehicle speeds and increase driver awareness near construction areas where wildlife mortality has or is likely to occur. Educate workers to not harass or attract wildlife. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|---|---|--|
| Construction (sandblasting) | Dust production (sand blasting) | <ul style="list-style-type: none"> Minimize sandblasting. Confine activity to days with little or no wind and use physical barriers (e.g., shrouds, scaffold canopies) to contain dust. Sandblasting should only remove loose paint to provide a clean surface for the new paint to adhere to. To reduce the amount of old paint needed to be removed, the new paint to be used should be as similar in colour as possible to the existing painted surface. |
| Construction (painting and paint stripping) | Contamination of soil and water from accidental spill of paint, stripping compounds, or thinner | <ul style="list-style-type: none"> Prepare an appropriate Spill Response Plan and ensure that spill contingency equipment and measures are in place before work begins. Ensure paint is stored appropriately to prevent spillage. In the event of emergency operations (as defined in Section 4.11 of the MCSR), call 911. The Warden Dispatch can also be contacted (available 24 hours/day) at (403) 762-4506 or the Wardens Office at (403) 762-1470 to notify of any emergency procedures required. Waste oil based paints must be transported out of the Park in accordance with the Federal and Provincial <i>Transportation of Dangerous Goods Act</i> and Regulations. Dispose of contaminated materials at provincially certified disposal sites outside of the Park. No treatment of contaminated soils (e.g., bioremediation) is allowed in the Park. All applicable documentation demonstrating proper disposal should be obtained. Alternatively, use the paint exchange program in Banff. |
| Site Servicing (Subsurface) | | |
| Trenching, Utilities excavation and removal | Runoff / sedimentation | <ul style="list-style-type: none"> To ensure that site run-off is minimized at times of heavy rainfall, control overland flow up gradient and down gradient of exposed areas by use of effective diversion ditches, bales, vegetation filter strips, or sediment traps. |
| | Wind and water erosion | <p>Particularly in areas with silty deposits (VL3 and VL4) and sloped areas with sandy deposits (see Figure 4.2):</p> <ul style="list-style-type: none"> Use interceptor ditches or berms (bales) up-gradient of excavation to divert overland flow around exposed soils Line steep ditches with filter fabric, rock or polyethylene lining to prevent channel erosion. |
| | Wildlife mortality | <ul style="list-style-type: none"> Fence trench if it is to be left unattended overnight. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|---|--|---|
| Trenching; Utilities excavation and removal (continued) | Loss of topsoil and/or topsoil- subsoil mixing | <ul style="list-style-type: none"> • Wherever possible, use separate lifts and storage of topsoil and subsoil horizons, replacing them in the same order after completion of activity. • Minimize the amount of time that the trench remains open. • Soils will be stored away from any steep slopes, subsoils, spoil material, construction activities and day-to-day operations. |
| | Slope failure | <ul style="list-style-type: none"> • Avoid work on steep slopes unless absolutely necessary. Areas with slopes of Class 6 (15-30%) or greater, especially where soils are shallow: • Use appropriate geo-technical control measures to stabilize slopes. Consult occupational health and safety guidelines. |
| <i>Decommissioning and Abandonment</i> | | |
| Demolition activities / foundation removal | Dust production | <ul style="list-style-type: none"> • Wet down dry, exposed soils. • Ensure fine materials being stored or transported are covered with tarps or equivalent material. |
| | Discovery of existing soil contamination | <ul style="list-style-type: none"> • If any contamination is found, cease work immediately. Inform the building site supervisor and, if necessary, implement Emergency Response Plan. |
| | Loss of topsoil and/or topsoil- subsoil mixing | <ul style="list-style-type: none"> • Wherever possible, use separate lifts and storage of topsoil and subsoil horizons, replacing them in the same order after completion of activity. • Soils will be stored away from any grades, subsoils, spoil material, construction activities and day-to-day operations. |
| <i>Site Reclamation or Restoration</i> | | |
| Grading | Dust production | <ul style="list-style-type: none"> • Wet down dry, exposed soils. • Ensure materials being stored or transported are covered with tarps or equivalent material. |
| | Runoff / sedimentation | <ul style="list-style-type: none"> • Halt grading on exposed soil during events of high rainfall intensity and runoff. Consult the Sediment and Erosion Control Plan. • Cover stockpiles of soil with polyethylene sheeting, tarps, or vegetative cover. Where possible, establishment containment structures to trap runoff. |
| | Wind and water erosion | <p>Particularly in areas with silty deposits (VL3 and VL4) and sloped areas with sandy deposits (see Figure 4.2):</p> <ul style="list-style-type: none"> • Protect exposed soils with coarse granular materials, mulches, or straw along drainage pathways. • Recontour slopes to pre-disturbance conditions. |
| Revegetation | Runoff / sedimentation / erosion | <ul style="list-style-type: none"> • Initiate replanting of disturbed areas immediately after construction is completed. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|-----------------------------|--|---|
| Revegetation (continued) | Compaction of soils | <ul style="list-style-type: none"> Cultivate affected areas before reclaiming, especially areas with fine textured or organic soils. |
| | Weed invasion | <ul style="list-style-type: none"> Revegetate exposed areas at first opportunity. Ensure topsoil is clean and weed free. If clean fill is unavailable, check on weeds or treat as needed for 3 years following landscaping and revegetation. Revegetate with Parks Canada approved grass seed mix or the Town seed mix for landscape rehabilitation (see Appendix C). Monitor the site to ensure appropriate weed control for two years following landscaping (applicable to construction crews only). Follow Parks Canada Integrated Pest Management Plan 2.4.1 for weed control. |
| Herbicide/fertilizer use | Contamination of soil or water | <ul style="list-style-type: none"> Accurately assess the need for chemicals during site revegetation. Use products and methods identified in Parks Canada Management Directive 2.4.1 (1985). Do not use fertilizers and herbicides in areas where residue or run-off may enter a waterbody or drainage pathway. Do not over water. |
| Paving | Dust production | <ul style="list-style-type: none"> Wet down dry, exposed soils. Ensure fine materials being stored or transported are covered with tarps or equivalent material. |
| | Contamination of soil or water | <ul style="list-style-type: none"> Prepare an appropriate Spill Response Plan. In the event of emergency operations (as defined in Section 4.11 of the MCSR), call 911. The Warden Dispatch can also be contacted (available 24 hours/day) at (403) 762-4506 or the Wardens Office at (403) 762-1470 to notify of any emergency procedures required. Use an environmentally friendly tack coat and do not apply if rain is in the forecast. |
| | Noise disturbance and mortality of wildlife due to increased traffic | <p>Adjacent to natural areas.</p> <ul style="list-style-type: none"> According to the wildlife that may be present, schedule high noise level activities and other intrusive construction activities to avoid critical life stages (breeding, nesting, rearing, migration). Consult with Parks Canada (403-762-1416) to discuss any localized wildlife concerns. If wildlife mortality is likely to increase due to traffic, post signs to reduce vehicle speeds and increase driver awareness. Educate workers to not harass or attract wildlife. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|-------------------------------------|---|--|
| General Activities | | |
| Materials handling / storage | Dust production | <ul style="list-style-type: none"> Wet down dry, exposed soils or cover with tarps. Ensure materials being stored or transported are covered with tarps or equivalent material. |
| | Damage to adjacent vegetation | <ul style="list-style-type: none"> Excavated material will not be permitted to damage or bury plant material that is to be retained on the site or in adjacent areas. Protect undisturbed land by only stockpiling materials on heavy canvas or polypropylene tarpaulins to protect native vegetation. Excavated material should not be permitted to damage or bury plant material that is to be retained on the construction site or in adjacent areas. |
| | Decreased aesthetics (visual) and public safety | <ul style="list-style-type: none"> Materials will be stored within the confines of the work site. |
| Equipment operation and maintenance | Decrease in ambient air quality due to emissions | <ul style="list-style-type: none"> Ensure all equipment is properly tuned, free of leaks, in good operating order, and fitted with standard air emission control devices. Minimize idling of engines at all times. |
| | Dust production | <ul style="list-style-type: none"> Wet down dry and dusty roads. Do not use oil-based dust suppressants. Reduce speeds. Ensure fine materials being stored or transported are covered with tarps or equivalent material. |
| | Contamination of soil and water from accidental spill | <ul style="list-style-type: none"> Prepare an appropriate Spill Response Plan. In the event of emergency operations (as defined in Section 4.11 of the MCSR), call 911. The Warden Dispatch can also be contacted (available 24 hours/day) at (403) 762-4506 or the Wardens Office at (403) 762-1470 to notify of any emergency procedures required. Avoid work in high risk areas, particularly in areas of high water table, steep slopes or in close proximity to streams. Have spill containment equipment on-hand and ensure that all personnel are trained in their use. Ensure all construction equipment is free of leaks from oil, fuel or hydraulic fuels. The crossing of any waterbody (including wetlands) by construction equipment, or the use of such equipment within waterbodies is strictly prohibited unless prior approval has been confirmed. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

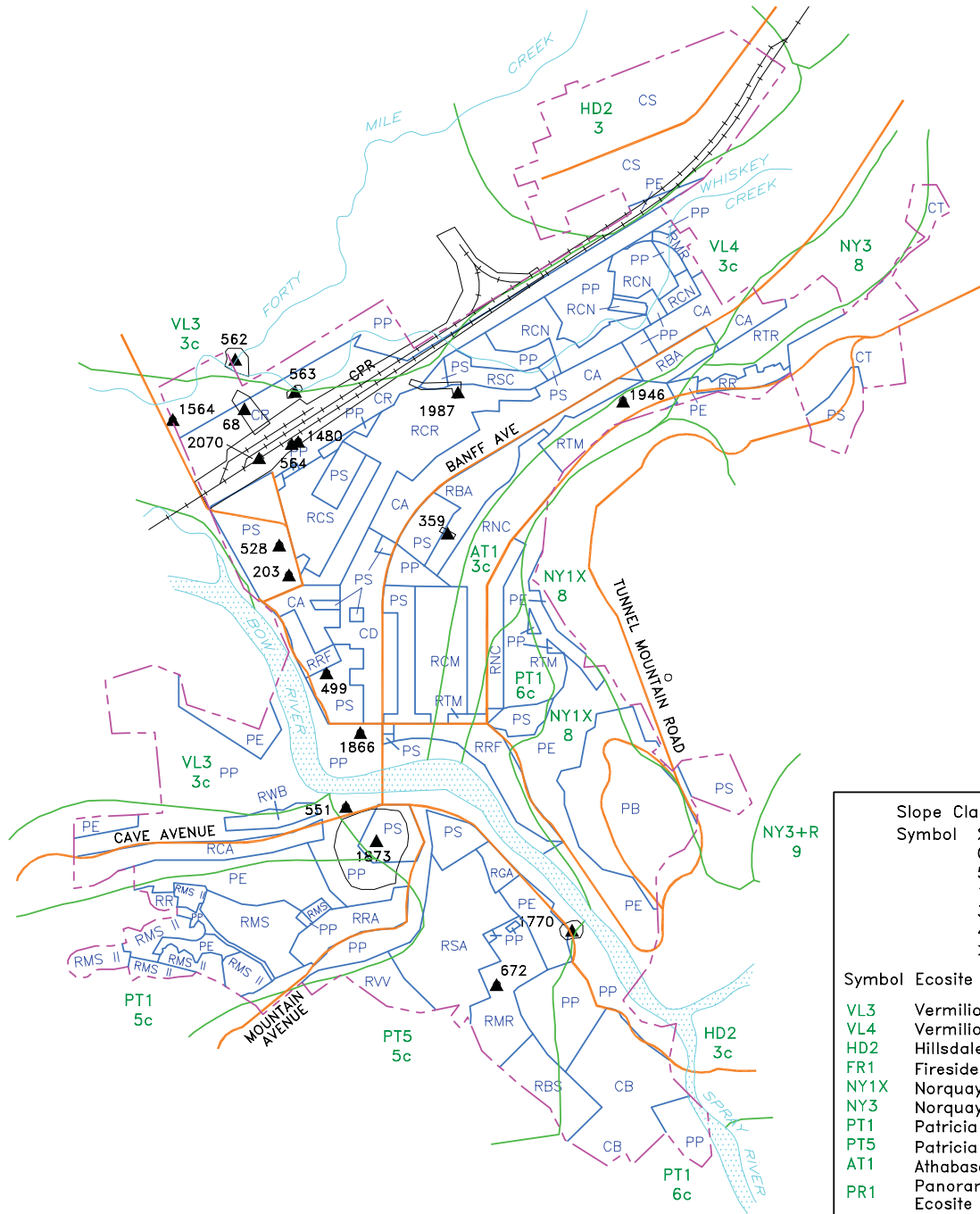
| Activity | Potential Impacts | Mitigation Measures |
|---|---|---|
| Equipment operation and maintenance (continued) | Contamination of soil and water from accidental spill | <ul style="list-style-type: none"> Designate refuelling areas at least 100 m away from any water body. Refuelling sites will be bermed with an impermeable liner to contain 125% of the anticipated fuel quantity. Any contaminated rainwater will be moved out of the park. |
| | Contamination of soil and water from accidental spill | <ul style="list-style-type: none"> Refuelling activities should not be conducted where run-off could carry contaminants into drainage pathways (including storm sewers). Dispose of contaminated materials at provincially certified disposal sites outside of the Park. No treatment of contaminated soils (e.g., bioremediation) is allowed in the Park. All applicable documentation demonstrating proper disposal should be obtained. |
| | Compaction of soils | <ul style="list-style-type: none"> Restrict vehicular travel and other equipment operation to the construction site and approved access routes. Vehicle parking will be restricted to specialized areas on the construction site. Minimize or halt construction traffic during wet conditions when the soil shows signs of ponding or rutting. In sensitive areas, if possible, use equipment which minimizes surface disturbance including low ground pressure tracks/tires, blade shoes and brush rake attachments. |
| | Damage to adjacent vegetation | <p>Undeveloped areas adjacent to development site:</p> <ul style="list-style-type: none"> Careful machine operation is required to ensure that damage to surrounding vegetation does not occur. Excavated material must not be permitted to bury plant material that is to be retained. Snow fences may be used to prevent excavated material escaping into the surrounding forest. Hoarding around trees to be retained must be installed beyond the tree's drip line prior to commencement of site work. |
| | Weed invasion | <ul style="list-style-type: none"> All construction equipment from outside Banff National Park will be steam cleaned prior to arrival to minimize the risk of introducing weeds. Construction equipment from outside the Park will not be washed while in the Park. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|---|--|---|
| Equipment operation and maintenance (continued) | Sensory disturbance to wildlife | <ul style="list-style-type: none"> • All undeveloped areas and areas bordering natural habitat, especially wildlife movement corridors and natural wetlands: • Use existing roadways, pathways and previously disturbed areas for site access and travel within the site. • Educate workers not to enter wildlife corridors. • Confine “noise” activities to hours set out in Town of Banff Noise Bylaw. |
| | Increased traffic levels | <ul style="list-style-type: none"> • Time construction activities to minimize vehicle conflicts on access roads and/or use flagging personnel. |
| Waste management (general) | Contamination of soil and water from accidental spill or improper disposal | <ul style="list-style-type: none"> • No rock, silt, cement, grout, asphalt, petroleum product, lumber, vegetation, domestic waste, or any deleterious substance shall be placed or allowed to disperse into any stream, river, pond, sewer, or other water course. |
| | Aesthetics (visual and smell) | <ul style="list-style-type: none"> • Collect all waste, store appropriately and dispose trade waste at the Bow Valley Waste Management Commission’s Class III landfill, and garbage at the Waste Transfer Station. • All garbage and food must be stored in bear-proof bins as per the Banff Waste Bylaw. • Construction sites must undergo thorough clean-up, including removal of general litter, survey stakes and flagging tape at project completion. |
| Hazardous materials collection and handling | Contamination of soil or water | <ul style="list-style-type: none"> • Prepare an appropriate Spill Response Plan. In the event of emergency operations (as defined in Section 4.11 of the MCSR), call 911. The Warden Dispatch can also be contacted (available 24 hours/day) at (403) 762-4506 or the Wardens Office at (403) 762-1470 to notify of any emergency procedures required. • All toxic/hazardous materials will be identified during demolition and will be handled as required under the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act and Workplace Hazardous Materials Information Service. • Dispose of contaminated materials at provincially certified disposal sites outside of the Park. No treatment of contaminated soils (e.g., bioremediation) is allowed in the Park. All applicable documentation demonstrating proper disposal should be obtained. Alternatively, use the paint exchange program in Banff. • All hazardous materials and wastes will be clearly labelled with WHMIS labels and information. • Spill contingency plans, equipment and supplies will be present on-site at all times and employees trained in their use. |

Attachment 1 Sub-Class 1: Buildings: Mitigations for reducing impacts of building projects -
Continued

| Activity | Potential Impacts | Mitigation Measures |
|---|--------------------------------|---|
| Hazardous materials collection and handling (continued) | Contamination of soil or water | <ul style="list-style-type: none"> • All fuels, oils, lubricants and other petrochemical products will not be stored within 100 meters of any waterbody (including wetlands). • Do not store fuels, lubricants, solvents, paints, and other chemicals on site overnight except within construction trailers secured with lock and key. Storage should be on a bermed, impervious site (secondary containment). Permits are required from Banff National Park or Town of Banff. • No rock, silt, cement, grout, asphalt, petroleum product, lumber, vegetation, domestic waste, or any deleterious substance shall be placed or allowed to disperse into any stream, river, pond, storm or sanitary sewer, or other water course. |



| Slope Class | |
|-------------|---------|
| Symbol | % Slope |
| | 0-5 |
| | 5-15 |
| | 15-30 |
| | 30-45 |
| | 45-70 |
| | >70 |

| Symbol | Ecosite |
|--------|--------------------------|
| VL3 | Vermilion Ecosite 3 |
| VL4 | Vermilion Ecosite 4 |
| HD2 | Hillsdale Ecosite 2 |
| FR1 | Fireside Ecosite 1 |
| NY1X | Norquay Ecosite 1 |
| NY3 | Norquay Ecosite 3 |
| PT1 | Patricia Ecosite 1 |
| PT5 | Patricia Ecosite 5 |
| AT1 | Athabasca Ecosite 1 |
| PR1 | Panorama Ridge Ecosite 1 |

LEGEND

| | | |
|------------------------|------------------------|-------------------------|
| --- Town Boundary | CA Banff Avenue | RCM Residential Central |
| --- Road | CB Banff Springs Hotel | RCN Cougar North |
| --- Railroad | CD Downtown | RCR Cougar Rabbit |
| --- Land Use Districts | CR Railway Lands | RMR Marmot Rundle |
| --- Ecosites | CS Commercial Service | RMS Middle Springs |
| ▲ Archaeology Site | CT Tunnel Mountain | RMSII Middle Springs II |
| | | (a)-(f) |
| | | Glen Avenue |
| | | North Central |
| | | Rainbow Avenue |
| | | River Front |
| | | Spray Avenue |
| | | Squirrel Cougar |
| | | Tunnel Mountain |
| | | Tatanga Ridge |
| | | Valley View |
| | | West Birch |

Banff Land-Use Bylaw Districts

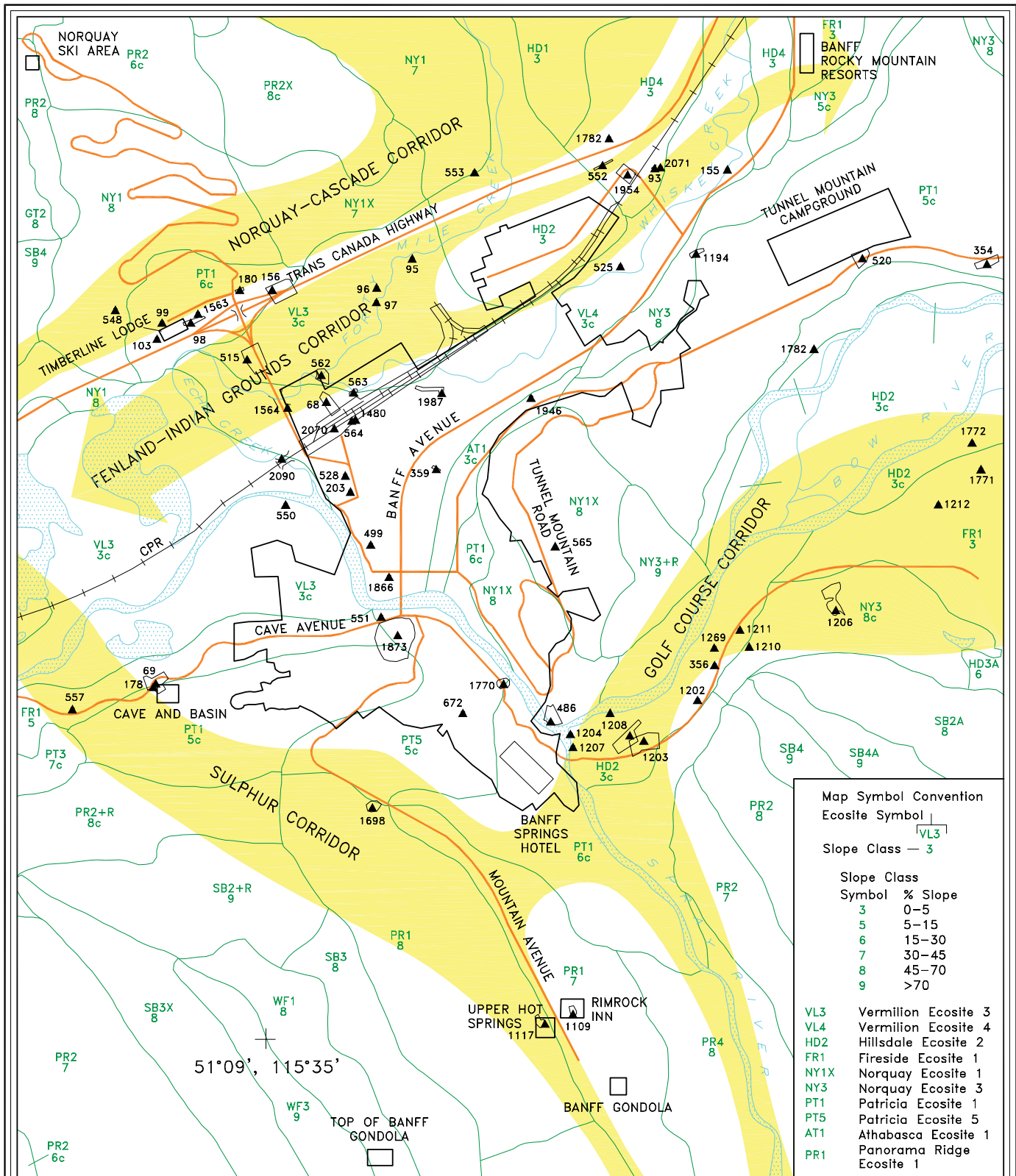
| | | |
|-----------------------------|------------------------|-------------------|
| Public/Institutional | Reserve | Residential |
| PB Banff Centre | RR Residential Reserve | CA Banff Avenue |
| PE Environmental Protection | | RBS Banff Springs |
| PP Parkland | | RCA Cave Avenue |
| PS Public Service | | |

Attachment 2

Ecosites, Archaeological Sites and Land Use Districts Within the Town of Banff

Scale 1:20,000
Metres
300 0 300 600 900 1200





LEGEND

- Local Study Area (Town of Banff and Outlying Areas)
- Road
- Railroad
- Available Wildlife Corridors
- Ecosystems
- Archaeological Site and Sensitive Area

Attachment 2

Ecological Information within the Class Screening Area (Sub-Class 1)

SOURCE: POPE (2001)

Scale 1:30,000
Metres

300 0 300 600 900 1200



Attachment 3

Potentially Sensitive Sites in the Class Screening Area

The following represents sites that are potentially sensitive to disturbance. Considerations of these sensitivities should be included in future development plans.

1. General Wetlands and Riparian Habitats

Whiskey Creek and associated springs. Middle Springs Creek and associated springs, Bow River, Forty Mile Creek, Forty Mile/Echo/Whiskey Creek/CPR 'Y' Wetlands, Discharge zones along the toe of Sulphur Mountain, Stables Wetlands (Recreation grounds to Cave and Basin).

2. Sand Dune and Beach Ridges

Fenland, Recreation Centre lands, lands including the train station and extending into residential areas SE of the station into downtown blocks past Rundle Church. Rocky Mountain Resort/new corrals/Brewster Doughnut Area.

3. Stream Levees

Bow River, Forty Mile/Echo Creek

4. Fish Spawning Sites

Forty Mile Creek, Bow River, Whiskey Creek, CPR 'Y'

5. Waterfowl Habitat

Whiskey Creek behind Cougar Street, Bow River, Forty Mile/Echo/Whiskey Creek/CPR 'Y' Wetlands, Stable Wetlands.

6. Beaver Habitat

Potential beaver habitat should be identified and projects designed to minimize the disruption of habitat. Potential sites include the CPR 'Y' and associated lands, Whiskey Creek, Fenlands, Bow River Levees, Horse Bams/Cave and Basin Wetlands.

7. Avifauna

Some parts of the class screening area are used by breeding and migrating birds. The most significant bird habitat is the shrub/wetland area on the Bow River flood plain adjacent to the Recreation Area (Edwards 1988). Other sites should also be reviewed.

8. Vegetation

Disturbance of the following species should be avoided whenever possible:

- Limber Pine: Tunnel Mountain, Hoodoos.
- Douglas Maple: North slope of Tunnel Mountain.
- Douglas Fir: most dry forested sites.

- Aspen: various locations.
- Balsam Poplar: various locations, especially in the vicinity of stable wetlands.

9. Viewpoints/Viewscapes

Surprise Corner, Bow River views, views from the Banff Springs Hotel, Mt. Norquay and Tunnel Mountain Drive.

10. Incidentals

- Fossils: sites should be surveyed for the presence of fossils; known and potential sites include Norquay Road, Bow Falls outcrops. Tunnel Mountain trail, Mt. Rundle talus rocks near the climbing practice rock and the landscaping rock in the recreation grounds play areas. Any exposure/application of "Rundle Rock" should be examined for fossils.
- Glacial Deposits: evidence of glacial and periglacial activity should be preserved as interpretive features. Features include: flutings along upper Tunnel Mountain Trail; till and outwash exposure at Grizzly Street; and outwash gravels at Compound Road turnoff from Banff Avenue.
- Bedrock Exposures offer an opportunity to interpret the geologic history of Banff National Park. Potential sites include: Bow Falls areas. Tunnel Mountain, Drive rock cuts; Buffalo Street; Norquay Road; and. Vermilion Lakes Drive older stone fences.
- Historical features sites should be reviewed for potential historical/archaeological features.



Appendix E

DF Technical & Consulting Services Ltd. Report

Project No. R075719.001
BNP Staff Housing Demolition

Banff National Park (BNP)
Banff, Alberta

Dec 22, 2015



DF Technical & Consulting Services Ltd.
Suite # 152-1500-14 Street SW, Calgary, AB T3C 1C9
Ph: 403.229.3131 Fax: 403.245.3224
Toll Free: 855.668.3131

August 19, 2015

Parks Canada
Banff National Park
Banff, Alberta
T1L 1K2

Attention: Laurie MacDonald

Regarding: Hazardous Materials Assessment
Location: 151 Cave Avenue Banff
Purchase Order Number: BFU2016-1092

Please find enclosed a copy of the report for the Hazardous Materials Assessment that was performed by DF Technical & Consulting Services Ltd. at the requested location of 151 Cave Avenue Banff AB on August 13, 2015.

If you have any inquiries or require more information, please feel free to contact the undersigned at (403) 229 3131 at your earliest convenience. Thank you for your patronage, and we look forward to assisting you in the future for your indoor air quality requirements.

Sincerely,

DF Technical & Consulting Services Ltd.

Dennis French CIEC
President

Distribution:

1 copy- Parks Canada
1 copy- DF Technical & Consulting Services Ltd.

Enclosures



DF Technical & Consulting Services Ltd.
Suite # 152-1500-14 Street SW, Calgary, AB T3C 1C9
Ph: 403.229.3131 Fax: 403.245.3224
Toll Free: 855.668.3131

Hazardous Materials Assessment

Final Report

Date:

August 19, 2015

For:

Parks Canada

Location:

151 Cave Avenue Banff AB

By:

Dennis French

DF Technical & Consulting Services Ltd.

Table of Contents

| | |
|--|----|
| Executive Summary | 1 |
| Introduction..... | 1 |
| Site History & Background Information..... | 2 |
| Regulations and Guidelines | 2 |
| Assessment & Sampling Methodologies | 2 |
| Scope and Methodology | 4 |
| Asbestos Survey Results | 5 |
| Lead Survey Results | 5 |
| Mercury..... | 6 |
| Radioactive Materials | 6 |
| Ozone Depleting Substances..... | 6 |
| PCBs | 6 |
| CFCs | 6 |
| Mould..... | 6 |
| Biohazards (Pigeon, mouse, bat, sewage)..... | 6 |
| Chemicals..... | 7 |
| General Comments and Recommendations | 7 |
| Closure | 10 |

Appendixes

Appendix I: Photographs

Appendix II: Independent Laboratory Results

Appendix III: Alberta Infrastructure Bulletin - Asbestos Containing Materials List

Appendix IV: Works Cited

Executive Summary

The hazardous materials assessment involved the collection of suspect hazardous materials by **DF Technical & Consulting Services Ltd.** at the requested location of 151 Cave Avenue, Banff, Alberta to determine the presence and extent of hazardous materials.

The hazardous materials assessment was requested to determine the extent of hazardous materials within the above structures as part of the planned site demolition. Those materials identified as hazardous will need to be dealt with and disposed of accordingly.

- Asbestos containing materials requiring removal prior to demolition were identified in building attic insulation and plaster. The floor tiles are allowed to remain as part of the demolition process.
- Lead paint identified in both buildings in varied concentrations. The Paint on the garage will require abatement with the beige trim on the garage paint needing special disposal as it was found to exceed the leachable guidelines for disposal.
 - The paint sample that was analyzed was found to contain lead in concentration of >90 mg/kg and is therefore considered lead paint. The concentration exceeds >600 mg/kg therefore removal must be undertaken utilizing specific **Lead Abatement Procedure** and **Air Monitoring**.
 - **Disposal**
 - The garage grey and white paint sample that was analyzed was found to contain lead in concentrations of >5000 mg/kg therefore further leachable lead analysis was conducted to determine proper disposal requirements as per Alberta Environment Protection guidelines.
 - The garage grey leachate sample analysis is under <5mg/L therefore the paint debris as analyzed can be disposed of at a regular class 2 landfill with proper authorization.
 - The garage white leachate sample analysis is over >5mg/L therefore the paint debris as analyzed must be disposed of as class 1 hazard in a class 1 landfill with proper authorization.
- Two source of radioactive material, smoke detector, was noted in the building.
- CFCs were identified in building in the form of a refrigerator.
- Mercury light bulbs and tubes were noted.

Introduction

The hazardous materials assessment was conducted on August 13, 2015 by Dennis French of **DF Technical & Consulting Services Ltd.** The assessment and sampling was conducted on behalf of Laurie Macdonald of **Parks Canada**. The following report is an overview of the observations, findings, conclusions, and recommendations generated during the assessment.

Site History & Background Information

The site is comprised of 2 buildings including 1 home and a garage. The garage is wood frame construction with painted siding and shingles with the interior unfinished. The house appears to have been built between the 50s and 60s and is an approximately 800 square foot one story with basement. The basement is unfinished. The interior finishes consist of Plaster and drywall. The floors are linoleum flooring, carpet, laminate and ceramic tile with original layers of flooring beneath the visual layers. The attic is insulated with cellulose and vermiculite.

Regulations and Guidelines

Exposure to asbestos containing materials and lead is regulated under the Alberta Occupational Health & Safety Act, Regulation and Code, July 2009 (OH&S): Part 4: Chemical Hazards, Biological Hazards and Harmful Substances. Under the heading General Requirements an employer must ensure that a worker's exposure to any substances listed in Schedule 1: Table 2 is kept as low as practicable and does not exceed its occupational exposure limit (OH&S Code 2009).

The Government of Alberta, Employment, Immigration and Industry developed a best practice manual for asbestos titled Alberta Asbestos Abatement Manual, AAAM, published in October, 2012. The following excerpts are from the manual.

- This manual describes the principles to be followed when selecting the most appropriate techniques for safe abatement of asbestos-containing materials. The manual presents basic information on asbestos and asbestos products, health hazards, and requirements for worker protection, safe work procedures, inspection criteria, applicable legislation and competency profiles for those persons involved in abatement activities.

Waste considered environmentally hazardous must be disposed of in accordance with The Alberta User Guide for Waste Managers, Alberta Environmental Protection.

Assessment & Sampling Methodologies

Asbestos Sample Collection

Suspected potential ACM were visually identified, sampled in accordance with the sampling protocols outlined in the Alberta Asbestos Abatement Manual, AAAM, 2012; 5.6.4.1. Bulk sampling of materials suspected to contain asbestos was conducted and samples were submitted to an independent laboratory for analyses and classification.

All bulk asbestos containing materials samples are analyzed by polarized light microscopy, PLM, conducted by **Bio-Chem Consulting Services Ltd.** in Calgary, Alberta, an independent laboratory, and Member of the American Industrial Hygiene Association, AIHA, Bulk Asbestos Proficiency Analytical Testing, BAPAT, Laboratory Quality Assurance Program.

Lead-Based Paint (LBP) and other Lead Products Sample Collection

Sampling for lead based paint was conducted. Samples of suspect paint were collected and sent for analysis. Those samples found to be lead containing, near or in excess of 5000 mg/kg of lead, were sent for leachable analysis.

All lead-based paint and other lead product samples are analyzed by **KaizenLAB** in Calgary, Alberta, an independent laboratory, and Member of the American Industrial Hygiene Association, AIHA, Bulk Asbestos Proficiency Analytical Testing, BAPAT, Laboratory Quality Assurance Program.

Mercury

T12 fluorescent light tubes which potentially contained mercury were visually identified. Mercury containing thermostat(s) were visually noted. Additionally Compact florescent bulbs were visually noted.

Polychlorinated Biphenyls (PCBs)

The suspected presence of PCB light ballasts were determined by the age of the building. Sampling of liquid PCB in transformers and hydraulic equipment was not conducted.

Radioactive Materials

Two Smoke detectors were visually noted during the inspection.

Ozone Depleting Substances

Visual inspections throughout all accessible areas in the building were conducted. Visible presence of potential ozone depleting substances were noted where observed.

CFC's

Visual inspections throughout all accessible areas in the building were conducted. Visible presence of potential CFC's were noted where observed in the way of a refrigerator.

Visible Mould

Visual inspections throughout accessible areas in the building were conducted. No visible presence of mould on building materials was noted where observed.

Biohazards

Visual inspections throughout all accessible areas in the building were conducted. No visible presence of potential biohazards was noted where observed.

Chemicals

Visual inspections throughout accessible areas in the building were conducted. Visible presence of chemicals was noted where observed.

A chain of custody, COC, is initiated to assign pertinent information to all samples suspected of containing asbestos. Typically, the date, type of sampling media, requested analysis methodology, sample collection location, sample measurement, and name of the person in care and control of the sample, and other relative assessment information is recorded. The COC is attached to the sample and the sample is sent to the laboratory. Analysis is returned with a copy of the COC specifying the condition of the sample at the time it was logged, the requested analysis, and signature of the attending lab technician.

Table 1: Sampling Methodologies

| Analyte | Methodology |
|--|--|
| Bulk Asbestos PLM | NIOSH 9002 Issue : 2 |
| Lead in Paint: Acid Digestion of Sediments, Sludges, and Soils and Inductively Coupled Plasma/Mass Spectrometry (ICP-MS) | ASTM D3335-85A; EPA SW 846-(3050B:7000B) |

Scope and Methodology

The Survey carried out by **DF Technical & Consulting Services Ltd.** consisted of the following:

- Visual survey of potentially hazardous materials.
- Individual field sampling and independent laboratory analysis of suspected ACM and lead containing materials.
- Interpretation of laboratory analysis results.
- Preparation of a report including results and recommendations.

The survey consisted of a visual inspection of all buildings within the site. The information pertaining to each specified building, including the quantities, condition, of suspected hazardous materials was documented.

Asbestos Survey Results

| Sample # | Location | Material | Result |
|----------|------------------------------------|-------------|------------------|
| 1 | Attic | Vermiculite | 2.7% Actinolite |
| 2 | Staircase | Linoleum | Non Detect |
| 3 | Living room floor under laminate | Floor Tile | Trace Chrysotile |
| 4 | Bedroom flooring under carpet | Floor Tile | 4% Chrysotile |
| 5 | Kitchen flooring middle layer | Linoleum | Non detect |
| 6 | Kitchen flooring bottom carpet | Floor Tile | 4% Chrysotile |
| 7 | Dining room flooring bottom | Floor Tile | 2% Chrysotile |
| 8 | Chimney cement | Cement | Non detect |
| 9 | Exterior roof house – top layer | Shingle | Non detect |
| 10 | Exterior roof house – bottom layer | Shingle | Non detect |
| 11 | Garage roof | Shingle | Non detect |
| 12 | Kitchen Ceiling | DWJC | Non detect |
| 13 | Living room wall | DWJC | Non detect |
| 14 | Stairwell Plaster | Plaster | Trace Chrysotile |

The results of the laboratory analysis indicate that six of the fourteen samples submitted for analysis were found to be asbestos containing. A copy of the independent laboratory analysis is included in the Appendixes.

Lead Survey Results

Lead in Paint Analyses

| Sample # | Location | Result mg/kg | Guideline |
|----------|---------------------------|--------------|-----------|
| 1 | Garage white paint | 29000 | 90 mg/kg |
| 2 | Garage Grey paint | 21400 | |
| 3 | House exterior grey paint | 4650 | |
| 4 | House exterior beige | 805 | |
| 5 | Interior beige/green | 1150 | |

- Bolded results indicate levels in excess of guidelines

The results of the laboratory analysis indicate that the sample submitted for analysis was found to be above the recommended guideline and some have been submitted for leachable analysis. A copy of the independent laboratory analysis is included in the Appendixes.

Leachable Analyses

| Sample # | Building | Location | Result mg/L | Waste Control Limit |
|-----------------|---------------------------|-----------------|--------------------|----------------------------|
| 1 | Garage white paint | trim | 41 | 5.0 mg/L |
| 2 | Garage grey paint | siding | 1.1 | |

- Bolded results indicate levels in excess of guidelines

A leachable lead analysis was conducted, as the paint sample that was analyzed was found to contain lead in concentrations of >5000 mg/kg, and the paint sample was found to exceed waste guidelines of 5.0 mg/L.

Mercury

Mercury was visually identified in the T12 fluorescent light bulbs in the basement and main floor light fixture. Also compact florescent lights (CFL) were noted. Mercury sources must be removed and disposed appropriately prior to demolition of the building.

Radioactive Materials

Smoke detectors in the building must be removed and properly disposed prior to demolition.

Ozone Depleting Substances

No ozone depleting substances were visually identified in the facility.

PCBs

Visual inspection of the fluorescent light fixtures identified all fluorescent lighting fixtures as T12. Ballast serial numbers should be identified and disposed of accordingly prior to demolition.

CFCs

Refrigeration units containing CFC's were observed and will require removal prior to demolition or appropriate extraction of the gases from the system prior to demolition.

Mould

No fungal activity was identified in the basement and main floor areas.

Biohazards (Pigeon, mouse, bat, sewage)

No biohazards were visually identified in the facility.

Chemicals

All paints and paint containers and residential and industrial chemicals should be collected, sorted and sent for disposal.

General Comments and Recommendations

The following comments apply to the analysis as reported.

Asbestos

- Professional abatement will be required to remove the ACM identified.
- Removal of the ACM should be completed following **High risk** abatement procedures as outlined in the Alberta Asbestos Abatement Manual, 2012.
- Asbestos containing floor tile are allowed to remain in the property as part of the demolition however all other ACM materials must be abated prior to demolition.
- Remove the asbestos containing vermiculite (approximately 800 sq. ft.) from the attic
- Remove the affected drywall/plaster wall in the stairwell complete.
- The wall surfaces must be removed right to the floor to ensure that no fibres have been left behind.
- The insulation and vapor barrier is to be removed in the areas where the drywall has been removed to expose the framing.

High Risk – Vermiculite insulation and Plaster removal

- Removal of the asbestos containing materials should be completed following high risk abatement procedures as outlined in the Alberta Asbestos Abatement Manual, 2012.
- Submit a completed Asbestos Project Notification Form, NOP, to Workplace Health and Safety 72 hours before workers may be exposed to airborne fibres, including set-up operations that may release fibres. A copy of the acknowledgement should remain on site for the duration of the project.
- Ensure the work area is isolated utilizing barriers and warning signs restricting access to the area until the work is completed.
- Access contents in work area. Manipulate and dispose of or otherwise clean, store and protect all contents ensuring that the work area is free of any content.
- Install fiber reinforced polyethylene sheeting containment enclosure separating the abatement work zone from the remainder of the area. Ensure a positive seal is achieved and maintained throughout the abatement process.
- Containment should be constructed utilizing 6 mil thick polyethylene sheeting and a three-stage decontamination facility should be attached to the entrance of the containment that should include; a clean room, a shower facility, and a dirty room. A waste transfer room may be constructed should there be enough room to do so.
- Where floor finishes are to remain Ensure that the floor has two layers of 6 mil thick polyethylene sheeting running at 90 degrees to one another, to avoid tearing. The floor covering should overlap the wall by 30 cm, with the wall sheeting overlapping the turn-up on the inside of the containment to avoid breaches.

- Ensure that the heating, ventilation, and air conditioning (HVAC) components are isolated from the abatement area.
- Install high efficiency particulate assembly (HEPA) filtered air filtration device (AFD) in containment to provide negative air. Exhaust outdoors
- Ensure that negative air is achieved within containment and maintained at a minimum of -5 Pascal's throughout the entire abatement process.
- The AFDs should be Di-octyl Phthalate/Poly Alpha Olefins, DOP/PAO, tested prior to the commencement of the abatement project. A copy of the successful DOP/PAO test should remain on site for the duration of the project.
- During abatement localized wetting of the asbestos containing materials must be undertaken to minimize fibre release.
- Removal and cleaning of dust must be undertaken utilizing a damp cloth and HEPA-equipped vacuum cleaner. The HEPA-equipped vacuum cleaner should be DOP/PAO tested prior to the commencement of the abatement project. A copy of the successful DOP/PAO test should remain on site for the duration of the project.
- Ensure all workers are, at a minimum, equipped with a National Institutes for Occupational Safety and Health, NIOSH, approved powered air purifying respirator with P-100, R-100 or N-100 particulate filters and disposable coveralls. Street clothing may not be worn underneath the disposable coveralls.
- On site air quality monitoring will be required prior to project commencement and daily during the abatement project. Occupational and perimeter air quality monitoring are required during abatement. On project completion an aggressive air clearance must also be completed. **DF Technical & Consulting Services Ltd.** can provide these services.
- On completion of the work effort, the work area must be visually inspected to ensure that all visible asbestos-containing debris has been cleaned. Following completion of a successful final visual inspection, the area should be encapsulated.

The possibility exists for other forms of asbestos containing materials on the property. This sample may not represent all possible areas that contain asbestos products. Review the potential asbestos containing materials potentially found in a workplace by reviewing the attached Alberta Infrastructure Technical Bulletin-Asbestos Management in Appendixes.

Lead

- The house interior and exterior paint sample that was analyzed was found to contain lead in concentration of >90 mg/kg and is therefore considered lead paint.
- The concentration exceeded >600 mg/kg therefore removal can be undertaken utilizing specific lead **Safe Work Procedure** along with **Air Monitoring** outlining appropriate worker protection; gloves, respiratory protection, etc.
- The paint samples collected from within the house and the house exterior did not exceed the 5000 mg/kg threshold and therefore can be disposed of as lead containing but not requiring a Class 1 landfill disposal.
- The garage paint samples that was analyzed was found to contain lead in concentrations of >5000 mg/kg therefore further leachable lead analysis was conducted to determine proper disposal requirements as per Alberta Environment Protection guidelines.

- The garage grey leachate sample analysis is under <5mg/L therefore the paint debris as analyzed can be disposed of at a regular class 2 landfill with proper authorization.
- The garage white (trim) leachate sample analysis is over >5mg/L therefore the paint debris as analyzed must be disposed of as class 1 hazard in a class 1 landfill with proper authorization.

- The paint sample analyzed was found to contain lead in concentrations in excess of the recommended guideline is therefore considered lead containing paint.
- A leachable lead analysis was conducted and the paint sample was found to exceed waste guidelines and will need to be disposed of according to Alberta Environment Protection guidelines.
- Ensure the work area is isolated utilizing barriers and warning signs restricting access to the area until the work is completed.
- A worker decontamination area should be installed adjacent to the work area.
- During removal of the lead paint workers should be protected from exposure to lead.
- Proper personal protective equipment, PPE, including, at a minimum, a National Institutes for Occupational Safety and Health, NIOSH, approved half-mask, nitrile gloves beneath work gloves, and disposable coveralls are recommended.
- Workers may be required to wear full-face, powered air purifying respirators, PAPR, or supplied air respirators depending on the procedures used to remove the lead paint.
- It is recommended that air monitoring be conducted during demolition to ensure workers are not overexposed to lead. **DF Technical & Consulting Services Ltd.** can provide these services.
- Lead is categorized as a Schedule 1 Chemical Substance in the Alberta Occupational Health and Safety Code, 2009. Lead abatement activities require a code of practice from the contractor outlining work controls for safe removal, handling and disposal.
 - **Disposal**
 - The garage grey and white paint sample that was analyzed was found to contain lead in concentrations of >5000 mg/kg therefore further leachable lead analysis was conducted to determine proper disposal requirements as per Alberta Environment Protection guidelines.
 - The garage grey leachate sample analysis is under <5mg/L therefore the paint debris as analyzed can be disposed of at a regular class 2 landfill with proper authorization.
 - The garage white leachate sample analysis is over >5mg/L therefore the paint debris as analyzed must be disposed of as class 1 hazard in a class 1 landfill with proper authorization

Closure

This report is based on observations and collected data from August 13, 2015. The conclusions made in this report are not a certification of the site's air quality. No warranty is expressed or implied as to final site condition. This report provides an analysis and assessment of materials tested and is based on information provided to **DF Technical & Consulting Services Ltd.**

Regards,



Dennis French CIEC
President
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Calgary, Alberta. T3C 1C9
Ph:403-229-3131
Fx:403-245-3224
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Reviewed by:







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Appendix I: Photographs

Hazardous Materials Assessment
For Parks Canada – 151 Cave Avenue Banff AB
By DF Technical & Consulting Services Ltd.

| | |
|---|--|
|  |  |
| Exterior of home | Garage , including paint colors sampled Lead containing both colors |
|  |  |
| Unfinished garage interior | Typical smoke detector |

Hazardous Materials Assessment
For Parks Canada – 151 Cave Avenue Banff AB
By DF Technical & Consulting Services Ltd.

| | |
|---|--|
|  |  |
| Typical CFL bulbs | Typical florescent light fixture |
|  |  |
| Interior paint multi-layer and asbestos containing | Exterior grey paint |

Hazardous Materials Assessment
For Parks Canada – 151 Cave Avenue Banff AB
By DF Technical & Consulting Services Ltd.

| | |
|--|---|
|  |  |
| Exterior soffit beige paint | Attic Insulation – vermiculite under blow in |
|  |  |
| Multiple layer kitchen floor – 3 layers | Floor tile in Bedroom under carpet |

Appendix II: Independent Laboratory Results



BIO-CHEM CONSULTING
Services (1980) Ltd.

Analytical Test Report

Test Report #: BC26091A

Revision #: 0

Issue Date: 19-Aug-15

Client: DF Technical & Consulting Services Ltd

Code: DFT

Contact: Dennis French

Job #: 15-C-001-101098

P.O.#:

Address: #152, 1500-14 Street SW
Calgary AB
T3C 1C9

Internal Project #: BC26091

Sampled By: DF

Sample Location: 151 Cave Ave, Banff

Sample Date: 13-Aug-15

Date Received: 13-Aug-15

| Analytical | # of Pages |
|---------------------|------------|
| Bulk Asbestos | 2 |
| Total (incl. Cover) | 3 |

Comments: None.

Approved By: _____

Michael Busse, B.Sc.
Laboratory Supervisor

-
- 1) THIS REPORT MAY NOT BE REPRODUCED IN PART WITHOUT THE EXPRESSED WRITTEN CONSENT OF THE LABORATORY.
 - 2) ANY REMAINING SAMPLES WILL BE DISPOSED OF 30 DAYS FOLLOWING ANALYSIS. CONTACT THE LABORATORY IF ADDITIONAL SAMPLE STORAGE TIME IS REQUIRED.
 - 3) ALL LABORATORY ANALYSES INCORPORATE STANDARD QC PROTOCOLS; HOWEVER, UNSIGNED TEST REPORTS ARE PRELIMINARY AND UNOFFICIAL. IF REQUIRED, PLEASE CONTACT LABORATORY SUPERVISOR FOR QC DATA REPORTS.
 - 4) REPORTED TEST RESULTS RELATE ONLY TO THE SAMPLES AS RECEIVED BY THE LABORATORY.
 - 5) BIO-CHEM CONSULTING SERVICES (1980) LTD. ASSUMES NO LIABILITY FOR THE USE OR INTERPRETATION OF THE TEST RESULTS
 - 6) WHERE APPLICABLE, ESTIMATION OF THE MEASUREMENT UNCERTAINTY IS AVAILABLE ON REQUEST.
 - 7) THIS LABORATORY OR SUB-CONTRACTED LABORATORY IS NOT ACCREDITED FOR THE TESTS MARKED [§]
-

Laboratory Contact Information

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Calgary, Alberta T2G 2B3

CANADA

Telephone: (403) 253-7026

Fax: (403) 253-7072

E-mail: reporting@bio-chemconsulting.com

www.bio-chemconsulting.com



Please note that laboratory privacy policy limits discussion of this report to the client listed above.
For all others, please direct questions directly to client listed.

CERTIFICATE OF ANALYSIS
Bulk Asbestos Report (NIOSH 9002; EPA 600/R-93/116; EPA 600/R-04/004)

B.C. Report No. : BC26091A Rev. 0
Sub-Contracted: No
Client Job No.: 15-C-001-101098

Date Analyzed: 17-Aug-15
Page Issue Date: 19-Aug-15

| Sample # | Sample Description | Layer | | Asbestos | | Non-Asbestos Components | | | |
|----------|--------------------------------|-------|-----|--------------------------|------|-------------------------|---------|----------------------|-----------|
| | | No. | % | Fibers | % | Fibers | % | Non-Fibers | (%) |
| 1 | Attic Insulation | 1 | 100 | Actinolite/ Tremolite | 2.07 | | | Vermiculite | 97.93 |
| 2 | Stair Lino | 1 | 50 | N/D | | | | SYNT | 100 |
| | | 2 | 50 | N/D | | Cellulose MMVF | 50 5 | Other | 45 |
| 3 | LR Floor | 1 | 100 | Chrysotile | + | | | Inorganic Organic | >76 23 |
| 4 | Bedroom Floor Tile | 1 | 100 | Chrysotile | 4 | | | Inorganic Organic | 75 21 |
| 5 | Kitchen Middle Floor Layer | 1 | 50 | N/D | | | | SYNT | 100 |
| | | 2 | 50 | N/D | | Cellulose MMVF | 40 5 | Other | 55 |
| 6 | Kitchen Bottom Floor Layer | 1 | 100 | Chrysotile | 4 | | | Inorganic Organic | 73 23 |
| 7 | Dining Room Bottom Layer Floor | 1 | 100 | Chrysotile | 2 | | | Inorganic Organic | 77 21 |

Comments:

None.

Glossary:

+: Sample contains asbestos. Estimated concentration is below 1% detection limit of analytical method (<0.01% for Vermiculite samples)
 N/D: Indicates that No Asbestos Fibers Detected in the specified layer(s).
 ASM: Acid Soluble Material (including, but not limited to: Calcite, Dolomite, Gypsum, Magneite, Hydromagnesite, Anhydrite and Bassanite)
 DE: Diatomaceous Earth
 MICA: Micaceous Material (Talc, Vermiculite, Muscovite, and/or Biotite)
 MMVF: Man-made Vitreous Fibers (Glass Wool, Mineral/Slag Wool, Ceramic Fibers)
 NPAF: Natural Plant/Animal Fiber (Cotton, Silk, Hemp, Flax, Wool, etc.)
 Other: Non-Fibrous materials which were not identified during analysis. May also refer to mixtures of materials which were not identified.
 SYNT: Synthetic Organic Polymer (Fiber, Sheet, Resin)



CERTIFICATE OF ANALYSIS
Bulk Asbestos Report (NIOSH 9002; EPA 600/R-93/116; EPA 600/R-04/004)

B.C. Report No. : BC26091A Rev. 0
Sub-Contracted: No
Client Job No.: 15-C-001-101098

Date Analyzed: 17-Aug-15
Page Issue Date: 19-Aug-15

| Sample # | Sample Description | Layer | | Asbestos | | Non-Asbestos Components | | | |
|----------|---------------------------------|-------|-----|------------|---|-------------------------|----|------------|-----|
| | | No. | % | Fibers | % | Fibers | % | Non-Fibers | (%) |
| 8 | Chimney Mortar | 1 | 100 | N/D | | | | Other | 100 |
| 9 | House Shingle Top | 1 | 100 | N/D | | Cellulose | 40 | Other | 60 |
| 10 | House Shingle Bottom | 1 | 100 | N/D | | Cellulose | 50 | Other | 50 |
| 11 | Garage Shingle | 1 | 100 | N/D | | Cellulose | 40 | Other | 60 |
| 12 | DWJC Kitchen Ceiling | 1 | 100 | N/D | | | | Other | 100 |
| 13 | DWJC LR Wall | 1 | 100 | N/D | | | | Other | 100 |
| 14 | DWJC/Plaster Basement Stairwell | 1 | 100 | Chrysotile | + | | | Other | >99 |

Comments:

None.

Glossary:

+: Sample contains asbestos. Estimated concentration is below 1% detection limit of analytical method (<0.01% for Vermiculite samples)
N/D: Indicates that No Asbestos Fibers Detected in the specified layer(s).
ASM: Acid Soluble Material (including, but not limited to: Calcite, Dolomite, Gypsum, Magnesite, Hydromagnesite, Anhydrite and Bassanite)
DE: Diatomaceous Earth
MICA: Micaceous Material (Talc, Vermiculite, Muscovite, and/or Biotite)
MMVF: Man-made Vitreous Fibers (Glass Wool, Mineral/Slag Wool, Ceramic Fibers)
NPAF: Natural Plant/Animal Fiber (Cotton, Silk, Hemp, Flax, Wool, etc.)
Other: Non-Fibrous materials which were not identified during analysis. May also refer to mixtures of materials which were not identified.
SYNT: Synthetic Organic Polymer (Fiber, Sheet, Resin)

ANALYTICAL REPORT

Client: DF Technical & Consulting Services Ltd.
6948 Roper Road
Edmonton, AB, T6B 3H9

Attention: Dennis French

| | |
|-------------------------|-----------------|
| KaizenLAB JOB #: | 173384 |
| DATE RECEIVED: | 13-Aug-2015 |
| DATE REPORTED: | 19-Aug-2015 |
| PROJECT ID: | 15-C-001-101098 |
| LOCATION: | 151 Cave Ave |

KaizenLAB Sample #: 173384_001 **Sample ID:** Garage White
Date Sampled: 13-Aug-2015 **Matrix:** OTHER

| Parameter Description | Units | Result | Detection Limit |
|-----------------------|-------|--------|-----------------|
| Lead | mg/kg | 29000 | 1.0 |
| TCLP Lead | mg/L | 41 | 0.40 |

KaizenLAB Sample #: 173384_002 **Sample ID:** Garage Grey
Date Sampled: 13-Aug-2015 **Matrix:** OTHER

| Parameter Description | Units | Result | Detection Limit |
|-----------------------|-------|--------|-----------------|
| Lead | mg/kg | 21400 | 1.0 |
| TCLP Lead | mg/L | 1.1 | 0.04 |

KaizenLAB Sample #: 173384_003 **Sample ID:** House Ext Grey
Date Sampled: 13-Aug-2015 **Matrix:** OTHER

| Parameter Description | Units | Result | Detection Limit |
|-----------------------|-------|--------|-----------------|
| Lead | mg/kg | 4650 | 1.0 |

KaizenLAB Sample #: 173384_004 **Sample ID:** House Ext Beige
Date Sampled: 13-Aug-2015 **Matrix:** OTHER

| Parameter Description | Units | Result | Detection Limit |
|-----------------------|-------|--------|-----------------|
| Lead | mg/kg | 805 | 1.0 |

KaizenLAB Sample #: 173384_005 **Sample ID:** House Int Grey/White
Date Sampled: 13-Aug-2015 **Matrix:** OTHER

| Parameter Description | Units | Result | Detection Limit |
|-----------------------|-------|--------|-----------------|
| Lead | mg/kg | 1150 | 1.0 |

Test Methodologies

TCLP Metals in Soil: Modified from EPA 1311 and APHA 3120B

Total Lead in Paint: Modified from EPA 3050B and APHA 3125B

Final Review by:



Dipika Shrestha
Client Service Representative / Project Coordinator

Note: The results in this report relate only to the items tested. Information is available for any items in 5.10.2 of ISO/IEC 17025 that cannot be put on a test report.

Appendix III: Alberta Infrastructure Technical Bulletin-Asbestos Management

Appendix III, Table 1: Asbestos Containing Materials, Concentrations, Date Made, Uses, and Friability

| Category | Description | Asbestos % | Date Made | Uses | Friability |
|-----------------------------|--|------------|-------------|--|------------------|
| Ceilings, Walls, & Textiles | Drywall taping Compounds | 1 - 10 | 1950 - 1985 | Gypsum wall or ceiling board edge treatment | Low to Moderate |
| | Sprayed on texture or troweled on texture | 1 - 95 | 1935 - 1985 | Fire resistance acoustic treatment thermal insulation condensation control | Moderate to High |
| | Ceiling tiles | 1 - 10 | 1960 - 1985 | Acoustical suspended ceiling finish | Moderate to High |
| Flooring | Plaster (brown or finish coat) , stucco, drywall, joint cement | 2 - 10 | 1930 - 1985 | Wall - ceiling finish rough or Smooth | Low |
| | Vinyl asbestos (VAT) tile | 30 - 50 | 1950 – 1985 | Hard wearing floor covering | Low |
| | Resilient sheet | 30 - 50 | 1950 – 1985 | Backing layer to vinyl facing | Moderate to High |
| | Concrete leveling compounds | 1 - 10 | 1950 - 1985 | Concrete floor leveler and finished flooring | Moderate to High |
| Mechanical | Asphalt/asbestos tile | 20 - 30 | 1920 – 1985 | Roof or exterior walls finish | Low |
| | Rigid block insulation | 40 - 60 | 1926 - 1985 | Boiler or pipe work insulation | Moderate to High |
| | Paper like insulation | 50 - 70 | 1910 - 1985 | Pipe work insulation | Moderate |
| | Insulating cement | 10 - 80 | 1949 - 1985 | Pipe work insulation at elbows and fittings | Moderate to High |
| | Corrugated paper sheets | 70 - 80 | 1925 - 1985 | Duct and pipe insulation | Moderate |
| Electrical | Insulating cement parging | 10 - 80 | 1910 - 1985 | Duct parging or pipe insulation applied over glass fiber | Moderate to High |
| | Wire insulation | 90 - 100 | 1910 – 1985 | High heat applications | Moderate |
| | Insulator board | 40 - 60 | 1930 – 1985 | Electrical insulation | Low |
| | Reflective layers | 70 - 90 | Until 1985 | Heat resistant incandescent light reflector | Low |
| | | | | | |

(continued)

Appendix III, Table 1: Asbestos Containing Materials, Concentrations, Date Made, Uses, and Friability (continued)

| Category | Description | Asbestos % | Date Made | Uses | Friability |
|----------------------|----------------------|------------|-------------|---|---|
| Cement Like Products | Millboard | 40 – 50 | 1930 – 1995 | Industrial type siding, heat shields water proofing | Low |
| | Roof tiles | 20 – 30 | 1930 – 1985 | Roof finish | Low |
| | Cement pipe | 20 – 30 | 1935 – 1995 | Subterranean Water pipes | Low |
| | Siding and shingles | 20 – 40 | Until 1985 | Domestic and Commercial cladding | Low |
| | Mortars | 1 – 10 | Until 1985 | Brick or cement block mortar | Low |
| Textiles | Woven cloth | 90 – 100 | 1910 – 1985 | Fire blankets, stage/welding curtains, isolation joints in duct work, heat shields, fire hoses, gland packing | Low to Moderate |
| Roofing Materials | Shingles | 1 – 5 | 1971 – 1985 | Asphalt roof shingles | Low |
| | Roofing felts | 10 – 15 | 1910 – 1985 | Built-Up roofing | Low |
| | Slip layers | 70 – 80 | Until 1985 | Base layer for Built-Up roofing | Low to Moderate |
| Other | Caulking | 20 – 30 | 1930 – 1985 | For flow ability in mastic | Low |
| | Coatings | 5 – 15 | 1900 – 1985 | Roof- Coatings and air barriers | Low |
| | Brake/clutch linings | 30 – 40 | 1920 – 1995 | Elevator motors-Mechanical plants | Low |
| | Filters | 50 – 70 | 1930 – 1985 | Cooling towers humidifiers | Low to Moderate |
| | Gaskets | 20 – 60 | 1900 – 1985 | Mechanical equipment | Low to Moderate |
| | Vinyl wallpaper | 5 – 10 | Until 1985 | Decorative wall coverings | Low |
| | Textured paints | 5 – 10 | Until 1985 | Decorative wall coverings | Low |
| | Fire doors | 50 – 70 | Until 1985 | Fire ratings | Low to High but enclosed within wood or steel doors |
| | | | | | |

Source: Alberta Infrastructure Technical Bulletin - Asbestos Management; Issue No. 2B – Revised, September 2013

Appendix IV: Works Cited

Works Cited

- Alberta, G. o. (2009). *Occupational Health and Safety Act, Occupational Health and Safety Code*. Edmonton: Alberta Queens printer.
- Alberta, G. o. (2013, September). *Asbestos Management Technical Bulletin, Issue No. 2B - Revised, September 2013*. Retrieved from <http://www.infrastructure.alberta.ca/>:
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- Center For Disease Control. (2009, 8 24). *NIOSH National Institute for Occupational Safety and Health*. Retrieved 8 25, 2009, from NIOSH National Institute for Occupational Safety and Health: <http://www.cdc.gov/niosh/>
- Government of Alberta. (2012). *Alberta Asbestos Abatement Manual*. Employment and Immigration. Edmonton: Alberta Queen's Printer.



Appendix F

EMC Laboratory Report

Project No. R075719.001
BNP Staff Housing Demolition

Banff National Park (BNP)
Banff, Alberta

Jan 15, 2016

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0164438

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client: AMEC ENV. & INFRASTRUCTURE Job# / P.O. #: CEOH1001 CEOH1001
Address: 440 DOVERCOURT DRIVE Date Received: 12/28/2015
WINNIPEG, MANITOBA R3Y1N4 Date Analyzed: 12/29/2015
Collected: 12/22/2015 Date Reported: 12/29/2015
Project Name: PWGSC BANFF-PART I-151 CAVE EPA Method: EPA 600/R-93/116
AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents | |
|-----------------------|-------------------------------------|---|----------------------|----------------------|---|-----|
| 0164438-001 ASB-01 | KITCHEN WALL (FRENCH DOORS) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 2% | Cellulose Fiber | 2% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 96% |
| 0164438-002 ASB-02 | KITCHEN WALL (FRONT ENTRANCE) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 3% | Carbonates Mica Quartz Binder/Filler | 97% |
| | | | | | | |
| 0164438-003 ASB-03 | KITCHEN CEILING (ABOVE CABINET) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 2% | Cellulose Fiber | 1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 97% |

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Project Name: PWGSC BANFF-PART I-151 CAVE EPA Method: EPA 600/R-93/116
AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents | |
|-----------------------|-----------------------------------|---|----------------------|----------------------|---|------|
| 0164438-004 ASB-04 | KITCHEN CEILING (FRENCH DOORS) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 3% | Cellulose Fiber | 1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 96% |
| 0164438-005 ASB-05 | LIVING RM WALL (BY OUTLET) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound/ Paint, Off White/ White Note: Layer is mainly Paint - little Compound present | No | None Detected | Carbonates Mica Quartz Binder/Filler | 100% |
| | | | | | | |

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Project Name: PWGSC BANFF-PART I-151 CAVE EPA Method: EPA 600/R-93/116
AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|----------------------------------|---|----------------------|----------------------|---|
| 0164438-006 ASB-06 | LIVING RM WALL (FRENCH DOORS) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber 10% Gypsum Carbonates Mica Quartz 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | No | None Detected | Cellulose Fiber 1% Carbonates Mica Quartz Binder/Filler 99% |
| | | LAYER 3 Tape, Yellow | No | None Detected | Fibrous Glass 95% Carbonates 5% |
| | | LAYER 4 Texture, White | No | None Detected | Carbonates Perlite Quartz Binder/Filler 100% |
| 0164438-007 ASB-07 | LIVING RM CEILING (SW CORNER) | Drywall Joint Compound, Off White/ White | Yes | Chrysotile 2% | Cellulose Fiber 1% Carbonates Mica Quartz Binder/Filler 97% |
| | | | | | |
| 0164438-008 ASB-08 | LIVING RM WALL (SW CORNER) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber 10% Gypsum Carbonates Mica Quartz 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 3% | Carbonates Mica Quartz Binder/Filler 97% |

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Project Name: PWGSC BANFF-PART I-151 CAVE EPA Method: EPA 600/R-93/116
AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|-------------------------------------|--|----------------------|----------------------|---|
| 0164438-009 ASB-09 | LIVING RM CEILING (SE CORNER) | LAYER 1 Drywall Joint Compound, Off White/ White | Yes | Chrysotile 2% | Cellulose Fiber 1% Carbonates Mica Quartz Binder/Filler 97% |
| | | LAYER 2 Texture, White | No | None Detected | Carbonates Mica Quartz Binder/Filler 100% |
| | | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber 10% Gypsum Carbonates Mica Quartz 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 2% | Cellulose Fiber 2% Carbonates Mica Quartz Binder/Filler 96% |
| 0164438-010 ASB-10 | LIVING RM CEILING (FRENCH DOORS) | LAYER 3 Tape, Yellow | No | None Detected | Fibrous Glass 95% Carbonates 5% |
| | | LAYER 4 Texture, White | No | None Detected | Carbonates Mica Quartz Binder/Filler 100% |

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AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents | |
|-----------------------|--|--|----------------------|----------------------|---|-----|
| 0164438-011 ASB-11 | EAST BEDRM WALL (S. WALL NEAR ENTRY) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound, Off White/ White | Yes | Chrysotile 2% | Cellulose Fiber | 1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 97% |
| 0164438-012 ASB-12 | EAST BEDRM CEILING (NE CRNR) | LAYER 1 Drywall Joint Compound, Off White/ White | Yes | Chrysotile 3% | Carbonates Mica Quartz Binder/Filler | 97% |
| | | | | | Cellulose Fiber | <1% |
| | | LAYER 2 Texture, White | Yes | Chrysotile 2% | Carbonates Gypsum Mica Binder/Filler | 97% |
| | | | | | | |

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Project Name: PWGSC BANFF-PART I-151 CAVE EPA Method: EPA 600/R-93/116
AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|---------------------------------------|---|----------------------|----------------------|---|
| 0164438-013 ASB-13 | WEST BEDRM WALL (NW CRNR) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber 10% Gypsum Carbonates Mica Quartz 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 2% | Cellulose Fiber 1% Carbonates Mica Quartz Binder/Filler 97% |
| | | LAYER 3 Texture, White | No | None Detected | Carbonates Gypsum Mica Quartz Carbonates 100% |
| 0164438-014 ASB-14 | WEST BEDRM CEILING (NEAR ENTRY) | Drywall Joint Compound, Off White/ White | Yes | Chrysotile 3% | Carbonates Mica Quartz Binder/Filler 97% |
| | | | | | |

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AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents | |
|-----------------------|---------------------------|--|----------------------|----------------------|---|-----|
| 0164438-015 ASB-15 | STAIRWELL WALL (NORTH) | LAYER 1 Drywall, White/ Brown Note: No Plaster Present | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 2% | Cellulose Fiber | 1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 97% |
| | | LAYER 3 Texture / Paint, Off White/ White | Yes | Chrysotile 2% | Carbonates Gypsum Mica Binder/Filler | 98% |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 0164438-016 ASB-16 | STAIRWELL WALL (EAST) | LAYER 1 Drywall, White/ Brown Note: No Plaster Present | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 2% | Cellulose Fiber | 1% |
| | | | | | Carbonates Mica Quartz Gypsum | 97% |
| | | LAYER 3 Texture / Paint, Off White/ White | Yes | Chrysotile 2% | Carbonates Mica Quartz Binder/Filler | 98% |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

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Project Name: PWGSC BANFF-PART I-151 CAVE EPA Method: EPA 600/R-93/116
AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents | |
|-----------------------|---------------------------|--|----------------------|----------------------|--|-----------|
| 0164438-017 ASB-17 | STAIRWELL WALL (NORTH) | LAYER 1 Drywall, White/ Brown Note: No Plaster Present | No | None Detected | Cellulose Fiber | 10% |
| | | | | | Gypsum Carbonates Mica Quartz | 90% |
| | | LAYER 2 Drywall Joint Compound, Off White | Yes | Chrysotile 3% | Carbonates Mica Quartz Gypsum | 97% |
| | | LAYER 3 Texture / Paint, Off White/ White | Yes | Chrysotile 2% | Carbonates Mica Quartz Binder/Filler | 98% |
| 0164438-018 ASB-18 | BATHRM | Grout, White | No | None Detected | Quartz Gypsum Carbonates Binder/Filler | 100% |
| 0164438-019 ASB-19 | BATHRM | Mortar, Gray | No | None Detected | Cellulose Fiber Gypsum Quartz Carbonates Mica Binder/Filler | 1% 99% |
| 0164438-020 ASB-20 | BATHRM | Grout, White | No | None Detected | Quartz Gypsum Carbonates Binder/Filler | 100% |

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AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|--------------------|--|----------------------|----------------------|--|
| 0164438-021 ASB-21 | BATHRM | LAYER 1 Ceramic Floor Tile, White | No | None Detected | Quartz Gypsum Carbonates Binder/Filler 100% |
| | | LAYER 2 Mortar, Gray | No | None Detected | Cellulose Fiber <1% Gypsum Quartz Carbonates Mica Binder/Filler 99% |
| 0164438-022 ASB-22 | HALLWAY | LAYER 1 Floor Tile, Beige | Yes | Chrysotile 5% | Carbonates Quartz Binder/Filler 95% |
| | | LAYER 2 Mastic, Black | Yes | Chrysotile 3% | Cellulose Fiber 5% Quartz Gypsum Binder/Filler 92% |
| 0164438-023 ASB-23 | HALLWAY | Mastic, Black | Yes | Chrysotile 2% | Cellulose Fiber 5% Quartz Gypsum Binder/Filler 93% |
| | | | | | |
| 0164438-024 ASB-24 | LIVING RM | LAYER 1 Floor Tile, Beige/ Tan/ Lt. Brown | Yes | Chrysotile 3% | Carbonates Quartz Binder/Filler 97% |
| | | LAYER 2 Mastic, Black | Yes | Chrysotile 8% | Cellulose Fiber 2% Quartz Binder/Filler 90% |
| | | LAYER 3 Carpet Mastic, Yellow | No | None Detected | Synthetic Fiber 5% Quartz Binder/Filler 95% |

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Project Name: PWGSC BANFF-PART I-151 CAVE EPA Method: EPA 600/R-93/116
AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|------------------------|--|----------------------|----------------------|--|
| 0164438-025 ASB-25 | LIVING RM | Mastic, Black | Yes | Chrysotile 3% | Cellulose Fiber 5% Quartz Carbonates Binder/Filler 92% |
| 0164438-026 ASB-26 | LIVING RM BY WINDOW | LAYER 1 Floor Tile, Beige/ Tan | Yes | Chrysotile 5% | Carbonates Quartz Binder/Filler 95% |
| | | LAYER 2 Mastic, Black | Yes | Chrysotile 3% | Cellulose Fiber 5% Quartz Carbonates Binder/Filler 92% |
| | | LAYER 3 Carpet Mastic, Yellow | No | None Detected | Synthetic Fiber 2% Carbonates Binder/Filler 98% |
| 0164438-027 ASB-27 | KITCHEN | LAYER 1 Linoleum, Gray/ Tan | No | None Detected | Fibrous Glass 10% Carbonates Quartz Binder/Filler 90% |
| | | LAYER 2 Mastic/ Leveling Compound, Clear/ Gray Note: Difficult to separate adjacent layers | No | None Detected | Cellulose Fiber 3% Carbonates Binder/Filler 97% |
| | | LAYER 3 Linoleum, White | No | None Detected | Cellulose Fiber 15% Fibrous Glass 5% Carbonates Binder/Filler 80% |
| | | LAYER 4 Mastic, Beige Note: Difficult to separate adjacent layer | No | None Detected | Cellulose Fiber 3% Quartz Carbonates Binder/Filler 97% |

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Project Name: PWGSC BANFF-PART I-151 CAVE EPA Method: EPA 600/R-93/116
AVENUE Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|-----------------------|--|----------------------|----------------------|---|
| 0164438-028 ASB-28 | KITCHEN | LAYER 1 Linoleum, Lt. Tan | No | None Detected | Cellulose Fiber 15% Fibrous Glass 2% Carbonates Carbonates 83% |
| | | LAYER 2 Mastic, Yellow Note: Difficult to separate adjacent layer | No | None Detected | Cellulose Fiber 3% Quartz Carbonates Binder/Filler 97% |
| | | LAYER 3 Linoleum, Tan | No | None Detected | Cellulose Fiber 15% Carbonates Gypsum Binder/Filler 85% |
| | | LAYER 4 Mastic, Yellow/ Black | No | None Detected | Cellulose Fiber 8% Quartz Binder/Filler 92% |
| 0164438-029 ASB-29 | KITCHEN | LAYER 1 Floor Tile, Off White | Yes | Chrysotile 5% | Carbonates Quartz Binder/Filler 95% |
| | | LAYER 2 Mastic, Black | Yes | Chrysotile 5% | Cellulose Fiber 3% Quartz Carbonates Binder/Filler 92% |
| | | LAYER 3 Carpet Mastic, Yellow | No | None Detected | Synthetic Fiber 5% Cellulose Fiber 2% Carbonates Quartz Binder/Filler 93% |
| 0164438-030 ASB-30 | STAIRS TO BASEMENT | Mastic, Black | No | None Detected | Cellulose Fiber 1% Carbonates Binder/Filler 99% |

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NVLAP#101926-0

| | | | | |
|---------------|-----------------------------|----------------|------------------|----------|
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| Address: | 440 DOVERCOURT DRIVE | Date Received: | 12/28/2015 | |
| | WINNIPEG, MANITOBA R3Y1N4 | Date Analyzed: | 12/29/2015 | |
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| Project Name: | PWGSC BANFF-PART I-151 CAVE | EPA Method: | EPA 600/R-93/116 | |
| | AVENUE | Submitted By: | PAUL HOULE | |
| Address: | | Collected By: | | |

| Lab ID | Sample | Layer Name / | Asbestos | Asbestos Type | Non-Asbestos |
|-----------|----------|--------------------|----------|---------------|--------------|
| Client ID | Location | Sample Description | Detected | (%) | Constituents |


Analyst - Johann Hofer


Signatory - Lab Director - Kurt Kettler

Distinctly stratified, easily separable layers of samples are analyzed as subsamples of the whole and are reported separately for each discernible layer. All analyses are derived from calibrated visual estimate and measured in area percent unless otherwise noted. The report applies to the standards or procedures identified and to the sample(s) tested. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. These reports are for the exclusive use of the addressed client and that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. The report shall not be reproduced except in full, without written approval by our laboratory. The samples not destroyed in testing are retained a maximum of thirty days. The laboratory measurement of uncertainty for the test method is approximately less than 1 by area percent. Accredited by the National Institute of Standards and Technology, Voluntary Laboratory Accreditation Program for selected test method for asbestos. The accreditation or any reports generated by this laboratory in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Polarized Light Microscopy may not be consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.

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Laboratory Report
0164437

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client: AMEC ENV. & INFRASTRUCTURE Job# / P.O. #: CEOH1001 CEOH1001
Address: 440 DOVERCOURT DRIVE Date Received: 12/28/2015
WINNIPEG, MANITOBA R3Y1N4 Date Analyzed: 12/29/2015
Collected: 12/22/2015 Date Reported: 12/30/2015
Project Name: PWGSC BANFF-PART II-549 DEER EPA Method: EPA 600/R-93/116
STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents | |
|-----------------------|--|------------------------------------|----------------------|----------------------|---|-----|
| 0164437-001 ASB-01 | UNIT #1-LIVING RM WALL (NEAR BALCONY DOOR) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber | 12% |
| | | | | | Gypsum Carbonates Mica Quartz | 88% |
| | | LAYER 2 Joint Compound, White | No | None Detected | Cellulose Fiber | <1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 99% |
| 0164437-002 ASB-02 | UNIT #1-KITCHEN WALL | Joint Compound, White | No | None Detected | Cellulose Fiber | <1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 99% |
| 0164437-003 ASB-03 | UNIT 1-BEDRM WALL | Joint Compound, White | No | None Detected | Cellulose Fiber | 1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 99% |
| 0164437-004 ASB-04 | UNIT 1-BATHRM WALL | LAYER 1 Joint Compound, White | No | None Detected | Cellulose Fiber | 2% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 98% |
| | | LAYER 2 Texture, White | No | None Detected | Cellulose Fiber | 1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 99% |

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Project Name: PWGSC BANFF-PART II-549 DEER EPA Method: EPA 600/R-93/116
STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|--------------------|---|----------------------|----------------------|---|
| 0164437-005 ASB-05 | UNIT 1-LIVIN GRM | Ceiling Stipple, White | No | None Detected | Cellulose Fiber <1% Carbonates Mica Quartz Binder/Filler 99% |
| 0164437-006 ASB-06 | UNIT 1-HALLWAY | Ceiling Stipple, White | No | None Detected | Cellulose Fiber 4% Carbonates Mica Quartz Binder/Filler 96% |
| 0164437-007 ASB-07 | UNIT 1-W. BEDRM | Ceiling Stipple, White | No | None Detected | Cellulose Fiber 3% Carbonates Mica Quartz Binder/Filler 97% |
| 0164437-008 ASB-08 | UNIT 1-BATHRM | Ceiling Tile, White/ Beige | No | None Detected | Mineral Wool 80% Gypsum Quartz Binder/Filler 20% |
| 0164437-009 ASB-09 | UNIT 1-BATHRM | LAYER 1 Linoleum, Beige/Pebble Pattern | Yes | Chrysotile 15% | Cellulose Fiber 5% Gypsum Carbonates Quartz Binder/Filler 80% |
| | | LAYER 2 Mastic, Brown Note: Difficult to separate adjacent layer | Yes | Chrysotile 3% | Cellulose Fiber 2% Gypsum Carbonates Quartz Binder/Filler 95% |

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Project Name: PWGSC BANFF-PART II-549 DEER EPA Method: EPA 600/R-93/116
STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|-----------------------------------|---|----------------------|----------------------|---|
| 0164437-010 ASB-10 | UNIT 1-KITCHEN | LAYER 1 Linoleum, Beige/Pebble Pattern | Yes | Chrysotile 15% | Cellulose Fiber 5% Carbonates Gypsum Quartz Binder/Filler 80% |
| | | LAYER 2 Mastic, Brown Note: Difficult to separate adjacent layer | Yes | Chrysotile 4% | Gypsum Carbonates Quartz Binder/Filler 96% |
| 0164437-011 ASB-11 | UNIT 4-ENTRY WAY (LOWER LEVEL) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber 10% Fibrous Glass 2% Gypsum Carbonates Mica Quartz 88% |
| | | LAYER 2 Joint Compound, White | No | None Detected | Cellulose Fiber 5% Carbonates Mica Quartz 95% |
| | | LAYER 3 Texture, White | No | None Detected | Cellulose Fiber <1% Carbonates Mica Quartz Binder/Filler 99% |
| 0164437-012 ASB-12 | UNIT 4-BEDRM WALL | Drywall Joint Compound, White | No | None Detected | Carbonates Mica Quartz Binder/Filler 100% |

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STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents | |
|-----------------------|---|--|----------------------|----------------------|---|------|
| 0164437-013 ASB-13 | UNIT 4-KITCHEN WALL | LAYER 1 Drywall Joint Compound, White | No | None Detected | Cellulose Fiber | <1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 99% |
| | | LAYER 2 Texture, White | No | None Detected | Carbonates Mica Quartz Binder/Filler | 100% |
| | | | | | | |
| 0164437-014 ASB-14 | UNIT 4-LIVING RM WALL (NEAR CLOSET) | LAYER 1 Drywall Joint Compound, White | No | None Detected | Cellulose Fiber | <1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 99% |
| | | LAYER 2 Texture, White | No | None Detected | Carbonates Mica Quartz Binder/Filler | 100% |
| | | | | | | |
| 0164437-015 ASB-15 | UNIT 4-BEDRM | Ceiling Stipple, White | No | None Detected | Cellulose Fiber | 5% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 95% |
| 0164437-016 ASB-16 | UNIT 4-ENTRYWAY WALL (LOWER LEVEL) | Ceiling Stipple, White | No | None Detected | Cellulose Fiber | 5% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 95% |

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Project Name: PWGSC BANFF-PART II-549 DEER EPA Method: EPA 600/R-93/116
STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|--|--|----------------------|----------------------|---|
| 0164437-017 ASB-17 | UNIT 4-KITCHEN | Ceiling Stipple, White | No | None Detected | Cellulose Fiber 3% Carbonates Mica Quartz Binder/Filler 97% |
| 0164437-018 ASB-18 | UNIT 4-LIVING RM | Ceiling Stipple, White | No | None Detected | Cellulose Fiber 3% Carbonates Mica Quartz Binder/Filler 97% |
| 0164437-019 ASB-19 | UNIT 4-BATHRM | Ceiling Tile, White / Tan | No | None Detected | Mineral Wool 45% Cellulose Fiber 40% Carbonates Perlite Binder/Filler 15% |
| 0164437-020 ASB-20 | UNIT 4-ENTRYWAY (UPPER LEVEL) | LAYER 1 Linoleum, White/ Yellow/ Tan | Yes | Chrysotile 15% | Cellulose Fiber 5% Gypsum Carbonates Quartz Binder/Filler 80% |
| | | LAYER 2 Mastic, Yellow Note: Difficult to separate adjacent layer | Yes | Chrysotile 5% | Cellulose Fiber <1% Gypsum Carbonates Quartz Binder/Filler 94% |
| 0164437-021 ASB-21 | UNIT 6-ENTRYWAY WALL (LOWER LEVEL) | Drywall Joint Compound, White | No | None Detected | Carbonates Mica Quartz Binder/Filler 100% |

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NVLAP#101926-0

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Collected: 12/22/2015 Date Reported: 12/30/2015
Project Name: PWGSC BANFF-PART II-549 DEER EPA Method: EPA 600/R-93/116
STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|-------------------------------|--|----------------------|----------------------|--|
| 0164437-022 ASB-22 | UNIT 6-BEDRM WALL (CLOSET) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber 12% Gypsum Carbonates Mica Quartz 88% |
| | | LAYER 2 Drywall Joint Compound, White | No | None Detected | Carbonates Mica Quartz 100% |
| | | LAYER 3 Texture, White | No | None Detected | Cellulose Fiber <1% Carbonates Mica Quartz Binder/Filler 99% |
| 0164437-023 ASB-23 | UNIT 6-KITCHEN WALL | LAYER 1 Drywall Joint Compound, White | No | None Detected | Carbonates Mica Quartz Binder/Filler 100% |
| | | LAYER 2 Texture, White | No | None Detected | Carbonates Mica Quartz Binder/Filler 100% |
| 0164437-024 ASB-24 | UNIT 6-LIVING RM WALL | LAYER 1 Drywall Joint Compound, White | No | None Detected | Carbonates Mica Quartz Binder/Filler 100% |
| | | LAYER 2 Texture, White | No | None Detected | Carbonates Mica Quartz Binder/Filler 100% |

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NVLAP#101926-0

| | | | | |
|---------------|-------------------------------------|----------------|------------------|----------|
| Client: | AMEC ENV. & INFRASTRUCTURE | Job# / P.O. #: | CEOH1001 | CEOH1001 |
| Address: | 440 DOVERCOURT DRIVE | Date Received: | 12/28/2015 | |
| | WINNIPEG, MANITOBA R3Y1N4 | Date Analyzed: | 12/29/2015 | |
| Collected: | 12/22/2015 | Date Reported: | 12/30/2015 | |
| Project Name: | PWGSC BANFF-PART II-549 DEER STREET | EPA Method: | EPA 600/R-93/116 | |
| Address: | | Submitted By: | PAUL HOULE | |

Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|----------------------------------|------------------------------------|----------------------|----------------------|---|
| 0164437-025 ASB-25 | UNIT 6-ENTRYWAY (LOWER LEVEL) | Ceiling Stipple, White | No | None Detected | Cellulose Fiber 3% Carbonates Mica Quartz Binder/Filler 97% |
| 0164437-026 ASB-26 | UNIT 6-BEDRM | Ceiling Stipple, White | No | None Detected | Cellulose Fiber 5% Carbonates Mica Quartz Binder/Filler 95% |
| 0164437-027 ASB-27 | UNIT 6-LIVING RM | Ceiling Stipple, White | No | None Detected | Cellulose Fiber 3% Carbonates Mica Quartz Binder/Filler 97% |
| 0164437-028 ASB-28 | UNIT 6-KITCHEN | Ceiling Stipple, White | No | None Detected | Cellulose Fiber 5% Carbonates Mica Quartz Binder/Filler 95% |
| 0164437-029 ASB-29 | UNIT 6-BATHRM | Ceiling Tile, White/ Gray | No | None Detected | Mineral Wool 80% Gypsum Quartz Binder/Filler 20% |

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Project Name: PWGSC BANFF-PART II-549 DEER EPA Method: EPA 600/R-93/116
STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents | |
|-----------------------|---|--|----------------------|----------------------|---|-----------|
| 0164437-030 ASB-30 | MECH RM-WALL (NW CRNR OF BOILER RM) | LAYER 1 Drywall Joint Compound, White | No | None Detected | Cellulose Fiber | <1% |
| | | | | | Carbonates Mica Quartz Binder/Filler | 99% |
| | | LAYER 2 Texture, White | No | None Detected | Carbonates Mica Quartz Binder/Filler | 100% |
| | | | | | | |
| 0164437-031 ASB-31 | MECH RM-WALL (NEAR ENTRYWAY) | LAYER 1 Drywall Joint Compound, White | No | None Detected | Carbonates Mica Quartz Binder/Filler | 100% |
| | | | | | Cellulose Fiber | <1% |
| | | LAYER 2 Mastic, Brown | No | None Detected | Carbonates Quartz Binder/Filler | 99% |
| | | | | | | |
| 0164437-032 ASB-32 | LAUNDRY RM - WALL (STORAGE RM) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber Fibrous Glass | 10% 3% |
| | | | | | Gypsum Carbonates Mica | 87% |
| | | LAYER 2 Drywall Joint Compound, White | No | None Detected | Carbonates Mica Quartz Binder/Filler | 100% |
| | | | | | | |

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Project Name: PWGSC BANFF-PART II-549 DEER EPA Method: EPA 600/R-93/116
STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------------|---|--|----------------------|----------------------|--|
| 0164437-033 ASB-33 | LAUNDRY RM - WALL (NEAR ENTRYWAY) | LAYER 1 Drywall, White/ Brown | No | None Detected | Cellulose Fiber 10% Fibrous Glass 3% |
| | | LAYER 2 Drywall Joint Compound, White | No | None Detected | Gypsum Carbonates Mica 87% Cellulose Fiber <1% Carbonates Mica Quartz Binder/Filler 99% |
| 0164437-034 ASB-34 | EXTERIOR-S. SIDE OF BLDG (BOTTOM OF STAIRS) | Parging Cement, Gray | Yes | Chrysotile 0.3% | Carbonates Gypsum Quartz Mica Binder/Filler 99.7% |
| 1000 pt. POINT COUNT | | | | | |
| 0164437-035 ASB-35 | EXTERIOR-N. SIDE OF BLDG | LAYER 1 Parging Cement, Gray Note: *Not analyzed per client request | | | |
| | | LAYER 2 Mastic, Black | No | None Detected | Cellulose Fiber <1% Carbonates Quartz Binder/Filler 99% |

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STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | Non-Asbestos Constituents |
|-----------------------|--|--|----------------------|----------------------|---|
| 0164437-036 ASB-36 | EXTERIOR-FRONT OF BLDG | LAYER 1 Stucco-Scratch Coat, Tan | Yes | Chrysotile 0.5% | Cellulose Fiber 0.2% |
| | | | | | Carbonates Quartz Gypsum Mica 99.3% |
| | | LAYER 2 Stucco-Finish Coat, Off White | No | None Detected | Carbonates Gypsum Quartz Mica Binder/Filler 100% |
| | | 1000 pt. POINT COUNT | | | |
| 0164437-037 ASB-37 | EXTERIOR-BACK OF BLDG (STAIRWELL BANNISTER) | LAYER 1 Stucco-Scratch Coat, Tan Note: *Not analyzed per client request | | | |
| | | | | | |
| | | LAYER 2 Stucco-Finish Coat, Off White | No | None Detected | Carbonates Gypsum Quartz Mica Binder/Filler 100% |
| | | 1000 pt. POINT COUNT | | | |
| 0164437-038 ASB-38 | EXTERIOR- GARAGE 5/6 (INTERIOR) | Parging Cement, Lt. Gray | Yes | Chrysotile 0.3% | Carbonates Quartz Gypsum Mica Binder/Filler 99.7% |
| | | | | | |
| | | | | | |
| | | 1000 pt. POINT COUNT | | | |

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Project Name: PWGSC BANFF-PART II-549 DEER EPA Method: EPA 600/R-93/116
STREET Submitted By: PAUL HOULE
Address: Collected By:

| Lab ID Client ID | Sample Location | Layer Name / Sample Description | Asbestos Detected | Asbestos Type (%) | | Non-Asbestos Constituents | |
|-----------------------|---|--|----------------------|----------------------|------|---|-------|
| 0164437-039 ASB-39 | EXTERIOR- GARAGE 5/6 (INTERIOR) | LAYER 1 Stucco-Scratch Coat, Tan | No | None Detected | | | |
| | | | | | | Carbonates Quartz Gypsum Mica | 100% |
| | | LAYER 2 Stucco-Finish Coat, Off White | Yes | Chrysotile | 0.4% | | |
| | | | | | | Carbonates Gypsum Quartz Mica Binder/Filler | 99.6% |
| 1000 pt. POINT COUNT | | | | | | | |
| 0164437-040 ASB-40 | EXTERIOR-N. SIDE STAIRWELL (OUTSIDE UNIT 2) | Ceiling Stipple, White | No | None Detected | | Cellulose Fiber | 5% |
| | | | | | | Carbonates Mica Quartz Binder/Filler | 95% |
| 0164437-041 ASB-41 | EXTERIOR-S. SIDE STAIRWELL (OUTSIDE UNIT 3) | Ceiling Stipple, White | No | None Detected | | Cellulose Fiber | 5% |
| | | | | | | Carbonates Mica Quartz Binder/Filler | 95% |

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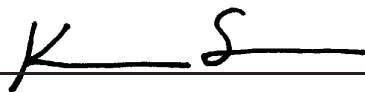
Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

| | | | | |
|---------------|-------------------------------------|----------------|------------------|----------|
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| Project Name: | PWGSC BANFF-PART II-549 DEER STREET | EPA Method: | EPA 600/R-93/116 | |
| Address: | | Submitted By: | PAUL HOULE | |

Collected By:

| Lab ID | Sample | Layer Name / | Asbestos | Asbestos Type | Non-Asbestos |
|-----------|----------|--------------------|----------|---------------|--------------|
| Client ID | Location | Sample Description | Detected | (%) | Constituents |



Analyst - Kenneth Scheske



Signatory - Lab Director - Kurt Kettler

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