CITY OF
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SECTION 08000
TRENCHING AND BACKFILLING UTILITIES

MARCH 2019

1 GENERAL

1.1 DESCRIPTION

1.1.1 This section includes the Trenching and backfilling for utilities to be carried out in accordance with Saskatchewan Occupational Health and Safety Regulations, Part XVII.

1.1.2 The Contractor shall provide all labour, products and equipment for trenching and backfilling for utilities, including but not limited to:

- watermains
- sanitary sewers
- storm sewers
- manholes, valve boxes
- lot service connections
- shoring, sheet piling
- dewatering

1.2 RELATED SECTIONS

- 08001 Watermains
- 08002 Sanitary Sewer Mains
- 08003 Lot Service Connections
- 08010 Storm Sewer Mains
- 08040 Culverts

1.3 INSPECTION AND TESTING

1.3.1 Depending on material required, testing will be conducted based off standard proctor values and compaction tests, and specific percent compaction will be in accordance with the standard drawings and backfilling section of this specification.

1.3.2 Compaction results will be based on a minimum of one density test per 100 lineal meters of trench for each 0.3 meters of depth. If a density test indicates insufficient compaction at any depth, then two more densities, which are proportionally representative of trench length, will be taken at that depth. Then, if the average of the three tests is below the required density, the contractor will re-excavate and re-compact to meet the specified density.

2 EXECUTION

2.1 EXCAVATION

2.1.1 Excavate to lines and to design depth shown or as required by the City to provide satisfactory bearing. Excavate unsuitable soil from trench bottoms as required by the City. Backfill with screened rock material specified to the required level and compact to provide uniform bearing.

2.1.2 No additional compensation will be paid for any changes due to deterioration of excavations caused by activities or neglect of the contractor.

2.1.3 Level and clean excavation bottoms free from loose material and debris.

2.1.4 Where excavation is made below depth shown through error, fill to required depth with 20 MPa compressive strength concrete or screened rock at no additional cost to City.

2.1.5 Provide firm undisturbed earth or rock bearings for granular bedding below pipelines and structures.

2.1.6 Excavate for structures to widths sufficient for formwork construction. Place no concrete or masonry until the City has inspected excavation.

2.1.7 Where concrete is to be placed, thaw excavation bottom if frozen, and protect from further freezing.

2.1.8 Maximum lengths for open trenches are 30 meters ahead of pipe laying crew and 200 meters behind, unless otherwise permitted by the City.

2.1.9 Where pipelines are constructed through fills and embankments, surface elevations will generally at least be 250 mm above top of pipeline prior to excavation.

2.1.10 Where trenches are excavated in existing pavements, saw cut the pavement to neat lines.

2.2 ROCKS AND BOULDERS

2.2.1 Remove boulders to provide 150 mm minimum clearance under pipes. Backfill with granular and compact at required level to provide suitable bearing, at no additional cost if boulders are less than 0.4 cubic meters.

2.2.2 Boulders larger than 0.4 cubic meters and material which cannot be removed with pick and bar will be classified as rock by the City. Notify the City when rock is encountered for classification and measurement.

2.2.3 Excavate rock to provide 150 mm minimum clearance on each side and under pipes. Backfill with granular and compact at required level to provide suitable bearing. Rock excavation will be paid for as unclassified work.

2.2.4 Prior to commencing blasting operations, obtain written approval from authorities having jurisdiction and from the City. Employ licensed workers only.

2.3 SHORING, BRACING AND SHEET PILING

2.3.1 Provide all shoring, bracing and sheet piling required for support and protection of earth banks at excavations.

2.3.2 Erect all shoring, bracing and sheet piling independent of utilities and structures.

2.3.3 Shore and brace sides of trenches and excavations in accordance with applicable Occupation, Health and Safety and Workers' Compensation Board Regulations.

2.3.4 Maintain during backfilling and remove in stages as backfilling progresses or as approved by the City.

2.3.5 Remove all shoring, bracing and sheet piling unless otherwise permitted by the City. If shoring is allowed to remain, cut off to a level at least 600 mm below finish grade.

2.3.6 Pre-fabricated cages or shields may be used, at the discretion of the City, to supplement or replace conventional shoring provided they conform to all applicable safety regulations, and permit the proper placing and tamping of bedding material under and around utility pipes.

2.4 BACKFILLING

2.4.1 Bedding and backfill of pipes and utilities in accordance with standard drawing C-100.

2.4.2 Remove all rocks larger than 200 mm in diameter from earth backfill.

2.4.3 Place and compact all backfill in maximum 150 mm deep compacted layers.

2.4.4 Compact in-situ site material used as trench backfill above pipe zone to bottom of granular base for roads to a density not less than 98% of SPD (Standard Proctor Density) and carried out at a moisture content of within 3% of optimum moisture content or less.

2.4.5 Remove any free water in the trench prior to placing additional lifts. Note that if moisture content is too high and densities not initially attainable the contractor will make every reasonable attempt to dry the material by whatever means available (i.e. discing, spreading, etc.) should the City deem the material to be "unworkable" the use of imported granular backfill may be required.

2.4.6 Place and compact evenly around structures to prevent damage or displacement. Grade surface to direct water away.

2.4.7 Stockpile spread or remove excess excavated earth material where directed by the City

2.4.8 Remove and dispose of boulders off site at no additional cost.

2.4.9 Where imported material is called for by written direction of the City, place the specified depth of granular material to the elevations provided and compacted to specified Standard Proctor Densities.

2.4.10 Where filter fabric is called for by written direction of the City, or Engineer, place fabric to the overall dimensions specified.

2.5 TRENCHLESS INSTALLATION

2.5.1 Installation requirements shall be dependent upon the method used for installation and will require review and approval from the City. The Contractor shall be responsible for selecting an installation method which, based on past experience, has proven to be satisfactory for excavation of the soils that will be encountered.

2.5.2 The layout, alignment, and grade shall be established from the lines, elevations, and tolerances specified in the Contract Documents. Typical tolerances for alignment and grade shall be a maximum of 150 mm for each 30 m of pipe. The excavated hole shall not exceed 30 mm greater than the outside diameter of the pipe.

2.5.3 Construction shafts shall be provided at locations and constructed as specified in the Contract Documents or according to the Contractor's submission. Shafts shall be maintained in a drained condition and clearly marked or fenced off to prevent injury.

2.5.4 The construction methods, procedures, and precautions shall ensure that excavations are stable, free from disturbance, and maintained in a drained condition.

2.5.5 Backfilling and compacting for shafts or other locations along the pipe path shall be according to Section 2.4 above.

2.6 SETTLEMENT

2.6.1 The contractor shall be responsible for all settlement of backfill that may take place during a period of two (2) years after date of completion certificate.

2.6.2 When notified of any such settlement, promptly repair same, or make arrangement for others to do so at the contractor's expense. Failure to do so will result in the City making appropriate arrangements at the Contractor's expense and at no cost to the City.

2.6.3 Pay the cost of all damages that may be caused by such settlements, including but not limited to repair and/or replacement of concrete sidewalks, curb and gutter and asphaltic concrete pavement.

3 MEASUREMENT AND PAYMENT

3.1.1 Measurement for trenching and backfilling for utilities will be based on actual field measurement of lineal metres of each trench.

3.1.2 Payment for trenching and backfilling for utilities will be made at the unit price specified in the contract and the correlating measurement. Price will include all labour, equipment and materials required for excavation, backfilling, compaction and moisture conditioning.

END OF SECTION