1 ASBESTOS CEMENT PIPE CUTTING AND HANDLING

2 PURPOSE

The City of Surrey Water, Sanitary and Storm Sewer Systems exposure to asbestos is from Asbestos Cement (AC) pipe. Asbestos cement pipe is used in a variety of applications. AC pressure pipe is used primarily for the distribution of potable water, as well as for sewer force mains and industrial effluent and process piping. AC non-pressure pipe is used for sanitary and storm drainage systems, casings for electric cables and for duct work.

During regular maintenance and construction activities, the City of Surrey Field Operations Staff performs work on asbestos cement pipe. Disturbance of asbestos cement pipe through cutting, drilling, coring, tapping, penetrating and other activities may result in elevated levels of airborne asbestos fibres, if proper safety procedures are not applied. The intention of these safety procedures is to provide a guideline for performing the work in a manner which will protect workers from airborne asbestos fibres. These procedures have been prepared in accordance with WorkSafeBC regulations and guidelines outlined in the Occupational Health and Safety Regulations (OHSR) and Safe Work Practices for Handling Asbestos (2012).

3 SCOPE

This procedure describes how asbestos cement drainage pipe (non-pressurized) is to be handled, cut and disposed of during the following work activities:

- Adjustment of AC pipe chamber
- Removal of pipe chamber with AC connections
- Cutting AC non-pressurized pipes
- Removal and replacement of damaged AC pressure pipe
- Replace pipe fittings
- Wet tapping into AC pipe for new connection installation

4 DEFINITIONS

Asbestos Containing Material (ACM):

(a) a manufactured article or other material, other than vermiculite insulation, that would be determined to contain at least 0.5% asbestos if tested in accordance with one of the following methods:

(i) Asbestos, Chrysotile by XRD, Method 9000 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control.

(ii) Asbestos (bulk) by PLM, Method 9002 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control

(iii) Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116, dated July 1993) published by the United States Environmental Protection Agency.

(b) vermiculite insulation that would be determined to contain any asbestos if tested in accordance with the Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation (EPA/600/R-04/004, dated January 2004) published by the United States Environmental Protection Agency

AC:
Asbestos cement pipe

Containment:
An isolation system designed to effectively contain asbestos fibre within a designated work area where asbestos-containing material is handled, removed, encapsulated or enclosed, and includes a glove bag

Designated Working Area:
An area for working with asbestos-containing material which is restricted to access by authorized persons by warning signs and by barricades, enclosures or other means of isolation, with due regard for the level of risk.

Friable asbestos-containing material:
Asbestos-containing material that is crumbled or powdered or can be crumbled or powdered by hand pressure

Qualified Person:
Has knowledge of the management and control of asbestos hazards through education and training, and has experience in the management and control of asbestos hazards

5 RISK ASSESSMENT

All work is to be performed as outlined in the WorkSafeBC publication, Safe Work Practices for Handling Asbestos (2012).

This risk assessment was completed by Evan Alvernaz, CIH, ROH, CSP of Arcose Consulting Ltd. in September 2016.

5.1 Low-risk work activities

Activities that involve working with or in proximity to asbestos-containing material if the material is not being:

- Cut, sanded, drilled, broken, ground down, or otherwise fragmented, or
- Disturbed, such that asbestos fibres may be released

It would not be necessary to use PPE or engineering controls to prevent worker exposure to airborne asbestos fibres.

Activities that carry a low risk of exposure to airborne asbestos fibres include:

- Removing caps from asbestos pipe risers that are in good condition.
- Moving asbestos-containing waste material that is contained within a cleaned labelled bag and double wrapped in 6 mil polyethylene.

5.2 Moderate-risk work activities

Activities other than high-risk work activities that involve working with or in proximity to asbestos-containing material that is being cut, sanded, drilled, broken, ground down, fragmented, or otherwise disturbed. It is necessary to use PPE or engineering controls to prevent worker exposure to airborne asbestos fibres.

Moderate-risk work activities require specific procedures to ensure the safety of workers and others who may be affected by the activities.

Activities that carry a moderate risk of exposure to airborne asbestos fibres include:

- Using hand tools to cut, shape, drill, grind, or remove non-friable manufactured products containing asbestos, such as asbestos cement pipe.

- Adjusting AC pipe chambers.
- Removing of pipe chambers with AC connections
- Replacing damaged AC pipes (ex. Main pipe burst) with hand tools
- Replacing AC pipe fittings
- Wet tapping into AC pipe for new connection installation

5.3 High-risk work activities

Activities that involve working with or in proximity of asbestos-containing material if a high level of control is necessary to prevent worker exposure to airborne asbestos fibres.

High-risk work activities require specific procedures and containment to ensure the safety of workers and others who may be affected by the activities.

- With the current controls taken into consideration, no "High Risk" work activities have been identified.

6 WORK PROCEDURES – MODERATE RISK WORK ACTIVITIES

NOTE: NO POWER TOOLS (ie. cut-off saw, K-5 saw, stihl saw, etc) PERMITTED WHEN CUTTING A.C. PIPE. The use of such abrasive disc saws will release excessive levels of asbestos fibres into the atmosphere and cause over-exposure to employees, contractors and the public.

6.1 Equipment:

The following tools and equipment are required when working with asbestos cement (e.g., pipe cutting, drilling, etc):

1. Traffic Control Equipment
2. High Visibility Vests
3. Two Wash Buckets
4. Duct Tape (for sealing PPE and disposal bags)
5. Pylons/Sawhorses/Traffic Cones
6. Asbestos Warning Tape
7. Minimum of 2 Asbestos Hazard Signs
8. Labelled Asbestos Waste Bags (must be double bagged, sealed with duct tape and clearly marked 'Asbestos)
9. Disposable Hand Towels
10. Roll of 6 Mil Polyethylene Sheeting
11. Roll of Landscape Fabric
12. Airless Spray Canister Capable of Misting, if no local source of water present

13. Hose connected to a water source for washing down tools, etc,
14. Shovel/Hand Spade
15. Snap-cutter appropriate for size of pipe

6.2 Personal Protection Equipment (PPE):

1. High Visibility Vests
2. Lace-less Rubber Steel Toed Safety Boots
3. Disposable Tyvek (or similar) Coveralls with hoods and elastics at wrists and ankles
4. Disposable gloves
5. NIOSH-Approved Half-Face (minimum) or Full-Face Respirator. Respirators will have cartridges for particulate (P100)
6. Safety glasses (if using Half-Face respirator)

6.3 Moderate Risk AC Pipe Handling Procedures (General)

NOTE: Prior to commencing removal of AC pipe underground, asbestos pipe caps are often removed first. Handling of such task can be performed without tools to prevent any damage to the material. If the material is intact and in good condition, the work may be considered as "low risk work activity".

This procedure applies to:

- Cutting AC non-pressurized pipes
- Removal and replacement of damaged AC pressure pipe
- Replacing pipe fittings

NOTE: Eating, drinking, chewing or smoking shall not be permitted in the work area by any of the crew.

6.3.1 Excavate around the AC pipe a sufficient distance to ensure adequate tool clearance in the area to be cut. Care must be taken to avoid any pipe abrasions.

6.3.2 Set up asbestos working area boundaries with asbestos warning tape, and/or cones and barriers with asbestos warning signage, whichever practicable.

6.3.3 Don Personal Protective Equipment before entering asbestos working area:

a) Disposable Tyvek (or similar) Coveralls with hoods and elastics at wrists and ankles
b) High Visibility Vests
c) NIOSH Approved Half-Face or Full-Face Respirator w/ P-100 Filters
    a. Worker must be fit-tested on respirator to be used
    b. Must be clean shaven
    c. Perform positive and negative pressure fit check
d) NIOSH Approved Protective Gloves
e) CSA Approved Protective Eye Wear (if using Half-Face respirator)
f) CSA Approved Protective Foot Wear (Lace-less Rubber Boots)
g) Hearing Protection (if required)
h) Hard Hat (if required)

Use duct tape or other effective means to assure that the coveralls fit snugly to the contours of the wearer and will not be at risk of tearing when the worker bends or turns.

6.3.4 For dust control, apply water to the area being cut and continue until the cutting has been completed.

6.3.5 Operate the cutting tool in accordance with the manufacturer's instructions making sure that water is applied in sufficient quantities to continuously wet the cut surface and prevent AC dust creation.

6.3.6 Detach the cutter, move to the next cut location on the pipe.

6.3.7 Upon completion of the final cut, thoroughly wash all equipment with clean water to remove AC debris.

6.3.8 Compressed air shall not be used to clean up and remove dust from any surface.

6.3.9 Install replacement pipe and fittings as required, taking care to avoid any abrasion to the AC pipe.

NOTE: In the event damaged AC pipe is removed and the remaining AC pipe in the trench will become abandoned due to alternate services, wrap the ends of the abandoned AC pipe with 6mil poly and labelling it with asbestos hazard tape.

6.3.10 Once the work in the excavation area has been completed, move any tools and materials from the work zone to the decontamination.

6.4 Moderate Risk Procedure for Removing AC Connections from Pipe Chambers

6.4.1 Excavate around the pipe chamber a sufficient distance to ensure adequate tool clearance in the area to operate. Care must be taken to avoid any pipe abrasions.

6.4.2 Set up asbestos working area boundaries with asbestos warning tape, and/or cones and barriers with asbestos warning signage, whichever practicable, adjacent to the excavation. Place a 6 mil poly drop sheet inside the area. This drop sheet will be used to collect the pipe chamber and its AC pipe attachments once it has been removed by the excavator.

6.4.3 Using the excavator bucket, remove the pipe chamber and place it in the designated asbestos working area on top of the 6 mil poly drop sheet. For dust control, apply water to the area being removed and continue until the chamber is detached.

6.4.4 Don Personal Protective Equipment before entering asbestos working area:

a) Disposable Tyvek (or similar) Coveralls with hoods and elastics at wrists and ankles
b) High Visibility Vests
c) NIOSH Approved Half-Face or Full-Face Respirator w/ P-100 Filters
    a. Worker must be fit-tested on respirator to be used
    b. Must be clean shaven
    c. Perform positive and negative pressure fit check
d) NIOSH Approved Protective Gloves
e) CSA Approved Protective Eye Wear (if using Half-Face respirator)
f) CSA Approved Protective Foot Wear (Lace-less Rubber Boots)
g) Hearing Protection (if required)
h) Hard Hat (if required)

Use duct tape or other effective means to assure that the coveralls fit snugly to the contours of the wearer and will not be at risk of tearing when the worker bends or turns.

6.4.5 While keeping the debris wet, separate the AC pipe connections from the pipe chamber and properly dispose of the asbestos containing material following Section 6.6 below.

6.4.6 Using water and wipes, clean the surface of the pipe chamber before disposal.

6.4.7 For installing new chambers, set up a new asbestos working area around the excavation, proceed with moderate risk AC pipe handling procedures.

6.5 Wet Tapping Procedures

6.5.1 Excavate around the AC pipe a sufficient distance to ensure adequate tool clearance in the area. Care must be taken to avoid any pipe abrasions.

6.5.2 Set up asbestos working area boundaries with asbestos warning tape, and/or cones and barriers with asbestos warning signage – whichever is practicable.

6.5.3 Don Personal Protective Equipment before entering asbestos working area:

a) Disposable Tyvek (or similar) Coveralls with hoods and elastics at wrists and ankles
b) High Visibility Vests
c) NIOSH Approved Half-Face or Full-Face Respirator w/ P-100 Filters
    a. Worker must be fit-tested on respirator to be used
    b. Must be clean shaven
    c. Perform positive and negative pressure fit check
d) NIOSH Approved Protective Gloves
e) CSA Approved Protective Eye Wear (if using Half-Face respirator)
f) CSA Approved Protective Foot Wear (Lace-less Rubber Boots)
g) Hearing Protection (if required)
h) Hard Hat (if required)

Use duct tape or other effective means to assure that the coveralls fit snugly to the contours of the wearer and will not be at risk of tearing when the worker bends or turns.

6.5.4 For dust control, apply water to the area of the AC pipe being tapped for new connections.

6.5.5 Install the tapping sleeve around the pipe in the selected area. Operate the tapping machine in accordance with the manufacturer's instructions, making sure that water is applied in sufficient quantities to continuously wet the cut surface and prevent AC dust creation.

6.5.6 Place an asbestos labelled 6 mil waste bag, or 6 mil poly sheet under the AC pipe being tapped. This will ensure the AC pipe debris from the tap will be collected by the bag/sheet immediately after the process is completed.

6.5.7 Compressed air shall not be used to clean up or remove dust from any surface.

6.5.8 Install new connection as required, taking care to avoid any abrasion to the AC pipe.

6.5.9 Once the work in the excavation area has been completed, move any tools and materials from the work zone to the decontamination area.

6.6 Clean-up and Decontamination

Tools and materials used to perform cutting of AC pipe will be thoroughly rinsed in a bucket of water and any remaining pieces of debris shall be wiped off of the tools using a damp cloth (or cleaned with a HEPA filtered vacuum). Tools and materials must be thoroughly washed and inspected (to ensure there is no asbestos contamination) before being removed from the authorized work zone. Materials contaminated with asbestos will be rinsed with clean water and placed in a labelled asbestos waste disposal bag (see below). Properly sealing disposal bags of asbestos waste will follow these directions:

6.6.1 The workers shall clean-up the area and place all asbestos contaminated waste (including PPE, rags and sponges used in work area) into a labeled 'Asbestos Waste' disposal bag. Gently squeeze the bag to expel the air.

6.6.2 Twist tightly the unused top portion of the bag into a tail and seal with duct tape at the base of the tail.

6.6.3 Take the leftover twisted tail section of the bag and bend it around to make a loop and attach it to the base of the tail using the duct tape (this seals the bag and makes a handle).

6.6.4 Clean the surface of the bag using water and wipes. Place the first bag into the second bag and repeat the sealing procedure in steps 6.4.2 and 6.4.3 above.

6.6.5 Visually inspect the barricaded work area thoroughly to ensure all asbestos-containing material and dust/debris has been fully removed.

6.7 Further steps to decontaminate workers' PPE and tools are noted below:

6.7.1 PPE and tools that are to be reused are to be cleaned and immersed in a bucket of water, followed by a second immersion in a second, clean bucket of water. Inspect thoroughly for asbestos contamination and repeat if necessary until all asbestos containing materials have been removed. Place the object outside the authorized work area.

67.2 If the object is too large to be washed in the buckets of water, such as a shovel or wrecking bar, use a wet cloth to wipe it down until visually "clean". Inspect thoroughly for asbestos contamination and repeat if necessary until all material has been removed from the item.

6.8 Disposal of Asbestos Contaminated Waste

Follow the remaining steps to dispose of asbestos contaminated waste:

6.8.1 Asbestos-containing materials will be contained, once removed, in 6 mil polyethylene bags marked with Asbestos warning markings. The Asbestos Waste bag is then sealed in a goose neck fashion with duct tape and placed in a second Asbestos Waste bag which is again sealed in a goose neck fashion.

Where use of Asbestos Waste Bags is not applicable (i.e. length of AC Pipe to be removed is longer than 4 feet or too large for the bag to contain) 6-mil Polyethylene drop sheets will be utilized. Two layers of 6-mil Polyethylene drop sheets will be placed beneath the section of AC Pipe to be removed. Once removed, the AC Pipe will be placed directly onto the 6-mil Polyethylene drop sheets. The first layer of the 6-mil Polyethylene drop sheet will be used to contain the AC Pipe by wrapping around the pipe and tying the ends in a goose neck fashion and sealing with duct tape. The second layer of 6-mil Polyethylene sheeting will be utilized to further contain the AC Pipe by double-wrapping the pipe and tying the ends in a goose neck fashion and sealing with duct tape. The double wrapped AC Pipe will then be labelled with an Asbestos Warning Sticker or marked appropriately with other means.

6.8.2 The Supervisor or Chargehand will arrange for disposal by a third party certified Disposal Company.

The waste AC pipe will be picked up by a certified Disposal Company or with Section Manager approval back to City of Surrey Operations Yard to the designated waste storage area. When dealing with larger amounts of AC pipe to be disposed of, the pipe should be taken directly to a disposal facility through a Certified Disposal Company (I.E. PHOENIX ENTERPRISES LTD, TERVITA, etc).

Note: Please verify that the Abatement Contractors must carry 5 million of insurance with inclusion of Asbestos. The abatement contractor must name the City of Surrey as additionally insured.

The list below is a sample of companies that offer disposal services.

1) PHOENIX ENTERPRISES LTD.

#200 - 19429 54th Avenue
Surrey, BC V3S 7X2
Phone: 604-594-0224
Fax: 604-594-0324
admin@pelsurrey.com

2) TREVITA CORPORATION

13511 Vulcan Way, Richmond, BC, V6V 1K4
M: (604) 214-7000 F: (604) 214-7017
www.tervita.com
Troy Kizmann
Field Services Supervisor - Richmond Waste Management
D: (604) 214-6042 C:(604) 202-3449

3) PROACTIVE HAZMAT AND ENVIRONMENTAL LTD.

#101-9295 198th Street
Langley BC, V1M 3J9
Phone: 778-298-2268 Fax:778-298-2269

4) ENVIRO-VAC, DIVISION OF PARAGON REMEDIATION GROUP

8815 Harvie Road, Surrey, BC V4N 4B9
Phone: 604-513-1324 Fax: 604-513-1325
www.envirovac.com

5) QUANTUM MURRAY LP [Richmond]

#100-3600 Viking Way
Richmond, British Columbia Canada V6V 1N6
24/7 Emergency Response 1.877.378.7745
www.quantummurray.com

6.8.3 To decontaminate the buckets that contained the contaminated water, empty the first bucket of water into the excavation. Use the second bucket of water to rinse the first bucket and then rinse with clean water and wipe down with a clean wet rag. Rinse and wipe down the second bucket of water with clean water and ensure at all times that the water is poured into the excavation.

6.8.4 Before completing the backfilling, the used barrier tape should be taken down and loosely coiled and placed into the excavation approximately 150-300 mm below the finished ground surface (this will warn others involved in future excavation work of the hazard).

6.8.5 Any remaining asbestos waste must be picked up by a Certified Disposal Company or with section manager approval be transported back to City of Surrey Works Yard to the designated waste storage area. When dealing with larger amounts of AC pipe to be disposed of, the pipe should be taken directly to a disposal facility through a Certified Disposal Company (I.E. TERVITA).

6.9 Personnel Exiting the Work Area (Personal Decontamination after Moderate Risk Activity)

This process is to be followed by every worker each time they leave the asbestos clean-up area.

6.9.1 One entrance and exit will be used and maintained by all workers.

6.9.2 The worker is to damp wipe his/her disposable coveralls, boots and respirator to remove visible debris.

6.9.3 Still within the work area, the worker will remove coveralls and place in a 6 mil asbestos-waste-labelled polyethylene bag and dispose of as asbestos waste. DO NOT REMOVE RESPIRATOR AT THIS TIME.

6.9.4 Still wearing the respirator, the worker will proceed to a designated "personal decontamination" area provided.

6.9.5 In the personal decontamination area, thoroughly clean the outside of the respirator with water.

6.9.6 Remove the respirator.

6.9.7 Thoroughly wash hands and face.

6.9.8 Wash and rinse the inside of the respirator.

6.9.9 Respirator filters will be taped over while respirator is not in use to prevent possible release of entrapped asbestos fibres and place the respirator and filters into a sealable bag for storage.

6.9.10 If this is the last use of the filter cartridges, they must be disposed of as asbestos waste

6.9.11 Exit the "clean area".

7 RELATED DOCUMENTS

Half and Full Face Respiratory Use
Safe Work Practices for Handling Asbestos
OHS Guidelines Part 6 Substance Specific Requirements

8 REVISION HISTORY

Date	Revision #	Revised By	Reason for Revision
09-02-2016	0		Procedure issued: OHS Section
06-10-2016	1	Arcose Consulting	Added procedure
23-01-2018	2	Sam Chauhan, Manager, OHS	Clarified AC pipe disposal procedures
28-01-2019	3	Sam Chauhan, Manager OHS	No leaving the waste AC pipe in the ground