



## Excavation and Trenching Safety - Template Program

The following Excavation Safety template program has been developed by the Massachusetts Department of Labor Standards to assist employers prevent work-related injury. The template is developed to comply with the OSHA regulation on Excavation and Trenching, 29 CFR 1926.651 and 1926.652.

**Why?** Workers can be injured from cave-in and other hazards at excavation and trench sites. This template program was developed to help employers prevent these accidents.

**Is a written program mandatory?** Yes, an employer who does not have a written excavation safety program, per 29 CFR 1926.20(b)(1) may be cited.

**Am I required to use the DLS template?** No. You may already have a written program from APWA, your insurance carrier, or other resource that is satisfactory. In this case, review your current program with the contents of the DLS template. The template is provided for employers who may be starting from scratch and want to develop a minimum program to meet the OSHA regulation on Excavation and Trenching, 29 CFR 1926.651 and 1926.652.

**How to use this template program:** The template contains some fill-in-the-blank areas. Fill in the information with specific details for your department/agency. You may also decide to add additional information to be stricter than the minimum OSHA requirements.

- Review the sample template.
- Confirm that your department is able to implement each component of the program.
- Complete the fill-in-the-blank sections.
- Sign and date the program.
- Communicate and train employees on the program.
- Monitor operations in the field to confirm that employees understand and are able to conduct the requirements provided in the program.

The Massachusetts Department of Labor Standards has resources for public sector employees to reduce work-related injuries and illnesses. Visit us at [mass.gov/dols/wshp](https://mass.gov/dols/wshp).



## TRENCH SAFETY PROGRAM

### SAMPLE DRAFT for Massachusetts Public Works

*How to use this draft:* A written Trench Safety Program is required under 29 CFR 1926.21 (b)(1). Your workplace can elect to fill-in-the-blank for this sample draft, or develop your own program that contains these sections. The employer can revise the format to match existing programs and policies at the workplace. This program assumes that laborers are trained in trench safety and Competent Person is trained in soil testing, cave-in protective systems, and hazard identification.

**Municipality:** \_\_\_\_\_

**Department Name:** \_\_\_\_\_

**1.0 PURPOSE:** This program provides safety requirements for all excavation and trenching activity, regardless of whether it is a planned project or emergency.

**2.0 RESPONSIBILITY:** The employer is responsible for protecting employees from cave-in at excavation sites. The employer must ensure that a daily inspection is conducted by a designated Competent Person who has completed training to identify excavation hazards, **and has authority to stop work and make corrections**. The employer must provide training to employees, and ensure that cave-in protection systems are provided when required.

### **3.0 REQUIREMENTS FOR CAVE-IN PROTECTION**

Each excavation will provide safe work conditions to protect employees from cave-in.

**3.1 Required for Deeper than 5 feet:** A cave-in protection system is **required** when employees enter an excavation deeper than 5 feet. A cave-in protection system could include trench boxes, shoring, or sloping. The only time cave-in protection is not required in an excavation deeper than 5 feet deep is if the excavation is made entirely in stable rock. Cave-in protection is always required in excavations over 5 feet deep for Type A, B or C soils.

3.2 **Required for Less than 5 feet:** A cave-protection system is **required** for an excavation less than 5 feet deep when examination of the ground indicates a potential for cave-in.

3.2.1 The Competent Person makes this determination in the daily inspection. The Competent Person must complete the Daily Inspection Worksheet in Appendix A.

3.2.2 Example signs of potential cave-in include, but are not limited to:

- Water accumulation
- Upward flow of water into cut
- Water seeping out of soil
- Tension cracks or fissures
- Sliding of walls
- Bulging wall or floor
- Undermined structures that are not supported
- Significant vibration or surcharge loads from nearby equipment or traffic
- Wet mud

3.3 **Not Required for Less than 5 feet:** Cave-in protection is **not required** when employee enters an excavation less than 5 feet deep **and** the daily inspection by the Competent Person provides no indication of cave-in potential. Complete the Daily Inspection Worksheet in Appendix A to show that site conditions have been evaluated.

#### 4.0 SELECTING CAVE-IN PROTECTIVE SYSTEM PER SOIL TYPE

Soil type is used, in addition to ground conditions, to determine effective shielding (trench box), shoring, or sloping.

4.1 **Assume Type C:** Public works departments may choose to assume all soil is Type C when selecting trench box, shoring, or sloping the site. A manual and visual soil test to classify soil is not required when soil is assumed to be Type C. For Type C soil, you must slope out 1.5 feet on each side for each 1 foot of depth (i.e. 34 ° from horizontal). Designs for Type C soil are provided in the OSHA excavation standard 29 CFR 1926.652. Benching is not permitted in Type C soil.

4.2 **Type A, B:** The Competent Person must conduct at least one visual and manual soil test if Type C soil is not assumed. Record these results on the Daily Inspection Worksheet. Then refer to the manufacturers tab data or engineered plan to ensure that the shoring or trench box is adequate for the soil type on the site and the depth of excavation.

4.3 **Cave-In Protection Systems:** The following equipment is available to the department as owned, through rental, or loan agreement.

<b>Task</b>	<b>System</b> <i>(Employers should edit this section to indicate what systems they have. Keep owner's manual and specifications on file.)</i>
Up to 20 Feet Deep	<p>Trench box model number _____</p> <p>Manufacturer: _____</p> <p>Trench box model number _____</p> <p>Manufacturer: _____</p> <p>Shoring system Manufacturer: _____</p> <p>List specs for distance between shores: _____</p> <p>Shoring system Manufacturer: _____</p> <p>List specs for distance between shores: _____</p> <p>Sloping</p> <p><b>Type C soil:</b> 1 ft. high to 1-1/2 feet horizontal run on each side (34°)</p> <p>Type B soil: 1 ft. high to 1 feet horizontal run on each side (45° slope)</p> <p>Type A soil: 3/4 feet high to 1 feet. horizontal run on each side (53°)</p> <p>Type A soil (short-term): 1/2 feet high to 1 foot horizontal each side (63°)</p>
More Than 20 Feet Deep	Engineered system required by Professional Engineer

## 5.0 DAILY SITE INSPECTIONS

### 5.1 **Daily Inspection:**

- 5.1.1 Each crew will have a designated person with knowledge and training to be the “Competent Person.” The employer gives authority to the Competent Person to correct hazards at the site.
- 5.1.2 The “Daily Inspection Worksheet” is completed by the designated Competent Person before any worker is allowed to enter a trench, even if the site is less than 5 feet deep (See Appendix A for worksheet).

5.2. **Repeating the Daily Inspection:** A reinspection is conducted using the Inspection Worksheet at the beginning of every shift, *AND* as needed throughout the shift. *Inspections shall also be made after every rainstorm or other hazard increasing occurrence.*

### 5.3 **Verifying the Daily Inspection:**

- 5.3.1 The Daily Inspection Worksheet is returned to the department Superintendent at completion of the job. The Superintendent will review the Inspection Worksheet and review the safety conditions which occurred during the project with employees to evaluate the effectiveness of the trench safety program.
- 5.3.2 The Superintendent will conduct on-site inspections of excavation sites periodically to ensure that daily inspections are conducted and cave-in protective systems are provided.

## 6.0 WORK PROCEDURES

### 6.1 **Utilities**

- a. Digsafe (811) called for underground utilities. Confirmation number kept on file.
- b. Exposed utilities are supported or removed.
- c. Maintain 10 feet of clearance to overhead powerlines when operating trucks or equipment.
- d. To prevent sudden flooding, block or reduce pressure in water mains that could be exposed and accidentally damaged during excavation. Pressure should be reduced even if the actual tasks do not involve planned contact with the water main.

## **6.2 WET CONDITIONS:**

- a. Water accumulation is controlled before employees authorized to enter excavation.
- b. Surface water is diverted or controlled.
- c. Re-inspection is conducted after a rain event.
- d. Employees are ordered to exit if water seeps from floor or walls or if water accumulation is not able to be continuously controlled.

## **6.3 UNDERMINED STRUCTURES:**

- a. Adjacent foundations, telephone poles, etc. are braced before employees are authorized to enter excavation.
- b. Adjacent sidewalks, pavement, walls, etc. are fully supported. When a structure becomes unsupported or unstable in any way, employees are ordered to exit the excavation.
- c. Exposed underground utility pipes are supported.

## **6.4 EDGE OF EXCAVATION:**

- a. Spoils are kept more than 2 feet from edge.
- b. Top of trench box/shoring reaches grade level, or extends 18" above grade if any portion of the trench is sloped.
- c. Bottom of trench box/shoring is not more than 2 ft. above bottom of excavation. The 2 ft. allowable rise is not allowable if free-flowing soil comes in at the gap.
- d. Trench boxes are installed in a manner to restrict lateral or other hazardous movement of the shield in the event of sudden lateral loads.
- e. Ladder in place for trenches deeper than 4 ft. and placed so that egress is available without traveling more than 25 feet.
- f. Workers prohibited from "riding bucket" into or out of excavation.
- g. Weight of adjacent trucks and equipment are kept a safe distance away from edge to prevent surcharge loading or vibration.
- h. Provide a warning system to prevent mobile equipment from falling over the trench edge.

## **6.5 HAZARDOUS ATMOSPHERE:**

- a. Where oxygen deficiency (< 19.5% oxygen) or a hazardous atmosphere exists or could be expected to exist, the atmosphere in the excavation must be tested before employees enter excavations > 4 ft. deep.
- b. Test air for Oxygen, Carbon Monoxide, Hydrogen Sulfide, flammable levels and VOCs in landfills, underground fuel, or other contaminated soils.
- c. Test air at all levels. Do not assume that toxics are heavier than air.
- d. Test the air for Carbon Monoxide if gas/diesel powered tools are brought in to or used adjacent to the excavation. Ventilate.
- e. Control dust when cutting concrete or asbestos pipe. Follow Department of Labor Standards and DEP procedures for asbestos cement pipe.

## **6.6 WORK ZONE TRAFFIC:**

- a. Traffic is controlled in accordance with the Manual on Uniform Traffic Control (MUTCD), using MUTCD signs and devices. Close street to traffic if possible.
- b. Use adequate warning signs, cones and taper per MUTCD and MassDOT.
- c. Check blind spots before any vehicle or piece of heavy equipment is moved at the site, use spotters when necessary, and conduct circle checks of DOT vehicles moving off the site.

## **6.7 EXPOSURE TO FALLING LOADS**

- a. Employees are not permitted to work under raised loads.
- b. Employees are required to stand away from equipment that is being loaded or unloaded.

## **6.8 PERSONAL PROTECTIVE EQUIPMENT:**

- a. The following Personal Protective Equipment (PPE) is required:
  - i. ANSI Class 2 or Class 3 high-visibility reflective clothing, for all work that is located in, or adjacent to a road
  - ii. Hardhat
  - iii. Boots that address the hazards on site.
  - iv. Safety glasses when activities could cause projectiles
  - v. Hearing protection when concrete / metal cutting tools are used
  - vi. Respirator when concrete or asbestos cutting is conducted.

## **6.9 UNATTENDED TRENCH – PUBLIC RISK:**

Trenches will not be left unattended or pose a hazard to the public.

Unattended trenches must be backfilled, covered, or otherwise protected per Department of Professional Licensure (formerly Department of Public Safety) regulation 520 CMR 7.00.

## **7.0 WHEN MUNICIPAL EMPLOYEES WORK WITH A PRIVATE CONTRACTOR: Employees**

Private contractors often conduct work on municipal property. Municipal employees should not enter an excavation created by a private contractor unless the municipality's designated Competent Person has conducted an inspection and authorized municipal employees to enter.

**8.0 EMPLOYEE QUALIFICATIONS:**

- 8.1 The designated Competent Person must have completed “Trench Competent Person” training, per OSHA 29 CFR 1926.269 *and* have authority from employer to stop work, and order that cave-in protective systems be installed and site hazards are corrected, before work continues.
- 8.2 Other employees on site must have completed “Trench Safety” awareness training.
- 8.3 Laborers assigned to use a grinder, saw, or other power tool must have completed training which reviews the Owner’s Manual instructions for use and maintenance of the tool.
- 8.4 Laborers assigned to disturb Asbestos Cement Pipe must have completed “Asbestos Cement Pipe” training.
- 8.5 Equipment operators must have a current Massachusetts Hoisting License issued by Massachusetts Department of Professional Licensure (formerly Department of Public Safety).

**9.0 Annual Review:**

This policy will be reviewed annually and revised as necessary. In addition, if a near miss incident or injury occurs, this policy will immediately be reviewed and revised if necessary.

Version/Revision Number	
Date of Last Revision or Review	
Signature of Director of Public Works	

Appendix A: “Daily Excavation and Trenching Inspection Worksheet – 2018”



# Appendix A

## DAILY INSPECTION WORKSHEET

**How to Use this Inspection Worksheet:** A daily inspection is required at all excavation sites that workers enter, even sites less than 5 feet deep. One way to verify that the daily inspections are conducted is to complete an inspection checklist.

1. **Date:** \_\_\_\_\_ **Work Order Number:** \_\_\_\_\_

2. **Excavation Address:** \_\_\_\_\_

3. **Scope:** Purpose of excavation:  
\_\_\_\_\_

**Dimensions:** Depth: \_\_\_\_\_ Width: \_\_\_\_\_ Length: \_\_\_\_\_

### 4. CAVE-IN PROTECTION

4.1 **Is the depth of excavation greater than 5 feet deep?** \_\_\_ Yes \_\_\_ No

**If YES to 4.1**, the trench is greater than 5 feet deep, cave-in protection is required.

**If NO to 4.1**, is there potential for cave-in as determined by the Competent Person? \_\_\_ Yes \_\_\_ No

If YES, there is a cave-in potential, then cave-in protection is required.

Key issues to be reviewed by the competent person in determining the cave-in potential:

**Does ground have any of the following:**

	<u>Yes</u>	<u>No</u>
<input type="radio"/> Water accumulation	___	___
<input type="radio"/> Water seeping out of wall or floor	___	___
<input type="radio"/> Tension cracks or fissures	___	___
<input type="radio"/> Bulging wall or heaving floor	___	___
<input type="radio"/> Sliding walls	___	___
<input type="radio"/> Significant vibration or surcharge load	___	___
<input type="radio"/> <u>Other</u> _____	___	___

4.2 **If excavation is deeper than 5 feet, OR the Competent Person determined that there is a potential for cave-in, then cave-in protection is required.** Answer the questions below to determine cave-in protection options.

4.2.1. List the soil types, to aid in proper use of protective systems and/or required sloping.  
*Vibration, surcharge loads, and other conditions may require downgrade of soil type.*

Soil Type

\_\_\_ Type C

\_\_\_ Type B

\_\_\_ Type A

\_\_\_ Stable Rock

4.2.2 List soil tests conducted.  
*At least one manual and one visual test.*

\_\_\_ No Test, assume Type C soil.

\_\_\_ Soil Tested: \_\_\_ Visual: \_\_\_\_\_

Manual: \_\_\_\_\_

4.2.3 List the type or types of cave-in  
***Trench and Shoring:*** The employer is responsible to ensure the Owner's Manuals and tab data is available and all equipment is used in accordance with manufacturer's instructions and tab data.

<p>___ Trench Box</p> <p>___ Shoring</p> <p>___ Slope</p> <p>___ Trench box plus slope</p> <p>___ Engineered system</p>	<p><u>Max. Allowable Slope</u></p> <p>C: (34°) 1 ½ H: 1V</p> <p>B: (45°) 1H: 1V</p> <p>A: (53°) 3/4H: 1V</p> <p>Rock: (90°) Vertical</p>
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4.2.4 Confirm proper use of protective systems and/or sloping:

4.2.4.1 **If sloping** is used, what is maximum allowable slope for the soil type? H:V = \_\_\_\_\_

4.2.4.1 **If shoring** is used, what are maximum spacing requirements per tab data? H: \_\_\_\_\_ V: \_\_\_\_\_

4.2.4.2 **If trench box** is used, what is the maximum depth certification? \_\_\_\_\_

**5. SAFE WORK PROCEDURES**

<b>UTILITIES</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
a. Digsafe 811 called for underground utilities. Conf. Number: _____	___	___	___
b. Exposed utilities are supported or removed.	___	___	___
c. Water pipe pressure is shut off or reduced at excavation location.	___	___	___
d. 10 foot clearance between operating equipment and overhead electrical is maintained.	___	___	___

<b>WET CONDITIONS</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
a. Water accumulation is controlled.	___	___	___
b. Surface water is diverted or controlled.	___	___	___
c. A re-inspection for cave-in potential is conducted after each rainstorm.	___	___	___
d. Employees exit if water seeps from walls or floor.	___	___	___

<b>UNDERMINED STRUCTURES</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
a. Adjacent foundations, telephone poles, etc. are braced.	___	___	___
b. Adjacent sidewalks, pavement, etc. are fully supported.	___	___	___
c. Exposed underground utility pipes are supported.	___	___	___

<b>EDGE OF EXCAVATION</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
a. Spoils are kept more than 2 feet from edge.	___	___	___
b. Top of trench box/shoring reaches grade level or higher.	___	___	___
c. Bottom of trench box/shoring is less than 2 feet from floor.	___	___	___
d. Ladder in place for trenches deeper than 4 feet	___	___	___
e. Trench boxes are installed in a manner to restrict lateral or other hazardous movement of the shield in the event of sudden lateral loads, e.g, space between box plate and soil wall is minimized.	___	___	___
f. Weight of adjacent trucks and equipment are kept a safe distance away from edge to prevent surcharge loading or vibration.	___	___	___

<b>HAZARDOUS ATMOSPHERE</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
a. Test air before employees enter excavation > 4 feet deep when oxygen deficiency or a hazardous atmosphere could be expected.	___	___	___
b. Test air for LEL, O2, CO, and VOCs in landfills, underground fuel, or other contaminated soils. Don't assume that toxics are heavier than air.	___	___	___
c. Test air for CO if gas powered tools used in or near excavation.	___	___	___
d. Dust control is used when cutting concrete or asbestos pipe.	___	___	___

<b>WORK ZONE TRAFFIC</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
a. Traffic controlled by MUTCD signs/devices. Close street if possible.	___	___	___
b. Hi-visibility reflective clothing worn.	___	___	___
c. Check blind spots before each vehicle is moved at the site.	___	___	___

**6. INSPECTION and VERIFICATION BY EMPLOYER**

<b>To be filled out by the Competent Person:</b>	
Name: _____	
Inspection date/time _____	