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TRENCH EXCAVATION AND BACKFILL
(OAKDALE 2451)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Trench excavation.
   2. Special pipe foundation.
   3. Trench backfill.
   4. Compaction.
   5. Pipe grade and alignment conflicts.

B. Related Sections:
   1. Section 2611 – Water Distribution Systems
   2. Section 2621 – Sanitary Sewer Systems

C. Method of Measurement:
   1. Trench excavation and backfill: incidental to associated pipe installation.
   2. Special pipe foundation materials:
      a. Measure crushed rock by weight in tons of materials acceptably placed.
      b. Weight shall be based on sum of individual load tickets provided within 24 hours of time of delivery to Site.
      c. Measure granular material by Compacted Volume (CV) in cubic yards of material acceptably placed.
      d. Bid price includes removal and disposal of material replaced.
   3. Replacement backfill:
      a. Measure by weight in tons of material acceptably placed.
      b. Weight shall be based on sum of individual load tickets provided within 24 hours of time of delivery to Site.
      c. Bid price includes removal and disposal of material replaced.
   4. Compaction: Incidental to associated pipe installation.
   5. Dewatering: Incidental to associated pipe installation.

D. Basis of Payment;
   1. Payment for quantities measured in this Section shall be at the Contract Unit Price as listen on the Bid Form. All associated Work items shall be considered incidental.

1.02 REFERENCES

A. MnDOT 3149 – Granular Material

1.03 SUBMITTALS

A. Provide for each granular material:
   1. Name and location of source.
   2. Sample gradation.

1.04 SITE CONDITIONS

A. Groundwater: Provide trench dewatering if groundwater surface is above or within 3 feet of pipe zone.

1.05 WARRANTY

A. Repair all trench settlements and resulting damage or displacement of surface facilities that occur within the Contract correction period.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crushed rock Pipe Foundation: Shall be in accordance with MnDOT 3149.2H.

B. Granular Pipe Foundation: Shall be in accordance with MnDOT 3149.2F.

C. Replacement Backfill: Shall be in accordance with MnDOT 3149.2B.

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. Trench Excavation:
   1. Alignment and grade;
      a. Excavate trench to alignment and grade as staked.
      b. Excavate no more than 100 feet in advance of pipe laying operation.
   2. Trench width at pipe zone:
      a. Center trench on pipe alignment.
      b. Minimum width: Pipe outside dimension plus 12 inches.
      c. Maximum width: Pipe outside dimension plus 24 inches (except rock excavation).
   3. Excavated materials:
      a. Use stable material for backfill.
      b. Waste unstable material as directed.
      c. Do not place material on sidewalk, driveways, or drainageways.
   4. Drainage:
      a. Provide dewatering trenches when required.
      b. Drain trench water into natural channels or storm sewer.
      c. Do not drain trench water into sanitary sewer.
   5. Rock excavation:
      a. Blasting shall conform to all local and state ordinances.
      b. Submit blasting schedule for approval.
      c. Minimum trench width: 36-inch.

d. Provide minimum 6-inch vertical clearance between pipe and rock trench bottom.
e. Provide minimum 12-inch horizontal clearance between pipe and rock trench walls.
f. Provide pipe foundation material for pipe in rock trenches.

B. Pipe Foundations:
1. Engineer to determine stability of trench bottom.
2. Stable trench bottom:
a. Shape trench bottom to conform to bottom half of pipe.
b. Excavate bell holes to permit proper jointing.
3. Unstable trench bottom:
a. Excavate below pipe grade to specified depth.
b. Refill with specified foundation material in accordance with Drawings details and compact.

C. Trench Backfill:
1. Pipe zone:
a. Use granular foundation material for all storm sewer within 5 feet of finished grade.
b. Use native material free of rocks and other unsuitable debris.
c. Deposit material uniformly on both sides of pipe throughout entire trench width.
d. Place material in 6-inch lifts and mechanically compact.
2. Above pipe zone:
a. Use granular foundation material between pipe zone and subgrade elevation for all storm sewer within 5 feet of finished grade.
b. Use native materials free of debris and rock, concrete or clay lumps with a volume greater than 1/3 cubic foot.
c. Place in uniform lifts no more than 1 foot thick.
d. Mechanically compact each lift of the upper 3 feet of trench to a Standard Proctor density of 100 percent.
e. Mechanically compact each lift under the upper 3 feet of trench to a Standard Proctor density of 95 percent.
f. Do not backfill unless approved compaction equipment is operating.
g. Fine grade street subgrade to staked elevation and cross section.
3. Replacement backfill:
a. Engineer to determine suitability of native material for backfill.
b. Use replacement backfill in lieu of native materials as directed.
c. Place in accordance with subparagraph 2 above.
4. Excess or deficiency of backfill material:
a. Dispose of excess backfill material as directed after all trenches are backfilled.
b. Provide replacement backfill as required to establish required surface elevation.

3.02 FIELD QUALITY CONTROL

A. Density tests on backfill materials will be as directed by Engineer.\

B. Recompact all areas represented by failed density tests.

C. Owner will provide for initial test and first retest.

D. Cost of subsequent retests to be deducted from Contractor’s payment.

3.03 PIPE CLEARANCES AND CONFLICTS

A. Provide clearance between sewers and water main as follows:
   1. Maintain 10-foot horizontal between pipes.
   2. Maintain 18-inch vertical separation between pipes.

B. When 18-inch vertical separation between sewer and water main cannot be maintained, provide special pipe crossing as follows:
   1. Advise Engineer of pipe conflict.
   2. Lower water main in accordance with Drawing or as directed.
   3. Provide 18-inch vertical separation between pipes.
   4. Construct sewer using pipe material and joints equal to water main at crossing point.
   5. Center pipe lengths at crossing point.
   6. Provide special foundation material for both pipes.
   7. Place insulation as directed.

END OF SECTION