

CITY OF SURREY

Excavation Safe Work Practices And Site Preparation



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**BE SMART
WORK SAFE**

“Safety is everybody’s business”

This is a living document and ongoing improvements will be made to improve the health & safety of all employees, volunteers and contractors.

The updated document will be posted as revised on the City of Surrey intranet under Health & Safety.

This document does not replace the Workers’ Compensation Act or WorkSafeBC OH&S regulation.

This document is designed to complement the City of Surrey Health & Safety Program Handbook.

**For information on:
City Occupational Health & Safety Programs, safety issues and questions**

Call:

**Sam Chauhan, Manager,
Occupational Health & Safety
604-591-4658
778-846-0673**

**Tanya Tighe, Specialist,
Occupational Health & Safety
604-591-4876
778-846-0193**

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Appendices

- Pre-Construction Safety Checklist Form
- Geotechnical Reports – Excavations
- Utilities – Accidental Contact Procedures
- Incident Report - Damage To Utility

Accidental Contact Instructions

- Fortis BC Gas Utility
- BC Hydro Electrical Utility
- Street Lighting Utility
- Communications Utility
- 7 Steps to Electrical Safety

Section Manager/Manager OHS to contact WCB

- Incident Report - Damage To Utility

WorkSafeBC OHS Requirements

- Sloping In Lieu Of Shoring
- Benching In Lieu Of Shoring
- Combined Supporting And Sloping

Respirable Silica Exposure Control Plan

Notice Of Project – Sample Form

Excavation Safe Work Practices And Site Preparation

Excavation Safe Work Practices And Site Preparation

PURPOSE

Excavation and trenching are among the most hazardous work activities undertaken by the City of Surrey. This document outlines general requirements and specific safe work practices to ensure the health and safety of employees who work in or around excavations as part of their job duties. These safe work practices are also designed to protect the general public who work or travel in the vicinity of excavations.

OBJECTIVE

A Pre-Construction Safety Checklist Form must be completed and communicated to all workers prior to the start of any excavation for the purpose of an infrastructure installation or repair. At the job site, workers must review the information on the Form, assess the job site for any hazards that may not have been identified and sign the form once they are satisfied the information is correct.

Before a worker enters any excavation over 1.2 m (4 ft) in depth or, while in the excavation, a worker approaches closer to the side or bank than a distance equal to the depth of the excavation, the sides of excavation must be sloped, benched, shored or supported in accordance with Part 20 of the WCB Occupational Health & Safety Regulation or with the specifications and requirements of a registered professional engineer.

HAZARDS

Hazards that workers may be exposed to when excavating around underground utilities include:

- Electrocution
- Explosive, flammable, combustible gases or fluids
- Toxic gases & vapours
- Drowning
- Cave-ins
- Contaminated soils (PCB's may be present in coal-tar coating around natural gas pipelines)
- Moving heavy equipment/machinery around excavations
- Vehicular traffic
- Silica / Asbestos

SUPERVISION

Site Supervisors (i.e. Foreman/Chargehand/Trades Improver) shall be familiar with the actual and potential hazards associated with this work. Site Supervisors must ensure that workers under their direction and control are aware of the dangers associated with the work and perform their work in a safe manner. Site Supervisors shall ensure the requirements of this procedure, related elements of the Occupational Health & Safety regulation, and applicable industry best practices are applied at all times. Site Supervisors must hold a pre-job meeting with the crew to discuss the hazards and control measures for the work to be done. Site Supervisors are responsible to ensure the workers under their direction and control sign-off the site preparation form under the communication section prior to the commencement of the work.

WORKER RESPONSIBILITY

Each employee is responsible to carry out their work in accordance with the established safe excavation practices outlined in this document. Employees must also use and or wear protective equipment, devices and clothing as required for the hazards of the work. It is every employee's responsibility to ask questions about anything they do not understand or safe work procedures that are not clear.

Excavation Safe Work Practices And Site Preparation

If any worker believes that there is a risk of injury to themselves, a co-worker or damage to a utility or piece of equipment, it is their duty to stop work immediately and correct the situation including contacting their supervisor to determine the next course of action. Workers must sign-off the site preparation form under the communication section prior to the commencement of the work.

EXCAVATION SAFE WORK RULES

1. Before excavating or drilling with powered tools and equipment **and/or saw cut asphalt/concrete**, the location of all underground utilities in the area must be accurately determined; mark location on asphalt to identify location of underground utilities and any danger to workers from the utility must be controlled (see page 7). Call BC One Call to:

- Tell you which members may have underground facilities in the proposed excavation area
- Transmit the information about the proposed activity to the member companies
- Inform you about your liability and provide you with a ticket number to confirm your request
- Advise you to contact any other parties who may have underground facilities in the excavation area, as all facility owners are not members of BC ONE CALL. You must contact these non members directly.

Each member company will then contact you with information about where their facilities are buried in the proposed excavation area. **Always wait for a response from all facility owners in the proposed excavation site before digging.** Give the utility a **minimum of three full working days'** notice for planned work.

2. If a section of another utility owners duct works needs to be replaced or repaired in order to facilitate infrastructure relocation, we need to contact the utility owner or utility representative to undertake this work. **City of Surrey staff should not be altering another utility owners work.**

Do not cut into abandoned gas lines, damaged conduit, shake damaged utilities or open BC hydro high voltage vaults.

Do not remove, contact, alter, pull, cut, repair, etc. any utility including conduit, unless directed and approved by the utility company owner. This approval must be in WRITING.

3. Mechanical digging is not permitted within the "no mechanical dig zone boundary limit" (1m (3ft. 3in.) in any direction from the utility or its marked location) until it is exposed by hand digging or hydro-excavating at a sufficient number of locations to determine its exact positions and depths. Once the utility or service is adequately exposed, mechanical digging is permitted up to 0.3m (12in.) of the utility.

Staff MUST paint or mark a boundary area using WHITE to indicate the safe hand dig area within the non- mechanized equipment zone.

4. Pointed tools must not be used for probing to locate underground gas lines or electrical utilities.
5. The Equipment on site is under the direct supervision of the Foreman & Chargehand.
6. The Equipment Operator must operate the equipment safety and maintain full control.
7. Only an authorized person may be on mobile equipment while the equipment is in motion.
8. The equipment operator must not move the equipment when a worker is exposed to a hazard created by a swinging movement.

Excavation Safe Work Practices And Site Preparation

9. Traffic around the site must be controlled, and barricades, signs, and/or flag persons used as needed to control both vehicular and pedestrian traffic.
10. Excavated material must be kept back a minimum distance of 0.6 m (2 feet) from the edge of a trench excavation and 1.22 m (4 feet) from any other excavation. Excavated material must not be piled so it endangers workers.
11. The sides of an excavation must be scaled and trimmed or otherwise stabilized to prevent slides of material or falls of rock which could endanger workers.
12. Trees, utility poles, rocks or similar objects adjacent to an area to be excavated must be removed or secured if they could endanger workers.
13. Safe access must be provided in the immediate area where workers are employed in trenches over 1.22 m (4 ft deep). Ladders must extend from the bottom of the excavation to at least 0.9 m (3 ft) above ground.
14. If an excavation is a hazard to workers, it must be effectively covered or guarded.
15. A worker must be designated as a spotter at all times when mechanical digging is undertaken. The spotter must maintain visual contact with the equipment operator and the excavation at all times watching for underground utilities. The spotter must signal the equipment operator to stop digging immediately if any unexpected utilities are encountered.
16. All workers must maintain a safe distance from the radius of the backhoe bucket. Workers must never walk under a loaded bucket due to the danger of falling debris, hydraulic failure or operator error. Eye contact is required to be made with the operator prior to entering the hazard bite zone (radius of backhoe/excavator swing radius).
17. All equipment and machinery must maintain a safe distance from overhead hazards. The Limits of Approach” as outlined in the WCB OSHR Section 19.23. Table 19-1 must be adhered to when working in close proximity to power lines.

Table 19-1: General limits of approach

Voltage Phase to phase	Minimum distance	
	Meters	Feet
Over 750 V to 75 kV	3	10
Over 75 kV to 250 kV	4.5	15
Over 250 kV to 550 kV	6	20

If the minimum distance in Table 19-1 cannot be maintained because of the circumstances of work or the inadvertent movement of persons or equipment, an assurance in writing must be signed by a representative of the owner of the power system. The "assurance in writing" form is referred to as a WCB form 30M33.

18. Water must not be allowed to accumulate in an excavation if it might affect the stability of the excavation or endanger workers. Surface water must also be prevented from eroding the slopes of the excavation.
19. If unexpected contact is made with a utility, the accidental contact procedures must be followed as specified in this document.

Excavation Safe Work Practices And Site Preparation

20. If the excavation work is not complete at the end of the day, the excavation must be covered, fenced or otherwise made safe for the public.
21. Workers are not allowed to cut into abandoned gas lines or damaged conduit. Workers must not open BC Hydro High Voltage Vaults. Permission and direction must be obtained from the utility owner with regards to handling damaged or abandoned conduit. Document the name and contact information of the utility representative that provides the City with guidance and direction.
22. When cutting Asbestos containing pipe, Asphalt or Concrete workers must suppress the dust by using wetting techniques and wear an appropriate personal protective equipment i.e. Respirator, Tyvek suit (disposable coverall), etc. Please see the Respirable Silica Exposure Control Plan (see Appendix) for further details. Please review Engineering Operations AC pipe cutting safe work procedures.
23. A Notice of Project must be filed 24hrs prior to a planned excavation / construction project if:
- the total cost of labour and materials for the work exceeds \$100 000, or
 - the construction project includes a trench more than 1.2 m (4 ft) in depth and over 30 m (100 ft) in length, or
 - the project includes another type of excavation more than 1.2 m (4 ft) in depth, which a worker may be required to enter.

If field markings are conducted, you should identify and accurately mark the horizontal location and alignment of your facilities following the International Color Code (table below excerpted from the WorkSafeBC Prevention of Damage to Buried Facilities in British Columbia resource available at WorkSafetBC.com).

Colour Codes For Marking Underground Utility Lines (Universal Standards)		
Electrical power lines, cables, conduits & ducts or lighting wires and cables	Red	
Gas, oil, petroleum, steam or gaseous material	Yellow	
Telephone, communications, cable TV, alarm or signal lines, wires, cable, conduits or ducts	Orange	
Portable water lines or pipes	Blue	
Sanitary sewer, storm sewer, culvert or drain lines	Green	
Temporary survey markings	Pink	
Limits of proposed excavation	White	
Irrigation, reclaimed water or slurry lines or pipes	Purple	

SLOPING AND SHORING REQUIREMENTS

1. Before a worker enters any excavation over 1.2 m (4 ft) in depth or, while in the excavation, approaches closer to the side or bank than a distance equal to the depth of the excavation, the excavation sides must be sloped or supported as specified by a professional engineer or geoscientist (see Appendix for minimum geotechnical requirements), or the sides of the excavation must be:
 - a) Sloped to safe angle - no slope can be steeper than 0.9 m (3 ft) horizontal to 1.22 m (4ft) vertical (see Appendix),
 - b) Benched - bench width shall not be less than 1.5 times the height of its rise below (see Appendix),
 - c) Supported in accordance with the minimum requirements of section 20.85 of the Regulation, or
 - d) Supported by manufactured or prefabricated trench boxes or shoring cages, or other effective means.
2. If the end of a trench over 4 feet in depth is not adequately sloped, end shoring must be installed unless:
 - a) A worker in the trench is not required to approach closer to the end of the trench than a distance equal to the depth of the trench at that end,
 - b) Where, for the prevailing soil conditions at the end of the trench, the permissible spacing of uprights equals or exceeds the width of the trench, or
 - c) Otherwise authorized in writing by a professional engineer.
3. A safety spotter system must be used at each excavation while the excavator is operating and workers are in the excavation. The spotter will assist to identify any potential hazard that may occur while the work is being performed. Equipment Operators and Truck Drivers may be designated as spotters, they must remain in a position while designated as the spotter to observe and communicate at all times with the excavator. Workers can work in a shoring cage with no spotter if no excavator/backhoe is working within their vicinity (i.e. bite zone).
4. Any engineered excavation support system must have certified design documentation available on site. It must also be inspected daily and maintained in a fully effective condition.
5. Shoring is installed from the top down and removed in the reverse order.
 - Workers are not allowed in an unsupported trench to compact backfill.
 - Workers must not enter an excavation to remove shoring materials if ground conditions have deteriorated so as to make entry for shoring removal unsafe.
6. Excavation support systems must be installed so that they are firmly in contact with the face of the excavation. This can be achieved by back filling or blocking.
7. Shoring must extend above the top of the excavation by at least 0.3 m (1 ft) and must be as close to the bottom of the trench as is possible but in no case more than 0.6 m 2 ft from the bottom. An exception is given to the 0.3 m (1 ft) extension above the ground for excavation using road plates.
8. When a combination of sloping and shoring is used the minimum amount of shoring must be equivalent to the standard for the overall depth of the excavation (see Appendix).

Excavation Safe Work Practices And Site Preparation

PRE-CONSTRUCTION SAFETY CHECKLIST

A Pre-Construction Safety Checklist must be completed for all jobsites involving mechanical digging. A communication jobsite meeting must be held with all site workers prior to the start of any excavation.

It is the responsibility of all workers participating in the excavation to sign the form once they have reviewed it at the site and are satisfied that the information is correct. If any information is unclear or not understood, employees must contact their supervisor for clarification prior to commencing work at the site. The form must remain at the site for the duration of the work for all subsequent workers arriving after the start of the excavation to review and sign. All forms are to be submitted to the foreman for review once the job is completed.

Note:

Where a cut is made for the purpose of a utility repair, both sides of the Pre-Construction Safety Checklist form is required to be completed prior to the removal of the asphalt.

SITE SAFETY

It is essential that the health and safety of the general public who work or travel in the vicinity of the excavation be taken into account. The excavation site should be barricaded off and made highly visible. If possible, keep the road and sidewalks clear of debris for vehicle and pedestrian traffic. A detour needs to be provided if a sidewalk is closed. Orange cones should be placed over tripping hazards such as exposed valves. If the excavation work is not complete at the end of the day, the excavation must be covered, fenced or otherwise made safe for the public.

UNDERGROUND UTILITIES - PREVENTIVE MEASURES

1. Supervisor / Crew leader to check off on the Fortis BC Gas as-built record table to confirm that the services have been located.
2. Ensure that all Utility as-built information is fully reviewed and checked each day prior to excavation so all crew members including operators, trades and labourers understand what is going to be encountered.
3. If any utility or underground infrastructure is encountered that is not shown on the BC One Call as-builts, the supervisor must be notified and the supervisor must take the appropriate action after determining the ownership of the infrastructure.
4. Accurately locate, layout and mark all utilities before digging. Particularly where utilities were laid out weeks prior to construction. All underground utilities will be double checked during the initial locating, scoping and marking. BC One Call Information will be checked and double checked.
5. When tracing utility services, trace past the main by 2 meters, if there are two mains on the street, to ensure that the service does not extend beyond the near side service and is actually connected to the other main.

Note:

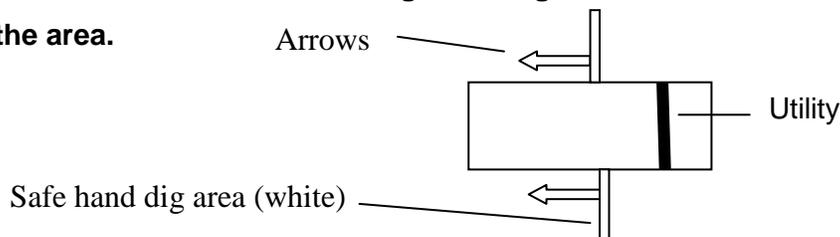
Do not remove, contact, alter, pull, cut, repair, etc. any Utility including conduit unless directed and approved in writing by the Utility Company.

Excavation Safe Work Practices And Site Preparation

EXPOSING UNDERGROUND UTILITIES

The “No Mechanical Dig Zone Boundary Limit” is defined to be equal to the diameter of the conduit or cable plus one meter in any direction of the utility. Within 1m (3ft 3 in), the utility must be located by hand digging or hydro-excavating. Once the utility has been exposed in a sufficient number of locations, to determine its routing, mechanical digging may resume up to 0.3m (1ft) from the utility.

Staff **MUST** paint or mark a boundary area using WHITE to indicate the safe hand dig area within the non-mechanized equipment zone. Arrows indicating hand dig area should also mark the area.



Mechanical digging is not permitted:

- To dig within the “no mechanical dig zone boundary limit” until the utility is exposed.
- Within 0.3m (1ft.) of a utility at any time.

Hydro-excavating is permitted:

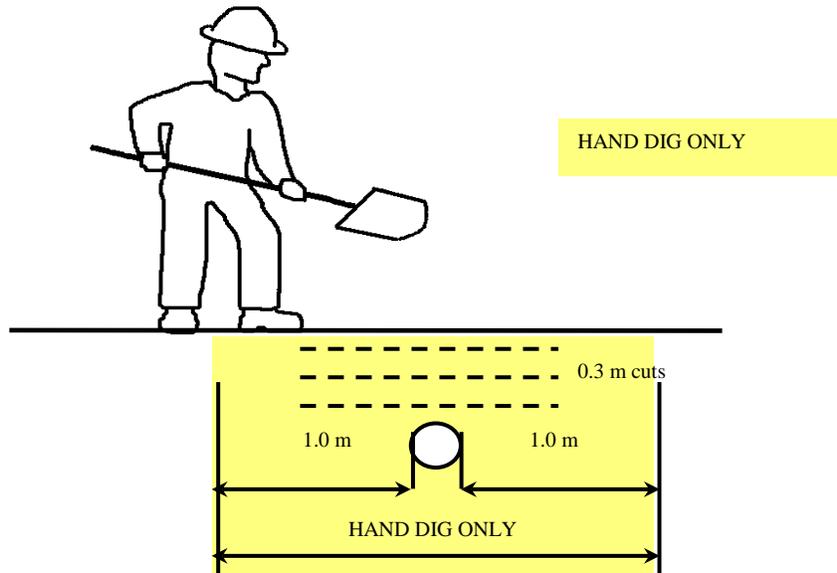
- Within the “no mechanical dig zone boundary limit” and to expose the utility.

WORKERS ARE NOT TO CUT INTO ABANDONED GAS LINES, DAMAGED CONDUIT, SHAKE DAMAGED UTILITIES OR OPEN BC HYDRO HIGH VOLTAGE VAULTS. WORKERS DO NOT REMOVE, CONTACT, ALTER, PULL, CUT, REPAIR, ETC. ANY UTILITY INCLUDING CONDUIT, UNLESS DIRECTED AND APPROVED BY THE UTILITY COMPANY OWNER. THIS APPROVAL MUST BE IN WRITING.

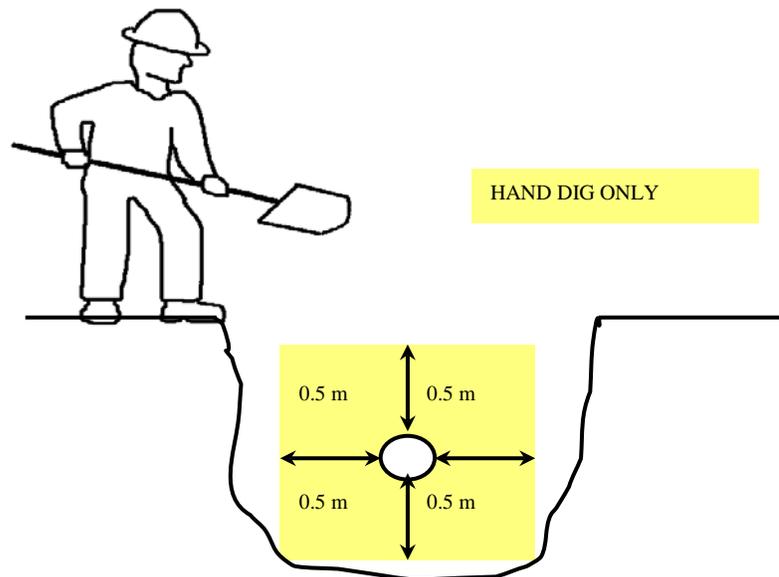
If the BC One Call information package indicates that the abandoned gas line has been cut at the Main you must still Contact utility owner for direction.

Contact BC Hydro, or other utility owners for site evaluation and location determination if utility information is conflicting.

EXPOSING THE UTILITY



DIGGING AROUND AN EXPOSED UTILITY



Excavation Safe Work Practices And Site Preparation

EXCAVATION PARALLEL TO A BURIED FACILITY

Quite often, construction activities such as road construction or curb and gutter replacement require excavation parallel to a buried facility. The excavator is cautioned that buried facilities, particularly shallow utilities - telephone, cable TV, electric and natural gas - are not necessarily installed in a straight alignment.

1. Determine the location of the utility with Electronic Locating Device (MetroTeck, M-scope, Rigid), within 1.5m of the trench wall
2. Mark the asphalt
3. Be careful / gentle
4. Ensure that the soil is native
5. Have locator on site – get depth reading
6. Ensure that 0.3m is maintained from the excavator bucket and location of parallel buried facility
7. Dig very cautiously to depth of parallel utility
8. Use locator to verify distance of trench side to the parallel gas utility:
 - **If the location is verified by the detector you can proceed**
 - **If the location cannot be verified by the detector do not proceed. Contact the utility owner and keep the City of Surrey Project supervisor or Manager for the project apprised.**
9. Confirm continuous running line with locator every 3m. This spacing should expose any wandering / alignment change of the gas system.

Note:

When locating gas utility, please remember that it is the tracer being located and not Polyethylene gas pipe. **Do not proceed unless the location of the utility has been verified.**

HYDRO EXCAVATION

- If it is not practical to hand dig, hydrovacing or airvacing may be considered. Hydrovacing is the use of pressurized water to liquefy and loosen soil which is then removed from the excavation by the use of on-truck vacuum systems and hoses. Facility owners may allow hydrovacing as a method of exposing their buried facilities under certain conditions such as certification of operators, maximum pressure, maximum temperature or type of nozzle.
- Hydrovacing is faster and easier than hand digging and is helpful when the excavation is complex and involves multiple lines. Hydrovacing may not work in all situations, and may be expensive. When assessing an excavation technique, you must consider avoiding damage to the coating of facilities as well as the methods of soil disposal.
- Hydrovacing in the vicinity of a buried utility without locates constitutes a ground disturbance with mechanical excavation equipment. Requests for locate information is still required.

LIMITS OF APPROACH– SkyTrain, Federally Regulated Utility-Kinder Morgan Pipeline

SkyTrain

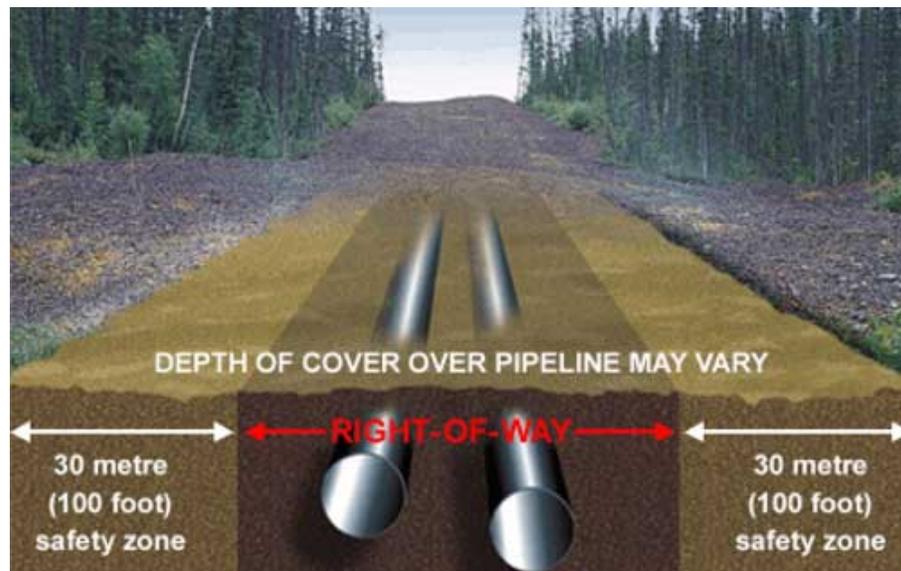
Prior to any work commencing, within ten meters of a SkyTrain station or the drip-line of the Guideway the supervisor/crew leader must contact SkyTrains' Wayside and or Safety departments at (604)520-3641 or after hours at (604)520-5555 and advise them of the work activity. See page 20 for further information.

Note: the drip-line is a line which extends from the edge of the guideway (track) to the ground below. The area of SkyTrain's concern extends from the ground up to and beyond the guideway due to the dangers of falling objects into the track from above.

Federally Regulated Pipeline - Kinder Morgan / Trans Mountain Pipeline

If we are planning an excavation or a construction project near a federally regulated pipeline or any other type of buried infrastructure prior approval from the pipeline company is required.

The Supervisor/Crew leader must make a locate request when an excavation is being planned on the pipeline right of way or within the 30-metre (100ft) safety zone on either side of the right of way. Examples of such activities include planting / tree removal, installing a fence/deck, digging / clearing a ditch, and landscaping, etc.



Pipeline company approval is required for any excavation using power operated equipment or explosives within the 30-metre safety zone.

If we are unable to reach an agreement with the pipeline company to excavate and construct within 30metres of the right of way we are to contact the National Energy Board at 1-800-899-1265.

Excavation Safe Work Practices And Site Preparation

MARKING UNDERGROUND UTILITIES

Before excavating or drilling with powered tools and equipment, the location of all underground utilities in the area must be accurately determined and marked.

The thickness of the markings should be 0.5m – 0.6m (18"-24") in length and 50 mm (2") in width. The utility should be indicated by initials or by name in letters (150 mm (6") high on the locate marking. On long locates the facility owner should be indicated every 100'. If the surface over the buried line is to be removed, supplemental offset markings may be used. Offset markings should be on a uniform alignment and must clearly indicate that the actual facility is a specific distance away.

POOR UTILITY DETECTOR SIGNAL

Sometimes, it is difficult to verify the location of the utility due to a poor utility detector signal. It is imperative for safety that if the location cannot be verified by the detector that staff do not proceed. **Contact the utility owner, if the location cannot be verified by the detector and keep the City of Surrey Project Supervisor or Manager for the project apprised.**

Excavation Safe Work Practices And Site Preparation

PERMITS

A work permit is required from Fortis BC Gas for any activity or work that:

- Crosses under or over an Intermediate Pressure (IP) or Transmission Pressure (TP) gas pipeline.
- Is within 3m. (10 ft.) of the outer surface of the pipeline within the public right of way.

ABANDONED UTILITIES

If you unexpectedly come across an underground utility that was not previously located, **Stop digging**, review BC One Call maps and city maps to determine if the utility locate was accidentally missed. Call Supervisor for instructions.

Workers are NOT allowed to cut conduit until the utility owner advises that it is safe to do so and that they authorize the City to perform the task. Violation of this requirement will result in a severe discipline up to termination of employment.

HAZARDOUS ATMOSPHERES

Atmospheric testing must be conducted in excavations over 1.22m (4 ft) deep where hazardous atmospheres could reasonably be expected to exist (e.g. landfill areas, near hazardous substance storage or gas pipelines).

INSTRUCTION OF PROFESSIONAL ENGINEER OR GEOSCIENTIST

Excavation work must be in accordance with the written instructions of a professional engineer if:

- a) The excavation is more than 6m (20 ft) deep,
- b) Support structures other than as specified in Section 20.81 of the WCB OSHR are used in the excavation,
- c) An improvement or structure (building) is adjacent to the excavation,
- d) The excavation is subject to vibration or hydrostatic pressure likely to result in ground movement hazardous to workers, or
- e) The ground slopes away from the edge of the excavation at an angle steeper than 0.9m (3 ft) horizontal to 0.3m (1 ft) vertical.

Excavation Safe Work Practices And Site Preparation

Safety Bulletin COS- Park Operations- 2014

SYNOPSIS

The City contracts the services of Modern Grounds Maintenance Ltd (MGM) to provide landscaping and horticultural services. A permit was not obtained prior to planting four trees in a Kinder Morgan Gas Right of Way. No mechanical equipment was used to excavate the ground. Four of the hand dug installed trees needed to be removed.

ABC One Call ticket was not obtained nor was a permit from Kinder Morgan prior to the tree planting.

As part of the City of Surrey's Green City Planting Residential Program, the City planned this street for tree planting. A City of Surrey Parks Arborist develops planting plans for trees, the procedure included turning on infrastructure layers in the City of Surrey Mapping Online System (COSMOS). However, the Oil Pipelines layer was not turned on as part of the procedure. The Pre Tree Planting check list procedure was updated such that this Oil Pipelines layer will now be turned on every time with the other infrastructure layers.

COSMOS Kinder Morgan



PREVENTION REMINDERS

- A. Before planting any trees in the ground, **a BC One Call must be obtained** by the Prime Contractor. Ensure that the contracted language is clear.
- B. **If we are planning an excavation or a construction project near a federally regulated pipeline or any other type of buried infrastructure prior approval from the pipeline company is required.**
- C. The Supervisor/Crew leader must make a locate request when an excavation is being planned on the pipeline right of way or within the 30-metre (100ft) safety zone on either side of the right of way. Examples of such activities include planting / tree removal, installing a fence/deck, digging / clearing a ditch, and landscaping, etc.

Safety Bulletin COS- Engineering Operations- 2014 - 1

SYNOPSIS

A City Roads and Drainage crew located a FortisBC gas service that was located 10” under the asphalt.

The crew was requested to repair a catch basin as the asphalt around the grate had deteriorated. A BC One Call ticket was obtained.

The primary reason not to perform mechanical digging is that the gas service would have been ruptured had we not hand dug.

This incident could have resulted in a severe injury had mechanical excavation occurred prior to hand digging.

PREVENTION REMINDERS

- D. Before excavating or drilling with powered tools and **equipment and/or saw cut asphalt/concrete**, the location of all underground utilities in the area must be accurately determined; mark location on asphalt to identify location of underground utilities and any danger to workers from the utility must be controlled.
- E. A BC One Call ticket must be available at the worksite prior to saw cut of the asphalt occurring.
- F. **An underground utility must be located by hand digging or hydro-excavating.** Once the utility has been exposed in a sufficient number of locations, to determine its routing, mechanical digging may resume up to 0.3m (1ft) from the utility.

**THE IMPORTANCE OF OBTAINING
BC ONE CALL TICKET &
HAND DIGGING!!**



Safety Bulletin COS- Engineering Operations- 2014 - 2

SYNOPSIS

A City Water Operations crew was involved in a near miss incident which involved a backhoe damaging a 3” pvc duct which contained a 25kv BC Hydro primary power line. No one was injured and no hazardous energy was released.

The crew had challenges finding the hydro and TELUS lines as they were not being clearly picked up by the Utility Locator. An assumption was made that the hydro lines must be in the same location as the TELUS lines. The crew hand dug the excavation until they located the BC Gas lines and TELUS ducts. The backhoe was instructed to remove the loose soil in the excavation. As the soil was being removed the backhoe bucket struck the hydro duct. The pink hydro duct apparently shattered.



The accident occurred because the underground utilities were not accurately located, the utility owner was not contacted for locating assistance and that the backhoe bucket came in contact with a BC Hydro underground utility duct while removing soil from within the excavation.

The City of Surrey Excavation Safe Work Practices and Site Preparation Manual safe excavation work procedures and rules were not followed. The investigation further revealed that the excavation should have been benched, sloped or a shoring cage should have been installed in the area that was greater than 4” deep.

This incident could have resulted in a severe injury.

PREVENTION REMINDERS

- A. The COSMOS maps are not 100% accurate with regards to determine a third party utility owner's underground utility location information. The BC One Call ticket information is to be the primary map source to be used to locate underground utility locations.
- B. Utility locators can be used inside of trench to further clarify the location of the underground utility prior to further excavation work.
- C. If a utility line cannot be located by hand digging, **call the utility owner and/or immediate supervisor for direction.**
- D. Do not tick utility located on the construction checklist because a BC One Call record indicates it is present, only check off once the location is verified by using the underground utility locating equipment.
- E. If a utility is accidentally contacted, **stop work immediately and follow utility contact emergency procedures**

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SYNOPSIS

An 18ft. single-leg lifting chain was being used to attach an ~600kg concrete lawn basin (L/B) to the backhoe bucket, as the L/B was being lifted and moved the chain slipped off of the L/B. The concrete lawn basin fell into the trench, pinning an employee's left leg against the sidewall of the trench. The L/B seriously injured the left leg.

PREVENTION REMINDERS

All workers must maintain a safe distance from the radius of the backhoe bucket. Workers must never walk under a loaded bucket due to the danger of falling debris, hydraulic failure or operator error. Eye contact is required to be made with the operator prior to entering the hazard bite zone (radius of backhoe/excavator swing radius).

The site supervisor must appoint a spotter. The employee providing spotting/padding services to the equipment operator must not enter or allow anyone else to enter the bite zone where a load is being lifted or lowered.

Langley Concrete Group the manufacture of the Lawn Basin has indicated that the pre-cast pins embedded in the 600 diameter L/B are rated at 2.5 Tons. "Swift Lift Clutches" or "universal lifting eye clutches" can be used to lift and lower the lawn basins. The Langley Concrete Group sell the swift lift clutches and they also rent /lend them if required.



Safe Lowering/Lifting Objects Into and Out of a Trench:

- a) Ensure proper lifting capabilities of equipment
- b) Supervisor needs to appoint a spotter who will be in charge of signaling the operator
- c) Assess and barricade the lift area
- d) Position machine according to the center of gravity of the load
- e) Be acquainted with hand signals
- f) Ensure lifting equipment is in good condition. Used approved slings/chains of the proper size and length and working load limit rating, swift lift clutches or universal lifting eye clutch. Inspect all rigging prior to each use. Replace damaged or defective rigging immediately
- g) Ensure load is centred
- h) Utilize tag line if required
- i) Hook up of the load to be done by person with rigging skill and knowledgeable
- j) Be aware of pinch points
- k) Do not walk under suspended loads, personnel should stand clear of the load
- l) Equipment Operator to only lift when spotter signals safe to do so and the area is clear of personnel
- m) Ensure you are not between the load and the trench wall
- n) Know the hand signals used at the work site
- o) Ensure that you are visible to the operator
- p) Be aware of the direction of the swing of load
- q) Be aware of changing conditions
- r) Move load is moved slowly to landing area and then gently lowered
- s) Equipment Operators to take the appropriate action i.e. Stop work when worker enters bite zone inadvertently or places themselves in harm's way
- t) Ensure load is stable on level ground before slackening slings/chains and unhooking

REMINDER: All lifting chains/cables/hooks/clings must bear an inspection tag at all times and be inspected prior to use and once a year by a certified inspector. Manager of Fleet and Garage will at the request of a Section Manager the certified inspectors contact information. The Manager, of Fleet and Garage may call for all chains and cables to be inspected at the same time. Damaged chains and Hooks with broken or missing safety pins must be taken out of service immediately.

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SYNOPSIS

A prime Contractor recently brought to the City's attention an incident which involves the cutting of empty hydro ducts by City of Surrey work crews.



HAZARDS WHEN EXCAVATING AROUND UNDERGROUND UTILITIES

- Electrocutation
- Explosive, flammable, combustible gases or fluids
- Toxic gases and vapours
- Drowning
- Cave-ins
- Contaminated soils
- Silica
- Overhead equipment and machinery

CITY OF SURREY EXCAVATION SAFETY RULES

- Before excavation begins, locate and identify utility services such as electrical, gas, as street lighting, fibre optics, tel, cable, drainage, steam, water, and sewer in the area. Call B.C. OneCall 1-800-474-6886 and any non-member facility owners.
- Both sides of the pre-construction checklist must be completed for all jobsites involving mechanical digging
- City Staff are not authorized to remove, repair or replace non-City utilities (ie. Hydro, Shaw, Telus, FortisBC, etc. This includes other utility owner's empty ducts.
- **Do not remove, contact, alter, pull, cut, repair, etc. any utility including conduit, unless directed and approved by the utility company owner. This approval must be in WRITING.**

Staff will be disciplined up to and including termination if the above rules are violated.

**Pre-Construction Checklist
Form**

ENGINEERING OPERATIONS

PRE-CONSTRUCTION SAFETY CHECKLIST

A Pre-Construction Safety Checklist shall be completed for each project and communicated to all workers prior to the start of any construction. This checklist must remain at the site for all workers to review. The information identified on this form must be reviewed and understood by all employees working at the job site. All subsequent workers arriving after the start of the project must also review and understand information on this document. If any information is unclear or not understood, employees must contact their supervisor for clarification prior to commencing work at the site.

Project Information				
Project Title / Description:		Start Date:		
Work Order #:	Site-Supervisor/Foreman:			
Equipment Operator:	Crew Supervisor / Charge-Hand:			
Location:	WorkSafeBC: Notice Of Project# _____			
Site Hazards, Control Measures And PPE - Check Applicable Boxes				
<input type="checkbox"/> Underground/Overhead Hazards	<input type="checkbox"/> Asbestos Pipe	<input type="checkbox"/> Small Powered Equip		
<input type="checkbox"/> Fire Or Explosion	<input type="checkbox"/> Work From Height	<input type="checkbox"/> Slopes/Rollover		
<input type="checkbox"/> Gases, Dusts, Fumes, Vapours	<input type="checkbox"/> Adjacent Structure	<input type="checkbox"/> Poor Lighting/Visibility		
<input type="checkbox"/> Slipping-Maintain Housekeeping	<input type="checkbox"/> Spoil Placement	<input type="checkbox"/> Ladder-Rails And Rungs-Good		
Personal Protective Equipment:		<input type="checkbox"/> Hardhat	<input type="checkbox"/> Hi-Vis Vests	
		<input type="checkbox"/> Gloves	<input type="checkbox"/> Eye Protection	
		<input type="checkbox"/> Safety Boots	<input type="checkbox"/> Respirator	
Working Around Heavy Equipment Discussed:		<input type="checkbox"/> Eye Contact/Aware Of Position And Traffic		
Environmental:	<input type="checkbox"/> Cold/Heat Stress	<input type="checkbox"/> Water Accumulation/Continuous Dewatering		
Overhead Hazards:	<input type="checkbox"/> Communicated With Operator	<input type="checkbox"/> Clearance Controls Established	<input type="checkbox"/> 30m33	
Traffic Control:	<input type="checkbox"/> Adequate Signs Posted	<input type="checkbox"/> # Of Traffic Control Persons (__)	<input type="checkbox"/> Barricades	
Cave-In Protection:	<input type="checkbox"/> Professional Engineer/Geoscientist	<input type="checkbox"/> Shoring	<input type="checkbox"/> Sloped At Angles	
		<input type="checkbox"/> Benching		
Hazardous Atmosphere: <input type="checkbox"/> Use Gas Detection Follow Confined Space Entry Procedures				
Utility Locations: <input type="checkbox"/> BC One Call <input type="checkbox"/> As-Built <input type="checkbox"/> Utility <input type="checkbox"/> Detector				
Utilities Mains/Services	Utility In Or Near Construction/Excavation		Located & Marked /Scoped Utility (Place Check Mark)	Comments
	Yes	No		
BC Hydro	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Terasen Gas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Trans-Mtn. Pipe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fiber Optic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Telephone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Street Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sewer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Drainage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other (I.E. Irrigation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

All underground utilities will be **double checked** during the initial locating, scoping and marking. Due to the time that can elapse from the initial locating, scoping and marking of utilities to the construction period, the utilities within the daily construction and excavation limits will also be checked daily before the start of any construction. All locates will be conducted using the as-built drawings provided by the Utility Companies. The consultant's design drawings shall not be used for locating utilities. Before excavating or drilling with powered tools and equipment, the location of all underground utility services in the area must be accurately determined, and any danger to workers from the services must be removed. All utilities must be located and exposed by hand digging or hydro-excavating. Supervisors / Crew to check off on the Gas / Utility as-built record table to confirm that the services have been located and gas meters on all buildings shall be located and confirmed with BC One Call gas as-built service location information.

Completed by: _____	Date: _____
Site Supervisor	

**Geotechnical Reports -
Excavations**

GEOTECHNICAL REPORTS - EXCAVATIONS

The following should be included as a minimum for a qualified registered professional's certificate on a site under this section:

- Date of issue
- Site address/location
- **Drawing/sketch, plan, and sections and/or clearly written instructions**
- Geotechnical description of the expected soil conditions, or confirmation upon site review
- Limitations for machinery or equipment being adjacent to the excavation
- Time period for which certification applies
- Influence of changing weather conditions
- Name of the certifying qualified registered professional, signature, and seal

Subsequent certifications may refer back to the initial certification documents, in which case such documents shall be available at the site. If conditions and/or instructions change with respect to the conduct of the excavation work, supplementary instructions and documentation are required.

If the certification is incomplete or deemed inadequate, work should stop in the hazard area until acceptable certification is available, or until remedial work is done so that the excavation complies with the *Regulation*.

CONCERNS:

- Advise inspection liaison that the minimum information required on the report is lacking and that s/he needs to have a Geotechnical report that contains the minimum info as required by WSBC.
- If the Geo-technician writes an updated report and you are satisfied, proceed with inspection.
- If the Geo-technician writes a report and you are not satisfied, call Sam Chauhan, Manager, OHS (778-846-0673) or WorkSafeBC at 604-276-3100 and ask for an Occupational Health & Safety Officer to assist with your concern.

GEOTECHNICAL REPORTS
EXCAVATIONS



**Utilities – Accidental Contact
Procedure**

Purpose:

The purpose of this safety procedure is to:

- a) Prevent injuries to workers resulting from accidental contact with underground utilities
- b) Prevent economic loss resulting from accidental contact with underground utilities
- c) Provide the appropriate response to accidental contact with underground utilities

Procedures For Accidental Contact With :

- Fortis BC Gas Utility
- BC Hydro Electrical Utility
- Street Lighting Utility
- Communications Utility

Additional Information is provided as follows:

- 7 Steps to Electrical Safety
 - **Section Manager/Manager OHS to contact WCB**
 - Incident Report - Damage To Utility
-

FORTIS BC GAS UTILITY

Procedures for Accidental Contact with a Gas Utility

- 1. If Gas line has been struck, jarred, or pulled, or if the wrapping or surface of a pipe has been damaged:**
 - Stop work immediately in the area around the damaged gas line.
 - Turn off vehicles, machinery and eliminate all sources of ignition.
 - Check for the smell or sound of escaping gas in the area. **If gas is detected, proceed to the steps outlined in the next section.**

- Call the Eng. Ops. Radio Room/Dispatch (604-590-7226) and request Fortis BC to attend the scene.
 - **Fortis BC Emergency Line: 1-800-663-9911 or 604-576-7000**
- Notify the crew supervisor(s)/foreman/charge-hand of the incident.
- If safe to do so, cordon area off with vehicles, barricades, tape, etc.
- Do not backfill! Fortis BC must physically check the integrity of the piping system and repair the damage.
- Work must not resume at the damaged gas line location until Fortis BC has confirmed that the site is safe for the intended work. Only the City of Surrey (COS) crew foreman/charge-hand or project supervisor can authorize the crew to resume work in the excavation.
- The COS supervisor(s)/foreman must conduct an accident/incident investigation and submit a damage to utility report to Occupational Health and Safety in Human Resources.

2. If Gas is escaping from a ruptured line:

- Stop work immediately and shut down the project.
- Turn off vehicles, machinery and eliminate all sources of ignition.
- Evacuate the area – move people upwind if possible – and prevent cars and bystanders from entering.
- Call the Radio Room (**604-590-7226**) and request Fortis BC, Fire-Rescue, Manager, Occupational Health & Safety and Eng. Ops. Section Manager to attend the scene.
 - **Fortis BC Emergency Line: 1-800-663-9911**
 - **Surrey Fire-Rescue:**
 - **Emergency: 911**
 - **Fire Dispatch: 604-543-6700**
 - **Manager, Occupational Health & Safety: 778-846-0673**
 - **Section Manager: # _____**
- Notify the crew supervisor(s)/foreman/charge-hand of the incident.
- If safe to do so, cordon area off with vehicles, barricades, tape, etc.

ACCIDENTAL CONTACT PROCEDURES

- Do not attempt to make temporary repairs or operate any underground gas valves.
- Work must not resume until Fortis BC has confirmed that the site is safe for the intended work. Only the COS crew foreman/charge-hand or project supervisor can authorize the crew to resume work in the excavation. If safe to do so, please take pictures of damaged utility.
- COS Supervisors must complete an accident/incident investigation and submit a report to Occupational Health and Safety in Human Resources

WARNINGS:

- **Dead gas mains may contain residual natural concentrations in the explosive range for natural gas (5-15% methane in air).**
 - **Polyethylene gas lines generally have a static charge build-up, making it dangerous for unqualified workers to try to stop a gas leak in an excavation involving this type of pipe.**
-

BC HYDRO ELECTRICAL UTILITY

Procedures for Accidental Contact with a BC Hydro Electrical Utility

(e.g. broken conduit, pulled cable, wires down)

1. If a cable is accidentally contacted, stop work immediately. Treat all electrical components as if they are “live” – do not approach them. **Do not take any steps.** Ensure people keep people well back (stay 10m/33 ft away).
2. If you must move on energized ground, shuffle or hop away to a minimum distance of 10m/33 ft while keeping your feet together and touching each other never allowing the heel of one foot to go beyond the toe of the other.
3. Call the Eng. Ops. Radio Room (**604-590-7226**) and request BC Hydro, Manager, Occupational Health & Safety, Section Manager and Fire-Rescue to attend the scene.
 - **BC Hydro Trouble Centre: 604-430-2722.**
 - **Surrey Fire-Rescue:**
 - **Emergency: 911**
 - **Dispatch: 604-543-6700**
 - **Manager, Occupational Health & Safety: 778-846-0673**
 - **Section Manager: #_____**
4. Notify the crew supervisor(s)/foreman/charge-hand of the incident.

ACCIDENTAL CONTACT PROCEDURES

5. Move the digger bucket clear of the cable to break contact and stay out of the trench.
6. If the machine can't be moved, keep workers 10m (33 ft) away and have the operator remain in the vehicle.
7. If the operator is in danger by remaining in the machine, (i.e. an uncontrolled fire, or vehicle rollover), the operator should jump off the machine keeping his feet together. Never contact the machine and the ground at the same time.
8. Once clear of the machine, shuffle or hop away to a minimum distance of 10m/33 ft while keeping your feet together and touching each other never allowing the heel of one foot to go beyond the toe of the other.
9. If safe to do so, cordon area off with vehicles, barricades, tape, etc.
10. Work must not resume until BC Hydro has confirmed that the site is safe for the intended work. Only the COS crew foreman/charge-hand or project supervisor can authorize the crew to resume work in excavation.
11. COS Supervisors must complete an accident/incident investigation and submit a report to Occupational Health and Safety in Human Resources.

WARNINGS:

- **If there is an electrical fire, do not use water to control it. Water conducts electricity.**

STREET & TRAFFIC LIGHTING UTILITY

Accidental Contact with Street & Traffic Lighting Utility

(e.g. broken conduit, wires down)

1. If the cable is accidentally contacted, stop work immediately and shut down the project. Treat all electrical components as if they are "live" – do not approach them. **Do not take any steps.** Ensure people keep people well back (stay 10m/33 ft away).
2. If you must move on energized ground, shuffle or hop away to a minimum distance of 10m/33 ft while keeping your feet together and touching each other never allowing the heel of one foot to go beyond the toe of the other.
3. Call the Eng. Ops. Radio Room and request Traffic Operations Section to have Cobra Electric attend the scene.

Note: Radio Room is to inform Traffic Operations.

- **Traffic Operations Section – 604-591-4205 (8:30am-4:30pm)-Rhonda Hallett**
 - **Cobra Electrics- 604-594-1633**
 - **After hours – 604-591-4338- follow prompts**
4. Notify the crew supervisor(s)/foreman/charge-hand of the incident.
 5. Move the digger bucket clear of the cable to break contact and stay out of the trench.
 6. If the machine can't be moved, keep workers 10m/33 ft away and have the operator remain in the vehicle.
 7. If the operator is in danger by remaining in the machine, (i.e. an uncontrolled fire, or vehicle rollover), the operator should jump off the machine keeping his feet together. Never contact the machine and the ground at the same time.
 8. Once clear of the machine, shuffle or hop away to a minimum distance of 10m/33 ft feet while keeping your feet together and touching each other never allowing the heel of one foot to go beyond the toe of the other.
 9. If safe to do so, cordon area off with vehicles, barricades, tape, etc.
 10. **Work must not resume until the crew foreman/charge-hand or project supervisor confirms that the site is safe for the intended work.**
 11. COS Supervisors must complete an accident/incident investigation and submit a report to Occupational Health and Safety in Human Resources

WARNINGS:

- If there is an electrical fire, do not use water to control it. Water conducts electricity.

COMMUNICATIONS UTILITY

Accidental Contact with Communications Utility

(TELUS, Shaw, Fibre Optic or Copper Cable)

1. If a communications cable is accidentally contacted, stop work immediately and shut down the project.
2. Call the Radio Room and request that the communication company attend the scene.
3. Notify the crew supervisor(s)/foreman/charge-hand of the incident.

ACCIDENTAL CONTACT PROCEDURES

4. If the identification of the communication utility cannot be determined, the project must be shut down until the excavation is deemed safe to work.
5. Work may only resume if the site is deemed safe by the COS supervisor(s)/foreman/charge-hand, project supervisor or section manager.
6. COS Supervisors must complete an accident/incident investigation and submit a report to Occupational Health and Safety in Human Resources.
 - **Shaw – 8am - 4pm - 604-629-3162**
 - **TELUS – 611**
 - **Risk Management – 604-591-4738 – Jeff Schaafsma**

Electricity. Don't take it for granted. 

7 Steps to Electrical Safety

Learn BC Hydro's Seven Steps to Electrical Safety.
There's a lot to live for.



1 Ten Metres to Safety
Stay back at least 10 metres (33 feet) from any fallen power line or exposed underground cable.



2 Look Up and Live
Look up, check and keep equipment clear of overhead power lines.



3 Know Your Limits
When using equipment in the vicinity of power lines, always maintain the limits of approach: from 3-7 metres (10-20 feet) depending on the voltage.



4 Don't Hang Around Operating Equipment
Stay at least 10 metres (33 feet) from operating equipment, in case it contacts an energized line.



5 Shuffle or Hop – Don't Step
If your vehicle makes contact with an energized line, remain inside until help arrives. If you must get out due to fire, jump out with your feet together. Then shuffle away, keeping both feet close together. Never contact the ground and your vehicle at the same time.



6 Call Before You Dig
To avoid contacting underground power lines, before you dig, call "BC 1 Call" at 1 800 474-6886.



7 Don't Become a Victim
Always call local emergency personnel when someone is injured in an electrical accident.

BC Hydro 

www.bchydro.com

ACCIDENTAL CONTACT PROCEDURES



SECTION MANAGER, OR MANAGER, OHS TO CONTACT WORKSAFEBC IMMEDIATELY UPON:

- (1) The occurrence of any accident that:
 - (a) Resulted in serious injury to or the death of a worker,
 - (b) Involved a major structural failure or collapse of a building, bridge, tower, crane, hoist, temporary construction support system or excavation,
 - (c) Involved the major release of a hazardous substance, or
 - (d) Was an incident required by regulation to be reported.
- (2) Except as otherwise directed by an officer of the Board or a peace officer, a person must not disturb the scene of an accident that is reportable under subsection (1) except so far as is necessary to:
 - (a) Attend to persons injured or killed,
 - (b) Prevent further injuries or death, or
 - (c) Protect property that is endangered as a result of the accident.

Note: A major release does not only mean a considerable quantity, or the peculiar nature of the release, such as a gas or volatile liquid, but, more importantly, the seriousness of the risk to the health of workers. Factors that determine the seriousness of the risk include:

- The degree of preparedness of the department to respond to the release,
- The necessity of working in close proximity to the release,
- The atmospheric conditions at the time of the release, and,
- The nature of the substance.

A major release can be considered to have occurred if:

- The incident resulted in an injury that required immediate medical attention beyond the level of service provided by a first aid attendant, or injuries to several workers that require first aid, or
- The incident resulted in a situation of continuing danger to workers, such as when the release of a chemical cannot be readily or quickly cleaned up, or
- The release is due to exposures not normal to the operation or not under immediate control

Situations that should be considered a "Major Release" include the following if:

- High voltage line contact
- It was necessary for people to be evacuated from buildings,
- Gas seeped into sewers or drains,
- Any person required medical treatment,
- The gas leak ignited,
- Workers entered the gas envelope when the atmosphere contained flammable gas or vapor concentrations in excess of 20% of the LEL; and
- A non-gas company worker entered an excavation, after a contact, to attempt to stop or slow the flow of gas.

<p>WorkSafeBC-Prevention Division Contact Number – 604-276-3100 (8:30am- 4:30pm) After hours emergency number- 1-866-922-4357 Fraser Valley Tel-serve-passes message to WorkSafeBC duty manager.</p>

**Incident Report –
Damage to Utility**

INCIDENT REPORT

DAMAGE TO UTILITY

B.C. GAS	<input type="checkbox"/>	TIME:	AM/PM	DATE:	_____
B.C. HYDRO	<input type="checkbox"/>	EQUIPMENT:	C.O.S.		_____
CABLEVISION	<input type="checkbox"/>		HIRED:		_____
TELUS	<input type="checkbox"/>				_____
OTHER	<input type="checkbox"/>				_____

DESCRIPTION OF INCIDENT & DAMAGE UTILITY:

(ATTACH PHOTOGRAPH IF POSSIBLE)

ADDRESS: _____

WORK ORDER #: _____

FOREMAN OR CHARGEHAND: _____

PROJECT DESCRIPTION: _____

UTILITY COMPANY NOTIFIED: YES _____ NO _____ (ATTACH THEIR REPORT)

UTILITY COMPANY REFERENCE AND CONTACT NUMBER _____

RADIO ROOM & MANAGER NOTIFIED YES _____ NO _____

ATTACH DIAGRAM SHOWING LOCATION OF SERVICE

What could have been done to prevent this incident?
(see below for assistance)

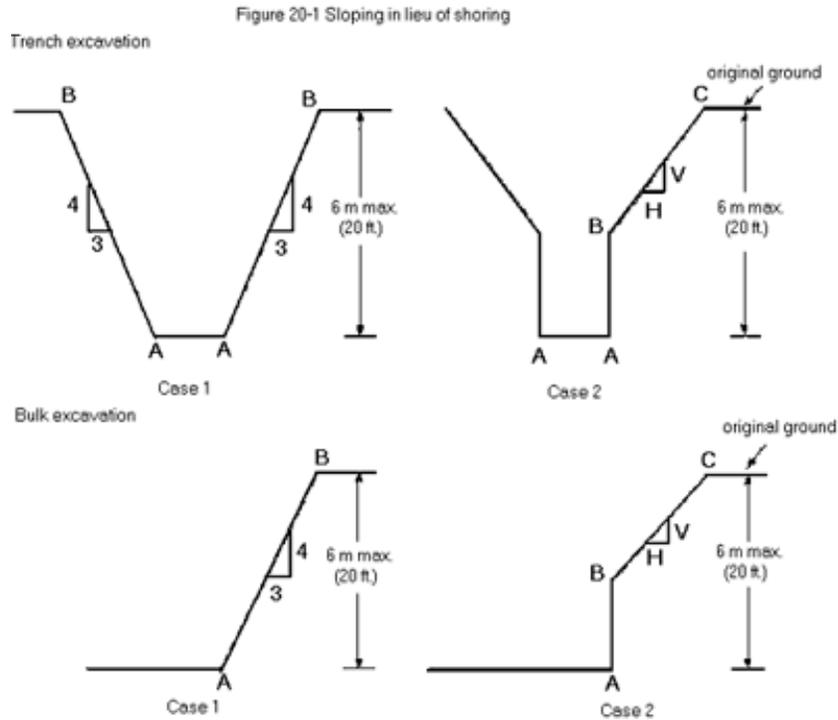
FACTORS TO CONSIDER:

- NO PLAN AVAILABLE THAT SHOWS UTILITY LOCATION
- DID NOT LOCATE UTILITY PRIOR TO EXCAVATION – LACK OF PLANNING
- OPERATOR ERROR
- DID NOT HAND DIG WHEN REQUIRED
- UTILITY IN WRONG LOCATION
- UNFORESEEN UNDERGROUND OBSTACLES
- OTHER:

INCIDENT REPORT

DAMAGE TO UTILITY

SLOPING IN LIEU OF SHORING



Case 1 (trench or bulk excavation) - maximum slope of excavated face, shown as line AB, in hard and solid soil is 3 horizontal to 4 vertical.

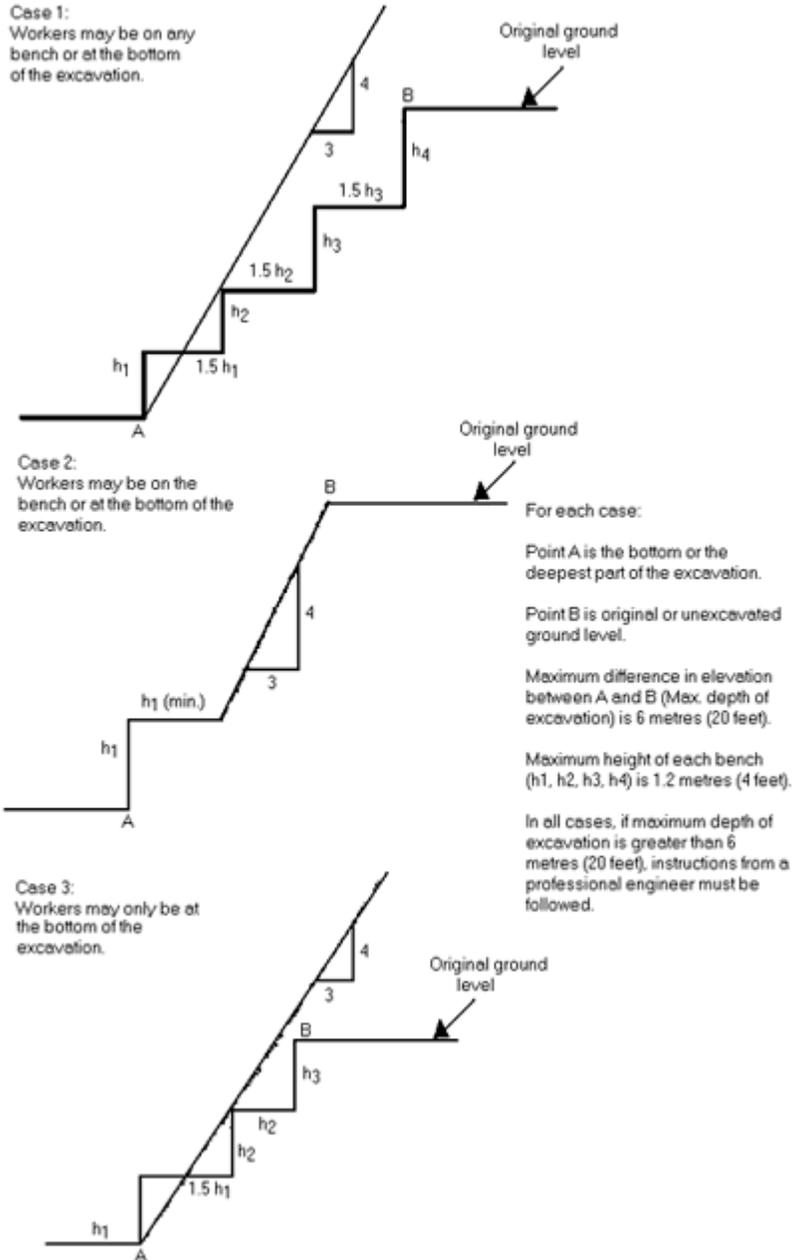
Case 2 (trench or bulk excavation), maximum height of vertical portion, shown as line AB is 1.2m (4 ft).

For Case 2 (trench or bulk excavation), the maximum permissible slope of the excavated face BC for the corresponding height of the lower vertical cut AB is as follows:

Height of line AB		Maximum slope of line BC (in hard and solid soil)
centimeters	feet	
up to 30	up to 1	1 horizontal (H) to 1 vertical (V)
30 to 60	1 to 2	3H to 2V
60 to 90	2 to 3	2H to 1V
90 to 120	3 to 4	3H to 1V

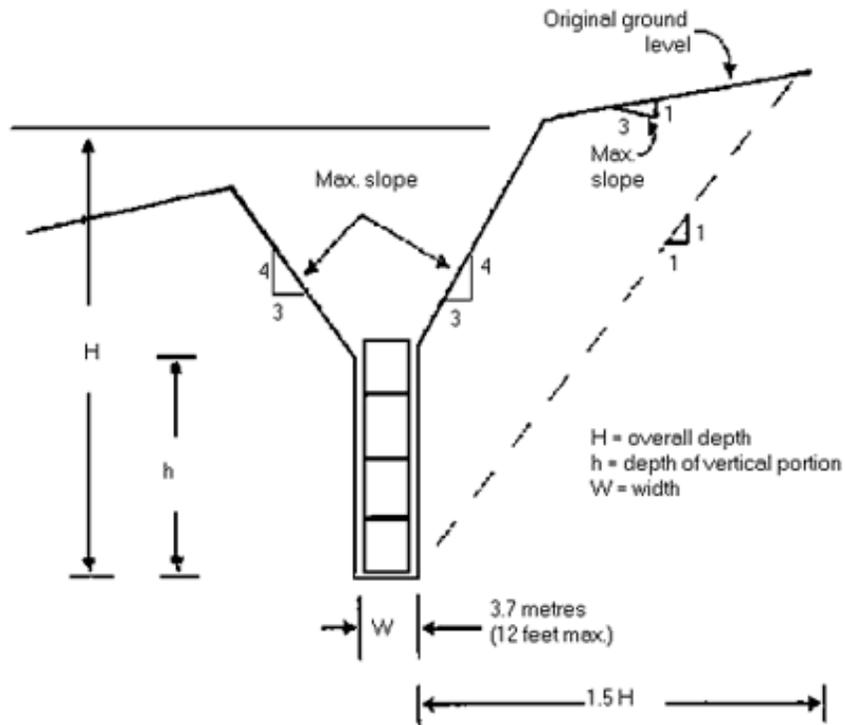
BENCHING IN LIEU OF SHORING

Figure 20-2: Benching in lieu of shoring



COMBINED SUPPORTING AND SLOPING

Figure 20-3: Combined supporting and sloping



Shoring must be adequate for excavation depth H .
Depth H cannot exceed 6 metres (20 feet).

WORKSAFEBC OHS REQUIREMENTS

EXCAVATIONS

**Respirable Silica Exposure
Control Plan**

CITY OF SURREY

**RESPIRABLE SILICA EXPOSURE
CONTROL PLAN**



SEPTEMBER 2012

**BE SMART
WORK SAFE**

“Safety is everybody’s business”

This is a living document and ongoing improvements will be made to improve the health & safety of all employees, volunteers and contractors.

Updated document will be posted as revised on the City of Surrey intranet under Health & Safety.

This document does not replace the Workers’ Compensation Act or WorkSafeBC OH&S regulation.

This document is designed to complement the City of Surrey Health & Safety program Handbook.

**For information on:
City Occupational Health & Safety Programs, safety issues and questions**

Call:

**Sam Chauhan, Manager,
Occupational Health & Safety
604-591-4658
778-846-0673**

**Tanya Tighe, Specialist
Occupational Health & Safety
604-591-4876
778-846-0193**

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RESPIRABLE SILICA EXPOSURE CONTROL PLAN

INTRODUCTION

Control methods for cutting, drilling, grinding, chipping, jack hammering and polishing of stone, concrete and asphalt.

Cutting concrete without proper dust controls can generate high levels of silica containing dust. Breathing in this fine dust can cause a serious lung disease called silicosis, which is characterized by scarring and thickening of the lungs, and can ultimately result in death.

OVERVIEW

Health Hazards From Silica Exposure

- Long-term exposure to airborne crystalline silica (e.g., quartz) can cause a disabling, sometimes fatal lung disease called silicosis.
- When the dust is inhaled deep into the lungs, microscopic particles of silica can cause scar tissue to form in the lung tissue, which restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.
- The disease initially causes fatigue and shortness of breath. If exposure continues, it can lead to chest pain, heart problems (difficulty breathing can strain the heart), and respiratory failure.

Purpose

- The City of Surrey is committed to providing a safe and healthy workplace for all of our staff. A combination of measures will be utilized to minimize worker exposure to silica exposure during concrete cutting, grinding and drilling, including the most effective control technologies available.
- Studies show that work tasks involving the cutting, grinding, and drilling of concrete generate airborne silica levels well in excess of safe levels.
- The work procedures we establish for cutting, drilling, grinding, chipping or jack-hammering of concrete and asphalt will protect not only our workers but also any other workers on-site who are not involved in these operations.
- All employees must follow the procedures outlined in this plan to prevent or reduce exposure to respirable silica.

Roles And Responsibilities

Management

Managers Are Responsible For The Following:

- Ensure that the materials, tools, equipment, personal protective equipment and other resources (i.e. worker training) required to fully implement and maintain this ECP are readily available where and when they are required
- Ensure that supervisors and workers are educated and trained to an acceptable level of competency in the hazards of silica exposure and trained to work safety with silica
- Provide proper training and education to workers on selection, use, inspection, cleaning, maintenance and storage of respirators

Supervisors

Supervisors/Foreman Are Responsible For The Following:

- Provide adequate instruction to workers on the hazards associated with the cutting, drilling, grinding, chipping or jack-hammering of concrete and asphalt, cutting fibre cement board or cutting, grinding or polishing of stone
- Select and implement the appropriate control measures
- Ensure that workers using respirators have been properly fit-tested and that the results are recorded and maintained
- Ensure that work is conducted in a manner that ensures the risk to workers and others
- Is minimized and adequately controlled. This includes ensuring that workers appropriate engineering controls and wear the necessary PPE.

Workers

Workers Are Responsible For The Following:

- Use the assigned protective equipment in an effective and safe manner within the scope of their training
- Follow established work procedures as directed by the supervisor
- Report any unsafe conditions or acts to the supervisor
- Report any exposure incidents or any signs or symptoms of silica illness

Safety Manager & Joint Occupational Health & Safety Committee

- Assist and/or coordinate Fit Testing for workers when required or applicable
- Keeping copies of all fit-testing records and training completed
- Acting as a resource for any workers with questions or concerns regarding the N95 or P-100 respirators
- Annually review the Silica Exposure Control Plan

PROCEDURES

Risk Identification And Assessment

- Concrete and Asphalt can contain a high percentage of silica.
- Cutting, grinding, drilling without the use of proper dust controls and PPE can expose workers to levels of airborne respirable crystalline silica that are above the exposure limit listed in the Occupational Health and Safety Regulation.

Exposure Limit

- The occupational exposure limit (OEL) for respirable crystalline silica (including quartz) is 0.025 milligrams per cubic meter (mg/m³).
- Because crystalline silica is linked to lung cancer, workplace exposures must be reduced to levels that are as low as reasonably achievable (ALARA) below the OEL.

Silica Dust Control

- The Regulation requires employers to select silica dust controls based on the following hierarchy:
 1. Engineering
 2. Administrative controls
 3. Personal protective equipment (PPE)
- Use of respirators as a primary control is not acceptable when other methods are available and practical
- Respirators will be used in conjunction with other controls such as wet cutting, grinding, and drilling to reduce worker exposure to silica, unless air monitoring information suggests otherwise
- Wet cutting, grinding, and drilling or the use of local exhaust ventilation (LEV) are the preferred engineering methods and will be used when practicable
- Dry cutting, grinding, and drilling will be avoided unless additional respiratory and other controls are used

- Dry cutting or grinding methods might be required for certain applications or work locations. If this is the case, dry work will be isolated from other work areas.
- Effective LEV will be used in order to control the dust. A HEPA vacuum will be used for cleanup and decontamination
- Air discharged from an LEV system will not be re-circulated into the work area.
- A worker must wear properly fitting safety eyewear appropriate to the conditions of the workplace if handling or exposed to materials which are likely to injure or irritate the eyes.
- If there is a danger of injury, contamination or infection to a worker's hands, arms, legs, or torso, the worker must wear properly fitting protective equipment appropriate to the work being done and the hazards involved.

Health Monitoring

Workers will promptly report any symptoms of Silica exposure to their Manager or Supervisor and the first aid attendant.

Record Keeping

The City of Surrey will keep records of instruction and training provided to workers regarding Silica exposure, as well as respirator fit tests and first aid records.

Training

- Should workers require to cut, drill or grind Asphalt or Concrete they will receive training and/or information on the following:
 1. The risk of exposure to silica, and the signs and symptoms of the disease
 2. Safe work procedures to be followed, including dust suppression (Dust controls can be as simple as a water hose to wet the dust before it becomes airborne.)
 3. The importance of dust suppression
 4. Proper use of N95s/P-100s if and where required
 5. How to seek first aid
 6. How to report an exposure to, or symptoms of Silica exposure
- Training will be in form of staff bulletins and crew talks.

Annual Review

- The Exposure Control Program will be reviewed every year and update it as necessary, in consultation with the Joint Health and Safety Committee.

CONTROLS

Cutting Concrete Or Asphalt

The work methods in the following table are acceptable, provided that the respirator selection is adhered to.

The following control options will be used to eliminate or reduce the risk to workers from the hazards of silica dust exposure, unless air monitoring information suggests otherwise:

WORK ACTIVITY	DUST SUPPRESSION	OTHER CONTROLS	RESPIRATOR TYPE
Cutting Or Splitting Pavers Or Blocks With A Hand Powered Splitter	None	Barriers (for example, a tape barrier) to restrict access to the work area	N95 single use respirator
Small Cuts Of 2-3 Meters Using A Saw	HEPA vacuum extraction or continuous water spray	Barriers (for example a tape barrier) to restrict access to the work area	Half face respirator with 100 series (N, P or R) filters
Large Cuts Or Multiple Cuts In One Area	HEPA vacuum extraction or continuous water spray	Barriers (for example, a tape barrier) to restrict access to the work area. <hr/> A water flow rate of 2.3 liters per minute (0.5 gallons/minute) is the recommended minimum for saws equipped with wetting controls.	Full face respirator with 100 series (P or R) filters
Using A Saw In A Small Unventilated Area	HEPA vacuum extraction or continuous water spray	Full enclosure systems (with negative air) are required to restrict access to and contain the work area	Full face powered air purifying respirator (PAPR) with 100 series (P or R) filters

Concrete Drilling

The work methods in the following table are acceptable, provided that the respirator selection, dust suppression and other controls are adhered to.

The following control options will be used to eliminate or reduce the risk to workers from the hazards of silica dust exposure, unless air monitoring information suggests otherwise:

WORK ACTIVITY	DUST SUPPRESSION	OTHER CONTROLS	RESPIRATOR TYPE
Drilling A Few (12 Or Fewer) Holes In A Wall Or Ceiling	Dust cap, HEPA attachment on drill or; HEPA vacuum extraction	Barriers (for example, a tape barrier) to restrict access to the work area	Half face respirator with 100 series (N, P or R) filters
Drilling A Few (12 Or Fewer) Holes In A Floor	HEPA attachment on drill or HEPA vacuum extraction or; Continuous water spray	Barriers (for example, a tape barrier) to restrict access to the work area	Half face respirator with 100 series (N, P or R) Filters CWS:N:95
Drilling More Than 12 Holes In A Wall Or Ceiling	Drill connected to HEPA vacuum extraction	Barriers (for example, a tape barrier) to restrict access to the work area	Full face respirator with 100 series (P or R) filters
Drilling More Than 12 Holes In A Floor	Drill connected to HEPA vacuum extraction or; Continuous water spray	Barriers to restrict access to the work area or a full enclosure system with negative air (depending on the size of the work area and amount of work) CWS: Barriers (for example, a tape barrier) to restrict access to the work area	Full face respirator with 100 series (P or R) Filters CWS: Half face respirator with 100 series (P or R) Filters
Drilling Holes In A Small Unventilated Work Area Where Standard Engineering Controls Are Not Practicable	None	Barriers to restrict access to the work area or; a full enclosure system with negative air (depending on the size of the work area and amount of work)	Full face powered air purifying respirator (PAPR) with 100 series (P or R) filters

Chipping Or Jack Hammering Concrete

The work methods in the following table are acceptable, provided that the respirator selection, dust suppression and other controls are adhered to.

The following control options will be used to eliminate or reduce the risk to workers from the hazards of silica dust exposure, unless air monitoring information suggests otherwise.

Work Activity	Dust Suppression	Other Controls	Respirator Type
Chipping small areas of walls or ceilings	<hr/> LEV (could include a negative air unit or; HEPA vacuum positioned near the working surface) or; <hr/> Continuous water spray (could include a portable airless sprayer, air mister, or hose sprayer)	Barriers (for example, a tape barrier) to restrict access to the work area	Half face respirator with 100 series (N, P or R) filters
Chipping large areas of walls or ceilings	<hr/> LEV (could include a negative air unit or; HEPA vacuum positioned near the working surface) or <hr/> Continuous water spray (could include a portable airless sprayer, air mister, or hose sprayer)	Barriers (for example, a tape barrier) to restrict access to the work area	Half face respirator with 100 series (N, P or R) filters
Using a chipper in a small unventilated area or;	None	Full enclosure systems (with negative air) are required to restrict access to and contain the work area	Full face powered air purifying respirator (PAPR) with 100 series (P or R) filters
Jack hammering a small area	<hr/> LEV (could include a sleeve on the tool, connected to a HEPA vacuum or negative air unit) or; <hr/> Continuous water spray (could include a portable airless sprayer, air mister, or hose sprayer)	Barriers (for example, a tape barrier) to restrict access to the work area	Half face respirator with 100 series (N, P or R) filters
Jack hammering a large area (or	LEV (could include a sleeve on the tool,	Barriers (for example, a tape barrier) to restrict	Full face respirator with 100 series (P or

using more than one tool in an area)	connected to a HEPA vacuum or negative air unit)	access to the work area R) filters
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Cutting Fibre Cement Board

WorkSafeBC has reviewed the various cutting methods available for fibre cement board and have determined that the methods that appear in the following table are acceptable, provided that the respirator selection is adhered to.

Work Activity	Work Location	Respirator Type
Fibre cement shears	Indoors	None required
Fibre cement shears	Outdoors	N95 respirator
Score and snap knife	Outdoors or Indoors	None required
Dust reducing circular saw connected to HEPA vacuum extraction	Outdoors	Half face or full face respirator with N100 filters
Dust reducing circular saw connected to HEPA vacuum extraction	Indoors	Half face or full face respirator with N100 filters

Dry Sweeping Or Pressurized Air Blowing Of Concrete Or Sand

City of Surrey has reviewed the various methods available for dry sweeping or pressurized air blowing of concrete or sand and have determined that the methods that appear in the following table are acceptable, provided that the respirator selection is adhered to. A worker must position themselves upwind before blowing begins. Blowing should be in the direction that the wind is blowing. Safety eyewear must be worn when blowing.

Work Activity	Work Location	Respirator Type
Where practicable, water/pressure washer will be used to removed debris (dirt, dust and grass)	Outdoors	Half face or full face respirator with P100 filters
When it is not practicable to remove debris using water, a broom will be used to sweep excess dirt, dust and grass in pile and load into bucket of machine	Outdoors	Half face or full face respirator with P100 filters
When it is not practicable to use water or sweep debris, a backpack leaf blower will be used to blow excess dirt, dust and grass clippings onto grass	Outdoors	Half face or full face respirator with P100 filters

SITE-SPECIFIC SILICA EXPOSURE CONTROL PLAN

Location: _____ Date: _____

Work description:

Small emergency asphalt/concrete cutting – natural ventilation -

Primary silica control options (check those options used and explain use if needed)

Substitution controls (using procedures or products that do not create silica; must review MSDSs)

Other means of _____ Not Applicable

demo: _____

Different products: _____

Other

substitutions: _____

◆ Engineering controls (when using ventilation, draw air out and don't expose others to exhaust dusts)

Vacuuuming: _____

Wetting: • Hose will be connected to Fire Hydrant, a water flow rate of 2.3 litres per minute (0.5 gallons/minute) is the minimum that will be used. A worker will spray water in front of cut off saws and the water is to be used for dust control.

Caution—water may produce slipping hazards

Ventilation: _____

Isolation: _____

Other _____ Large Cut was made by qualified contractor

means: _____

◆ Administration controls (reducing exposure by work schedules, timing, or planning options)

Control _____ Duration of exposure will be minimal (less than 3M of cutting to be performed, workers not cutting asphalt will be up wind from the cutting.

Work _____
schedule: _____

Other means: _____ Keep public outside of work zone area

Secondary silica control options (check those options used and explain use if needed)

◆ Personal protective equipment

Half-mask _____ Cartridge _____ Fit tests _____
respirators: Yes type: P-100 confirmed: _____

Full-face _____ Cartridge _____ Fit tests _____
respirators: type: confirmed: _____

Supplied air _____
units: _____

Coveralls
required:

◆ Hygiene and decontamination options (reducing exposures after work has stopped or during breaks)
Water or washing facilities on

site:

Vacuuming clothing/self:

Safe work procedures and other
details:

- Engineering Operations Cut off saw safe work procedures must be followed.
- Eye protection should be worn when using a half-face respirator.
- Hearing protection should be considered when using powered equipment.

TOOLBOX MEETING GUIDE

Silica Dust—Are You At Risk?

Many common construction work tasks generate harmful levels of crystalline silica dust if proper controls are not followed. When silica dust builds up in your lungs, you are at risk of developing a serious lung disease called silicosis, which can lead to death.

Silicosis is not curable, but it is preventable. The more you know about silica dust, the better prepared you will be to adequately protect yourself.

What Is Silica?

Silica is the basic component of sand and rock. The best-known and most abundant type of crystalline silica is quartz. Some common silica-containing materials include:

- Concrete, concrete block, cement and mortar
- Masonry and tiles
- Brick, refractory brick
- Composite products such as Hardi-plank
- Granite, sand, fill dirt, top soil
- Asphalt containing rock or stone
- Abrasive used for blasting

Construction workers may be exposed to silica when working with these materials.

Are You Exposed To Silica Dust?

If you do one of the following activities, you are at risk of breathing silica dust:

- Chipping, sawing, grinding, hammering, and drilling of rock, concrete, or masonry
- Crushing, loading, hauling, and dumping of rock
- Sawing, hammering, drilling, grinding, and chipping of concrete or masonry structures
- Demolition of concrete or masonry structures
- Power cutting or dressing stone
- Facade renovation, including tuck-point work
- Abrasive blasting and hydro-blasting of concrete
- Clean-up activities such as dry sweeping or pressurized air blowing of concrete or sand dust
- Tunnelling, excavation, and earth moving of soils with high silica content

How Is Silica Disease Prevented?

The key to silica disease prevention is to prevent the dust from getting into the workplace air. If you are exposed to silica dust, ask your employer to explain the dust controls that will be used to protect you.



Worker grinding concrete using local exhaust ventilation



Worker cutting concrete using water for dust control



Worker drilling concrete inside an enclosure equipped with a “negative air” unit

Project: _____ Address: _____

Employer: _____ Supervisor: _____

Date: _____ Time: _____ Shift: _____

Number in crew: _____ Number attending: _____

Other safety issues or suggestions made by crew members:

Record of those attending:

Name: <i>(please print)</i>	Signature:	Company:
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Manager's remarks: _____

Manager: _____ Supervisor: _____
(signature) *(signature)*

WORKSAFEBC NOTICE OF PROJECT

WorkSafeBC must be informed by a Notice of Project before a large scale or high risk project begins. The Prime Contractor must send WorkSafeBC a notice of project at least 24 hours before starting a construction project that: exceeds \$100,000; or involves high risk work such as asbestos abatement, lead paint removal, or major structural alteration to a building or 2 stories or more. A copy of the notice of project must be posted at the construction site before work commences.



NOTICE OF PROJECT: Construction, Asbestos, Lead

Notice of project number
Sequential number assigned

Please print or type all information in BLOCK CAPITALS and press hard — you are making three copies.

To report forestry, aircraft operations, diving, or underground workings projects, please see Notice of Project form 52E48.

- For construction, asbestos, and lead projects, please post the white copy of this completed form at the project site.
- Please fax or mail the remaining copies of this completed form to: WorkSafeBC, PO Box 5350 Stn Terminal, Vancouver BC V6B 5L5
Telephone 604 276-3100 in the lower mainland, or 1 888 621-7233 toll-free in B.C., Fax 604 276-3247.

General information (You must complete this part.)

Name of owner	Name of prime contractor or asbestos contractor (if different from owner)	Name of consulting firm (asbestos only)
Address (street, city, postal code)	Address (street, city, postal code)	Name of person in charge of project
Employer account number	Employer account number	Job title
Has the prime contractor agreed in writing with the owner to be the prime contractor? Yes <input type="checkbox"/> No <input type="checkbox"/>		Telephone (please include area code)
Project site location (find care street address and city. If unavailable, describe general geographic location — road, kilometre, latitude/longitude, etc. — and nearest town. Attach a map if necessary.)		Name of person completing this form
		Telephone (please include area code)
		Project start date (yyyy-mm-dd)
		Anticipated duration of project Hours <input type="checkbox"/> Days <input type="checkbox"/> Month <input type="checkbox"/>

➔ Only complete the section pertaining to your project. ➔

➔ Construction project (OH&S Regulation 20.2) — At least 24 hours' notice required			
General construction <input type="checkbox"/> Commercial <input type="checkbox"/> Institutional <input type="checkbox"/> Residential <input type="checkbox"/> Single family <input type="checkbox"/> Multi-family wood <input type="checkbox"/> Multi-family concrete Number of floors _____ Total square feet _____ <input type="checkbox"/> Industrial (explain) _____ <input type="checkbox"/> Recreational (explain) _____	Site preparation <input type="checkbox"/> Pile driving <input type="checkbox"/> Remediation <input type="checkbox"/> Ground preparation Service construction <input type="checkbox"/> New <input type="checkbox"/> Repair <input type="checkbox"/> Sewer line <input type="checkbox"/> Water line <input type="checkbox"/> Gas line <input type="checkbox"/> Power line Other (explain) _____	Road construction Length _____ km <input type="checkbox"/> New <input type="checkbox"/> Resurfacing <input type="checkbox"/> Alignment Heavy construction <input type="checkbox"/> Bridge Length _____ m Height _____ m <input type="checkbox"/> Pier, wharf, or dry-dock <input type="checkbox"/> Dam, dyke, or reservoir	<input type="checkbox"/> Project cost > \$100,000 <input type="checkbox"/> Designed by a professional engineer <input type="checkbox"/> Work in a compressed air atmosphere or caisson, tunnel, underground working, or cofferdam <input type="checkbox"/> Ground support drawings available <input type="checkbox"/> Work in an excavation > 1.2 m in depth <input type="checkbox"/> Work in a trench > 1.2 m in depth and > 30 m in length Construction, demolition, or alteration involving: <input type="checkbox"/> Building > 2 storeys or > 6 m in height <input type="checkbox"/> Bridge <input type="checkbox"/> Earth or water retaining structure > 3 m in height <input type="checkbox"/> Silo or chimney > 6 m in height
Estimated project cost (Must enter estimated cost only on copies of the form submitted to WorkSafeBC.) \$ _____		Person responsible for coordinating health and safety activities _____	

With respect to electrical safety for portable electrical equipment at this location, it is declared (check one or more boxes):

The project will use GFCI protection of installed receptacles in accordance with the requirements of the BC Electrical Code.

Where GFCI protection indicated above is not intended to be provided, the electrical contractor(s) will make application(s) to the applicable electrical authority for variance(s) to the BC Electrical Code requirements for the referenced GFCI protection based on a declaration by the prime contractor that an assured grounding program is implemented at the worksite. Where the variance(s) is granted, it is the responsibility of the prime contractor to ensure that the assured grounding program at the site is used in accordance with WorkSafeBC published guidelines and practices set out in OHS Guideline 18.15(1) Ground fault circuit interrupters and other acceptable means.

Not applicable. No portable electrical equipment, including temporary lighting, will be used on this site.

➔ Asbestos or lead project (OH&S Regulation 20.2(1)(c)) — At least 24 hours' notice required			
Hours of work _____	Number of workers per shift _____	Detailed written work procedures attached to this form? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Asbestos project information Building or structure containing asbestos materials involving: <input type="checkbox"/> Demolition <input type="checkbox"/> Repair/renovation <input type="checkbox"/> Dismantlement	Building materials containing friable asbestos material involving: <input type="checkbox"/> Removal <input type="checkbox"/> Enclosure <input type="checkbox"/> Encapsulation	Asbestos risk level: <input type="checkbox"/> High <input type="checkbox"/> Moderate <input type="checkbox"/> Low	Lead project information <input type="checkbox"/> Lead abatement <input type="checkbox"/> Significant disturbance of lead coating <input type="checkbox"/> Other risk of occupational disease (explain) _____

For WorkSafeBC use only

Officer and number _____	Region _____	Area _____	Date received (yyyy-mm-dd) _____
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52E49

WHITE — Project site copy

YELLOW — WorkSafeBC file copy

PINK — WorkSafeBC officer copy

WORKERS' COMPENSATION BOARD OF B.C.

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