



Designation: C891 – 20

# Standard Practice for Installation of Underground Precast Concrete Utility Structures<sup>1</sup>

This standard is issued under the fixed designation C891; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice covers the procedures to be followed in the planning, site preparation, and installation of underground precast concrete utility structures. Concrete pipe and box culverts are not covered under this practice. Also, precast concrete manholes covered in Specification C478/C478M are excluded from this practice.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

C478/C478M Specification for Circular Precast Reinforced Concrete Manhole Sections

## 3. Survey

3.1 The installation area shall be surveyed using the workprint and a checklist to identify the work to be done and to determine that the plans are correct.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee C27 on Precast Concrete Products and is the direct responsibility of Subcommittee C27.10 on Utility Structures.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.1 The location of the utility structure should be where it will cause minimum interference with traffic and shall be clearly defined on work prints.

3.1.2 All underground facilities and structures such as gas, water, sewer, power, telephone cable, and so forth shall be located and identified. Location markings shall be placed by the affected utilities before the construction.

3.2 The survey shall identify any obstacles such as overhead wires, building structures, and so forth that will interfere with crane operations, work progress, or create a safety hazard. Precautionary arrangements shall be made before excavation begins.

3.3 The survey shall give consideration to the soil structure so that proper shoring, sloping, or both, may be planned in advance of the excavation work.

## 4. Planning

4.1 Permits required to do work in accordance with the detail plans shall be secured before starting the job. All permits or a record of the permits shall be retained on the job for immediate reference.

4.2 All utilities and owners of surface and subsurface facilities and structures in the area shall be given advance notification of proposed excavation. Every effort shall be made to avoid damage to the facilities of others. If any damage occurs, the owner of the damaged facility shall be notified immediately.

4.3 Planning shall include the coordination of all responsible parties to ensure that arrangements for removal of broken pavement, rocks, excess spoil, and so forth have been made. Responsible parties shall arrange for the delivery, distribution, and storage of required material. If such material cannot be stored on the site, other storage areas must be provided.

4.4 Should it appear that a structure location will interfere with traffic, review the situation with the engineer and notify appropriate authorities.

4.5 Provide for access to call boxes, fire hydrants, etc.

4.6 Lifting equipment capabilities and certifications shall be in compliance with local and national safety codes. The manufacturer shall supply special lifting instructions of the

structure if needed. If precast component weights are not available, the installer shall consult with the manufacturer to obtain the weight of the utility structure.

## 5. Safety Requirements

5.1 Safety requirements for construction shall be in accordance with all federal, state, and local regulations.

5.2 The utility structure or any sections that comprise the structure assembly shall only be lifted at the lifting points so designated by the manufacturer.

5.2.1 The weight of each section to be handled shall be clearly indicated by marking of the section or clearly indicated on the delivery documents.

## 6. Excavating

6.1 Coordinate the various excavation operations from the point of opening the pavement to completion of backfill so that the work area thus occupied is kept to a minimum consistent with the conditions governing the work. This is particularly important where an excavation is adjacent to hospitals, police and fire department buildings, service stations, and so forth.

6.2 If unforeseen facilities or obstructions are encountered, stop excavating operations immediately. Expose the obstructions with wood handled digging tools and investigate them with caution. If there is any doubt as to the type of obstruction exposed, request positive identification from those suspected of owning the facility and then proceed as circumstances dictate.

6.3 Buried work frequently requires the use of heavy construction equipment and transport of heavy loads. Certain soil conditions may be encountered that will not support these loads. To avoid hazards and unnecessary delays caused by cave-ins or equipment becoming mired, carefully observe the prevailing conditions beforehand and take appropriate preventive measures.

6.4 When excavating across highways, streets, alleys, drives, and walks, perform the work in a manner that will minimize interference with traffic. If necessary, bridge the opening with a structure of adequate strength to support any traffic likely to pass over it. Handrails are required for structures bridging sidewalk openings.

6.5 Inspect excavations after every rainstorm or other hazard-increasing occurrence, and increase the protection against slides and cave-ins, if necessary.

6.6 In dewatering excavations, make certain that the discharge is carried to a suitable runoff point.

6.7 The excavation depth must allow for the overall assembled height of the utility structure plus the height of collar sections, a manhole frame and cover, and any bedding material required.

6.8 The excavation shall have sufficient width and length, in accordance with local, state, and federal regulations, to ensure safe installation and compaction of the backfill. Excavation to be not less than 18 in. (457 mm) larger than the outside dimensions of the structure or as wide as safety regulations and the compaction equipment require, whichever is greater, for all sides of the structure.

## 7. Shoring

7.1 Shoring for construction shall be in accordance with all federal, state, and local regulations.

7.2 Install shoring by starting at the top of the excavation and working down. Take care to place braces and jacks in a true horizontal position with proper vertical spacing. Braces must be firmly secured to prevent kickouts.

7.3 All materials used for shoring must be in good condition and of the right size. Do not use timbers with large loose knots. Prefabricated box type shoring is permitted provided it is clean and structurally sound after previous use.

7.4 Installation of the shoring should follow closely the excavation work even if no work is being done in the excavation. The longer an excavation is left unsupported, the greater the chance of a cave-in.

7.5 As soon as the work in the excavation is completed and the utility structure has been installed, remove the shoring and complete the backfilling, unless otherwise instructed by authorities. Remove the shoring from the bottom up. Release the jacks or braces slowly. Use chains or wire ropes to pull out the jacks or braces from above.

## 8. Installation Procedures

8.1 Consult the detailed plan for the proper orientation of the precast concrete utility structure to ensure proper alignment with entering cables, pipes, or conduits.

8.2 Do not place damaged precast concrete sections unless approved by the customer.

8.3 Do not field modify the structure unless it is determined that such modifications (for example, cuts to form slots or holes) will not adversely affect the strength of the structure.

8.4 Do not install structures under conditions known to result in loads heavier than that for which the structure was designed.

8.5 After the excavation has been completed to the required dimensions specified on the detailed plan, level off the area where the base section will be located. Verify the existing soils will provide an adequate foundation to support the structure. If concerns arise regarding foundation adequacy the installer shall notify the owner or owner's representative for consultation and recommendations. If an adequate foundation is provided, loosely place and level bedding material with a thickness of 4 in. (102 mm) to 6 in. (152 mm). Bedding material shall be suitable granular material free of rocks greater than 2 in. (51 mm) or any obstructions that may result in a point load being applied on the base. Set the base as level as possible so any water in the structure will drain toward the sumps as designed.

8.6 Assemble the multi-section utility structures by lowering each section into the excavation. Lower, set level, and firmly position the base section before placing the additional sections.

8.7 Where the possibility exists of a watertight structure becoming buoyant in a flooded excavation, take necessary steps to avoid flotation of the structure.