19.1 Policy Statement

Excavation and trenching activities are recognized as one of the most hazardous construction operations and is the leading cause of fatalities on construction sites. The management of All States Materials Group has created policies and guidelines to prevent cave-ins and other excavation and trench hazards for the general safety, health, and wellbeing of our workers.

Employees in excavations/trenches always be protected from cave-ins. Employees in excavations must also be protected from falling rock, soil, or materials using an adequate system including scaling for loose rock or soil, and installation of protective barricades.

19.2 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. The soil classification determines the benching dimensions.
- **Cave-in:** The separation of a mass of soil or rock from the side of an excavation or trench, or the loss of soil from under a trench shield or support system, and its sudden movement into the trench or excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure, kill, and/or immobilize a person.
- **Competent Person:** A person who is capable of identifying existing and predicable hazards in a trenching or excavation activity which have the potential to injure or otherwise harm an individual, knows how to eliminate or control these hazards and has been given the authority by management to act.
- **Excavation**: Any man-made cut, cavity, trench, or depression in the surface of the earth which has been formed by the removal of earth.
- **Hazardous Atmosphere:** Any atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.
- **Protective System:** A method of protecting employees from cave-ins. Protective systems include support systems, sloping and benching systems, shield systems, and any other system that provides the necessary protection to employees.
- **Registered Professional Engineer:** An engineer who is registered as such in the state where work is performed.
- **Shielding System:** A structure designed as to withstand the forces imposed upon it during a cave-in thereby protecting the employees within the system. The most common form of shielding is the trench box.
- **Shoring System:** A system designed from wood or metal which is placed at the sides of an excavation to prevent a cave-in. Sheet piles or timber lag shoring is an example of a shoring system.

- **Sloping System:** A protective system which actually forms the sides of an excavation to a predetermined slope to protect the employees within the excavation. The angle of the slope is determined by the soil classification.
- **Trench:** A narrow excavation where the bottom width is narrower than the depth of the excavation. The width at the bottom is not greater than 15feet wide. Anything that narrows the bottom dimensions of an excavation to 15feet or less where the width is less than the depth, the excavation is now considered to be a trench and must be treated as such.

19.3 Site Evaluation

- Before starting any digging, the site must be thoroughly evaluated for at least the following:
  - Determine where and what the existing utilities are and where they are located.
  - These locations should be marked both on the site and on the plans. No digging shall be performed without confirmation of underground utilities placement. The condition and proximity of existing structures.
  - Are there trees or utility poles that must be moved or eliminated?
  - What kind and volume of traffic is in the area. Pay close attention to what the common carriers are transporting with special attention to the hazardous materials that could impact the project if there was an incident.
  - What types of soil are involved in the trenching/excavation operation?
  - The height of the existing water table for the season and its susceptibility to rise during a rainstorm.
  - Determine current and long-range weather forecasts.
  - What is needed for protective equipment and systems? Are pumps needed? What protective system is to be used – trench box, shoring, sloping?
  - The Massachusetts Excavation and Trenching Law (520 CMR 14.00) aka “Jackie’s Law,” must be followed **in MA**. Jackie’s Law requires specific controls to protect the public from accessing trenches and excavations and requires a permit from the town or city. Here are the summarized requirements:
    - Trench = subsurface excavation >3 feet in depth and is 15 feet or less between soil walls as measured from the bottom;
    - Must obtain permit from Towns;
    - All regulated trenches must be attended, covered, barricaded, or backfilled;
    - Covers must be road plates at least ¾inch thick or equivalent; and

- Barricades must be fences at least 6feet high with no openings greater than 4inches between vertical supports and all horizontal supports required to be located on the trench-side of the fencing.

19.4 Underground Utilities

- All underground utilities shall be located by safe means prior to the commencement of digging. It is required that Dig Safe or other one-call service be notified at least 72 hours before the planned commencement of work following each State's regulation. The requirements of these organizations must be met. It is important to remember that unless a utility belongs to the Dig Safe organization, their service will not be in the Dig Safe database. Always look for other evidence of what may be buried.
  - Dig Safe (MA, ME, NH, RI, NY, VT)
  - VT Underground Utility Locators (VT)
  - CALL BEFORE YOU DIG (CT)
- Excavated underground service duct banks, pipelines, structures, sewer pipes, etc. were designed to have soil all the way around them for support. They were not meant to be suspended unsupported. All exposed utilities must be adequately supported.

19.5 General Requirements

- **Safe Entry and Egress from Excavations & Trenches**: All trenches and/or excavations 4feet or more in depth shall be provided with a safe means to access and leave the excavation.
  - A ladder or structural ramp designed by a competent person can be used for this purpose.
  - This access/egress ladder or ramp must not be more than 25feet from any worker in a trench or excavation area.
  - All ladders shall extend a minimum of 3feet from the top of the surface.
- **Superimposed Loads on the Sides of an Excavation**: At no time shall equipment or spoils piles be closer than 2feet from the sides of an excavation or trench because this would superimpose a significant load weight to the side of the trench and cause the possible failure of the excavation sides.
- **Raised/Suspended Loads:** No employee shall work in a trench under any equipment with a load.
  - Equipment shall be no closer than 2 feet from the sides of an excavation or trench.
- **Trench Protection**:
  - All workers in a trench of 5 feet or more in depth shall be protected from the effects of a cave-in or from the cave-in itself by shielding, shoring, or sloping.
    - Sloping or benching system to proper angle dependent on Type A, B or C soil.

- Trenches 20 feet or deeper shall have protection designed by a Professional Engineer (OSHA requires that trench boxes used in trenches 20 feet or deeper be based on tabulated data prepared and approved by a registered P.E.).
    - Per OSHA regulations, a trench box should have a "depth rating" stamped on it, which indicates the maximum depth at which the box can be safely used, and this rating should be determined and approved by a registered P.E.; essentially, the engineer's stamp signifies the box's rated capacity for a specific soil condition.
- At no time shall a worker leave the protective system that is in place for any reason, nor shall any worker enter a trench that is 5feet or more in depth without proper shielding, shoring, or sloping already in place.

- All workers in a trench under 5 feet must be evaluated by a competent person before any employee is allowed to enter.

19.6 Soil Classifications

- Unless tested by an authorized 3rd party prior to excavation of soils, field personnel will assume soils are of the class C Standard and will follow such guidelines accordingly.
- The classification of the soil to be excavated must be determined by a competent person. Here are the summarized classifications:
    - **Stable Rock**: Natural solid mineral matter with sides which when excavated can be vertical and which will remain vertical while exposed.
    - **Type A Soil**: Cohesive solids with an unconfined compressive strength of 1.5 tons per square foot (TSF) or greater. These soils can be clay, silty clay, sandy clay, clay loam, caliches, and hard pan. No soil is a type A if it is fissured, subject to vibration, or previously disturbed soil.
    - **Type B Soil:** Cohesive soils with unconfined compressive strength greater than 0.5 TSF but less than 1.5 TSF. These can be granular cohesive soils such as angular rock, silt, silty loam, sandy loam, and sloped or layered material.
    - **Type C Soil:** Cohesive soils with an unconfined compressive strength of 0.5 TSF or less. These can be granular soils including sand, gravel, loamy sand, submerged soils, or soils with seeping water. Type C soils cannot be benched at any time. The slope required to afford adequate protection is for every 1 foot in depth, the trench must also be laid back 1 ½ foot to the horizontal.
    - **ASMG shall use controls to prevent cave-ins specific to each soil type.**

19.7 Hazardous Atmospheres

- If the operation is in the vicinity of a hazardous dump site, landfill area, fuel farm, heavy traffic areas, industrial areas and the like, where there is the potential for the accumulation of a hazardous

atmosphere, or the trench is four feet or deeper, the atmosphere within that excavation/trench shall be minimally tested for flammability, toxicity, oxygen deficiency, and carbon monoxide before any employee is to enter the trench.

- If a possible contaminant is known to possibly exist in the trench or excavation, that contaminant should also be specifically tested for.

- If welding, cutting, or burning activities are being performed in the trench, frequent testing of the atmosphere within the trench may also be required, as well as use of the Welding Permit (see Hot Work Section of the ASMG Health & Safety Manual).

19.8 Working in or Around Traffic

- An appropriate sign package and lane closure system shall be utilized as outlined in the latest MUTCD manual.
- Personnel shall wear ANSI Type II or Type III safety vest.
- Trained flaggers/police shall be used to control the flow of traffic within the work zone where normal traffic patterns may be affected or lane closures are required.

19.9 Emergency Procedures

- In the event of an emergency the following procedures shall be followed to expedite the mitigation of the emergency.
  - **Dial 911:** State the nature of the emergency, the location, the number of victims, the excavation/trench dimensions, the soil type and any special hazards present.
  - Meet & brief the rescue personnel.
  - Keep all safety systems, such as pumps, shoring, shielding, etc., in place and operational.
  - Clear all unnecessary personnel away from the scene.
  - Shut down all equipment such as trucks, excavators, bulldozers, and the like.
  - Remember, keep all safety equipment running.
  - Close the roadway if necessary.
  - **Do not** perform rescue procedures unless specifically trained to do so. 50% of the fatalities in cave-ins are the would-be rescuers. **Do not sacrifice anyone else!!**
  - Never attempt to dig a victim out with motorized equipment.

19.10 Water

- Water in an excavation/trench is very dangerous and shall be controlled, and a Competent Person must evaluate the excavation/trench after water is controlled to determine if it is safety for workers to enter the excavation/trench to perform any task.

- Surface run off must be diverted so that it does not enter a trench.
- All workers shall vacate the excavation/trench during rainstorms and shall not re-enter the trench until approval is obtained from the Competent Person.
- Any water situation shall be constantly monitored by the Competent Person and all employees shall follow the directions of the Competent Person.

19.11 Weather

- Any changes in the ambient weather can adversely affect an excavation/trenching operation. Weather conditions such as rain, sleet, snow, freeze-thaw situations, the lack of rain, high winds and the like are situations that warrant close monitoring by the Competent Person.
- Excavation/trench operations may require frequent inspections by the designated Competent Person for the operation.

19.12 Adjacent Buildings & Other Surface Encumbrances

- Adjacent Buildings may need to be evaluated by a registered Professional Engineer to determine if the trenching/excavation activities will adversely affect the stability of the structure especially if the foundation footings have been exposed or undermined.
- Utility poles, trees, and the like shall be supported or removed from the vicinity of the trenching operation.

19.13 Trenches As Confined Space

- If the operation is in the vicinity of a hazardous dump site, landfill area, fuel farm, heavy traffic areas, industrial areas and other such areas, where there is the potential for a hazardous atmosphere, the trench could be considered a confined space.
- Any structures in the trench/excavation, such as sewer pipes, that may be entered are confined spaces. When this occurs, workers shall comply with the Confined Space Procedures as outlined in this manual, in addition to trenching and excavation requirements.

19.14 Competent Person

- A Competent person shall have the training, experience, and knowledge of soil analysis, use of protective systems, and the requirements of OSHA's Trenching Standard (29 CFR 1926 – Subpart P).
- A competent person as the ability to detect or anticipate conditions that could result in cave-ins, failures in protective systems, hazardous atmospheres and other hazards including those associated with confined spaces relative to the trenching/excavation operation.
- A Competent Person has the authority to take prompt corrective measures to eliminate and/or control any predictable hazards and to stop work when necessary.
- A Competent Person must be present for all trenching activities and shall determine if a trench is safe for workers to enter at the beginning of every work shift and when any change of conditions or soil

occurs.

19.15 Excavation & Trench Inspection

- Each trench/excavation must be inspected daily and before the start of each shift by a Competent Person.
- Each time a trench box is moved, a new trench has been created and must therefore be inspected.
- Frequency of the inspection could be dictated by the work being performed in the trench/excavation.
- A trench/excavation must be inspected after any inclement weather such as rain, sleet, snow, drought, wind, etc.
- Trenches/excavations must be inspected after other events that could increase the stability of the side walls such as freeze/thaw cycles, earthquakes, blasting activities, or the like.
- Inspections must be performed when fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or when similar adverse conditions occur that could adversely affect the stability of the trench or excavation.
- Safety Equipment Inspections - All safety systems and equipment shall be inspected daily or more often as the situation warrants by the Competent Person.
- Trench boxes and shoring systems must be inspected daily or after damage has occurred.
- Pumps must be inspected before each use for proper function.
- Access/egress ladders and systems must be inspected before each shift or before being used in each new trench.
- The stability of the sloping /benching system is used.