

TECHNICAL SPECIFICATIONS

ITEM 1

TRENCHING AND BACKFILLING

1. General: All excavation, trenching and backfilling for utility lines and appurtenant structures shall conform to the requirements of this specification and to the applicable typical details attached to these specifications. The inspector shall have the right to limit the amount of trench opened in advance or left open after pipe laying.
2. Excavation: Trench excavation shall be to the lines and grades shown on the plans or standard details or as required by the specifications for the line work to be installed therein. The City inspector may direct or authorize deviations where appropriate at his discretion. Excavation for structures shall be sufficient to accommodate forms, where required. Overdepth excavation shall be avoided. All excavation, regardless of the materials encountered, shall be unclassified so far as payment is concerned.
3. Methods of Excavation: Excavation may be performed with any type of trenching or excavating equipment which is capable of cutting properly aligned trenches in whatever materials are encountered. All excavation shall be by open cut unless specifically required to be bored. Blasting will be permitted only when or where specifically approved by the City Manager in writing, and only in the manner specifically approved. Blasting shall conform to all Federal and State laws and Municipal Ordinances. When necessary to prevent caving or unduly hazardous working conditions, trench walls shall be sheathed and braced or shall be laced back from a point six (6) inches above the pipe. Where sheathing and bracing are used, sheathing shall remain in place until the pipe has been installed, tested for leaks and defects, repaired if necessary, and the earth backfill completed to a depth of two (2) feet unless ordered by the City Engineer to be left in place. (see also section on Trench Safety) If trenching for utilities indicates seepage of ground water into the area under the road bed subsurface drainage as approved by the City Engineer shall be installed.
4. Excavated Materials: All excavated material shall be piled in such a manner that it will not endanger the work in progress and will avoid blocking sidewalks and driveways or obstructing traffic. Driveways must be immediately cleared to permit free access. Gutters and drainage channels shall be kept clear, or other means of securing proper drainage shall be provided.
5. Dewatering: Where ground water is encountered, the water table shall be lowered so that all necessary work may be carried on in the dry. The water shall be kept down until the unit or section under construction is completed. No water shall be allowed to flow through or over unset concrete or through the completed line.
6. Use of Washed Gravel: Where ground water is encountered, four (4) inches of washed gravel will be placed the full width of the trench in lieu of the granular embedment upon which the pipe will rest. The City Engineer will direct the Contractor when and where to place washed gravel.
7. Existing Structures: At the expense of the Contractor, all existing structures, improvements and utilities shall be adequately protected from damage that may occur due to construction operations. Where construction comes in close proximity to existing structures or utilities, or if it becomes necessary to

move services, poles, guy wires, pipelines or other obstructions, the Contractor shall notify and cooperate with the utility or structure owner.

8. Backfill: Backfill shall be of three types: Granular embedment, Select Backfill, and Trench Backfill.

A. Granular Embedment shall be used under, around, and over all utility lines in accordance with the standard details for utility trenches, except that service lines in soil not containing rock may be installed without embedment. Granular embedment shall be defined as free flowing sand or mixed sand and pea gravel that is free of stone, organic material or clay and which material shall not form mud or muck when wet. This material may be an inferior grade or "pit-run" sand not normally considered satisfactory for construction purposes, and it may be used directly from pits without processing. No fine granular material will be installed by the Contractor without the Engineer's approval.

Granular embedment shall be replaced to a grade slightly higher than required for the grade. Wedging or blocking up of pipe will not be permitted. Each pipe section shall have a uniform bearing on the embedment for the length of the pipe, except for immediately at the joint. Embedment under either water or sewer lines shall amount to at least four (4) inches in earth cut and six (6) inches in rock cut. Granular embedment over the pipe shall be at least six (6) inches.

Where sand of a quality meeting the requirements for granular embedment material is encountered in the trench excavation, it may be stockpiled and used in lieu of material from other sources. Compaction of granular embedment by flooding will not be permitted.

"Crusherfines" do not constitute approved embedment material.

B. Select Backfill: Select backfill shall be used for a depth of twelve (12) inches immediately below the base material of streets or other areas to be paved. Select backfill shall be of generally granular type material such as base material, road gravel, sand or sandy gravel, and shall have a Plasticity Index of not more than ten (10). Select backfill shall contain no rock larger than three (3) inches in its greatest dimension. Not more than fifty (50) percent of the material shall be rock, and not more than ten (10) percent shall be as large as three (3) inches. Not more than twenty-five (25) percent shall be clay or clay lumps. Select backfill shall be compacted to not less than ninety-five (95) percent of Modified Proctor Density, ASTM Designation D1667, in layers of not over four (4) inches in thickness. Compaction method shall be approved by City Engineer.

C. Other Trench Backfill: In areas outside of streets, drives, and in trees below select backfill material, etc., trench backfill above embedment material may be accomplished by the use of excavated material if the material is suitable for compaction and contains only an occasional rock up to eight (8) inches in greatest dimension.

Trench backfill in areas outside of streets, drives, etc., will not be tested for density, but the material shall be compacted and the entire area left in a neat and orderly condition with excess material mounding over the trench. After a suitable length of time to permit settling, the trench surface shall be brought to a smooth grade.

Trench backfill in streets below select backfill shall be compacted to ninety (90) percent modified Proctor Density.

9. Pavement Repair: Existing pavement shall be precut, sawed or scored so as to result in an even, straight cut. After completion of the trench backfill, and upon approval of the Engineer, on all paved streets other than gravel streets, the Contractor shall cut and excavate the surface and base of the streets back on each side of the trench to form a shoulder for the new base and surfacing. The base, if stone, shall then be replaced in three (3) inch layers tamped in place. On gravel streets, six (6) inches of road gravel shall be rolled in place to serve as a wearing surface. All cutbacks shall be to a neat, straight line, and the paving cut shall be made with a concrete saw and shall be parallel to the center line of the pipe. Where excess surfacing has been removed beyond the nominal limits of the ditch, such areas shall be kept to a minimum, and where excess of such areas shall be cut parallel to the pipe. All stone or gravel base or surface course shall be compacted to ninety-five (95) percent Modified Proctor Density, ASTM Designation D1557.

In all paved streets the trench shall be finished in a workmanlike manner with the same type of roadway which was removed so that the underlying courses, as well as the wearing surface, shall conform to the remainder of the roadway and shall be equal in every respect to the improvements existing prior to excavation.