City of Hendersonville, NC
Excavation and Trenching Policy
In compliance with: 29 CFR 1926.650

I. Purpose

The purpose of this document is to describe the guidelines and procedures to be followed by our employees when entering and working in excavations and trenches. These guidelines and procedures have been designed to eliminate the incidence of excavation/ trench injuries and illnesses.

II. Affected Personnel

These procedures and guidelines apply to all departments and all employees (temporary, permanent, part-time, and full-time) who, while performing their jobs, are exposed to or enter excavations or trenches. Visitors, vendors, contractors, and other non-employees will not be allowed to enter any excavation or trench produced by the City unless all contractual requirements of the City have been met. Contractors will be required to meet all standards outlined in this policy.

III. Responsibilities

A. It shall be the responsibility of each department head to ensure that the provisions of this policy are carried out within their respective department. They shall be responsible to initiate disciplinary action for any violation of these procedures.

B. It shall be the responsibly of the City's employees performing duties involving excavations or trenching to notify their supervisor of any changes of conditions affecting this policy. Employees shall familiarize themselves with this policy and comply with it and are to immediately report any unsafe act or conditions to their supervisor.

C. The supervisor will monitor compliance as described by this policy.

D. Independent contractors and their employees shall familiarize themselves with this policy and shall comply with it at all times.

IV. Definitions

Accepted Engineering Practices: The standards of practice required by a registered professional engineer.

Aluminum Hydraulic Shoring: A manufactured shoring system consisting of aluminum hydraulic cylinders (cross braces) used with vertical rails (uprights) or horizontal rails (wales). This system is designed to support the sidewalls of an excavation and prevent cave-ins.

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 a vertical or near surfaces between levels.

Cave-in: The separation of 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 falling or sliding in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent Person: An employee who is trained and 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.

Cross Braces: The horizontal members of a shoring system installed from side to side of the excavation. The cross braces bear against either uprights or wales.
Faces or sides: The vertical or inclined earth surfaces formed as a result of excavation work.
Failure: The movement or damage of a structural member or connection that makes it unable to support loads.

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.

Faces or sides: The vertical or inclined earth surfaces formed as a result of excavation work.

Failure: The movement or damage of a structural member or connection that makes it unable to support loads.

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

Kickout: The accidental movement or failure of a cross brace.

Monitoring: The process used to identify and evaluate the hazards after an authorized entrant enters the excavation or trench. This is a process of checking for changes and is performed in a periodic or continuous manner after the completion of the initial testing or evaluation of the excavation.

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

Ramp: Refers to an inclined walking or working surface that is used to gain access to one point from another and is constructed from earth or from structural materials such as steel or wood.

Sheeting: The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield: A structure that is capable of withstanding the forces imposed on 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. Shields used in trenching are usually referred to as trench boxes or trench shields. All shields must be in accordance with 29 CFR l926.652(c) 3 or (c) 4.

Shoring: Refers to a structure such as a metal hydraulic mechanical or timber shoring system that supports the sides of an excavation that are inclined away from the excavation so as to prevent cave-ins.

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

Soil Types:

Type A soil is cohesive and has a high unconfined compressive strength. Soil cannot be classified as type A if it is fissured, if it has been previously disturbed, if it has water seeping through it, or if it is subject to vibration from sources such as heavy traffic or pile drivers.

Type B soil is cohesive and has often been cracked or disturbed, with pieces that don't stick together as well as Type A soil. Examples of Type B soil include angular gravel, silt, silt loam, and soils that are fissured or near sources of vibration, but could otherwise be Type A.

Type C soil is the least stable type of soil and includes granular soils in which particles don't stick together. Because it is not stable, soil with water seeping through it is also automatically classified as Type C soil, regardless of its other characteristics

Spoil -Pile: Refers to the soil or rock material that has been removed from the excavation and has not been hauled away. Spoil piles shall be a minimum of 2 feet from edge of trench.

Surcharge Loads: Generated by the weight of anything in proximity to the excavation, anything up top pushing down. Common surcharge loads: weight of spoil pile, weight of nearby buildings, poles, pavement, or other structural objects and/or weight of material and equipment.

Support System: A structure used as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated Data: Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench: A narrow excavation below the surface of the ground, less than 15 feet wide with a depth no greater than the width.

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.

Uprights: The vertical members of a trench shoring system placed in contact with the earth and usually positioned so the individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called sheeting.

Wales: Horizontal members of a shoring system placed in the direction of the excavation face whose sides bear against the vertical members of the shoring system or earth (the uprights or sheeting).

V. General Requirements

This policy covers the safety requirements for employees who work around or enter excavations or trenches which:

- Pose cave-in dangers for entrants;
- Require protection for entrants from serious hazards including atmospheres are or may be toxic, explosive, or asphyxiating; and
- Have other hazards.

A. Pre-Excavation

All excavation and trenching sites will be reviewed for any types of surface encumbrances such as equipment, materials, supplies, permanent installations (i.e. buildings or roadways), trees, brush, boulders, or other objects at the surface that could resent a hazard to employees working in the excavation shall be removed or supported as necessary to safeguard employees.

Before excavating begins, the estimated location of utility installations that reasonably may be expected to be encountered shall be determined. Call the proper locating services for utilities that could reasonably be expectedto exist for the ticket number assigned to that job site.

In the event that excavating can't be postponed until a locating service is available, the excavation will be done with caution and with the aid of available detection equipment or other acceptable means to locate utility installations.

Barricades, walkways, lighting, and traffic posting shall be provided as necessary for the protection of the public prior to the start of excavation operations. Guardrails, fences, or barricades shall be provided on excavations adjacent to walkways, driveways, and other pedestrian or vehicle thoroughfares. Warning lights or other illumination shall be maintained as necessary for the safety of the public and employees from sunset to sunrise.

Wells, holes, pits, shafts, and all similar hazardous excavations shall be effectively barricaded or covered and posted as necessary to prevent unauthorized access. All temporary excavations of this type shall be backfilled as soon as possible.

B. Excavating

Excavation can begin once the competent person for the site has completed all the pre-excavation activities and the Excavation Checklist.

The spoil pile shall be placed no closer than 2 feet from the edge of the excavation.

Once excavating begins no employee shall be allowed to cross over the excavation. The proper method will be to walk around the excavation.

No employee shall be permitted underneath loads handled by lifting or digging equipment.

Note: *All soils in the Henderson County are considered to be Class C type soil. Due to this statement soil testing is not required unless for unusual conditions and the competent person wishes to try for a higher classification. A sample test will be kept for the duration of the excavation process.*

C. Entry into an excavation of less than 5 feet

No entry is allowed until the competent person for the site has made a safety review for possible cave-ins, possible hazardous atmospheres, and other safety hazards.

No employee will be allowed to enter the excavation without proper personnel protection equipment such as hard hat, safety boots, etc.

A ladder from the excavation shall be provided for trenches 4 feet or deeper and shall be located no further than 25 feet from where the employees are working.

When hazardous atmosphere exists or could reasonably be expected to exist, if the trench is 4 feet in depth (i.e. landfill areas, gas storage areas, dumps), the atmosphere inthe excavation shall be tested.

When atmosphere testing proves hazardous condition exists, special precautions shall be taken, including ventilation or proper respiratory protection. When these conditions exist, continuous atmosphere monitoring shall be conducted.

Rescue equipment, such as a breathing apparatus, a safety harness and a lifeline shall be at the job site where hazardous atmospheric conditions exist or could reasonable exist.

When lifelines are used, there shall be one person attending each employee wearing a lifeline.

When water is accumulating in an excavation, this water will be controlled by water removal equipment and shall be monitored by a competent person.

When excavations interrupt natural drainage of surface water, some type of diversion shall be used to prevent surface water from entering the excavation.

Support systems such as shoring, bracing or underpinning shall be used when excavating around adjacent structures such as buildings, walls, or other structures.

When tunneling under roadways, sidewalks, or other underground utilities, some type of support system will be used.

The competent person for evidence of a possible hazardous situation will make inspections daily on all excavations' adjacent areas and protective systems. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence.

Note: *In excavations and trenches less than 5 feet deep, no shoring or protective systems are required by OSHA for vertical walls of the excavation or trench. However, it is the competent person's decision that the excavation needs some type of protective system for employees to enter the excavation.*

D. Entry into an excavation between 5 and 20 feet

No entry is allowed in a trench or excavation of 5 feet or more without a proper and approved support system of one of the following types:

- Shoring System
- Shield System
- Benching or
- Sloping

These systems must meet the guidelines set forth by OSHA 1926.652 for Class C type soil unless tests prove a higher class of soil.

No entry is allowed until the competent person for the site has made a safety inspection of the protective system.

No entry is allowed until the competent person for the site has made a safety review for possible hazardous atmospheres and other safety hazards.

Whenever protective systems are used and hazardous atmospheric concerns exist, continuous atmosphere monitoring shall be conducted.

When atmosphere testing proves a hazardous condition exists, special precautions shall be taken including ventilation or proper respiratory protection.

No employee will be allowed to enter the excavation without proper personal protection equipment.

Proper means of egress from the excavation shall be provided within the protected area and no further than 25 feet from where the employees are stationed.

When lifelines are used there shall be one person attending each employee the lifeline.

When water is accumulating in an excavation, this water will be controlled by water removal equipment and shall be monitored by a competent person.

When excavation interrupts natural drainage of surface water, some type of diversion shall be used to prevent surface water from entering theexcavation.

When tunneling under roadways, sidewalks, or other underground utilities, some type of support system will be used.

The competent person for evidence of possible hazardous situation will make inspections daily on all excavations, adjacent areas, and protective systems. Inspections shall also be made after a rainstorm or other hazard-increasing occurrence.

E. Entry into an excavation of 20 feet or deeper.

No entry is allowed until a written statement of approval for the protective system is received from a professional engineer. A copy of the approved protective system shall be kept on the job site.

No entry is allowed until all other safety requirements listed in the policy are meet.

VI. Training

Employees, supervisors, and department heads who may work in an excavation/trench or in support of workers in excavations shall have adequate, thorough and frequent training in the hazards and correct procedures for working in excavations. New employees will be trained to an awareness level before working around excavations and at a later date be brought up to competent person level.

John F. Connet

3-4-21
Date of Approval

Adopted by City Council 01.07.2004
Revised by the Safety Committee 05.03.2016
Revised by the HR Coordinator 09.14.2018, 4.2.2019, 08.06.2020, 03.03.2021

EXCAVATION CHECKLIST

City of Hendersonville	Date-
Department	
Site Location -	Time : [ ] a.m. [ ] p.m.
Name of **Competent Person** making inspection -	

INSTRUCTIONS: *Mark a (X) in the YES column if the description is present and has been satisfied.*
Mark a (X) in the NO column if the item has NOT been completed.
Mark a line (-) across the YES and NO columns if the ITEM does not apply.
Use the NOTES section to list the ITEM NUMBER and write any comments that applies.

ITEM NO.	DESCRIPTION	YES	NO
1.	The utility company has been notified of excavation work schedule.		
2.	Location of underground utility lines are identified.		
3.	Hazardous objects have been removed from excavation area or blocked securely.		
4.	Soil type is classified.		
5.	Sloping and Benching system is designed per OSHA requirements.		
6.	Timber shoring system is designed per OSHA requirements.		
7.	Aluminum Hydraulic shoring system is designed per OSHA requirements.		
8.	Shielding system is designed per OSHA requirements.		
9.	Shields are free from damage or defects		
10.	Employees are protected from cave-ins when entering and exiting the shield.		
11.	When a combination of sloping and shielding is used, the shield must extend above the bottom slope of the excavation.		
12.	A ladder is provided and secured in trench four or more feet deep; top of ladder extending at least **36 inches** above the edge of the excavation.		
13.	A ladder is within **25 feet** of all employees working in trench.		
14.	Excavated material is stored at least two feet from the edge of the excavation.		
15.	Employees are protected from loose material which could fall into trench.		
16.	A competent person inspects the trench prior to the start of job.		
17.	The location of trench is marked by banners, barricades or other signals.		
18.	Bridges or walkways over excavations are equipped with guardrails and toe-boards.		

ITEM NO.	DESCRIPTION	YES	NO
19.	Employees working below other employees in trench are protected from hazards.		
20.	The trench is free of standing water.		
21.	The proper water removal equipment is operating under guidance of competent person.		
22.	Diversion ditches or dikes are in place to prevent surface water from entering trench.		
23.	The trench is inspected be competent person following any amount of rain.		
24.	Employees wearing proper safety equipment.		
25.	Test air quality in trench if a hazardous atmosphere is suspected.		
26.	A ventilation or respiratory protection is in use.		
27.	Protective support systems are installed from the top down.		
28.	Protective support systems are dismantled from the bottom up.		
29.	Excavation is back-filled as the protective system is dismantled.		
30.	Heavy equipment is mounted on wooden mats to distribute weight.		
31.	Damaged materials or equipment are removed from service.		
32.	An emergency response program is in place.		
33.	Life support equipment is in working order.		
34.	Emergency Response Service placed on stand-by. **Call**		
35.	Emergency Response Service taken off stand-by. **Call**		
Note other conditions.			
36.			
37.			
38.			
39.			
40.			
41.			

NOTES:

Revised: 4.27.2016

TRENCHING NUMBERS

18" – Slope back overhangs and trench box/shoring must extend above the trench.

2' – Distance shores pile must be from the edge of the trench.

2' – Maximum distance shoring/trench box can be from the bottom of the trench.

3' – Ladder must extend above trench lip at top.

4' – Ladder required. There must be a ladder within 25' of each employee in the trench.

5' – Depth shoring required; may be less if hazards exist.

6' – Fall protection required.

20' – Shoring must be designed by a registered professional engineer.

Appendix A to the Excavation and Trenching Policy

List of Competent Persons

Department/Facility	*Employee Name*
Water & Sewer	Kevin Albertson Clay Blackwell JR Blackwell James Clugh Brad Duncan Harley Gordon Matthew Herman Andrew Jones Matthew Keener Tim Laughter Richard Ledford Brian McCall Brentley Orr Jonathan Owen Caleb Smathers Tim Sexton Bo Stepp Austin Williams
Public Works	Timmy Hensley Josh Maybin Adam Rice Kevin Rhodes Kemper Henderson Frank Tankersley Tom Wooten