**ITEM #0202451A TEST PIT EXCAVATION**

**Description:**
Excavate and backfill a designated area to determine the exact location of utility facilities or sanitary sewer services which are near a proposed drainage pipe or structure or in an area where the road is proposed to be lowered.

**Materials:**
- Compacted Granular Fill: Article M.02.02
- Bituminous Concrete Materials: Article M.04

**Construction Methods:**
- Keep affected utility/property owner apprised of proposed test pit excavation.
- Excavate only as authorized and as directed by the Engineer. The size, depth and location will be as authorized by the Engineer.
- If rock greater than 0.5 c.y. (cu.m) is encountered, the Engineer will determine if it must be removed and the method. Do not use explosives. See the pertinent construction methods of Section 2.02.03. When concrete must be removed, reinforced or not, it shall be considered, measured, and paid for as rock in trench excavation.
- If unsuitable backfill material is excavated, dispose as directed by the Engineer. Replace with suitable backfill and compact in accordance with Section 2.14.
- Repair all damaged bituminous pavement in accordance with Section 4.06.03. Sawcut the edges to neat lines if there will be no subsequent excavation at the test pit for a foundation.

**Method of Measurement:**
Test pit excavation will be measured at the contract unit price per cubic yard (cubic meter) for the material actually removed from within the limits specified as directed by the engineer.

When necessary, rock in foundation excavation will be measured at the contract price per cubic yard (cubic meter) for the rock actually removed in accordance with Article 2.05.04.

**Basis of Payment:**
This work will be paid for at the contract unit price per cubic yard (cubic meter) for “Test Pit Excavation”, which price shall include excavation, unsuitable material disposal, compacted backfill, bituminous pavement, sawcut, pavement repair, all utility costs, all equipment, tools, labor and work incidental thereto. The volume excludes the volume of material that is measured as Rock In Trench Excavation.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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</thead>
<tbody>
<tr>
<td>Test Pit Excavation</td>
<td>c.y. (cu.m)</td>
</tr>
</tbody>
</table>
ITEM #216012A - CONTROLLED LOW STRENGTH MATERIAL

Description: Controlled Low Strength Material (CLSM) is a self consolidating, rigid setting material to be used in backfills, fills, structural fills and elsewhere as indicated on the plans, or as directed by the Engineer. The flow and set time characteristics of CLSM shall be designed to meet the specific job conditions. All CLSM material covered by this specification shall be designed to be hand excavatable at any time after placement. It shall be composed of a mixture of portland cement, aggregate, and water with the option of using fly ash, slag cement, air-entraining agents, and other approved admixtures.

Materials: All materials utilized in the CLSM mix design shall be in accordance with the applicable requirements of Article M.03.01

Composition: The composition of the CLSM shall be in accordance with the requirements set forth in Article M.03.01-General Composition of Concrete Mixes, as well as the applicable sections of ACI 229R. The Contractor shall submit each proposed mix design, with all supporting data, to the Engineer for review and approval at least two weeks prior to its use. The setting time of CLSM materials shall be designed so as to achieve the strength necessary to comply with the time constraints called for under the Maintenance and Protection of Traffic requirements of the project specifications. The use of chloride accelerators is not permitted.

The minimum compressive strength of the CLSM material shall be 30 pounds per square inch (psi) and the maximum compressive strength of the CLSM shall be 150 pounds per square inch (psi) when tested in accordance with ASTM D4832 after 56 days.

The CLSM mix design shall utilize a nominal maximum size of No. 8 aggregate as specified in M.01.01.

CLSM mixes shall have a minimum of 20% entrained air when tested in accordance with AASHTO T152.

Construction Methods: CLSM shall only be placed when the ambient temperature is at least 32° F and rising. CLSM material shall be deposited within 2 hours of initial mixing.

CLSM may be placed by chutes, conveyors, buckets or pumps depending upon the application and accessibility of the site. Should voids or cavities remain after the placement of the CLSM, the Contractor shall modify the placement method or flow characteristics of the CLSM. Voids or cavities which have not been filled properly shall be corrected as directed by the Engineer and at the Contractor's expense.

Method of Measurement: This work will be measured for payment by the actual number of cubic yards of "Controlled Low Strength Material installed and accepted within the pay limits shown on the contract plans or as directed by the Engineer."
**Basis of Payment:** This work will be paid at the contract unit price per cubic yard “Controlled Low Strength Material,” which price shall include all materials, equipment, tools and labor incidental thereto.

<table>
<thead>
<tr>
<th>Item</th>
<th>Pay Unit</th>
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</thead>
<tbody>
<tr>
<td>Controlled Low Strength Material</td>
<td>C.Y.</td>
</tr>
</tbody>
</table>
ITEM #0219011A – SEDIMENTATION CONTROL AT CATCH BASIN

**Description:** This work shall consist of furnishing, installing, cleaning, maintaining, replacing, and removing sedimentation control at catch basins at the locations and as shown on plans and as directed by the engineer.

**Materials**

Sack shall be manufactured from a specially designed woven polypropylene geotextile sewn by a double needle machine, using a high strength nylon thread. Sack shall be manufactured by one of the following or an approved equal:

- **SiltSack®**
  - SI Geosolutions:
  - www.sigeosolutions.com
  - (800)621-0444

- **Dandy Sack™**
  - Dandy Products Inc.
  - P.O. Box 1980
  - Westerville, Ohio 43086
  - Phone: 800-591-2284
  - Fax: 740-881-2791
  - Email: dlc@dandyproducts.com
  - Website: [www.dandyproducts.com](http://www.dandyproducts.com)

- **FLeXstorm Inlet Filters**
  - Inlet & Pipe Protection
  - 24137 W. 111th St - Unit A
  - Naperville, IL 60564
  - Telephone: (866) 287-8655
  - Fax: (630) 355-3477

The sack will be manufactured to fit the opening of the catch basin or drop inlet. Sack will have the following features: two dump straps attached at the bottom to facilitate the emptying of sack and lifting loops as an integral part of the system to be used to lift sack from the basin. The sack shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this cord is also a visual means of indicating when the sack should be emptied. Once the strap is covered with sediment, the sack should be emptied, cleaned and placed back into the basin.

**Construction Methods:**

Installation, removal, and maintenance shall be per manufacturer instructions and recommendations.
**Method of Measurement:** Sedimentation Control at Catch Basin will be measured as each installed, maintained, accepted, and removed. There will be no separate measurement for maintenance or replacement associated with this item.

**Basis of Payment:**

Sedimentation Control at Catch Basin will be paid for at the contract unit price each complete in place and accepted, which price shall include all maintenance throughout construction, materials, equipment, tools, and labor incidental thereto.
ITEM # 0404100A - BITUMINOUS CONCRETE PATCHING – FULL DEPTH

1. Description: This work shall consist of repairing areas of structurally failed flexible pavement and trench restoration by:

a) removal of the entire thickness of the bound and granular layers of the pavement structure to a distance at least one foot beyond the deteriorated area,

b) Application of tack coat to the bound-layer vertical edges of the patch, and

c) Placement of Hot-Mix Asphalt (HMA) to match surrounding pavement thickness as closely as possible except that the minimum HMA thickness shall be two (2) inches. Since the pay item is by area, the estimated composition of the patch is to be included as a detail in the plans or contract documents.

1.1 Definitions: The following definitions of terms shall apply to this Special Provision.

Structurally failed pavement: Structurally failed pavement exhibits deterioration that extends through the entire depth at least the bound layers of the pavement structure. Typical distress forms visible at the surface include potholes, temporary or deteriorated patches, severe depressions or heaves, or areas of alligator cracking. Raveling, delamination, or surface potholes are not indicators of structural failure and are not subject to the repair procedure described in this Provision.

Bound layers: Total thickness of pavement structure composed of material bound together by a bituminous binder.

Granular layers: Total thickness of the pavement structure composed of unbound but selected and/or engineered materials, typically crushed or bank-run aggregate and fines, or crushed stone or crushed or bank-run gravel.

Subgrade: The native fill or unimproved soil underlying the pavement structure.

Flexible pavement: For the purposes of this provision, flexible pavement shall be a pavement structure composed of bound layers and granular layers only, with no Portland-cement concrete (PCC) layers or cementitiously treated layers present in the pavement structure.

2. Materials: Materials for this work shall consist of the following:

a) Processed Aggregate Base conforming to the requirements of Sections 3.04 and M.05.01 of the Standard Specifications.

b) Hot-mix Asphalt conforming to the requirements of Sections 4.06 and M.04 of the Standard Specifications.

c) Tacking agent conforming to the material requirements for tack coat in Sections 4.06 and M.04 of the Standard Specifications.

d) If geotextile is included in the patch, it shall be a High Survivability Separation geotextile from the latest version of the Department of Transportation’s Qualified Products List, available at http://www.ct.gov/dot/LIB/dot/documents/dresearch/conndot_qpl.pdf.
3. **Equipment:** Equipment for this work shall include all pavement cutting, removal, material handling, and compaction equipment to perform all patching operations. Compaction equipment shall include, but not be limited to, a steel-wheeled roller and vibratory plate compactor both capable of compacting both granular and HMA materials to specification requirements.

4. **Construction Methods:**

   a) **Demarcation of Areas to be Patched:**
      Mark the areas to receive this treatment. All areas to be full-depth patched shall completely encompass the entire deteriorated area and extend one (1) foot beyond into the surrounding pavement, and shall be approved by the Engineer prior to execution of the work.

   b) **Patch Preparation:**
      i. Saw cut the edges of the areas demarcated for full-depth patching.
      ii. Excavate and remove all layers (bound, granular, and subgrade) in demarcated areas as approved by the Engineer to accommodate the pavement structure for full-depth patching indicated in the Plans. No surrounding pavement, either its bound layers or its granular layers, shall be damaged during removal; if surrounding pavement is damaged, the area of removal shall be extended to encompass the newly damaged pavement. The volume of pavement damaged and repaired beyond the demarcated areas shall be repaired at the Contractor’s expense and not be measured for payment.
      iii. Place the granular layer in the patch pavement structure to the depth shown on the Plans, compact to the requirements of the Standard Specifications, and bring to line and grade prior to placement of hot-mix asphalt.
      iv. In cases where the subgrade is not sufficiently stable to support compaction of the granular layers, a geotextile material may be used on top of the subgrade; if use of a geotextile is selected, the minimum thickness of the granular layer shall be 18 inches.

   c) **Patch construction:**
      i. Apply tack coat to the bound-layer edges of the patch prior to placement of HMA.
      ii. Place HMA in lifts as indicated in the plans or contract documents to match the existing thickness of the surrounding pavement as closely as possible but with a minimum HMA thickness of two (2) inches. The surface elevation of the finished HMA patch shall be even with the surrounding existing pavement within ¼ inch as measured with a 10-foot straightedge.

   d) **Disposal of waste:** Remove all waste materials the same day they are excavated.

5. **Method of measurement:** This work shall be measured by the total area, in square yards, of “Bituminous Concrete Patching – Full Depth.” If geotextile is used, it shall be measured by the total area, in square yards, of “Geotextile (Separation – High Survivability” placed.

6. **Basis of Payment:** This work will be paid for at the contract unit price per square yard of “Bituminous Concrete Patching-Full Depth.” The price shall include all tools, materials, labor,
and equipment used for this activity, including, but not limited to: sawcutting, pavement and granular base excavation and removal, HMA and Processed Aggregate Base used in the construction of the patch, compaction and/or formation of granular base, and tacking agent. Geotextile shall be paid for separately at the contract unit per square yard of “Geotextile (Separation – High Survivability)” placed and shall include all tools, materials, labor, and equipment used for placement of this item. No payment will be issued to the contractor prior to document submissions required.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>0404100A Bituminous Concrete Patching – Full Depth</td>
<td>S.Y.</td>
</tr>
<tr>
<td>0755014 Geotextile (Separation – High Survivability)</td>
<td>S.Y.</td>
</tr>
</tbody>
</table>
ITEM # 0406002A TEMPORARY PAVEMENT

Description:

Work under this item shall consist of placing temporary pavement at the locations and to the general requirements shown on the contract drawings or as directed by the Engineer.

Materials:

The materials to be used in the construction of temporary pavement shall be those indicated on the plans and in the details or ordered by the Engineer. Processed Aggregate Base shall conform to the requirements of CONN DOT Form 816 Article M.05.01. Bituminous Concrete shall conform to the requirements of Special Provision Section M.04 of the type and thickness specified.

Construction Methods:

A. The Contractor, upon completing the backfilling of the trenches in pavement used by traffic will be required to construct a temporary pavement daily.

B. The methods employed in placing the bituminous pavement and all equipment, tools, machinery and other plant equipment used in handling materials and executing any part of the work shall conform to all requirements of Special Provision Section 4.06. The completed and compacted temporary pavement shall match the adjacent grade of the existing pavement and meet or surpass the uniformity of the adjacent surface and its roughness or riding quality. Replacement of the temporary pavement will be required at no additional cost where the pavement surface is not smooth or the compacted thickness of the bituminous concrete is deficient by more than ½”.

C. It shall be the responsibility of the Contractor to maintain and repair temporary bituminous pavement surfaces until such time as the temporary pavements have been replaced with the construction of permanent pavements. The Contractor shall at all times maintain the temporary pavements in a safe and satisfactory condition and all maintenance and repairs of permanent and temporary pavements shall be provided by the Contractor at no additional expense.

D. The Contractor shall perform and complete the construction work in a continuous manner and so that pavement replacement work may proceed without delay. The Contractor shall install the temporary pavement as soon as practical. Unless otherwise directed by the Engineer the contractor shall install the temporary pavement daily.
E. All curbing, street fixtures and such other appurtenant work damaged or displaced as a result of the Contractor's operations shall be repaired or replaced and restored by the Contractor in a manner satisfactory to the Engineer at no cost.

F. Payment for temporary pavement shall be made only to the limits shown on the detail for trench excavation. The State shall not be responsible for the cost of additional temporary pavement required for trenches wider than the limits detailed.

**Method of Measurement:**

This work will be measured for payment by the square yards of temporary pavement surface to the limits shown on the plans or ordered by the Engineer and after verification of the proper depth of bituminous concrete pavement thickness by the Engineer.

**Basis of Payment:** The temporary pavement will be paid for at the contract unit price per square yard for "Temporary Pavement" complete in place and approved which price shall include all materials, tools, equipment and labor incidental thereto. No separate payments will be made for excavation and disposal of materials, furnishing, placing, and compaction of processed aggregate base, or the cleaning, saw cutting, and tack coating of the existing pavement. The costs for these items shall be included in the contract unit price.

<table>
<thead>
<tr>
<th>PAY ITEM</th>
<th>PAY UNIT</th>
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<tbody>
<tr>
<td>Temporary Pavement</td>
<td>s.y.</td>
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</tbody>
</table>
ITEM #0406999A - ASPHALT ADJUSTMENT COST

The Asphalt Price is available on the Department of Transportation web site at:

http://www.ct.gov/dot/asphaltadjustment

The asphalt adjustment cost will be based on the variance in price for the performance-graded binder component of hot mix asphalt (HMA), Polymer Modified Asphalt (PMA), and Ultra-Thin Bonded Hot-Mix Asphalt mixtures completed and accepted in the contract.

An asphalt adjustment cost will be applied only if all of the following conditions are met:

I. For HMA and PMA mixtures:
   a. The HMA or PMA mixture in which the adjustment is being applied is listed as a contract item with a pay unit of tons or metric tons.
   b. The total quantity for all HMA and PMA mixtures in a contract or individual purchase order (Department of Administrative Service contract awards) exceeds 1000 tons or more.
   c. The difference between the posted Asphalt Base Price and Asphalt Period Price varies by more than $5.00.

II. For Ultra-Thin Bonded HMA mixtures:
   a. The Ultra-Thin Bonded HMA mixture in which the adjustment is being applied is listed as a contract item.
   b. The total quantity for Ultra-Thin Bonded HMA mixture in a contract exceeds:
      i. 800 tons (727 metric tons) if Ultra-Thin Bonded HMA is listed as a contract item with a pay unit of tons or metric tons.
      ii. 30,000 square yards (25,080 square meters) if Ultra-Thin Bonded HMA is listed as a contract item with a pay unit of square yards or square meters.
         Note: The quantity of Ultra-Thin Bonded HMA measured in tons shall be determined from the material documentation requirements set forth in the Ultra-Thin Bonded HMA Special Provision.
   c. The difference between the posted Asphalt Base Price and Asphalt Period Price varies by more than $5.00.
   d. No Asphalt Adjustment Cost shall be applied to the liquid emulsion that is specified as part of the Ultra-Thin Bonded HMA mixture system.
III. Regardless of the binder used in all HMA and/or PMA mixtures, the Asphalt Adjustment Cost will be based on PG 64-22.

The Connecticut Department of Transportation (ConnDOT) shall post on its website, the average per ton selling price (asphalt price) of the performance-graded binder. The average is based on the high and low selling price published in the most recent available issue of the Asphalt Weekly Monitor® furnished by Poten & Partners, Inc. under the “East Coast Market – New England, New Haven, Connecticut area”, F.O.B. manufacturer’s terminal.

The selling price furnished from the Asphalt Weekly Monitor® is based on a standard ton (US$/ST). The metric ton price is determined by applying a factor of 1.1023 (US$/ST x 1.1023 = US$/mton). Example: $150.00/ton x 1.1023 = $165.34/mton

Formula: $ \text{HMA} \times \frac{\text{PG}\%}{100} \times \left[\frac{(\text{Period Price} - \text{Base Price})}{100}\right] = \$ ____ , where

- **HMA**:
  1. For HMA, PMA, and Ultra-Thin Bonded HMA mixtures with pay units of mass:
     The quantity (tons or metric tons) of accepted HMA, PMA, or Ultra-Thin Bonded HMA mixture measured and accepted for payment.
  2. For Ultra-Thin Bonded HMA mixtures with pay units of area:
     The quantity of Ultra-Thin Bonded HMA mixture delivered, placed, and accepted for payment, calculated in tons or metric tons as documented according to the Material Documentation provision (section E) of the Ultra-Thin Bonded HMA Special Provision.

- **Asphalt Base Price**: The asphalt price that is posted on the ConnDOT website 28 days before the actual bid opening posted.

- **Asphalt Period Price**: The asphalt price that is posted on the ConnDOT website for the period in which the HMA, PMA mixture is placed.

- Performance-Graded Binder percentage (PG%) 
  1. For HMA or PMA mixes:
     PG% = 4.5
     - For Superpave 1.5 inch (37.5mm), Superpave 1.0 inch (25.0mm), PMA S1, HMA S1, and Class 4
     
     PG % = 5.0
     - For Superpave 0.50 inch (12.5mm), HMA S0.5, PMA S0.5, and Class 1
PG % = 6.0

- For Superpave 0.375 inch (9.5mm), HMA S0.375, PMA S0.375, Superpave 0.25 inch (6.25mm), HMA S0.25, PMA S0.25, Superpave #4 (4.75mm) and Class 2

2. For Ultra-Thin Bonded HMA mixes:
   PG% = Design % PGB (Performance Graded Binder) in the approved job mix formula, expressed as a percentage to one decimal point (e.g. 5.1%)

The adjustment shall not be considered as a changed condition in the contract because of this provision and because the Contractors are being notified before submission of bids.

**Basis of Payment:** The "Asphalt Adjustment Cost" will be calculated using the formula indicated above. A payment will be made for an increase in costs. A deduction from monies due the Contractor will be made for a decrease in costs.

The sum of money shown on the estimate, and in the itemized proposal as "Estimated Cost", for this item will be considered the bid price although payment will be made as described above. The estimated cost figure is not to be altered in any manner by the bidder. If the bidder should alter the amount shown, the altered figure will be disregarded and the original cost figure will be used to determine the amount of the bid for the Contract.
ITEM #0905011A - RESET FENCE

This work shall conform to Section 9.06 supplemented as follows: Article 9.06.01 - Description:

Replace with the following:

This item shall consist of removing existing fence, (stockade, pipe rail in fence, split rail, chain link or other types) posts and fabric to the limits shown on the plans and resetting the fence or fence fabric and posts to provide a clean finished fence and end post at the locations shown on the plans or as directed by the Engineer.

Article 9.06.02 - Material:

Replace with the following:

The materials furnished and used for this work shall be existing and/or consistent with the existing fence.

Article 9.06.04 - Measurement:

Replace with the following:

This work will be measured per linear foot of fence and post reset, measured along the top of fence, so that the fence and post is consistent with the location and limits shown on the plans.

Article 9.06.05 - Payment:

Replace with the following:

This work will be paid for at the contract unit price per linear foot of "Reset Fence" complete in place, which price shall include all materials, tools, equipment, and labor incidental thereto to include but not limited to all excavation, cutting of fence and fabric, removal of fence, connection to existing fence to remain, removing and resetting posts, filling and disposal of surplus material necessary to complete the work.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Reset Fence</td>
<td>l.f.</td>
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</table>
ITEM 0905106A – 6’ STOCKADE FENCE

DESCRIPTION
This work shall consist of furnishing and installing a stockade fence including posts, concrete footings and component parts, as indicated on the plans and as directed by the Engineer.

MATERIALS
The fence shall be made of wood, either northern white cedar (number 1 grade - untreated), southern yellow pine (pressure treated and stained) or spruce (pressure treated and stained) as shown on the plans.

Wood rails, posts and pickets shall be the size specified on the plans and in accordance with Section M.12.13 of the Standard Specifications. Wood rails will be doweled into the posts. Wood pickets will be nailed to the rails.

Pressure treated wood shall be treated in accordance with Section M.12.13-3, and shall be stained with an approved oil based stain to the satisfaction of the Engineer.

Nails shall be galvanized in accordance with Section M.06.03 - Galvanizing.

Concrete shall be in accordance with Section M.03, Portland Cement Concrete.

CONSTRUCTION DETAILS
All posts shall be set vertically and to the required grade and alignment.

Fence shall generally follow the contour of the ground. Grading shall be performed where necessary to provide a neat appearance.

Posts shall be spaced as shown on the plans or as directed by the Engineer.

The contractor shall submit five copies of Manufacturer's Shop Drawings to the Engineer for approval. These drawings shall be submitted at least ten working days prior to the date the contractor orders materials for the fence. The fence materials shall not be shipped to the job site until the shop drawings are approved.

METHOD OF MEASUREMENT
This work will be measured as the number of linear feet measured along the top of the fence center to center of posts which is satisfactorily installed as indicated on the plans or as directed by the Engineer.

BASIS OF PAYMENT
The unit price bid shall include the cost of furnishing all labor, grading, equipment, concrete footings, footing excavation and materials necessary to complete the work.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>6’ Stockade Fence</td>
<td>LF</td>
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</tbody>
</table>
ITEM# 0924007A - RELAY BELGIAN BLOCK PAVERS

Description: Work under this item shall consist of removing and resetting Belgian block pavers which have been disturbed by excavation and at the locations shown on the plans or as directed by the Engineer in conformance with these specifications.

Materials: Gravel for base shall conform to Article M.02.01 for gravel fill. Leveling base material shall be concrete sand conforming to ASTMC-33 for fine aggregates or No. 10 as shown in AASHTO M 43-54 (1974) as specified in table II.

Construction Methods: Existing Belgian block pavers shall be carefully removed. If any stones are broken during removal, the Contractor shall be responsible for replacing them. Belgian block pavers may be salvaged from other locations within the project site where these are not re-used. The existing stone for this work shall be of a good grade, free from structural defects and shall be approved by the Engineer. All stone used shall have minimum surface dimensions of 4 inches by 4 inches. All stone shall have a minimum thickness of 3 inches. The stones shall have a "fine pointed" top surface, projections not to exceed 1/2 inch, and all edges shall be pitched to true lines.

All soft and yielding material and other portions of the subgrade which will not readily compact shall be removed and replaced with suitable materials. The surface of the subgrade and subbase shall be compacted with mechanical equipment capable of delivering a ground pressure of not less than 300 pounds per linear inch of contact width. The amount of compaction shall be as specified by the Engineer but in no case shall that amount be less than four complete passes of the compacting equipment. The dry density after compaction shall conform to Article 2.02.03-6 of the standard specifications, Form 816. After compaction, the subbase shall be true to the required line and grade. No additional payment will be made for any materials which are required to bring the subbase to the lines, grade and cross sections of the site. The Contractor shall protect the subbase from damage by exercising such precautions as the Engineer deems necessary. The subbase surface shall be maintained in such condition as to permit proper drainage. It shall be checked and approved prior to placement of the leveling base. The leveling base shall be screeded loose to a thickness of approximately 2”. The leveling shall be treated with a soil stabilizer, of a type to be approved by the Engineer, prior to the placement of the Belgian block pavers. The exact thickness of the leveling base will vary depending on the variation in thickness of the existing Belgian block pavers and is to be determined at the job site.

Care shall be taken by the Contractor to insure the screeded leveling base is loose and undisturbed. Belgian block pavers shall be carefully laid on a prepared base to the pattern and requirements shown on the Contract Plans. Belgian block pavers are to be installed “Hand-tight” with care being taken not to disturb the leveling bed.
Mason string lines shall be used to insure proper lines and grades. The Belgian block pavers, graded so that the smaller stone is uniformly distributed throughout the area, shall be set in place over the area designated until the specified dimensions are attained. The stone shall be set flush with the surrounding area. All joints shall be filled after final compaction with the same material used for the leveling base.

**Method of Measurement:** This work will be measured for payment by the actual number of square feet (square meters) of complete and accepted relayed Belgian block pavers.

**Basis of Payment:** This work will be paid for at the contract unit price per square foot (square meter) for "Relay Belgian Block Pavers" complete and accepted in place which price shall include all tools, equipment incidental thereto including removing, storing, all cutting necessary to attain the proper fit, and reconstruction of Belgian block pavers and all material including concrete sand for leveling base.

<table>
<thead>
<tr>
<th>Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Relay Belgian Block Pavers</td>
<td>S.F.</td>
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</tbody>
</table>
ITEM #0969060A - CONSTRUCTION FIELD OFFICE, SMALL
ITEM #0969062A - CONSTRUCTION FIELD OFFICE, MEDIUM
ITEM #0969064A - CONSTRUCTION FIELD OFFICE, LARGE
ITEM #0969066A - CONSTRUCTION FIELD OFFICE, EXTRA LARGE

Description: Under the item included in the bid document, adequate weatherproof office quarters with related materials, equipment and other services, shall be provided by the Contractor for the duration of the work, and if necessary, for a close-out period determined by the Engineer. The office, materials, equipment, and services are for the exclusive use of CTDOT forces and others who may be engaged to augment CTDOT forces with relation to the Contract. The office quarters shall be located convenient to the work site and installed in accordance with Article 1.08.02. This office shall be separated from any office occupied by the Contractor. Ownership and liability of the office quarters shall remain with the Contractor.

Materials/Supplies/Equipment: Materials shall be in like new condition for the purpose intended and shall be approved by the Engineer.

Office Requirements: The Contractor shall furnish the office quarters and equipment as described below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Small</th>
<th>Med.</th>
<th>Large</th>
<th>Extra Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Sq. Ft. of floor space with a minimum ceiling height of 7 ft.</td>
<td>400</td>
<td>400</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>Minimum number of exterior entrances.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Minimum number of parking spaces.</td>
<td>7</td>
<td>7</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

Office Layout: The office shall have a minimum square footage as indicated in the table above, and shall be partitioned as shown on the building floor plan as provided by the Engineer.

Tie-downs and Skirting: Modular offices shall be tied-down and fully skirted to ground level.

Lavatory Facilities: For field offices sizes Small and Medium the Contractor shall furnish a toilet facility at a location convenient to the field office for use by Department personnel and such assistants as they may engage; and for field offices sizes Large and Extra Large the Contractor shall furnish two (2) separate lavatories with toilet (men and women), in separately enclosed rooms that are properly ventilated and comply with applicable sanitary codes. Each lavatory shall have hot and cold running water and flush-type toilets. For all facilities the Contractor shall supply lavatory and sanitary supplies as required.

Windows and Entrances: The windows shall be of a type that will open and close conveniently, shall be sufficient in number and size to provide adequate light and ventilation, and shall be fitted with locking devices, blinds and screens. The entrances shall be secure, screened, and fitted with a lock for which four keys shall be furnished. All keys to the construction field office shall be
furnished to the Department and will be kept in their possession while State personnel are using the office. Any access to the entrance ways shall meet applicable building codes, with appropriate handrails. Stairways shall be ADA/ABA compliant and have non-skid tread surfaces. An ADA/ABA compliant ramp with non-skid surface shall be provided with the Extra-Large field office.

**Lighting:** The Contractor shall equip the office interior with electric lighting that provides a minimum illumination level of 100 foot-candles at desk level height, and electric outlets for each desk and drafting table. The Contractor shall also provide exterior lighting that provides a minimum illumination level of 2 foot-candles throughout the parking area and for a minimum distance of 10 ft. on each side of the field office.

**Additional Equipment, Facilities and Services:** The Contractor shall provide at the field Office at least the following to the satisfaction of the Engineer:

**Parking Facility:** The Contractor shall provide a parking area, adjacent to the field office, of sufficient size to accommodate the number of vehicles indicated in the table above. If a paved parking area is not readily available, the Contractor shall construct a parking area and driveway consisting of a minimum of 6 inches of processed aggregate base graded to drain. The base material will be extended to the office entrance.

**Field Office Security:** Physical Barrier Devices - This shall consist of physical means to prevent entry, such as: 1) All windows shall be barred or security screens installed; 2) All field office doors shall be equipped with dead bolt locks and regular day operated door locks; and 3) Other devices as directed by the Engineer to suit existing conditions.

**Electric Service:** The field office shall be equipped with an electric service panel to serve the electrical requirements of the field office, including: lighting, general outlets, computer outlets, calculators etc., and meet the following minimum specifications:

A. 120/240 volt, 1 phase, 3 wire
B. Ampacity necessary to serve all equipment. Service shall be a minimum 100 amp dedicated to the construction field office.
C. The electrical panel shall include a main circuit breaker and branch circuit breakers of the size and quantity required.
D. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed at each computer workstation location.
E. Additional 120 volt, single phase, 20 amp, isolated ground dedicated power circuit with dual NEMA 5-20 receptacles will be installed, for use by the Telephone Company.
F. Additional 120-volt circuits and duplex outlets as required meeting National Electric Code requirements.
G. One exterior (outside) wall mounted GFI receptacle, duplex, isolated ground, 120 volt, straight blade.
H. After work is complete and prior to energizing, the State’s CTDOT electrical inspector, must be contacted at 860-594-2240. (Do Not Call Local Town Officials)
I. Prior to field office removal, the CTDOT Office of Information Systems (CTDOT OIS) must be notified to deactivate the communications equipment.

Heating, Ventilation and Air Conditioning (HVAC): The field office shall be equipped with sufficient heating, air conditioning and ventilation equipment to maintain a temperature range of 68°-80° Fahrenheit within the field office.

Telephone Service: The Contractor shall provide telephone service with unlimited nation-wide calling plan. For a Small, Medium and Large field office this shall consist of the installation of two (2) telephone lines: one (1) line for phone/voice service and one (1) line dedicated for the facsimile machine. For an Extra-Large field office this shall consist of four (4) telephone lines: three (3) lines for phone/voice service and one (1) line dedicated for facsimile machine. The Contractor shall pay all charges.

Data Communications Facility Wiring: Contractor shall install a Category 5e 468B patch panel in a central wiring location and Cat 5e cable from the patch panel to each PC station, terminating in a (category 5e 468B) wall or surface mount data jack. The central wiring location shall also house either the data circuit with appropriate power requirements or a category 5 cable run to the location of the installed data circuit. The central wiring location will be determined by the CTDOT OIS staff in coordination with the designated field office personnel as soon as the facility is in place.

For a Small, Medium and Large field office the Contractor shall run a CAT 5e LAN cable a minimum length of 25 feet for each computer to LAN switch area leaving an additional 10 feet of cable length on each side with terminated RJ45 connectors. For an Extra-Large field office the Contractor shall run CAT 5e LAN cables from workstations, install patch panel in data circuit demark area and terminate runs with RJ45 jacks at each computer location. Terminate runs to patch panel in LAN switch area. Each run / jack shall be clearly labeled with an identifying Jack Number.

The installation of a data communication circuit between the field office and the CTDOT OIS in Newington will be coordinated between the CTDOT District staff, and the local phone company. The CTDOT District staff will coordinate the installation of the data communication service with CTDOT OIS once the field office phone number is issued. The Contractor shall provide the field office telephone number(s) to the CTDOT Project Engineer within 10 calendar days after the signing of the Contract as required by Article 1.08.02. This is required to facilitate data line and computer installations.
The following furnishings and equipment shall be provided in the applicable field office type:

<table>
<thead>
<tr>
<th>Furnishing Description</th>
<th>Office Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small</td>
</tr>
<tr>
<td><strong>Quantity</strong></td>
<td></td>
</tr>
<tr>
<td>Office desk (2.5 ft x 5 ft) with drawers, locks, and matching desk chair that have pneumatic seat height adjustment and dual wheel casters on the base.</td>
<td>1</td>
</tr>
<tr>
<td>Standard secretarial type desk and matching desk chair that has pneumatic seat height adjustment and dual wheel casters on the base.</td>
<td>-</td>
</tr>
<tr>
<td>Personal computer tables (4 ft x 2.5 ft).</td>
<td>2</td>
</tr>
<tr>
<td>Drafting type tables (3 ft x 6 ft) and supported by wall brackets and legs; and matching drafters stool that have pneumatic seat height adjustment, seat back and dual wheel casters on the base.</td>
<td>1</td>
</tr>
<tr>
<td>Conference table, 3 ft x 12 ft.</td>
<td>-</td>
</tr>
<tr>
<td>Table – 3 ft x 6 ft.</td>
<td>-</td>
</tr>
<tr>
<td>Office Chairs.</td>
<td>2</td>
</tr>
<tr>
<td>Mail slot bin – legal size.</td>
<td>-</td>
</tr>
<tr>
<td>Non-fire resistant cabinet.</td>
<td>-</td>
</tr>
<tr>
<td>Fire resistant cabinet (legal size/4 drawer), locking.</td>
<td>1</td>
</tr>
<tr>
<td>Storage racks to hold 3 ft x 5 ft display charts.</td>
<td>-</td>
</tr>
<tr>
<td>Vertical plan racks for 2 sets of 2 ft x 3 ft plans for each rack.</td>
<td>1</td>
</tr>
<tr>
<td>Double door supply cabinet with 4 shelves and a lock – 6 ft x 4 ft.</td>
<td>-</td>
</tr>
<tr>
<td>Case of cardboard banker boxes (Min 10 ea)</td>
<td>1</td>
</tr>
<tr>
<td>Open bookcase – 3 shelves – 3 ft long.</td>
<td>-</td>
</tr>
<tr>
<td>White Dry-Erase Board, 36” x 48”min. with markers and eraser.</td>
<td>1</td>
</tr>
<tr>
<td>Interior partitions – 6 ft x 6 ft, soundproof type, portable and freestanding.</td>
<td>-</td>
</tr>
<tr>
<td>Coat rack with 20 coat capacity.</td>
<td>-</td>
</tr>
<tr>
<td>Wastebaskets - 30 gal., including plastic waste bags.</td>
<td>1</td>
</tr>
<tr>
<td>Wastebaskets - 5 gal., including plastic waste bags.</td>
<td>1</td>
</tr>
<tr>
<td>Electric wall clock.</td>
<td>-</td>
</tr>
<tr>
<td>Telephone.</td>
<td>1</td>
</tr>
<tr>
<td>Full size stapler 20 (sheet capacity, with staples)</td>
<td>1</td>
</tr>
<tr>
<td>Desktop tape dispensers (with Tape)</td>
<td>1</td>
</tr>
<tr>
<td>Item Description</td>
<td>Quantity</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Business telephone system for three lines with ten handsets, intercom capability, and one speaker phone for conference table.</td>
<td>1</td>
</tr>
<tr>
<td>Mini refrigerator - 3.2 c.f. min.</td>
<td>1</td>
</tr>
<tr>
<td>Hot and cold water dispensing unit. Disposable cups and bottled water shall be supplied by the Contractor for the duration of the project.</td>
<td>1</td>
</tr>
<tr>
<td>Microwave, 1.2 c.f., 1000W min.</td>
<td>1</td>
</tr>
<tr>
<td>Fire extinguishers - provide and install type and *number to meet applicable State and local codes for size of office indicated, including a fire extinguisher suitable for use on a computer terminal fire.</td>
<td>*</td>
</tr>
<tr>
<td>Electric pencil sharpeners.</td>
<td>2</td>
</tr>
<tr>
<td>Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.</td>
<td>1</td>
</tr>
<tr>
<td>Small Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under Computer Hardware and Software.</td>
<td>1</td>
</tr>
<tr>
<td>Large Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under Computer Hardware and Software.</td>
<td>1</td>
</tr>
<tr>
<td>Computer System as specified below under Computer Hardware and Software.</td>
<td>2</td>
</tr>
<tr>
<td>Digital Camera as specified below under Computer Hardware and Software.</td>
<td>1</td>
</tr>
<tr>
<td>Video Projector as specified below under Computer Hardware and Software.</td>
<td>-</td>
</tr>
<tr>
<td>Smart Board as specified below under Computer Hardware and Software.</td>
<td>-</td>
</tr>
<tr>
<td>Infrared Thermometer, including annual third party certified calibration, case, and cleaning wipes.</td>
<td>1</td>
</tr>
<tr>
<td>Rain Gauge.</td>
<td>1</td>
</tr>
<tr>
<td>Concrete Curing Box as specified below under Concrete Testing Equipment.</td>
<td>1</td>
</tr>
<tr>
<td>Concrete Air Meter and accessories as specified below under Concrete Testing Equipment as specified below. Contractor shall provide third party calibration on a quarterly basis.</td>
<td>1</td>
</tr>
<tr>
<td>Concrete Slump Cone and accessories as specified below under Concrete Testing Equipment.</td>
<td>1</td>
</tr>
<tr>
<td>First Aid Kit</td>
<td>1</td>
</tr>
</tbody>
</table>
The furnishings and equipment required herein shall remain the property of the Contractor. Any supplies required to maintain or operate the above listed equipment or furnishings shall be provided by the Contractor for the duration of the project.

**Computer Hardware and Software:** Computer System(s), Digital Camera(s), Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors and Smart Board(s) as well as associated hardware and software, must meet the requirements of this specification as well as the latest minimum specifications posted, as of the project advertising date, at Departments website [http://www.ct.gov/dot/cwp/view.asp?a=1410&q=563904](http://www.ct.gov/dot/cwp/view.asp?a=1410&q=563904)

The Contractor shall provide the Engineer, Computer Systems, Software and Related Equipment, with support and documentation.

The Contractor shall provide a licensed copy of the required software on original media and/or download information, as well as license keys. The Contractor shall also supply instructions, manuals, maintenance for future version upgrades, and customer support services offered by each software producer, for the duration of the Contract. **The peripheral required software in excess of the operating system normally installed by the computer vendor should not be preinstalled. The installation will be performed by CTDOT OIS.**

The Contractor is responsible for service and repairs to all hardware. All repairs must be performed within 48 hours. If the repairs require more than a 48 hours then a replacement must be provided.

The Contractor shall provide all supplies, paper, maintenance, and repairs (including labor and parts) for the computers, laptops, printers, copiers, and fax machines and other facilities required by this specification for the duration of the Contract.

Within 10 calendar days after the signing of the Contract but before ordering/purchasing the Computer System(s), Software, Digital Camera(s), Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors and Smart Board(s) as well as associated hardware and software, the Contractor must submit a copy of their proposed order(s) with catalog cuts and specifications to the Administering CTDOT District for review and approval. The Computer System(s), Software, Multifunction Laser Printer/Copier/Scanner/Fax, and Smart Board(s) will be initially reviewed by the CTDOT District personnel and forwarded to the CTDOT OIS for final approval. The digital cameras will be reviewed and approved by the CTDOT District. The Contractor shall not purchase the equipment or software until the Administering CTDOT District informs them that the proposed equipment and software is approved. The Contractor will be solely responsible for the costs of any equipment or software purchased without approval.

**Prior to delivery of the computer hardware and software the Contractor should create or procure any backup media necessary to restore the operating system and any preloaded software provided (Example: the Windows software, driver disks and others necessary to reinstall the operating system.). At the conclusion of the project the Department must wipe**

ITEM #0969060A, 0969062A, 0969064A & 0969066A
the hard drive for security purposes. The Department will not be responsible for returning the computer to the out of the box state. It will be the responsibility of the Contractor.

After the approval of the hardware and software, the Contractor must speak to one of the representatives at the CTDOT OIS by calling 860-594-3500, Option #1, a minimum of 2 working days in advance of the proposed delivery.

The approved computer system(s) including all hardware and software shall be delivered at the same time (all software and hardware necessary for the complete installation of the latest versions of the software listed). If all items are not delivered at the same time or the CTDOT OIS has not been contacted 2 working days in advance the delivery cannot be accepted. Digital Cameras should be delivered to the District.

All software, hardware and licenses provided shall be clearly labeled, specifying the (1) Project No., (2) Contractor Name, (3) Project Engineer’s Name and (4) Project Engineer’s Phone No., and shall be delivered to the CTDOT OIS , 2710 Berlin Turnpike, Newington, CT, where it will be configured and prepared for field installation. Installation will then be coordinated with CTDOT District and Project personnel and the computer system specified will be stationed in the Department’s Project field office.

Once the Contract has been completed, the hardware and software will remain the property of the Contractor. Prior to the return of any computer(s) to the Contractor, field personnel will coordinate with the CTDOT OIS personnel for the hard-drive wiping and removal of Department owned equipment, software, data, and associated equipment.

First Aid Kit: The Contractor shall supply a first aid kit adequate for the number of personnel expected based on the size of the field office specified and shall keep the first aid kit stocked for the duration that the field office is in service.

Concrete Testing Equipment: If the Contract includes items that require compressive strength cylinders for concrete, in accordance with the Schedule of Minimum Testing Requirements for Sampling Materials for Test, the Contractor shall provide the following. All testing equipment will remain the property of the Contractor at the completion of the project.

A) Concrete Cylinder Curing Box – meeting the requirements of Section 6.12 of the Standard Specifications.

B) Air Meter – The air meter provided shall be in good working order and meet the requirements of AASHTO T 152.

C) Slump Cone Mold – Slump cone, base plate, and tamping rod shall be provided in like-new condition and meet the requirements of AASHTO T119, Standard Test Method for Slump of Hydraulic-Cement Concrete.
Insurance Policy: The Contractor shall provide a separate insurance policy, with no deductible, in the minimum amount of five thousand dollars ($5,000) in order to insure all State-owned data equipment and supplies used in the office against all losses. The Contractor shall be named insured on that policy, and the Department shall be an additional named insured on the policy. These losses shall include, but not be limited to: theft, fire, and physical damage. The Department will be responsible for all maintenance costs of Department owned computer hardware. In the event of loss, the Contractor shall provide replacement equipment in accordance with current Department equipment specifications, within seven days of notice of the loss. If the Contractor is unable to provide the required replacement equipment within seven days, the Department may provide replacement equipment and deduct the cost of the equipment from monies due or which may become due the Contractor under the Contract or under any other contract. The Contractor's financial liability under this paragraph shall be limited to the amount of the insurance coverage required by this paragraph. If the cost of equipment replacement required by this paragraph should exceed the required amount of the insurance coverage, the Department will reimburse the Contractor for replacement costs exceeding the amount of the required coverage.

Maintenance: During the occupancy by the Department, the Contractor shall maintain all facilities and furnishings provided under the above requirements, and shall maintain and keep the office quarters clean through the use of weekly professional cleaning to include, but not limited to, washing & waxing floors, cleaning restrooms, removal of trash, etc. Exterior areas shall be mowed and clean of debris. A trash receptacle (dumpster) with weekly pickup (trash removal) shall be provided. Snow removal, sanding and salting of all parking, walkway, and entrance ways areas shall be accomplished during a storm if on a workday during work hours, immediately after a storm and prior to the start of a workday. If snow removal, salting and sanding are not completed by the specified time, the State will provide the service and all costs incurred will be deducted from the next payment estimate.

Method of Measurement: The furnishing and maintenance of the construction field office will be measured for payment by the number of calendar months that the office is in place and in operation, rounded up to the nearest month.

There will not be any price adjustment due to any change in the minimum computer hardware and software requirements.

Basis of Payment: The furnishing and maintenance of the Construction Field Office will be paid for at the Contract unit price per month for “Construction Field Office, (Type),” which price shall include all material, equipment, labor, service contracts, licenses, software, repair or replacement of hardware and software, related supplies, utility services, parking area, external illumination, trash removal, snow and ice removal, and work incidental thereto, as well as any other costs to provide requirements of this specified this specification.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Field Office, (Type)</td>
<td>Month</td>
</tr>
</tbody>
</table>

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ITEM NO. 971001A- MAINTENANCE AND PROTECTION OF TRAFFIC

Article 9.71.01- Description is supplemented by the following:

The Contractor shall maintain and protect traffic as described by the following and as limited in the Special Provision "Prosecution and Progress":

South Street and All Other Streets

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction on a travel path not less than 11 ft in width.

Excepted there from will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall maintain and protect at least an alternating one-way traffic operation on a travel path not less than 12 ft in width. The length of the alternating one-way traffic operation shall not exceed 300 ft in length.

During the allowable period, the Contractor will be allowed to close South Street to through traffic and detour traffic as shown on the Detour Plans contained herein. Alternating one way traffic will be maintained through the work zone on a travel path not less than 12 ft in width.

All Drives

The Contractor shall maintain access to all driveways throughout the project limits. The Contractor will be allowed to close one half of the width of apartment building parking lot access driveways to perform the required work. If a temporary closure of a driveway is necessary, the Contractor shall coordinate with the owner to determine the time period of the closure.

Article 9.71.03- Construction method is supplemented as follows:

General

Travelpaths shall be paved except that unpaved travelpaths will only be permitted for areas requiring full depth and full width reconstruction. In which cases, the Contractor will be allowed to maintain traffic on processed aggregate for a duration not to exceed 10 calendar days. The unpaved section shall be the full width of the road and perpendicular to the travel lanes. Opposing traffic lane dividers shall be used as a centerline.

The Contractor is required to delineate any raised structures within the travel lanes so they are visible day and night unless there are specific contract plans and provisions to temporarily lower these structures prior to the completion of work.

The Contractor shall schedule operations so that pavement removal and roadway resurfacing shall be completed full width across a roadway section by the end of a workday (work night), or as directed by the Engineer.
All trenches shall be backfilled or covered with steel plates at the end of each work day. At no time will alternating one-way traffic patterns be allowed outside of normal work hours.

When the installation of all the intermediate courses of bituminous concrete pavement is completed for the entire roadway, the Contractor shall install the final course of bituminous concrete pavement.

When the Contractor is excavating adjacent to the roadway the Contractor shall provide a three foot shoulder between the work area and travel lanes with traffic drums spaced every 50 feet with in the three foot shoulder area. At the end of the workday if the vertical drop off exceeds 3 inches the Contractor shall provide a temporary traversable slope of 4:1 or flatter that is acceptable to the Engineer. The cost of furnishing, installing and removing the material for the traversable slope shall be included in the contract lump sum price for M&PT.

The field installation of a signing pattern shall constitute interference with existing traffic operations and shall not be allowed except during the allowable periods.

**Material Storage**

The Contractor shall not store any material on site which would present a safety hazard to the motorists (e.g. fixed object or obstruct sight lines) or pedestrians.

**Full Depth Reconstruction**

During the allowable period, the Contractor shall on a daily basis excavate a reasonable length of existing roadway, prepare the subgrade and install the subbase and processed aggregate base to the permanent locations and elevations as shown on the cross sections or as directed by the Engineer.

Excavation and installation of subbase and processed aggregate base and all temporary connections to abutting driveways and existing roadways must be accomplished in a satisfactory manner prior to the end of each work day/night.

On the next to last day of the work week, the Contractor must ensure that the processed aggregate base layer has been completed and fine graded and is ready for the placement of the first course of bituminous concrete pavement.

On the last day of the work week (usually considered to be Friday), the Contractor shall install a sufficient number of intermediate courses of bituminous concrete pavement for that length of roadway that was prepared during the past four workdays. The final course of pavement shall not be installed at this time. Temporary pavement markings shall be installed on the intermediate course of bituminous concrete pavement mentioned above in accordance with Article 9.71.03 as contained in the Special Provision “Maintenance and Protection of Traffic”.
When the installation of all the intermediate courses of bituminous concrete pavement is completed for an entire roadway, the Contractor shall install the final course of bituminous concrete pavement. Final pavement markings shall be installed on the final course of bituminous concrete pavement in accordance with Article 9.71.03 as contained in the Special Provision “Maintenance and Protection of Traffic”.

**Requirements For Winter**

The Contractor shall schedule a meeting with representatives from the Department including the offices of Maintenance and Traffic, and the Town/City to determine what interim traffic control measures the Contractor shall accomplish for the winter to provide safety to the motorists and permit adequate snow removal procedures. This meeting shall be held prior to October 31 of each year and will include, but not be limited to, discussion of the status and schedule of the following items: lane and shoulder widths, pavement restoration, traffic signal work, pavement markings, and signing.

**Signing Patterns**

The Contractor shall erect and maintain all signing patterns in accordance with the traffic control plans contained herein. Proper distances between advance warning signs and proper taper lengths are mandatory.

**Existing Signing**

The Contractor shall maintain all existing signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary and install temporary sign supports if necessary as directed by the Engineer.
TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

TRAFFIC CONTROL PATTERNS

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:

- Speed and volume of traffic
- Duration of operation
- Exposure to hazards

Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.

When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.

Typical traffic control plans 19 through 25 may be used for moving operations such as line striping, pot hole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate traffic person shall be used when required.

Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.
PLACEMENT OF SIGNS

Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs shall be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads), where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

ALLOWABLE ADJUSTMENT OF SIGNS AND DEVICES SHOWN ON THE TRAFFIC CONTROL PLANS

The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.

The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.

Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations. Adjustments to the traffic control plans shall be based on safety of work forces and motorists, abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.

The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

<table>
<thead>
<tr>
<th>POSTED SPEED LIMIT MILES PER HOUR</th>
<th>MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 OR LESS</td>
<td>180</td>
</tr>
<tr>
<td>35</td>
<td>250</td>
</tr>
<tr>
<td>40</td>
<td>320</td>
</tr>
<tr>
<td>45</td>
<td>540</td>
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<tr>
<td>50</td>
<td>600</td>
</tr>
<tr>
<td>55</td>
<td>660</td>
</tr>
<tr>
<td>65</td>
<td>780</td>
</tr>
</tbody>
</table>
SECTION 1. WORK ZONE SAFETY MEETINGS

1.a) Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the project. Other work zone safety meetings during the course of the project should be scheduled as needed.

1.b) A Work Zone Safety Meeting Agenda shall be developed and used at the meeting to outline the anticipated traffic control issues during the construction of this project. Any issues that can’t be resolved at these meetings will be brought to the attention of the District Engineer and the Office of Construction. The agenda should include:

- Review Project scope of work and time
- Review Section 1.08, Prosecution and Progress
- Review Section 9.70, Trafficpersons
- Review Section 9.71, Maintenance and Protection of Traffic
- Review Contractor’s schedule and method of operations.
- Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
- Open discussion of work zone questions and issues
- Discussion of review and approval process for changes in contract requirements as they relate to work zone areas

SECTION 2. GENERAL

2.a) If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow for each lane closed, two TMAs, Changeable Message Sign, etc.) are not available; the traffic control pattern shall not be installed.

2.b) The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, cones/drums, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.

2.c) Failure of the Contractor to have the required minimum number of signs, personnel and equipment, which results in the pattern not being installed, shall not be a reason for a time extension or claim for loss time.

2.d) In cases of legitimate differences of opinion between the Contractor and the Inspection staff, the Inspection staff shall err on the side of safety. The matter shall be brought to the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.
SECTION 3. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

3.a) Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.

3.b) Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advanced warning signs.

3.c) Stopping traffic may be allowed:
   - As per the contract for such activities as blasting, steel erection, etc.
   - During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.
   - To move slow moving equipment across live traffic lanes into the work area.

3.d) Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic. If required, traffic slowing techniques may be used and shall include the use of Truck Mounted Impact Attenuators (TMAs) as appropriate, for a minimum of one mile in advance of the pattern starting point. Once the advanced warning signs and the first ten traffic cones/drums are installed/removed, the TMAs and sign crew shall continue to install/remove the pattern as described in Section 5 and traffic shall be allowed to resume their normal travel.

3.e) The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.

3.f) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.

3.g) Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.

3.h) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.
SECTION 4. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

4.a) On limited access roadways, one Flashing Arrow shall be used for each lane that is closed. The Flashing Arrow shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the traffic control plan. For multiple lane closures, one Flashing Arrow is required for each lane closed. If conditions warrant, additional Flashing Arrows should be employed (i.e.: curves, major ramps, etc.).

4.b) On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Flashing Arrow.

4.c) The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.

4.d) The Flashing Arrow board display shall be in the “arrow” mode for lane closure tapers and in the “caution” mode (four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder. The Flashing Arrow shall be in the “caution” mode when it is positioned in the closed lane.

4.e) The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.

SECTION 5. USE OF TRUCK MOUNTED IMPACT ATTENUATOR VEHICLES (TMAs)

5.a) For lane closures on limited access roadways, a minimum of two TMAs shall be used to install and remove traffic control patterns. If two TMAs are not available, the pattern shall not be installed.

5.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs.

5.c) Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the “flashing arrow” mode when taking the lane. The sign truck and workers should be immediately ahead of the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the “caution” mode when traveling in the closed lane.
5.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the “caution” mode when in the closed lane.

5.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to the specification entitled “Type ‘D’ Portable Impact Attenuation System”. Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.

5.f) TMAs should be paid in accordance with how the unit is utilized. When it is used as a TMA and is in the proper location as specified, and then it should be paid at the specified hourly rate for “Type ‘D’ Portable Impact Attenuation System”. When the TMA is used as a Flashing Arrow, it should be paid at the daily rate for “High Mounted Internally Illuminated Flashing Arrow”. If a TMA is used to install and remove a pattern and then is used as a Flashing Arrow, the unit should be paid as a “Type ‘D’ Portable Impact Attenuation System” for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day as a “High Mounted Internally Illuminated Flashing Arrow”.

SECTION 6. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

6.a) Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.

6.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 36-hour duration.

6.c) Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.

6.d) Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

SECTION 7. USE OF (REMOTE CONTROLLED) CHANGEABLE MESSAGE SIGNS (CMS)

7.a) For lane closures on limited access roadways, one CMS shall be used in advance of the traffic control pattern. Prior to installing the pattern, the CMS shall be installed and in
operation, displaying the appropriate lane closure information (i.e.: Left Lane Closed - Merge Right). The CMS shall be positioned ½ - 1 mile ahead of the lane closure taper. If the nearest Exit ramp is greater than the specified ½ - 1 mile distance, than an additional CMS shall be positioned a sufficient distance ahead of the Exit ramp to alert motorists to the work and therefore offer them an opportunity to take the exit.

7.b) CMS should not be installed within 1000 feet of an existing CMS.

7.c) On non-limited access roadways, the use of CMS for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the CMS.

7.d) The advance CMS is typically placed off the right shoulder, 5 feet from the edge of pavement. In areas where the CMS cannot be placed beyond the edge of pavement, it may be placed on the paved shoulder with a minimum of five (5) traffic drums placed in a taper in front of it to delineate its position. The advance CMS shall be adequately protected if it is used for a continuous duration of 36 hours or more.

7.e) When the CMS are no longer required, they should be removed from the clear zone and have the display screen cleared and turned 90° away from the roadway.

7.f) The CMS generally should not be used for generic messages (ex: Road Work Ahead, Bump Ahead, Gravel Road, etc.).

7.g) The CMS should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs (Examples include: Exit 34 Closed Sat/Sun - Use Exit 35, All Lanes Closed - Use Shoulder, Workers on Road - Slow Down).

7.h) Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.

7.i) The messages that are allowed on the CMS are as follows:
<table>
<thead>
<tr>
<th>Message No.</th>
<th>Frame 1</th>
<th>Frame 2</th>
<th>Message No.</th>
<th>Frame 1</th>
<th>Frame 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LEFT LANE CLOSED</td>
<td>MERGE RIGHT</td>
<td>9</td>
<td>LANES CLOSED AHEAD</td>
<td>REDUCE SPEED</td>
</tr>
<tr>
<td>2</td>
<td>2 LEFT LANES CLOSED</td>
<td>MERGE RIGHT</td>
<td>10</td>
<td>LANES CLOSED AHEAD</td>
<td>USE CAUTION</td>
</tr>
<tr>
<td>3</td>
<td>LEFT LANE CLOSED</td>
<td>REDUCE SPEED</td>
<td>11</td>
<td>WORKERS ON ROAD</td>
<td>REDUCE SPEED</td>
</tr>
<tr>
<td>4</td>
<td>2 LEFT LANES CLOSED</td>
<td>REDUCE SPEED</td>
<td>12</td>
<td>WORKERS ON ROAD</td>
<td>SLOW DOWN</td>
</tr>
<tr>
<td>5</td>
<td>RIGHT LANE CLOSED</td>
<td>MERGE LEFT</td>
<td>13</td>
<td>EXIT XX CLOSED</td>
<td>USE EXIT YY</td>
</tr>
<tr>
<td>6</td>
<td>2 RIGHT LANES CLOSED</td>
<td>MERGE LEFT</td>
<td>14</td>
<td>EXIT XX CLOSED</td>
<td>FOLLOW DETOUR</td>
</tr>
<tr>
<td>7</td>
<td>RIGHT LANE CLOSED</td>
<td>REDUCE SPEED</td>
<td>15</td>
<td>2 LANES SHIFT AHEAD</td>
<td>USE CAUTION</td>
</tr>
<tr>
<td>8</td>
<td>2 RIGHT LANES CLOSED</td>
<td>REDUCE SPEED</td>
<td>16</td>
<td>3 LANES SHIFT AHEAD</td>
<td>USE CAUTION</td>
</tr>
</tbody>
</table>

For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.

SECTION 8. USE OF STATE POLICE OFFICERS

8.a) State Police may be utilized only on limited access highways and secondary roadways under their primary jurisdiction. One Officer may be used per critical sign pattern. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Likewise in areas with moderate traffic and wide, unobstructed medians, left lane closures can be implemented without State Police presence. Under some situations it may be desirable to have State Police presence, when one is available. Examples of this include:
nighttime lane closures; left lane closures with minimal width for setting up advance signs and staging; lane and shoulder closures on turning roadways/ramps or mainline where sight distance is minimal; and closures where extensive turning movements or traffic congestion regularly occur, however they are not required.

8.b) Once the pattern is in place, the State Police Officer should be positioned in a non-hazardous location in advance of the pattern. If traffic backs up beyond the beginning of the pattern, then the State Police Officer shall be repositioned prior to the backup to give warning to the oncoming motorists. The State Police Officer and TMA should not be in proximity to each other.

8.c) Other functions of the State Police Officer(s) may include:
   • Assisting entering/exiting construction vehicles within the work area.
   • Enforcement of speed and other motor vehicle laws within the work area, if specifically requested by the project.

8.d) State Police Officers assigned to a work site are to only take direction from the Engineer.
The 16-S sign shall be used on all projects that require sidewalk reconstruction or restrict pedestrian travel on an existing sidewalk.

Series 16 signs shall be installed in advance of the traffic control patterns to allow motorists the opportunity to avoid a work zone. Series 16 signs shall be installed on any major intersecting roadways that approach the work zone. On limited-access highways, these signs shall be located in advance of the nearest upstream exit ramp and on any entrance ramps prior to or within the work zone limits.

The location of series 16 signs can be found elsewhere in the plans or installed as directed by the engineer.

Signs 16-E and 16-H shall be post-mounted.

Sign 16-E shall be used on all expressways.

Sign 16-H shall be used on all ramps, other state roadways, and major town/city roadways.

Sign 16-M shall be used on other town roadways.

Regulatory Sign "Road Work Ahead, Fines Doubled"

The regulatory sign "Road Work Ahead Fines Doubled" shall be installed for all work zones that occur on any state highway in Connecticut where there are workers on the highway or when there is other than existing traffic operations.

The "Road Work Ahead Fines Doubled" regulatory sign shall not be installed on town roads.

The "Road Work Ahead Fines Doubled" regulatory sign shall be placed after the series 16 sign and in advance of the "Road Work Ahead" sign.

"End Road Work" Sign

The last sign in the pattern must be the "End Road Work" sign.
NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.

2. SIGNS (A), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.

3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.

4. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.

5. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.

6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.

7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).

8. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.

9. A-changeable message sign shall be installed one half to one mile in advance of the lane closure taper.

10 SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

<table>
<thead>
<tr>
<th>POSTED SPEED LIMIT (MILES PER HOUR)</th>
<th>MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 OR LESS</td>
<td>180' (55m)</td>
</tr>
<tr>
<td>35</td>
<td>250' (75m)</td>
</tr>
<tr>
<td>40</td>
<td>320' (100m)</td>
</tr>
<tr>
<td>45</td>
<td>540' (165m)</td>
</tr>
<tr>
<td>50</td>
<td>600' (180m)</td>
</tr>
<tr>
<td>55</td>
<td>660' (200m)</td>
</tr>
<tr>
<td>65</td>
<td>780' (240m)</td>
</tr>
</tbody>
</table>

METRIC CONVERSION CHART (1" = 25mm)

<table>
<thead>
<tr>
<th>ENGLISH METRIC</th>
<th>ENGLISH METRIC</th>
<th>ENGLISH METRIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>25mm</td>
<td>72&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
<td>450mm</td>
<td>78&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>600mm</td>
<td>84&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>750mm</td>
<td>90&quot;</td>
</tr>
<tr>
<td>36&quot;</td>
<td>900mm</td>
<td>96&quot;</td>
</tr>
</tbody>
</table>

CONSTRUCTION TRAFFIC CONTROL PLAN
NOTES

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED PRINCIPAL ENGINEER

Charles S. Hebert
2016.08.05 15:50 8:49:49
WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

DENOTES APPROXIMATE LOCATION OF UNIFORMED FLAGGER, TRAFFIC PERSON OTHER THAN POLICE OFFICERS SHALL USE SIGN 80-9950 MOUNTED ON A 6' MIN. STAFF.

FROM THE MUTCD (2009 EDITION) Table 6E-1: Stopping Sight Distance as a Function of Speed

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Distance (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>115</td>
</tr>
<tr>
<td>25</td>
<td>155</td>
</tr>
<tr>
<td>30</td>
<td>200</td>
</tr>
<tr>
<td>35</td>
<td>250</td>
</tr>
<tr>
<td>40</td>
<td>305</td>
</tr>
<tr>
<td>45</td>
<td>360</td>
</tr>
<tr>
<td>50</td>
<td>425</td>
</tr>
<tr>
<td>55</td>
<td>490</td>
</tr>
</tbody>
</table>

CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 1 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8
WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 68.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/ SLOW SIGN PADDLE (SIGN NO. 80-9550) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220-01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.

B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.

C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.
WORK IN MIDDLE OF ROADWAY
TWO LANE HIGHWAY

ADVANCE WARNING AREA

TRANSITION AREA

BUFFER AREA 120'

ACTIVITY WORK AREA

TERMINATION AREA

BUFFER AREA 120'

ACTIVITY WORK AREA

TERMINATION AREA

ADVANCE WARNING AREA

SIGN FACE
72 SQ. FT (MIN.)

END ROAD WORK

INSTALL 8 CONE/DRUMS

SPEED LIMIT
LENGTH
SPACING

<40 mph 110' 20'
40 mph 320' 40'

31-1526

31-1906

ROAD WORK AHEAD

ROAD WORK AHEAD FINES DOUBLED

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 16

SEE NOTES 1, 2, 4, 6, 7, 8

APPROVED

PRINCIPAL ENGINEER
WORK IN MIDDLE OF ROADWAY AT INTERSECTION

SIGN FACE
144 SQ. FT (MIN.)

PLAN 17
SEE NOTES 1, 2, 4, 6, 7, 8
Article 9.71.05- Basis of Payment is supplemented by the following:

The temporary relocation of signs and supports, and the furnishing, installation, and removal of any temporary supports shall be paid for under the item “Maintenance and Protection of Traffic.”

The cost of furnishing, installing, and removing the material for the 4H:1V traversable slope shall be paid for under the item “Maintenance and Protection of Traffic.”
ITEM #0981101A - OPPOSING TRAFFIC LANE DIVIDER

Article 9.81.01 - Description:
This item shall include furnishing, installing, resetting, and removing Opposing Traffic Lane Dividers. Opposing Traffic Lane Dividers will be used to separate opposing traffic on a two-lane two-way roadway. The legend on the divider shall be two opposing arrows.

The Opposing Traffic Lane Divider shall meet the requirements of Federal Highway Administration's Strategic Highway Research Program (SHRP). The Opposing Traffic Lane Divider shall be 12 inch wide by 18 inch high sign panels mounted back to back on a flexible support post. The post shall be mounted to a base.

A series of these devices shall be placed on the center line of a temporary two-way operation. The support shall be designed to recover automatically to a vertical position if struck by a vehicle.


Article 9.81.02 - Materials:
1) Panel - The vertical panel shall be constructed of a flexible material resistant to ultraviolet light, ozone and hydrocarbons. The surface shall be smooth and suitable for adherence of appropriate retroreflective sheeting. The retroreflective sheeting shall be Type IV retroreflective sheeting in accordance with Section M.18.09.

2) Support Post - The support post shall be made of a material resistant to ultraviolet light, ozone, and hydrocarbons. The post shall have sufficient stiffness to remain rigid in windy conditions. The support shall be designed to recover automatically to a vertical position or manually restored (when fastened to the roadbed), if struck by a vehicle.

3) Base - The base shall consist of a metal ballast plate fastened to a rubber base. For long-term use, the metal ballast plate can be fastened directly to the roadbed. When fastened to the roadbed, the post will need to be manually reset when hit. The base shall meet the requirements of the Federal Highway Administration's Strategic Highway Research Program (SHRP).

Article 9.81.03 - Construction Methods:
The Opposing Traffic Lane Dividers shall be spaced every 30 feet apart or as directed by the Engineer. The Contractor shall insure that the devices are kept clean and bright. Any devices that are missing, damaged, or defaced so that they are not effective, as determined by the Engineer and in accordance with the American Traffic Safety Services Association (ATSSA) guidelines contained in “Quality Standards for Work Zone Traffic Control Devices”, shall be replaced by the Contractor at no cost to the State. When no longer required, they shall remain the property of the Contractor.
Article 9.81.04 - Method of Measurement:
This work will be measured for payment by the number of opposing traffic lane dividers furnished, installed and accepted on the project. Replacement devices shall not be measured for payment. Devices relocated to a different location in accordance with the Engineer shall not be measured.

Article 9.81.05 - Basis of Payment:
This work will be paid for at the contract unit price each for "Opposing Traffic Lane Divider" which price shall include all materials, equipment, tools, labor and work incidental to furnishing, installing, maintaining and removing the units.
ITEM NO. 1206023A - REMOVAL AND RELOCATION OF EXISTING SIGNS

Section 12.06 is supplemented as follows:

**Article 12.06.01 – Description is supplemented with the following:**
Work under this item shall consist of the removal and/or relocation of designated side-mounted extruded aluminum and sheet aluminum signs, sign posts, sign supports, and foundations where indicated on the plans or as directed by the Engineer. Work under this item shall also include furnishing and installing new sign posts and associated hardware for signs designated for relocation.

**Article 12.06.03 – Construction Methods is supplemented with the following:**
The Contractor shall take care during the removal and relocation of existing signs, sign posts, and sign supports that are to be relocated so that they are not damaged. Any material that is damaged shall be replaced by the Contractor at no cost to the State.

Foundations and other materials designated for removal shall be removed and disposed of by the Contractor as directed by the Engineer and in accordance with existing standards for Removal of Existing Signing.

Sheet aluminum signs designated for relocation are to be re-installed on new sign posts.

**Article 12.06.04 – Method of Measurement is supplemented with the following:**
Payment under Removal and Relocation of Existing Signs shall be at the contract lump sum price which shall include all extruded aluminum and sheet aluminum signs, sign posts, and sign supports designated for relocation, all new sign posts and associated hardware for signs designated for relocation, all extruded aluminum signs, sheet aluminum signs, sign posts and sign supports designated for scrap, and foundations and other materials designated for removal and disposal, and all work and equipment required.

**Article 12.06.05 – Basis of Payment is supplemented with the following:**
This work will be paid for at the contract lump sum price for “Removal and Relocation of Existing Signs” which price shall include relocating designated extruded aluminum and sheet aluminum signs, sign posts, and sign supports, providing new posts and associated hardware for relocated signs, removing and disposing of foundations and other materials, and all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of extruded aluminum signs, sheet aluminum signs, sign posts, and sign supports designated for scrap and all equipment, material, tools and labor incidental thereto.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal and Relocation of Existing Signs</td>
<td>L.S.</td>
</tr>
</tbody>
</table>
ITEM# 1400003A - TRENCH EXCAVATION 0–10 FT DEEP (SANITARY SEWER)
ITEM# 1400004A - ROCK-IN-TRENCH EXCAVATION 0-10FT DEEP (SANITARY SEWER)
ITEM# 1400005A - TRENCH EXCAVATION 0-15 FT DEEP (SANITARY SEWER)
ITEM# 1400006A – ROCK-IN-TRENCH EXCAVATION 0-15 FT DEEP (SANITARY SEWER)
ITEM# 1400102A - 8 Inch POLYVINYL CHLORIDE PIPE (SANITARY SEWER)
ITEM# 1401038A - RECONSTRUCT SANITARY SEWER HOUSE LATERALS
ITEM# 1401946A – CUT AND PLUG ABANDONED SANITARY SEWER
ITEM# 1401977A - CONCRETE FOR ENCASEMENT AND CRADLE (SANITARY SEWER)
ITEM# 1403001A - MANHOLE (SANITARY SEWER)
ITEM# 1403501A – RESET MANHOLE (SANITARY SEWER)
ITEM# 1403504A – RECONSTRUCT MANHOLE (SANITARY SEWER)

14.00.01 – Description:
Work under this item shall consist of furnishing and installing materials necessary for the complete installation and testing of sanitary sewer facilities as shown on the plans. Trench excavation for the installation of sanitary sewers shall conform to the details shown on the plans and as specified herein. The Contractor shall submit samples, materials certifications, test reports and/or shop drawings for sewer pipe, concrete manholes, frames, covers and grates to the Engineer for approval.

Where “Form 816” is used, it shall mean the “State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, form 816, 2004” with latest revisions.

14.00.02 – Materials:
All sewer pipe shall be of size and classes as shown on the plans. The Contractor shall submit to the Engineer the manufacturer’s name with details of pipe, fittings and joints for approval. Pipe shall be in accordance with the following:

1. Polyvinyl chloride Pipe (PVC)
Polyvinyl chloride Pipe shall conform to ASTM Standard D-3034, or SDR-35 for type PSM poly (vinyl chloride) sewer and pipe fittings amended to date with the following additions and/or exceptions:

The pipe and fittings shall be made from PVC plastic having a cell classification of 12454-B as described in ASTM Standard D-1784 for “Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride) Compounds” amended to date.

Lengths and Joints: Pipe lengths shall generally be as long as possible but shall not exceed 16 feet. Each length of pipe shall have a bell-and-spigot or shall have furnished with it a separate jointing
sleeve or coupling with rubber rings compressed into place to make a watertight closure. Joints shall be sealed with a rubber ring gasket and shall be of a composition and texture which is resistant to common ingredient of sewage and groundwater, and which will endure permanently under the condition likely to be imposed by this use, and shall also conform to the applicable sections of ASTM Standards D-3034 and C-361 amended to date.

2. Ductile iron pipe (DIP)
Ductile iron pipe shall meet the requirements of the latest revisions of ANSI A21.51 (AWWA C151) and shall be of thickness Class 50 unless otherwise indicated. Joints shall be rubber gasket push-on type manufactured in accordance with the latest revision of ANSI A21.11 (AWWA C111). Pipe shall be supplied with the standard exterior bituminous coating of either coal tar or asphalt base approximately one mil thick.

3. Fittings
Wyes, tees, bends, adapters, transition couplings, and all other fittings required to complete the work shall be provided. The materials used shall conform to the requirements as set forth herein and any variation of such shall be subject to the approval of the engineer.

4. Water stops
Water stops shall be used on the outside of the pipe where the pipe is to be enclosed in any structure where the concrete or mortar is to be used to prevent leakage along the outer wall of the barrel of the pipe.

5. Manholes
Manholes shall be constructed of precast reinforced concrete bases, risers and tops conforming to the details shown on the Contract Drawings and shall conform to the requirements of ASTM C-478. Manhole joints shall conform to ASTM C-443. Ladder steps shall be steel reinforced copolymer polypropylene plastic model #PS2-PF-SL. Flexible sleeve for pipe connection shall be synthetic rubber, tensile strength, 1,054,500 kg/m² (1,500 psi), resistant to raw sewage, acids, ozone and weathering. The sleeve shall be cast into the manhole wall. Exterior surfaces of all manholes shall be painted with two (2) coats of an approved waterproofing compound. Concrete building brick for manholes shall be painted with two (2) coats of an approved waterproofing compound. Concrete building brick for manholes shall conform to the requirements of ASTM C55-11, Grade S II, as amended. Precast concrete grade rings may be used in place of or in tandem with, concrete brick if directed by the Engineer. Masonry concrete units for manholes shall conform to the requirements of ASTM 139-11, as amended.

6. Manhole Frame and Cover
The frame and cover shall be manufactured from tough, even grained cast iron free from scale and blisters and conforming to the requirements of ASTM A48 Class 30B. The cover shall conform to the Town of Vernon Standard Detail for Sanitary Sewer Manhole Cover included in the sanitary sewer details of the plans. The frame and cover shall be pattern number 1007 as manufactured by Campbell Foundry Company or approved equal. Bricks for adjustment of frames shall be whole bricks of good quality with a crushing strength of 5,000 psi. Mortar shall conform to the requirements of Conn DOT Form 816 Article M.11.04.
All components shall be manufactured of materials resistant to corrosion from atmosphere containing hydrogen sulfide.
7. Crushed stone
Crushed stone for pipe bedding and cover shall conform to the requirements of Form 816, Subarticle M.01.01 for No. 6 designation.

8. Utility identification tape
Utility identification tape shall be detectable 6-inches wide, designed to withstand extended underground exposure, colored green and be durably imprinted with an appropriate warning indicating the presence of the buried pipe.

9. Concrete
Concrete for pipe cradles and encasements, shall be Class “A” concrete and conform to the requirements of CONN DOT Form 816 Section M.03. Concrete shall poured around the sewer pipe when crossing utility or culverts, as shown on the plans or as directed by the Engineer.

10. Pipe Marking
Pipe shall be marked along the outside of the barrel in bold style type and shall indicate the Manufacturer’s name, pipe size, type, and ASTM or ANSI designation. Fittings shall be marked to indicate the Manufacturer’s name, nominal size, material designation and ASTM or ANSI designation.

11. Filter fabric wrap
Filter fabric wrap shall be Amoco 4553 or approved equal.

12. Reconstruct Sanitary Sewer House Lateral
All 6 inch diameter PVC pipe shall be used to construct, reconstruct or extend laterals as directed by the Engineer. The pipe shall be furnished in lengths no longer than 6.5 feet.

13. Trench backfill
The trench shall be backfilled with material as indicated on the plans. (Sand conforming to the requirements of CONN DOT Form 816 Section M.03.01-2 to 12” above the pipe. Above the sand layer granular fill conforming to CONN DOT Form 816 Section M.02.01 gradation “C”.)

14.00.03 – Construction Methods:
The Contractor shall at all times maintain sewage flows in the existing sewer system with bypass pumping in a manner approved by the Engineer to insure the health and safety of the public and protection of the environment. The Contractor shall submit to the Engineer for approval detailed plans of the flow maintenance operation and be responsible for damage from any sewage spills and sewage back-ups.

During the installation of sections of the sewer system, it is required that the Contractor maintain sewage flows in the system and from all abutting properties at all times. No sanitary service shall be interrupted by the Contractor except as absolutely necessary and then for only very short
periods of time of no more than thirty (30) minutes and then only when coordinated with the affected property owner.

1. Protection of Existing Structures
   (a) All existing pipes, poles, wires, fences, curbing, property-line markers, and other structures which, in the opinion of the Engineer, must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from injury by the Contractor, and in case of injury, the Contractor shall notify the appropriate party so that proper steps may be taken to repair any and all damage done. When the owners do not wish to make the repairs themselves, all damage shall be repaired by the Contractor, or, if not promptly done by him, the Engineer may have the repairs made at the expense of the Contractor.

   (b) All utility facilities including but not limited to services, mains, structures, and conduits, shall be supported by suitable means so that the services shall not fail when tamping and settling occurs. No separate item is provided for utility supports and the Contractor must cover same in the unit price bid for sewer construction.

2. Trench Excavation and backfill
   Trench excavation and backfill shall conform to all OSHA regulations and shall be performed in such a manner as to prevent damage to the pipe and other utilities. Backfill material shall be of the type indicated on the plans. The backfill material shall be placed in 12 inch lifts and compacted to 95% Maximum density based on ASTM D1557 Method C or as directed by the Engineer. Each layer of material shall be compacted by the use of vibratory compaction equipment or rollers. At such points as cannot be reached by mobile equipment, the materials shall be thoroughly compacted by the use of suitable power driven tampers.

3. Polyvinyl Chloride Pipe
   PVC sewer pipe shall be installed in accordance with Manufacturer’s recommendations. Particular care should be taken to keep from interfering with proper joint assembly. Mating surfaces of a joint shall be wiped clean. The surfaces shall then be coated with a lubricating material prescribed by the manufacturer to overcome the frictional resistance encountered with shoving the pipe home. Pipe that is not marked with a depth mark shall be marked before assembly to assure that the spigot end is inserted to the full depth of the joint. All lumps, blisters and excess coating shall be removed from the socket ends and plain ends of each pipe, and the outside of the plain ends and the inside of the bells shall be wiped clean and dry and be free from dirt, sand, grit or any foreign materials before the pipe is laid. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material. Push on joints shall be installed with gaskets facing in the proper direction and correctly seated. The manufacturer’s recommended lubricant shall be applied to the plain end of the pipe before joint assembly. Connection of pipe to existing manholes shall have a rubber water stop installed around the pipe prior to placing mortar in the void around the pipe. All connections to manholes must be watertight. Holes cut into the walls of existing manholes shall be done in such a manner to prevent structural damage.
The contractor shall remove any existing sanitary sewer pipe and appurtenances from the trench and properly dispose of it, if it is encountered at locations where the new sewer is called for.

No more than 25 feet of trench shall be fully excavated in advance of laying of the sewer, and the exposed end of all pipes shall be fully protected with a board or other approved stopper to prevent earth or other substances from entering the pipe.

Pipe foundation for each length of pipe shall be as noted on the plans and conform to bedding details. The top of the stone shall be brought carefully to the proper grade, well tamped or compacted, and shaped for the barrel of the pipe and the pipe laid thereon. When the pipe has been installed and approved by the Engineer, additional crushed stone shall be placed and compacted to provide cover over the pipe as shown on the plans. A sheet of filter fabric shall be laid completely over the stone. Where sewer installation is to occur below the groundwater table, then filter fabric shall be placed below, on the sides and above the crushed stone to completely enclose the stone. Suitable backfill, as approved by the engineer, shall be placed over the filter fabric wrap as shown on the plans. Each layer of material shall be compacted to 95% maximum density, based on ASTM D1557 Method C or as directed by the Engineer, and shall be done with the use of vibratory compaction equipment or rollers. At such points as cannot be reached by mobile mechanical equipment, the materials shall be thoroughly compacted by the use of suitable power driven tampers.

4. Manholes

Manholes shall be constructed in accordance with the details shown on the Contract Drawings. They shall be fitted with cast iron frames and covers and manhole steps. The bases shall be set so as to be uniformly supported by the prepared bedding. The precast sections shall be set so as to be vertical and in true alignment. The joints and gaskets of the precast sections of the manholes to be placed together shall be thoroughly cleaned prior to jointing and subsequent to placing the manhole sections together. They shall be checked for proper jointing. Rubber gaskets shall be installed in accordance with the manufacturer’s instruction pertaining to gasket location, lubrication and setting of sections. The manhole steps in each section shall be aligned to form a continuous ladder to the top of the manhole. Lift holes in the precast sections shall be plugged with a rubber stopper and then filled with approved non-shrink grout and made watertight. The grout shall be finished smooth and flush with adjoining surfaces.

Holes shall be preformed in the walls of the riser sections to accept the sewer pipe. Connections of pipe to manhole shall be made through factory installed, watertight, flexible sleeves cast into the manhole wall and secured to the pipe by a stainless steel strap clamp, draw bolt and nut. The formed brick inverts shall conform accurately to the size of the adjoining pipes. Side inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent to the centerlines of adjoining sewers. Prior to backfilling the manhole shall be vacuum tested.

The top of the wall of all manholes shall be leveled off with mortar and brick, if necessary, so as to form a flat surface upon which the manhole frame is to rest, and the manholes shall be carried to such height above the sewer as shown or as ordered. The frame shall be properly set in place in
a full bed of mortar and so adjusted as to make the top of the frame conform to the finished surfaces when located in streets or public highways. In other locations they shall be adjusted so as to conform to such elevations as indicated on the Contract Drawings.

Backfilling around manholes and special structures shall be made as specified elsewhere herein for pipe. No backfill shall be placed against masonry structures until, in the opinion of the Engineer, the concrete or mortar has had sufficient time to harden and cure. Backfill shall be placed evenly to the same height on all sides of the manhole or other structure in order to avoid unbalanced loading on the manhole or other structure.

Backfilling shall not be done in freezing weather except by permission of the Engineer, and it shall not be made with frozen material. Compaction of all backfill and fills shall be completed to the full satisfaction of the Engineer.

Sanitary sewer and culvert crossings shall be performed as shown on the plans. Provide Cofferdam, Pumping and Water Handling to perform sanitary sewer installation in a dry trench. Provide riprap, concrete encasement, support piers and other necessary work.

The interior of all sewers, manholes, and special structures shall be carefully freed from all dirt, rubbish, and superfluous mortar as the work proceeds, and shall be left clean upon the completion of the Contract, to the satisfaction of the Engineer. In no case shall the material to be removed be flushed down the completed sewer.

5. Resetting and Reconstructing Manholes
When brick or concrete units are used for structures, they shall be laid with joints completely filled with mortar. Horizontal joints shall not exceed $\frac{1}{2}$-inch, vertical joints $\frac{1}{4}$-inch, on the interior face. In building structures, lay all bricks or blocks as headers, breaking the joints between courses. Strike the interior joints smooth with the face of the wall. Plaster the exterior of sanitary manholes, constructed of brick or masonry units with 1:2 cement mortar, $\frac{3}{4}$-inch thick.

Manhole frames shall be set with the tops conforming accurately to the grade of the pavement or the finished ground surface, as indicated on the Drawings, or as directed. Frames shall be set concentric with the top of the masonry and in a full bed of mortar, so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around the bottom flange and have a slight slope to shed water away from the frame.

6. Abandon Manhole
Where plans show that a sanitary sewer manhole is to be abandoned, the structure shall be removed to a depth of 2 feet below the subgrade. The floor of the structure shall be broken and all pipes shall be plugged with concrete masonry. The trench shall be backfilled with granular fill conforming to CONN DOT From 816 Section M.02.01 gradation “C”. The backfill material shall be placed in 12 inch lifts and compacted to 95% Maximum density based on ASTM D1557 Method C or as directed by the Engineer. Each layer shall be compacted by the use of vibratory compaction equipment, rollers or power driven tampers as applicable.

6. Cut and Plug Abandon Sanitary Sewer
The abandoning of existing sanitary sewers, which are not removed during the construction, shall be filled with sand and plugged where "Abandon Sanitary Sewer" is indicated on the Contract Drawings or directed by the Engineer. Unless otherwise specified, pipes to be abandoned with an inside diameter of 10 inches or less will not require filling. Plugs shall be of brick and mortar or as approved by the Engineer. Plugs shall be constructed in the sewer main when laterals are being reconnected to new sewers. Laterals are to be reconnected to the new sanitary sewer starting at the upstream end of the project to insure that flow is maintained at all times. (a) Prior to abandoning any pipes or conduits under this Contract, it shall be the responsibility of the Contractor to ensure that no active connections remain to the pipes or conduits. Where the existing connections cannot be located during the excavation for the installation of the new work, the Contractor shall, by Closed Circuit Television or visual inspection, carefully record the exact location of all existing connections thereto and reconnect the same to the new work as required. Should, after said abandoning, live connections be discovered, the Contractor shall be responsible for all damages direct or consequent caused thereby and it shall be his responsibility to perform any and all remedial work to correct same at no additional cost to the Owner.

7. Pipe Inspection and Testing
Upon completion of installation and backfilling, all sewers shall be inspected and tested by Methods described hereinafter. The Engineer shall be notified in advance of testing and the Contractor shall provide all facilities, materials, equipment and labor required for testing. All pipe shall be inspected and tested and shall meet the minimum required limits as specified herein before the work is accepted.

8. Reconstruction or New Sanitary Sewer Lateral
Sewer laterals to be reconstructed, extended or new construction shall be laid in a dry trench on 6-inches of No. 6 stone bedding, at a minimum of 2% grade or as indicated on the plans. Stone bedding shall cover the pipe. Pipe shall be connected at joints with the use of an ‘O’ ring or push-on integral rubber gasket.

9. Visual Inspection
An inspection of the interior of the completed pipe by direct visual inspection shall be made for all pipe installed. Any lights, equipment or labor necessary for such inspection shall be provided by the Contractor. Any foreign material found in the interior of the pipe, any dirt, debris or other objects shall be removed by the Contractor. Visible defects such as improperly installed gaskets, projecting connections, cracks, visible leaks or other defects, shall be noted, corrected and the pipe reinspected.

10. Manhole Vacuum Testing
All lift holes, joints, and other imperfections shall be filled with an approved non-shrink grout and all pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manholes prior to testing.

Test Procedure:
1. The test head shall be placed at the top of the manhole in accordance with the manufacturer’s recommendation.

2. A vacuum of 10-inches mercury shall be drawn in the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9-inches mercury.

3. The manhole shall pass if the time for the vacuum reading to drop from 10 inches mercury to 9 inches mercury meets or exceeds the values indicated in the following table:

   Minimum Test Times for Various Manhole Diameters

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<th>Diameter (ft)</th>
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<th>6</th>
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<td>30</td>
<td>74</td>
<td>98</td>
<td>121</td>
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   Round actual depth of manhole to next depth up (ex. 11 foot deep manhole, use depth of 10 feet).

   If the manhole fails any test, necessary repairs shall be made by an approved method and the manhole shall be retested until a satisfactory test is obtained. Payment for failed manholes shall be limited to 50 % (percent) until a satisfactory test is obtained.

   11 Sewer Pipe Testing

   Sewer pipe joint testing shall be conducted by an independent testing agency employed by the Contractor and approved by the Engineer. The independent testing laboratory shall, after testing is complete and all leaking joints have been repaired, submit certified test reports and a certificate of compliance stating that the sanitary sewer and laterals meet all requirements of these specifications. The cost of testing, including the cost to hire an independent testing agency shall be included in the unit prices bid for sanitary sewer and laterals. No testing shall be conducted unless a representative of the Engineer is present.

   The Contractor shall remove all debris from manholes and shall thoroughly flush seers preparatory to testing for watertightness. All sewers, service connections and sewer laterals constructed under this Contract shall be tested by an independent testing agency employed by the Contractor and
approved by the Engineer under this Section and shall satisfactorily meet the test requirements prior to final acceptance of the work. No exceptions will be permitted from this rule unless stated in these Contract Documents or in written approval from the Engineer. The Contractor shall furnish all labor, testing materials and equipment (including plugs and standpipes), and shall perform either exfiltration or low pressure air tests under the supervision and to the entire satisfaction of the Engineer.

Testing of New Sewers

This method can be used to test large sections of new sanitary sewer pipe before service connections are made and before sewage flow is established. This test shall be conducted after all laterals and caps within each manhole run to be tested have been installed and backfilled but prior to any connection being made to existing services.

a) The low pressure air test shall be performed with AIR-LOC equipment manufactured by Cherne Industrial, Inc., Hopkins, Minnesota, New Britain Products, New Britain, PA., or equivalent and shall be conducted under the supervision of the Engineer.

(b) The Contractor may desire to make an air test prior to backfilling for his own purposes, but the “Line Acceptance” test shall be conducted after backfilling has been completed in accordance with other portions of this specification.

(c) All wyes, tees, or ends of lateral stubs, shall be suitably capped to withstand the internal test pressures. Caps shall be easily removable for future lateral connections or extensions.

d) After a manhole to manhole section of line has been backfilled and cleaned, it shall be plugged at each manhole with pneumatic plugs. The design of the pneumatic plugs shall be such that they will hold against the line test pressure without requiring external blocking or bracing. One of the plugs shall have three hose connections. Air for inflation of the triple connection pneumatic plug shall be supplied through a factory-equipped control panel. There shall be three hose connections from the control panel to the pneumatic plug. One hose shall be used for inflation of the plug. The second hose shall be used for continuously reading the air pressure in the sealed line. The third hose shall be used for introducing low pressure air into the sealed line.

e) There shall be a 3½” or larger diameter, 0-30 psi gauge mounted on the control panel for reading the internal pressure in the line being tested. Calibrations from the 0-10 psig range shall be in tenths of pounds and the 0-10 psig portion shall cover 90% of the complete dial range.

(f) Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any ground water that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period, the third hose shall be quickly disconnected from the control panel.

(g) The portion of line being tested shall be accepted if the portion under test does not lose air at a rate greater than 0.003 cfm per square foot of internal pipe surface when tested at an average
pressure of 3.0 psig greater than any back pressure exerted by ground water that may be over the pipe at the time of the test.

(h) The above requirement shall be accomplished by performing the test as follows:

The time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

<table>
<thead>
<tr>
<th>Pipe Diameter in Inches</th>
<th>Minutes</th>
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<tr>
<td>4</td>
<td>2.0</td>
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<tr>
<td>6</td>
<td>3.0</td>
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<td>21</td>
<td>10.0</td>
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<tr>
<td>24</td>
<td>11.5</td>
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</tbody>
</table>

(i) In areas where ground water is known to exist, the Contractor shall install a one-half inch diameter capped pipe nipple, approximately 10" long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the line acceptance test, the ground water level shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the pipe nipple. The hose shall be held vertically and a measurement of the height, in feet, of water shall be taken after the water stops rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. For example, if the height of water is 11½ feet, then the added pressure will be 5 psig. This changes the 3.4 psig to 8.5 psig, and the 2.5 psig to 7.5 psig. The one pound allowable drop and the timing remains the same.

(j) If leakage exceeds the specified amount, the Contractor shall make the necessary repairs or replacements required to permanently reduce the leakage to within the specified limit and the test shall be repeated until the leakage requirement is met.

Testing of Active Sewers

(a) Application: This technique for sewer pipe joint testing is used to test the integrity of individual pipe joints after backfilling and before or after existing sewage flows are reestablished. This test shall be utilized when sanitary sewer installation includes connections to existing live sewers and/or service laterals.

(b) Test Medium: A fluid (maximum viscosity of 2 centipoise) shall be used as the test medium. Both liquid (usually water) and air are acceptable, but the test procedure is different for each.
(c) Equipment: The basic equipment used shall consist of a television camera, joint testing device (such as a packer) and test monitoring equipment. The equipment shall be constructed in such a way as to provide means for introducing the test medium, under pressure, into the VOID area created by the expanded ends of the joint-testing device and means for continuously measuring the actual static pressure of the test medium at and within the VOID area only.

(d) VOID pressure data shall be transmitted electrically from the VOID to the monitoring equipment. Example: via a TV picture of a pressure gage located at the VOID, or via an electrical pressure transducer located at the VOID.

(e) All test monitoring shall be above ground and in a location to allow for simultaneous and continuous observation of the television monitor and test monitoring equipment by the Engineer.

(f) Test Procedure: Each sewer pipe joint which is not visibly leaking shall be individually tested at a test pressure equal to ½ psi per vertical foot of pipe depth (not exceeding a test pressure of 10 psi) in accordance with one of the following procedures:

1) Air Test Procedure:

a) The testing device shall be positioned within the line in such a manner as to straddle the pipe joint to be tested.

b) The testing device ends (end elements, sleeves) shall be expanded so as to isolate the joint from the remainder of the line and create a VOID area between the testing device and the pipe joint. The ends of the testing device shall be expanded against the pipe with sufficient pressure to contain a minimum of 10 psi within the VOID without leakage past the expanded ends.

c) Air shall then be introduced into the VOID area until a pressure equal to or greater than the required test pressure is observed with the VOID pressure monitoring equipment. If the required test pressure cannot be developed (due to joint leakage), the joint will have failed the test and shall be sealed as specified elsewhere.

d) After the VOID pressure is observed to be equal to or greater than the required test pressure, the air flow shall be stopped. If the VOID pressure decays by more than 2 psi within 15 seconds (due to joint leakage), the joint will have failed the test and shall be repaired as directed by the Engineer.

2) Control Tests: Prior to starting the pipe joint testing phase of the work, a two-part control test shall be performed as follows:

a) To insure the accuracy, integrity and performance capabilities of the testing equipment, a demonstration test will be performed in a test cylinder constructed in such a manner that a minimum of two known leak sizes can be simulated (see diagram). This technique will establish the test equipment performance capability in relationship to the test criteria and insure that there is
no leakage of the test medium from the system or other equipment defects that could affect the joint testing results. If this test cannot be performed successfully, the Contractor shall be instructed to repair or otherwise modify his equipment and re-perform the test until the results are satisfactory to the Engineer. This test may be required at any other time during the joint testing work if the Engineer suspects the testing equipment is not functioning properly.

b) After entering each manhole section with the test equipment, but prior to the commencement of joint testing, the test equipment shall be positioned on a section of sound sewer pipe between pipe joints and a test performed as specified. This procedure will demonstrate the reality of the test requirement, as no joint will test in excess of the pipe capability. Should it be found that the barrel of the sewer pipe will not meet the joint test requirements, the requirements will be modified as necessary.

3) Test Records: During the joint testing work, records shall be kept which include:

a) Identification of the manhole section tested;

b) The test pressure used;

c) Location (footage) of each joint tested;

d) A statement indicating the test results (passed or failed) for each joint tested.

e) A copy of the video record shall be submitted to the Owner.

**Final Acceptance**
Acceptance of the new sewer line shall be made upon the successful completion of the television inspection. Prior to TV inspection the contractor shall clean the entire portion of the newly constructed sanitary sewer. If TV inspection shows that cleaning to be unsatisfactory, the Contractor shall be required to re-clean and re-inspect the sewer line until the cleaning is shown to be satisfactory. In areas where television inspection is not performed, the Owner's Representative will require the Contractor to pull a double squeegee (with each squeegee the same diameter as the sewer) through each manhole section as evidence of adequate cleaning.

**Television Inspection**
(a) After cleaning, the pipe sections shall be visually inspected by means of closed-circuit television. The inspection will be done one manhole section at a time and the flow in the section being inspected will be suitably controlled as specified (see SEWER FLOW CONTROL).

(b) The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing picture quality to the satisfaction of the Engineer; and if unsatisfactory, the equipment shall be removed and replaced with acceptable equipment.
(c) The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case will the television camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire manhole section, the Contractor shall set up his equipment so that the inspection can be performed from the opposite manhole. If, again, the camera fails to pass through the entire manhole section the inspection shall be considered complete and no additional work will be required.

(d) When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being inspected to insure good communications between members of the crew.

(e) The importance of accurate distance measurements is emphasized. Measurement for location of defects shall be above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device, and the accuracy shall be satisfactory to the Engineer.

(f) Documentation of the television results shall be as follows:

1) Television Inspection Logs: Printed location records shall be kept by the Contractor and will clearly show the location in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, other points of significance such as locations of building sewers, unusual conditions, roots, storm sewer connections, broken pipe, presence of scale and corrosion, and other discernable features will be recorded and a copy of such records will be supplied to the Owner.

2) Photographs: Instant developing, 35 mm, or other standard-size photographs of the television picture of problems shall be taken by the Contractor upon request of the Engineer, as long as such photographing does not interfere with the Contractor's operations.

3) Videotape Recordings: The purpose of tape recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. Videotape recording playback shall be at the same speed that it was recorded.

Sewer Flow Control

(a) When sewer line depth of flow at the upstream manhole of the manhole section being worked is above the maximum allowable for television inspection, the flow shall be reduced to the level shown below by operation of pump stations, plugging or blocking of the flow, or by pumping and bypassing of the flow as specified.
(b) Depth of flow shall not exceed that shown below for the respective pipe sizes as measured in the manhole when performing television inspection, except that the Engineer may require that all flow be stopped in certain cases.

1) Maximum Depth of Flow ........................................... Television Inspection

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Maximum Depth of Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; - 10&quot; Pipe</td>
<td>20% of pipe diameter</td>
</tr>
<tr>
<td>12&quot; - 24&quot; Pipe</td>
<td>25% of pipe diameter</td>
</tr>
<tr>
<td>27&quot; &amp; up Pipe</td>
<td>30% of pipe diameter</td>
</tr>
</tbody>
</table>

(c) Plugging or Blocking: A sewer line plug shall be inserted into the line upstream of the section being worked. The plug shall be so designed that all or any portion of the sewage can be released. During TV inspection, flow shall be reduced to within the limits specified above. After the work has been completed, flow shall be restored to normal.

(d) Pumping and Bypassing: When pumping and bypassing is required the Contractor shall supply the pumps, conduits, and other equipment to divert the flow of sewage around the manhole section in which work is to be performed. The bypass system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during a rainstorm. The Contractor will be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum.

(e) Flow Control Precautions: When flow in a sewer line is plugged, blocked, or bypassed; sufficient precautions must be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precautions must be taken to insure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

14.00.04 – Method of Measurement:

Trench Excavation

Trench Excavation will be measured for payment as shown on the plans. The trench width shall be measured as the inside diameter of the pipe plus 12 inches on both sides of the pipe. Before starting any excavation, the Contractor shall notify the Engineer so that elevations and measurements of the work may be obtained. Backfill, bedding material, additional bedding material required because of rock in trench, utility identification tape, trench compaction and concrete cradles will not be measured for payment.

Sewer Pipe and Reconstructed Sewer House Laterals:

Sewer pipe, new sewer house laterals and reconstructed / extended sewer house laterals shall be measured for payment as the number of linear feet of pipe, measured along the horizontal projection of the pipe axis from inside of manhole to inside of manhole, of the respective sizes and types as indicated in the Proposal, completed and accepted. In measuring the lengths to be paid for, the spaces occupied by pipes with wye or tee branches and the spaces occupied by manholes shall be included. Wye and Tee branches for sewers, gaskets, transition couplings, joining materials, furnishing and installing gravel backfill material, crushed stone bedding material, filter
fabric wrap, utility identification tape and suitable backfill material, altering existing manholes, including coring, rebuilding of existing brick inverts, handling of sewage flows and pipe inspection and pressure testing will not be measured for payment.

**Manholes**
Precast reinforced concrete manholes will be measured for payment as the number of each type, as indicated in the Proposal, completed and accepted. Measurement for manhole depth will be made from the top of the frame to the lowest invert.

**Reset and Reconstruct Manholes**
When the adjustment can be made by adding or removing brick courses or grade rings to bring the frame and cover to the required finished grade, the work will be measured for payment as a Reset Manhole. When the adjustment requires the removal and replacement of existing cones and/or risers, where necessary, to allow the frame and cover to meet the finished grade, the work will be measured for payment as Reconstruct Manhole at the contract unit price per vertical foot of height measured to the nearest tenth of a foot of reconstructed manhole. When resetting or reconstructing manholes, there will be no measurement for excavation, cutting, removal and replacement of pavement, pervious material and backfill.

**Abandon Manhole**
Manhole removal in areas not in the path of the new sewer construction will be measured as the number of each unit removed. Manhole removal in the path of the new sewer shall not be measured for payment.

**Cut and Plug Abandoned Sanitary Sewer**
Cut and Plug Abandoned Sanitary Sewer will be measured for payment as the number of cut and plugs constructed.

**Concrete Encasement**
Concrete Encasement not indicated on the plans but "As Directed by the Engineer "shall be measured for payment at the number of cubic yards actually placed.

Other miscellaneous items such as maintenance and traffic control, removal of pavement and surface restoration that may occur during sanitary sewer construction are also part of the roadway and bridge construction and will be measured under their respective pay items as specified elsewhere.

**14.00.05 – Basis of Payment:**

**Trench Excavation and Rock Excavation**
This work will be paid for at the contract unit price per cubic yard for each class as specified in the Proposal complete in place, which prices shall include cutting and removal of bituminous and concrete pavement; trench excavation; sheeting; shoring and bracing; dewatering; erosion and sediment control; all materials, tools, equipment and labor necessary to complete the excavation in conformance with the plans or as ordered. They shall also include disposal of surplus material. No
additional payment will be made for shoring, bracing, sheeting, pumping, dewatering, and bailing or for material or equipment necessary for satisfactory completion of the work. Unsuitable material below normal grade shall be removed as ordered and replaced with no. 6 stone conforming to CONN DOT form 816 section M.01.01 (#6 stone). Payment will be made for the number of cubic yards of "No. 6 Crushed Stone" complete in place. Excavation of unsuitable material below normal grade will be paid as “Trench Excavation”.

Sewer Pipe and Construction, Reconstructed or Extension of Sewer Lateral:

Sewer Pipe and construction, reconstructed or extension of sewer laterals will be paid for at the contract unit price per linear foot of the respective types and pipe sizes indicated in the Proposal. The price shall include all labor, tools, materials, equipment and supplies required and necessary to perform all work including Wye and Tee branches for sewers, gaskets, transition couplings, joining materials, concrete encasements, crushed stone bedding material, filter fabric wrap, utility identification tape, removing and disposing of existing sewer pipe and appurtenances, connecting sewer pipe to existing sewer pipes and manholes, altering existing manholes, including coring, rebuilding of existing brick inverts, installing concrete class “A” pipe supports at crossings, handling sewage flows, dewatering of trenches and pits; bedding, jointing and cover of pipe; furnishing and installing main line sewer pipe and sewer lateral pipe, connecting new pipe, removal and disposal of existing pipe and fittings as specified on the plans; concrete for cradles; testing the sewer pipe or laterals for leakage, post construction television inspection of sewers, restoration of grassed areas, monuments, damaged surfaces and property; handling surface and flood flows; providing for the public safety; location and protection of existing structures and facilities; removal of surplus excavated materials; cleaning up; and all else necessary for furnishing and placing the pipe and fittings, complete in place, all in accordance with the provisions of the Contract Documents.

Sanitary sewer and culvert crossings as well as handling of sanitary sewer flows will be paid for under the respective sewer pipe item. The price shall include all labor, materials, equipment, tools, riprap, concrete, cofferdam and pumping, water handling necessary to maintain sanitary sewage flow through the work area during construction.

Manholes

Precast reinforced concrete manholes will be paid for at the contract unit price for each type specified in the Proposal complete in place, which price shall include all labor, tools, materials, equipment and supplies incidental thereto.

Reset Manholes

Reset manholes will be paid for at the contract unit price for “Reset Manhole” complete in place, which price shall include all labor, tools, materials, equipment and supplies incidental thereto.

Reconstruct Manholes

Reconstructed manholes will be paid for at the contract unit price per vertical foot of height of “Reconstructed Manhole” measured to the nearest tenth of a foot complete in place, which price shall include all labor, tools, materials, equipment and supplies incidental thereto.
Abandon Manhole
Each manhole to be abandoned in areas not in the path of the new sewer construction, will be paid for under the “Abandon Manhole” Item. This price will include all labor, tools, materials, equipment and supplies necessary for the removal of each Manhole structure to 2 feet below the subgrade. The work shall also include breaking the floor of the structure and plugging the pipes in the structure with concrete masonry. This price shall also include furnishing and placing backfill material, disposing of materials removed, and all other incidental work required to completely abandon manholes. Manhole removal in the path of the new sewer shall be paid for under the respective sewer pipe item.

Cut and Plug Abandoned Sanitary Sewer
Cut and Plug Abandoned Sanitary Sewer will be paid at the contract unit price for “Cut and Plug Abandoned Sanitary Sewer” complete in place, which price shall include all labor, tools, materials, equipment and supplies incidental thereto.

Concrete for Encasement and Cradle
Concrete Encasement or Cradle not indicated on the plans but ”As Directed by the Engineer“ will be paid for at the contract unit price per cubic yard under the item “Concrete for Encasement and Cradle”.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Trench Excavation 0 – 10 ft Deep (Sanitary Sewer)</td>
<td>CY</td>
</tr>
<tr>
<td>Trench Excavation 0 – 15 ft Deep (Sanitary Sewer)</td>
<td>CY</td>
</tr>
<tr>
<td>Rock-in-trench Excavation 0-10 ft Deep (Sanitary Sewer)</td>
<td>CY</td>
</tr>
<tr>
<td>Rock-in-trench Excavation 0-15 ft Deep (Sanitary Sewer)</td>
<td>CY</td>
</tr>
<tr>
<td>8 inch PVC Pipe (Sanitary Sewer)</td>
<td>LF</td>
</tr>
<tr>
<td>Manhole (Sanitary Sewer)</td>
<td>EA</td>
</tr>
<tr>
<td>Reset Manhole (Sanitary Sewer)</td>
<td>EA</td>
</tr>
<tr>
<td>Reconstruct Manhole (Sanitary Sewer)</td>
<td>VF</td>
</tr>
<tr>
<td>Reconstruct Sanitary Sewer House Laterals</td>
<td>LF</td>
</tr>
<tr>
<td>Concrete for Encasement and Cradle (Sanitary Sewer)</td>
<td>CY</td>
</tr>
</tbody>
</table>
ITEM #1504010A- TEMPORARY SUPPORT OF UTILITIES

Description: This work shall consist of providing temporary supports for underground utilities as required to adequately and safely support these during the work. The Contractor shall be responsible for providing facilities for the temporary support of the following utilities during construction:

- Existing 12”, 16” and 8” diameter water mains in South Street, Alpert Road and Janet Lane owned by the Connecticut Water Company.
- Existing 6” and 8” diameter gas mains in West Street and South Street owned by Eversource (formerly Yankee Gas).
- Existing 8” diameter sanitary sewer main in South Street and Alpert Road owned by the Town of Vernon Water Pollution Control Authority.
- Existing conduit duct bank crossing South Street west of Vernon Avenue owned by Frontier Communications (formerly AT&T).

The type of temporary supports shall be as accepted by the affected utility company and as approved by the Engineer. The temporary supports shall be removed upon completion of the work or upon completion of the need for temporary support of the underground utility. The Contractor shall coordinate his work under this item with the respective utility company throughout the period during installation, maintenance, and removal of the temporary supports.

Materials: Materials for the temporary supports shall be of a type adequate to provide the required strength and stability for maintaining the underground utility in a fixed position within the work area. Materials for temporary utility supports shall be submitted for approval by the Engineer.

Construction Methods: The underground utility shall be temporarily supported after it has been exposed by the utility company. Supports shall be adequately designed for the spans, loads and site conditions under which they will be used. Temporary supports shall be anchored as to not interfere with other construction operations and in a manner to insure the safety of all personnel and equipment in the work area.

The Contractor shall submit to the Engineer plans showing the proposed method of construction, maintenance and removal of the temporary supports prior to the start of related construction. The furnishing of such plans shall not relieve the Contractor of any part of his responsibility for the safety of the work, for the successful completion of the work, or other responsibilities indicated in the contract documents.

Upon completion of the work or at such time as the Engineer and/or utility company determines that the temporary supports are no longer needed, the supports shall be removed. Any damage to adjacent pavement or other property occurring as a result of the placement, maintenance or removal of the temporary supports shall be repaired by the Contractor at his own expense to the satisfaction of the Engineer.

Method of Measurement: This work will not be measured for payment but shall be paid on a lump sum basis.
**Basis of Payment:** Payment for this work will be at the contract lump sum for "Temporary Support of Utilities" and shall include all materials, equipment, tools, and labor incidental to the completion of this item.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Temporary Support of Utilities</td>
<td>L. S.</td>
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