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SUBPART A – PURPOSE AND SCOPE

This program outlines procedures and guidelines for the protection of employees working in and around excavations and trenches. BBGCI’s Safe Work Plans on confined space, hazard communication, lock-out/tag-out, respiratory protection, and any other safety programs or procedures deemed essential for employee protection, are to be used in conjunction with this program.

This program pertains to all Berry Bros.’ projects that require any excavation or trenching of material. Before any excavating or trenching takes place, a One-Cal must be initiated the appropriate BBGCI representative. A valid one-call ticket or copy of the ticket must be kept on the jobsite at all times and on file in the Main Divisional office.

Violating this excavation / trenching policy is breaking the law and not simply a violation of company policy. Breaking this policy could lead up to and include immediate termination from the company as well as possible legal / civil action being taken against the employee.



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SUBPART B - DEFINITIONS

Benching - A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between levels. Only soil Types A and B can be benched.

Cave-in - The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by failing or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent Person - One who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Confined Space: Is defined as any space large enough or so configured that an employee can physically enter and perform work, has limited or restricted means for entry or exits (i.e. tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry). In addition, the area in question is not designed for continuous employee occupancy.

Dredging – the removal of soil/material using a dragline crane on a floating deck barge

Duration of Exposure - The longer an excavation is open, the longer the other factors have to work on causing it to collapse.

Excavation - Any man-made cut, trench, or depression in an earth surface, formed by earth removal.

Ground Disturbance – refers to any mechanical digging, excavating and/or trenching that goes further than meets or exceeds the One Call state requirements. (i.e. Texas=16")

Hazardous Atmosphere - An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Permit required confined space (permit space) - is a confined space that has one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere.
2. Contains a material that has the potential for engulfing an entrant.



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3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly covering walls or by a floor, which slopes downward and tapers to a smaller cross-section.
4. Contains any other recognized serious safety or health hazard.

Protective System - A method of protecting employees from cave-ins and from material that could fall or roll from an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide necessary protection.

Shield - A structure that is capable of withstanding the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. All shields must be in accordance with 29 CFR 1926.652 (c) 2, (c) 3 or (c) 4.

Shoring - structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping - A method of protecting workers from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences such as soil type, length of exposure, and application of surcharge loads.

Surcharge Loads - Generated by the weight of anything in proximity to the excavation, push starts for a cave-in (anything up top pushing down). Common surcharge loads:

1. Weight of spoil pile.
2. Weight of nearby buildings, poles, pavement, or other structural objects.
3. Weight of material and equipment.

Trench - A narrow excavation below the surface of the ground, less than 15 feet wide, that is deeper than it is wide.

Undermining - Undermining can be caused by such things as leaking, leaching, caving or over-digging. Undermined walls can be very dangerous.

Vibration - A force that is present on construction sites and must be considered. The vibrations caused by backhoes, dump trucks, compactors and traffic on job sites can be substantial.



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SUBPART C - GENERAL REQUIREMENTS

1. It is BBGCI's policy that any employee has the right and duty to STOP WORK in an area and request a re-mark if a utility cannot be found as marked, or request a re-mark if an unmarked or mistaken utility is found. In addition, it is BBGCI's policy to maintain the marks during the course of work, and stop work if the marks are no longer visible.
2. A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.
3. Employees entering bell-bottom pier holes, caissons, or other similar deep and confined footing excavations, shall wear a harness with a life-line securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.
4. Employees are instructed not to walk or work underneath suspended loads handled by heavy equipment. In addition, employees are instructed not to perform any work above a co-worker on a sloped or benched excavation unless the worker is protected from falling material.
5. Employees are prohibited from working or walking within 2 feet of a leading edge of an excavation to prevent the possibility of themselves or materials falling down into the excavations.
6. Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.
7. When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.
8. Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with 1926.502(b) shall be provided where walkways are 6 feet (1.8 m) or more above lower levels.
9. When Hydro Excavation Activities are used to identify the existence of an existing line, a Tolerance zone of 3 feet on all sides of the existing line must be properly excavated before any further work can commence.



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- 10. At no times will BBGCI allow mechanical digging within 2 feet of all lines. In the event that digging has to be completed within this tolerance zone, hand digging will be the only acceptable method.
- 11. Under no circumstances can mechanical digging be performed if the operator cannot see the live line.
- 12. Once Hydro Excavation work has been completed a barrier must be put around the open-hole and the hole must be properly labeled with the length of the work duration and the person who completed the work.
- 13. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

SUBPART D – ONE CALL STIPULATIONS

Prior to any excavation operations of the jobsite/work area, it must have been properly inspected following SOP – CORE – 001. Where BBGCI’s Line finding Capabilities exist, it is best practice for that team to initiate One Calls and inspect the particular job site/work area.

When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, the company may proceed, provided the company does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used. Underground utility locating must be performed no more than 3 days prior to commencement of ground disturbance

Once the One Call has been placed, you must wait the entire 48 hours before any work commences onsite. There are no exceptions to this requirement. If a utility is found where no mark was placed, excavation stops, a call to the one-Call center is made, and work resumes after the operator has confirmed the location of the facility or confirmed the facility to be inactive and or abandoned. One Call Requirements vary from State-State:

Texas – (Any ground disturbing work that will result in the digging/penetrating of more than 16” into the Earth) If an active excavation project will continue for longer than 14 **days excluding weekends/holidays** or the markings become unclear or unusable at any time due to weather, construction or other causes, an Update request needs to be



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submitted to an 811 one-call center. Use the original ticket number as a reference. An Update request requires the two **business day** waiting period (48 hours).

Once the one call has been placed and the lines have been identified, the Line Owner will go out and manually mark all their potential lines **flagging or spray paint.** These markings are to be left in place for the duration of the job.

Louisiana - Markings for underground utilities are considered valid as long as they are visible up to 20 calendar days from the "mark-by" time. The "mark-by" time is provided by the one-call operator and excludes holidays and weekends. For larger projects, call in only the work that can be accomplished within a twenty-day period. Use the original ticket number as a reference. An Update request requires the two **business day** waiting period (48 hours).

Louisiana Marine Operations – the approximate area by coordinates must be given to the One-Call station in order to initiate the process. It is best practice to give Coordinates for an area slightly larger than the proposed area being excavated.

SUBPART E - INSPECTIONS

Prior to an employee entrance of an excavation, bell hole or excavated area; it is to be properly inspected by the competent person on site to identify any potential safety hazards. Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions.

- 1) All inspections shall be conducted by the competent person prior to the start of work and as needed throughout the shift.
- 2) Inspections will be made after every rainstorm or any other increasing hazard.
- 3) Any documented inspections will be kept on file in the jobsite safety files.
- 4) The safety coordinator will conduct periodic inspections of excavations using the HSE Field Hazard Survey.

Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous. The hazardous



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excavated area is to then be properly barricaded and labeled as a “NO-GO ZONE” until the necessary precautions are met and the work site is deemed safe by the competent person.

SUBPART F - COMPETENT PERSON RESPONSIBILITIES

A Competent person must be properly certified and trained to identify existing and predictable hazards in the surroundings of excavations; working conditions which are unsanitary, hazardous, or dangerous to employees; have authorization to take prompt corrective measures to eliminate them and, if necessary, to stop the work.

A competent person is required to:

1. Have a complete understanding of the applicable safety standards and any other data provided.
2. Assure the proper locations of underground installations or utilities, and that the proper utility companies have been contacted.
3. Conduct soil classification tests and reclassify soil after any condition changes.
4. Determine adequate protective systems (sloping, shoring, or shielding systems) for employee protection.
5. Conduct all air monitoring for potential hazardous atmospheres.
6. Conduct daily and periodic inspections of excavations and trenches.
7. Approve design of structural ramps, if used.

SUBPART G - ATMOSPHERIC HAZARDS

Any work being conducted in a bell-hole, Tie-in, or any other excavation must be tested with a 4-gas monitor by a competent person prior to any entry by an employee. The bell-hole inspection form is to then be filled out properly and handed to the PIC. If the excavated area has been found to be hazard free by a competent person, there is no need for additional paperwork to declassify this area from a permit-required confined space.

Any excavation that is determined to be a Permit Required Confined Space according to SWP – 14 – Confined Space, will require a Permit regarding Confined Space Entry to be filled out and approved prior to any employee entrance. Air monitoring will be performed periodically to check for adequate Oxygen Levels (19.5%-22%), Explosive Gas Levels, and Carbon Monoxide Levels. Entry will not be permitted if explosive gas is detected above one-half the Lower Explosive Limit (LEL).

Emergency rescue equipment, such as breathing apparatus, a safety harness, life line, body harness, or a basket stretcher, shall be readily available **where hazardous atmospheric**



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conditions exist or may reasonably be expected to develop during work in an excavation.

SUBPART H - SOIL CLASSIFICATION AND IDENTIFICATION

It is BBGCI's Policy that all excavated areas where employee entry is necessary will be treated as Type C Soil.**

In the event where employee entry is necessary but the operator is unable to slope to the proper specifications, approved Shielding methods may be used so long as it is approved by the Excavation Competent Person on site.

Type A, Type B, and Type C. Stability is greatest in Stable Rock and decreases through Type A and B to Type C, which is the least stable.

Cohesive Soil- Clay or soil with high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical side slopes, and is plastic when wet. Cohesive soil is hard to break when dry, and exhibits significant cohesion when wet.

Fissured- soil material that has the tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks in an exposed area.

Granular Soil- Gravel, sand, silt, with little or no clay content. Granular Soil has no cohesive strength. Granular soil cannot be molded when moist and crumble easily when dry.

Stable rock - natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

Type A - cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are:

- i. Clay
- ii. Silty and/or Sandy Clay
- iii. Clay loam
- iv. Silty clay loam and Sandy Clay Loam.

Cemented soils such as caliche and hardpan are also considered Type A.

However, soil is **not Type A** if:

- i. The soil is fissured; or



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- ii. The soil is subject to vibration from heavy traffic, pile driving, or similar effects
- iii. The soil has been previously disturbed; or
- iv. The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater
- v. The material is subject to other factors that would require it to be classified as a less stable material.

Type B - Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or

- i. Granular cohesion less soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
- ii. Previously disturbed soils except those which would otherwise be classed as Type C soil.
- iii. Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration
- iv. Dry rock that is not stable
- v. Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C - Cohesive soil with an unconfined compressive strength of 0.5 tsf (48kPa) or less; or

- i. Granular soils including gravel, sand, and loamy sand
- ii. Submerged soil or soil from which water is freely seeping
- iii. Submerged rock that is not stable
- iv. Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

SUBPART I - SOIL TEST & IDENTIFICATION

For any soils classified as Class C soil this section does not apply **

The competent person will classify the soil type using at least one visual and one manual analysis. These tests should be run on freshly excavated samples from the excavation and are designed to determine stability based on a number of criteria: the cohesiveness, the presence of fissures, the presence and amount of water, the unconfined compressive strength, and the duration of exposure, undermining, and the presence of layering, prior excavation and vibration.



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When examining the soil, three questions must be asked:

- Is the sample granular or cohesive?
- Fissured or non-fissured?
- What is the unconfined compressive strength measured in TSF?

Methods of testing soils:

Visual Testing- Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated materials.

Observe samples of soil and give consideration to:

- Particle Size (fine or coarse grain)
- Does the soil clump as its excavated
- Are they crack-like openings that could indicate fissured material?

Manual Test- Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly. Consider the following:

Plasticity test- Mold a moist or wet sample of soil into a ball and attempt to roll it into thin threads. Cohesive material can be successfully rolled into threads without crumbling.

Dry strength test: Try to crumble the sample in your hands with your fingers. If it crumbles into grains, it is granular. Clay will not crumble into grains, only into smaller chunks.

Pocket penetrometer test: This instrument is most accurate when soil is nearly saturated. This instrument will give unconfined compressive strength in tons per square foot. The spring-operated device uses a piston that is pushed into a coil up to a calibration groove. An indicator sleeve marks and retains the reading until it is read. The reading is calibrated in tons per square foot (TSF) or kilograms per cubic centimeter.

Thumb penetration test: The competent person attempts to penetrate a fresh sample with thumb pressure. If the sample can be dented, but penetrated only with great effort, it is Type A. If it can be penetrated several inches and molded by light pressure, it is Type C. Type B can be penetrated with effort and molded.

Shear vane: Measures the approximate shear strength of saturated cohesive soils. The blades of the vane are pressed into a flat section of undisturbed soil, and the knob is turned



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slowly until soil failure. The dial is read directly when using the standard vane. The results will be in tons per square foot or kilograms per cubic centimeter.

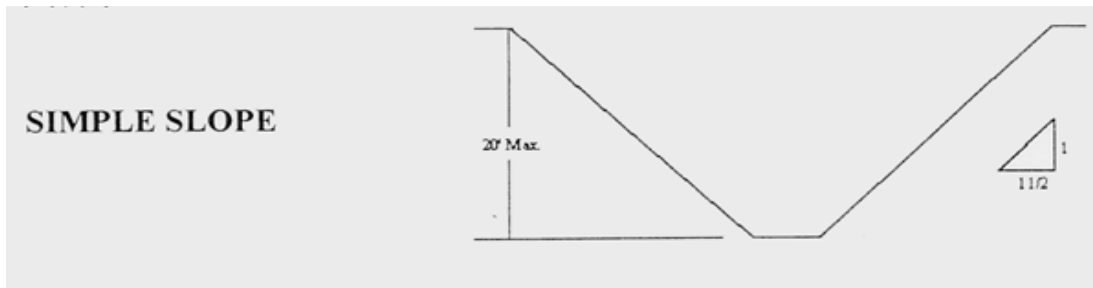
The competent person will perform several tests, when a soil classification test is necessary, of the excavation to obtain consistent, supporting data along its depth and length. The soil is subject to change several times within the scope of an excavation and the moisture content will vary with weather and job conditions. The competent person must also determine the level of protection based on what conditions exist at the time of the test, and allow for changing conditions.

SUBPART J – EXCAVATION PROTECTION SYSTEMS

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V)(1) FOR EXCAVATIONS LESS THAN 20 FEET DEEP(3)
STABLE ROCK	VERTICAL (90°)
TYPE A (2)	3/4:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1 1/2:1 (34°)

Excavations Made In Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1.



2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall a maximum allowable slope of 1 1/2:1.



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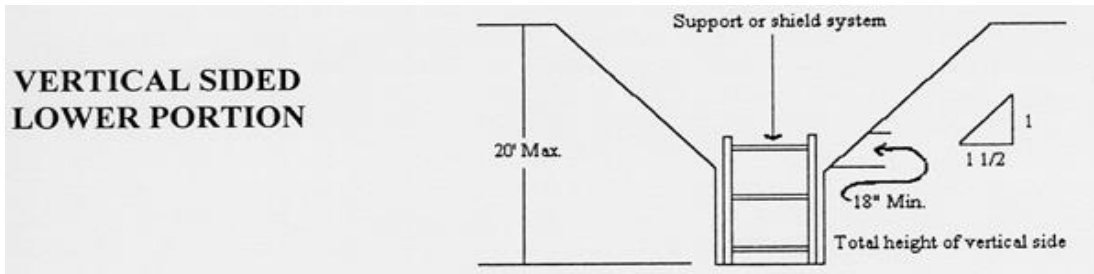
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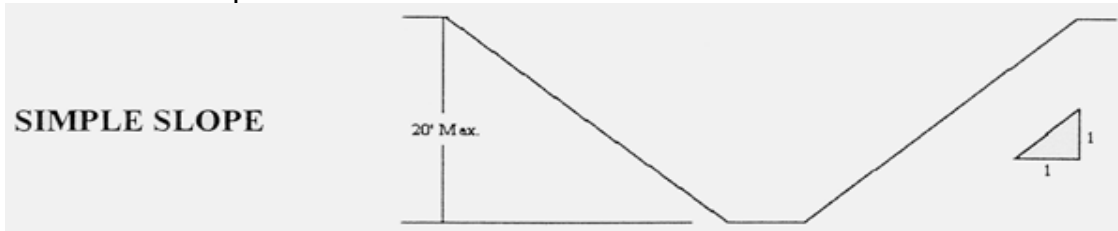
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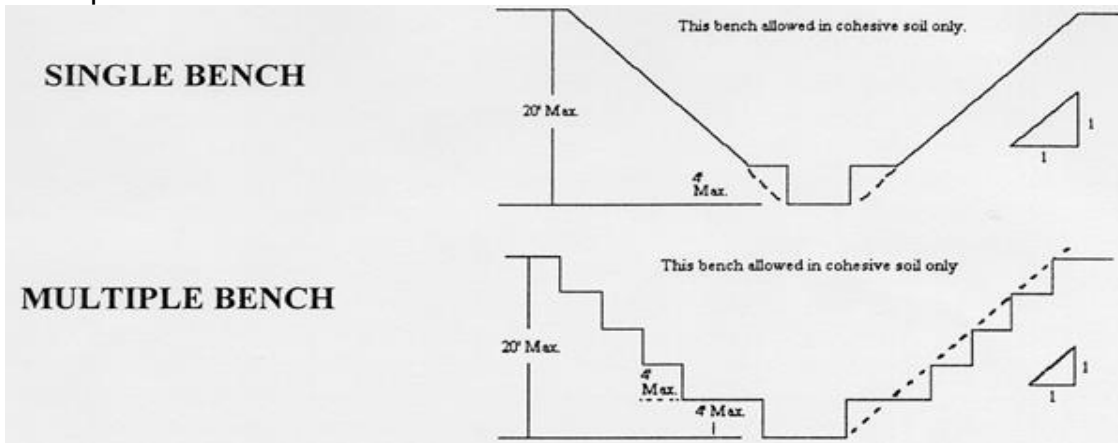


Excavations Made In Type B Soil:

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.



2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.





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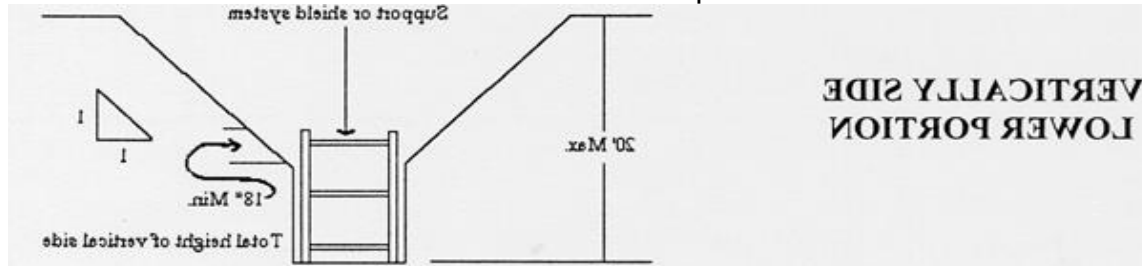
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3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.



2. Shoring Systems

Shoring is another protective system or support system. Shoring utilizes a framework of vertical members (uprights), horizontal members (whales), and cross braces to support the sides of the excavation to prevent a cave-in. Metal hydraulic, mechanical or timber shorings are common examples.

Different examples of shoring are found in the OSHA Standard under these appendices:

- a. **Appendix C** - Timber Shoring for Trenches
- b. **Appendix D** - Aluminum Hydraulic Shoring for Trenches
- c. **Appendix E** - Alternatives to Timber Shoring

3. Shield Systems (Trench Boxes)

Shielding is the third method of providing a safe workplace. Unlike sloping and shoring, shielding does not prevent a cave-in. Shields are designed to withstand the soil forces caused by a cave-in and protect the employees inside the structure. Most shields consist of 2 flat, parallel metal walls that are held apart by metal cross braces. Shielding design and construction is not covered in the OSHA Standards. Shields must be certified in design by a registered professional engineer and must have either a registration plate on the shield or registration papers from the manufacturer on file at the jobsite office.

Any repairs or modifications MUST be approved by the manufacturer!

Safety Precautions for Shield Systems



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- (a) Shields must not have any lateral movement when installed.
- (b) Employees will be protected from cave-ins when entering and exiting the shield (examples - ladder within the shield or a properly sloped ramp at the end).
- (c) Employees are not allowed in the shield during installation, removal, or during any vertical movement.
- (d) Shields can be 2 ft. above the bottom of an excavation if they are designed to resist loads at the full depth and if there are no indications of caving under or behind the shield.
- (e) The shield must extend at least 18 inches above the point where proper sloping begins (the height of the shield must be greater than the depth of the excavation).
- (f) The open end of the shield must be protected from the exposed excavation wall. The wall must be sloped, shored, or shielded. Engineer designed end plates can be mounted on the ends of the shield to prevent cave-ins.

SUBPART K - VEHICULAR TRAFFIC HAZARDS

When an excavation is near moving and vibrating traffic, workers are faced with dangers associated with collisions, falls, and cave-ins. Some methods used to prevent these hazards are as follows:

- Warn and reroute public traffic if possible.
- Post signs, barricades, and flagmen.
- Warn industrial traffic with stop logs, barricades, or other suitable means,
- Install a protective support system heavy enough to withstand the number and weight of nearby vehicles.

A warning system shall be utilized, such as barricades, hand or mechanical signals, or stop logs, when:

1. The mobile equipment operator does not have a clear and direct view of the edge of the excavation,
2. The mobile equipment is operated adjacent to an excavation,
3. When such equipment is required to approach the edge of an excavation.

SUBPART L - SPECIAL PRECAUTIONS



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Sometimes excavations have to be made below the water line or table, when this occurs special precautions must be made such as driving sheeting below the bottom of such an excavation to add to the soil stability.

BBGCI requires that diversion dikes and ditches or other suitable means be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water causes soil erosion and softening and should not be allowed to accumulate in a trench or excavation.

Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

SUBPART M - TRAINING

The competent person(s) must be trained in accordance with the OSHA Excavation Standard, and all other programs that may apply (examples Hazard Communication, Confined Space, and Respiratory Protection), and must demonstrate a thorough understanding and knowledge of the programs and the hazards associated. This training will be done by a certified third party training company. All other employees working in and around the excavation must be trained annually in the recognition of hazards associated with trenching and excavating.

Training will consist of:

- Violation of the excavation/trenching policy is breaking the law
- Requirement to have a valid one-call ticket onsite at all times.
- The requirement to renew one-call tickets prior to expiration if needed.
- Tolerance Zone review
- What to do if marks are no longer visible
- What to do if utilities cannot be found as marked.
- What to do if an unmarked utility is found.



**Berry Bros. General Contractors, Inc.
Corporate Policy Procedure**

Section # 24

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**(HSE) Health, Safety & Environmental
Policies and Procedures Manual**

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Approver: Joe Berry

EXCAVATION AND TRENCHING

- Hazards associated with excavations / trenching
- Soil types
- Types of benching.

Associated documents: SOP - Core – 001 Line Locating
 SOP - Core – 003 Ground Disturbance
 SOP - PL – 008 Hydro Excavations with protection platform
 SOP - PL - 009 - Hydro Excavations of 4' or greater
 SOP - PL - 015 - Bell Hole Procedure

Revision Date: 10-17-08, 7-8-2014
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