TECHNICAL SPECIFICATIONS
1. **GENERAL**
   
   A. Borings are to be completed using hollow stem auger, unless otherwise approved by the ENGINEER.
   
   B. Hollow stem augers shall have a minimum 2 1/4-inch inside diameter (ID). A center rod, plug, and pilot bit will be in place, unless otherwise directed, while advancing the hole by auger rotation. The plug shall not extend to a depth greater than the sampling interval. The center rod, plug, and pilot bit shall be removed and the samples obtained by driving the split spoon into the undisturbed material below the bottom of the auger.
   
   C. The contractor shall provide sufficient equipment to drill test borings to a depth of at least 40 ft.
   
   D. Provide jars for storage of disturbed split-spoon samples. Sample will be provided to the Town or its representative.

2. **ADVANCING THE BORING**
   
   A. Test borings will be advanced with hollow-stem augers or flush joint casing using drive and wash methods to 40 feet below the existing ground surface, or refusal, whichever is shallower.
   
   B. Split-spoon samples using Standard Penetration Test (SPT) procedures will be obtained continuously in the borings through any existing fill or organic soils to a maximum depth of 12 feet, and at 5 foot maximum intervals thereafter. Groundwater levels will be noted at the boring locations during drilling.
   
   C. Test borings will be backfilled with cuttings or grout if there is an insufficient amount of cuttings to fill the hole. An asphalt “cold patch”, 4” in depth after compaction, will be used at borings completed in paved areas and the area will be swept clean. No other surface repair is included. Any cuttings unable to be returned to the hole will be spread near the boring location in a vegetated upland area.

4. **Permits/Coordination**
   
   A. Scheduling of the field work will be coordinated through the Town. A permit to conduct work in the Town right of way is required, the Town will waive the permit fee.
   
   B. It is anticipated that the work temporarily obstruct at least one lane of traffic. The Contractor shall maintain and protect traffic in accordance with The Maintenance and Protection of Traffic section of these specifications.
   
   C. If police officers are required for traffic control, the Town of Trumbull will hired the officers directly.
   
   D. Work in Nichols Avenue (Route 108) and White Plains Road (Route 127) may require an encroachment permit from the Connecticut DOT. The Contractor is responsible
for securing this permit. The Town of Trumbull will reimburse the contractor the permit fee.

E. The Engineer will be onsite to observe and document the borings.

5. Method of Measurement

A. Drill Rig Setups (truck mounted) will be measured for payment by the actual number of setups as per the plans or as directed by the Engineer. The hole will be backfilled and patched and will not be measured separately.

B. Auger Hole (truck mounted) will be measured for payment by the actual vertical feet of boring advanced as per the plans or as directed by the Engineer.

C. Drill Rig Setups (ATV mounted) will be measured for payment by the actual number of setups as per the plans or as directed by the Engineer. The hole will be backfilled and patched and will not be measured separately.

D. Auger Hole (ATV mounted) will be measured for payment by the actual vertical feet of boring advanced as per the plans or as directed by the Engineer.

6. Basis of Payment

A. This work will be paid for at the contract unit price completed complete in place, which price shall include, and all materials, equipment, tools and labor incidental thereto and as follows:

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Auger Hole Setups, (truck mounted rig), Including road patching</td>
<td>Each</td>
</tr>
<tr>
<td>200</td>
<td>Auger Holes, Including Soil Samples</td>
<td>VF</td>
</tr>
<tr>
<td>300</td>
<td>Auger Hole Setups, (ATV mounted rig)</td>
<td>Each</td>
</tr>
<tr>
<td>400</td>
<td>Auger Holes, (ATV mounted rig, Including Soil Samples)</td>
<td>VF</td>
</tr>
</tbody>
</table>
ITEM 0971001A MAINTENANCE AND PROTECTION OF TRAFFIC

There will be no method of measurement or basis of payment for this item. The cost of this item is to be included in the cost of other items. Maintenance and Protection of Traffic” and all materials, equipment, tools and labor incidental thereto shall be included in the general cost of all other pay items.

Article 9.71.01 – DESCRIPTION, is supplemented by the following:

The Contractor shall maintain and protect traffic in the project area. The Contractor shall submit a plan showing proposed Maintenance and Protection of Traffic measures for approval by the Town of Trumbull and the Engineer prior to the start of construction activities.

ALL ROADWAYS

The Contractor shall maintain and protect one lane of through traffic in each direction, each lane on a paved travelpath not less than 11 feet in width.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor will be allowed to maintain and protect at least an alternating one-way traffic operation on a paved travelpath not less than 12 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet.

COMMERCIAL AND RESIDENTIAL DRIVEWAYS

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the project limits. The Contractor will be allowed to close said driveways to perform the required work during those periods when the businesses are closed unless permission is granted from the business owner to close the driveway during business hours. If a temporary closure of a residential 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:

SIGNING

The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary and install temporary sign supports and foundations if necessary and as directed by the Engineer. The temporary relocation of signs and supports, and the furnishing, installation and removal of any temporary supports and foundations, shall be paid for under the item ”Maintenance and Protection of Traffic.” Temporary overhead sign supports and foundations shall be paid for under the appropriate item(s).
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.

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.

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 may 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 I – MINIMUM TAPER LENGTHS**

<table>
<thead>
<tr>
<th>POSTED SPEED LIMIT MILES PER HOUR</th>
<th>MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE</th>
</tr>
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<tbody>
<tr>
<td>30 OR LESS</td>
<td>180</td>
</tr>
<tr>
<td>35</td>
<td>250</td>
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<tr>
<td>40</td>
<td>320</td>
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<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 Trumbull DPW.

SECTION 2. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

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

2.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.

2.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.

2.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, State Police may use traffic slowing techniques, including 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 two TMAs and sign crew should continue to install/remove the pattern as described in Section 4c and traffic shall be allowed to resume their normal travel.

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

2.f) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travelpath 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.
2.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.

2.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 3. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

3.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.).

3.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.

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

3.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.

3.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.

3.f) If the required number of Flashing Arrows is not available, the traffic control pattern shall not be installed.
**SECTION 4. USE OF TRAFFIC DRUMS AND TRAFFIC CONES**

4.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.

4.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 72-hour duration.

4.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.

4.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 5. GENERAL**

5.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.

5.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.

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

5.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 6. WORK ZONE SAFETY MEETING AGENDA**

1) Review Project scope of work and time.
2) Review requirements of the Trumbull Police Department traffic control.
4) Review Contractor’s schedule and method of operations.
5) Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
6) Open discussion of work zone questions and issues.
8) Discussion of review and approval process for changes in contract requirements as they relate to work zone areas.
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 WHEN THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

THE “ROAD WORK AHEAD, FINES DOUBLED” REGULATORY SIGNS 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 B, C, 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. A CHANGEABLE MESSAGE SIGN MAY BE UTILIZED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.

5. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 72 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.

6. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA WILL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS REOPENED TO ALL LANES OF TRAFFIC.

7. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED AND TEMPORARY PAVEMENT MARKINGS THAT DEPICT THE PROPER TRAVEL PATHS SHALL BE INSTALLED.

8. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 200’ ON LOW SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).

9. FOR LANE CLOSURES ONE (1) MILE OR LONGER, A “REDUCE SPEED TO 45 MPH” SIGN SHALL BE PLACED AT THE ONE MILE POINT AND AT EACH MILE THEREAFTER.

10. 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.

11. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
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 6E.04 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. 80-9950) shown on the typical detail sheet 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.

SEE NOTES 1, 2, 5, 7, 8 & 10
Article 9.71.05 – BASIS OF PAYMENT, is supplemented by the following:

There will be no direct payment for “Maintenance and Protection of Traffic”. The price for “Maintenance and Protection of Traffic” and all materials, equipment, tools and labor incidental thereto shall be included in the general cost of all other pay items.