TOWN OF GLASTONBURY

INVITATION TO BID

BID #	ITEM	DATE & TIME REQUIRED
GL-2017-04	Hebron Avenue Roundabout at New London Turnpike	August 2, 2016 at 11:00 A.M.

The Town of Glastonbury will receive Sealed Bids, in duplicate, for improvements to the intersection of Hebron Avenue and New London Turnpike, including construction of a roundabout and other related improvements, Town Project No. PW-1503 (Bid #GL-2017-04). Bids will be received only at the Office of the Purchasing Agent, Town Hall (second level), 2155 Main Street, Glastonbury, CT 06033, Attention: Mary F. Visone, Purchasing Agent, until August 2, 2016 at 11:00 A.M. (local time), at which time they will be publicly opened and read aloud. No late bids will be accepted.

The Town reserves the right to waive informalities or reject any or all bids when said action is deemed to be in the best interests of the Town.

Bid Forms, Plans, and Specifications may be obtained at no cost from the Town's website at www.glastonbury-ct.gov or they may be purchased at The Print House LLC, 22 Krieger Lane, Unit 6, Glastonbury, CT 06033, tel. (860) 652-0803.

Prevailing Wages: The contractor must comply with Section 31-53 of the Connecticut General Statutes as amended, including annual adjustments in prevailing wages.

State of CT DAS Contractor Pre-Qualification is required. Sealed bids must be accompanied with the correct State of CT DAS "Update (Bid) Statement" as applies.

This contract is subject to State set-aside and contract compliance requirements.

The Town of Glastonbury is an Affirmative Action/Equal Opportunity Employer. Minority / Women / Disadvantaged Business Enterprises are encouraged to bid.

Mary F. Visone
Purchasing Agent

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1. Sealed bids **(one original and one copy)** on the attached Bid Forms will be received at the Office of the Purchasing Agent, Town Hall, 2155 Main Street, Glastonbury, Connecticut 06033 (second level). At the designated time of opening, they will be publicly opened, read, recorded and placed on file.

2. Whenever it is deemed to be in the best interest of the Town, the Town Manager, Purchasing Agent or designated representative shall waive informalities in any and all bids. The right is reserved to reject any bid when such action is deemed to be in the best interest of the Town of Glastonbury.

3. The award will be on the basis of bid total cost unless otherwise specified. The bid total cost shall be arrived at by the mathematical calculation of the unit price multiplied times the number of units specified for each line item, and the total sum of all line items in the bid. In the event that the Town finds computational errors in a respondent's bid proposal, the bid total cost shall be recalculated by the Town based on the unit prices contained in the bid proposal.

4. Bids will be carefully evaluated as to conformance with stated specifications.

5. The envelope enclosing your bid should be clearly marked by bid number, time of bid opening, and date.

6. If a bid involves any exception from stated specifications, they must be clearly noted as exceptions, underlined, and attached to the bid.

7. The Bid Documents contain the provisions required for the requested item. Information obtained from an officer, agent, or employee of the Town or any other person shall not affect the risks or obligations assumed by the Bidder or relieve him/her from fulfilling any of the conditions of the bid.

8. Each Bidder is held responsible for the examination and/or to have acquainted themselves with any conditions at the job site which would affect their work before submitting a bid. Failure to meet this criteria shall not relieve the Bidder of the responsibility of completing the bid without extra cost to the Town of Glastonbury.

9. Any bid may be withdrawn prior to the above-scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No Bidder may withdraw a bid within sixty (60) days after the actual date of the opening thereof. Should there be reasons why a bid cannot be awarded within the specified period, the time may be extended by mutual agreement between the Town and the Bidder.

10. Each bid must be accompanied by a bid bond payable to the Town for ten percent (10%) of the total amount of the bid. The bid bond of the successful Bidder will be retained until the payment bond and performance bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a bid bond. The Town of Glastonbury will not be liable for the accrual of any interest on any certified check submitted. Cashier's checks will not be accepted.

11. A 100% Performance and Payment bond are required of the successful bidder. This bond shall cover all aspects of the specification and shall be delivered to the Purchasing Agent prior to the issuance of a purchase order. The Performance and Payment Bond will be returned upon the delivery and acceptance of the bid items.

12. The Bidder agrees and warrants that in the submission of this sealed Bid, they will not discriminate or permit discrimination against any person or group of persons on the grounds of

race, color, religion, national origin, sex, or physical disability including, but not limited to blindness, unless it is shown by such Bidder that such disability prevents performance of that which must be done to successfully fulfill the terms of this sealed Bid or in any manner which is prohibited by the laws of the United States or the State of Connecticut: and further agrees to provide the Human Relations Commission with such information requested by the Commission concerning the employment practices and procedures of the Bidder. An Affirmative Action Statement will be required by the successful Bidder.

13. Bidder agrees to comply with all of the latest Federal and State Safety Standards and Regulations and certifies that all work required in this bid will conform to and comply with said standards and regulations. Bidder further agrees to indemnify and hold harmless the Town for all damages assessed against the Town as a result of Bidder's failure to comply with said standards and/or regulations.

14. All correspondence regarding any purchase made by the Town of Glastonbury shall reference the Town's purchase order number. Each shipping container shall clearly indicate both Town purchase order number and item number.

15. Bidder is required to review the Town of Glastonbury Code of Ethics adopted July 8, 2003 and effective August 1, 2003 and revised October 29, 2013 and effective November 28, 2013. Bidder shall acknowledge that they have reviewed the document in the area provided on the bid/proposal response page (BP). The selected Bidder will also be required to complete and sign an Acknowledgement Form prior to award. The Code of Ethics and the Consultant Acknowledgement Form can be accessed at the Town of Glastonbury website at **www.glastonbury-ct.gov**. Upon entering the website scroll down to click on **Bids & Proposals Icon** which will bring you to the links for the **Code of Ethics** and the **Acknowledgement Form**. If the Bidder does not have access to the internet, a copy of these documents can be obtained through the Purchasing Department at the address listed within this bid/proposal.

16. **Non-Resident Contractors:** (if applicable)
Upon award the Town is required to report names of nonresident (out of state) Contractors to the State of Connecticut, Department of Revenue Services (DRS) to ensure that Employment Taxes and other applicable taxes are being paid by Contractors. **A single surety bond for 5% of the entire contract price is required to be filed with DRS by any unverified nonresident prime or general contractor (if awarded) where the contract price for the project is $250,000 or more.** The contractor will be required to promptly furnish to the Town a copy of the **Form AU-968 - Certificate of Compliance** issued by the State of Connecticut, DRS. See State of Connecticut **Notice SN 2012 (2).**

17. Bidder shall include on a sheet(s) attached to its proposal a complete disclosure of all past and pending mediation, arbitration and litigation cases that the bidder or its principals (regardless of their place of employment) have been involved in for the most recent five years. Please include a statement of the issues in dispute and their resolution. Acceptability of Bidder based upon this disclosure shall lie solely with the Town.

18. Bidder or its principals, regardless of their place of employment, shall not have been convicted of, nor entered any plea of guilty, or nolo contendere, or otherwise have been found civilly liable or criminally responsible for any criminal offense or civil action. Bidder shall not be in violation of any State or local ethics standards or other offenses arising out of the submission of bids or proposals, or performance of work on public works projects or contracts.

19. It is the responsibility of the bidder to check the Town's website before submitting bid for addendums posted prior to bid opening.

20. **State Prevailing Wage Rates:**

Respondents shall comply with State Statutes concerning Employment and Labor Practices, if applicable, and Section 31-53 of the Connecticut General Statutes, as amended (Prevailing Wages). Wage Rate Determination for this project from the State of Connecticut is included in the Bid Documents. Certified payrolls for site labor shall be submitted weekly to the Town's Representative or his designee on the correct State of Connecticut form (see RFP). The Town reserves the right to, without prior notice, audit payroll checks given to workers on site in order to ascertain that wages and fringe benefits are being paid as required by the State of Connecticut. Please make special note of the State requirement to adjust wage and fringe benefit rates on each July 1st following the original published rates.

NOTE that respondent is to include in its proposal all costs required by such annual increases in the PREVAILING RATES. NO escalation clauses are to be included in the respondent's proposal and NO escalation clauses will be in the Contract Agreement. Respondent is to anticipate any future increases and include these costs in the proposal response.

Contractor's invoices will not be paid if certified payrolls are incomplete, incorrect or not received in a timely manner.

All Apprentices must be registered with the State of Connecticut and their number shall not exceed the number allowed by law. Otherwise, all workers must be paid at least the Journeyman rate listed including benefits.

21. OSHA SAFETY AND HEALTH CERTIFICATION

Effective July 1, 2009: Any Mechanic, Laborer, or Worker, who performs work in a classification listed on the prevailing wage rate schedule on any public works project covered under C.G.S. Section 31-53, both on site and on or in the public building, must have completed a federal OSHA Safety and Health course within the last 5 years.

22. Each bid shall also include a description of three (3) similar intersection reconstruction projects completed by the bidder with references to demonstrate successful experience with road construction projects of similar complexity. Similar projects should include the extensive installation of granite curbing, streetscape/hardscape, construction of islands, complex temporary traffic control and experience with maintaining and protecting vehicle and pedestrian traffic during construction. The contractor shall make himself aware of the special considerations involved with constructing a circular roadway on an intersection. If the contractor has not yet constructed a roundabout, it is strongly suggested the contractor contact and consult with a contractor who has experience in constructing roundabouts to appreciate the level of work involved with setting the curbing for approaches and central island. The contractor should consider retaining a construction foreman with roundabout construction experience and at least have reviewed other roundabout construction plans for completed roundabouts and consulted with a contractor who has constructed a roundabout.

23. Commission on Human Rights and Opportunities (CHRO) Requirements:
The contractor who is selected to perform this State project must comply with CONN. GEN. STAT. §§ 4a-60, 4a-60a, 4a-60g, and 46a-68b through 46a-68f, inclusive, as amended by June 2015 Special Session Public Act 15-5.

State law requires a minimum of twenty-five (25%) percent of the state-funded portion of the contract for award to subcontractors holding current certification from the Connecticut Department of Administrative Services ("DAS") under the provisions of CONN. GEN. STAT. § 4a-60g. (25% of the work with DAS certified Small and Minority owned businesses and 25% of that work with DAS

certified Minority, Women and/or Disabled owned businesses.) The contractor must demonstrate good faith effort to meet the 25% set-aside goals.

For municipal public works contracts and quasi-public agency projects, the contractor must file a written or electronic non-discrimination certification with the Commission on Human Rights and Opportunities. Forms can be found at:
http://www.ct.gov/opm/cwp/view.asp?a=2982&q=390928&opmNav_GID=1806

As stated above, the work for this project falls under the provisions of CONN. GEN. STAT. Sections 46a-68c and 46a-68d which require that prior to the award of this contract, you must have your company affirmative action plan approved by CHRO. A copy of your plan must be submitted to the CHRO within 30 days of your receipt of award. Should you have any questions regarding the preparation of your plan, please contact the Contract Compliance Unit at the Commission on Human Rights and Opportunities at (860) 541-4709.

Affirmative action plans can be sent to:
Commission on Human Rights and Opportunities
25 Sigourney Street Hartford, CT 06106
Attn: Contract Compliance Unit

24. State of CT DAS Contractor Pre-Qualification is required for any bid in which the total exceeds $500,000. The Contractor shall hold a current "DAS Contractor Prequalification Certificate" (not a predetermination letter) from the Department of Administrative Services of the State of Connecticut according to C.G.S§ 4a-100, C.G.S.§4b-101 and C.G.S.§4b-91. **Bidders shall submit with their bids a current "Update (Bid) Statement". Any bid submitted without a copy of the DAS Update (Bid) Statement will be invalid**. If you have any questions regarding these requirements contact the State of CT DAS at telephone number 860-713-5280 or visit their web site at www.das.state.ct.us

IMPORTANT: Failure to comply with general rules may result in disqualification of the Bidder.

NOTE: Any technical questions regarding this bid shall be made in writing (email acceptable) and directed to Daniel A. Pennington P.E., Town Engineer/Manager of Physical Services, 2155 Main Street, PO Box 6523, Glastonbury, CT 06033; daniel.pennington@glastonbury-ct.gov. Telephone (860) 652-7744 between the hours of 8:00 a.m. – 4:30 p.m. For administrative questions concerning this bid/proposal, please contact Mary F. Visone, Purchasing Agent, at (860) 652-7588 or email the Purchasing Department at purchasing@glastonbury-ct.gov. All questions, answers, and/or addenda, as applicable, will be posted on the Town's website at www.glastonbury-ct.gov (Upon entering the website scroll down to click on Bids & Proposals Icon, then scroll down page to see the active bid table. You must click the Bid Title to view all bid details and document links). The request must be received at least five (5) business days prior to the advertised response deadline**. It is the respondent's responsibility to check the website for addenda prior to submission of any bid/proposal.**

01.00 WORKMANSHIP, MATERIALS AND EMPLOYEES

01.01 Wherever in this contract the word "Engineer" is used, it shall be understood as referring to the Town Engineer/Manager of Physical Services of the Town of Glastonbury acting personally or through any assistants duly authorized.

01.02 The entire work described herein shall be completed in accordance with the plans and specifications to the full intent and meaning of the same. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and material shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

01.03 The wording "furnish", "install", "construct", "furnish and install", or any similar terms, unless specifically noted to the contrary, shall include all labor, materials, water, tools, equipment, light, power, transportation, and any other services required for the completion of the work.

01.04 The Contractor shall at all times enforce strict discipline and good order among his employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned to him.

02.00 SUPERINTENDENT

02.01 The Contractor shall keep on the work during its progress, in the absence of the Contractor, a competent Superintendent. The Superintendent shall be acceptable to the Engineer and shall fully represent the Contractor. All directions given to the Superintendent shall be binding as if given to the Contractor.

03.00 PRECONSTRUCTION MEETING

03.01 A Preconstruction Meeting will be held with the Engineer, Contractor, and any private utility company prior to commencing any work. The Engineer shall arrange the meeting based on a mutually convenient time.

04.00 PERMITS

04.01 Other than local permits, all permits, licenses, and fees required for the performance of the Contract work shall be secured and paid for by the Contractor.

05.00 PROPERTY ACCESS

05.01 The Contractor shall take all proper precautions to protect from injury or unnecessary interference, and provide proper means of access to abutting property where the existing access is cut off by the Contractor.

05.02 The Contractor shall take all proper precautions to protect persons from injury or unnecessary inconvenience and leave an unobstructed way along the public and private places for travelers, vehicles, and access to hydrants.

05.03 The Contractor shall make arrangements with the adjacent property owners for such trespass as he may reasonably anticipate in the performance of the work. All such arrangements shall be reported, in writing, to the Engineer.

06.00 PROTECTION OF THE PUBLIC AND OF WORK AND PROPERTY

06.01 The Contractor shall continuously maintain adequate protection of all work from damage, and shall take all reasonable precautions to protect the Town from injury or loss arising in connection with the Contract.

06.02 The Contractor shall adequately protect adjacent private and public property as provided by law and the Contract Documents.

06.03 The Contractor shall make good any damage, injury, or loss of his work and to the property of the Town resulting from lack of reasonable protective precautions.

07.00 EXISTING IMPROVEMENTS

07.01 The Contractor shall conduct his work so as to minimize damage to existing improvements. Except where specifically stated otherwise in the specifications, drawings, or as directed by the Engineer, it will be the responsibility of the Contractor to restore to their original condition, as near as practical, all improvements on public or private property. This shall include:

a. Property within and adjacent to the side of installation such as shrubs, walks, driveways, fences, etc.

b. Utility mains, ducts, poles, and services. The Contractor is hereby notified that utilities, if/where shown on the plans, are at approximate locations. These locations are subject to possible errors in the source of information and errors in transcription. The Contractor shall make certain of the exact location of all mains, ducts, poles, and services prior to excavation.

08.00 SEPARATE CONTRACTS

08.01 The Engineer reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs. Wherever work being done by the Town of Glastonbury forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer to secure the completion of the various portions of the work.

09.00 INSPECTION OF WORK

09.01 The Town shall provide sufficient personnel for the inspection of the work.

09.02 The Engineer shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

09.03 If the specifications or the Engineer's instructions require any work to be specially tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection and, if the inspection is by another authority other than the Engineer, of the date fixed for such inspection. Inspections by the Engineer shall be made promptly. If any work should be covered up without approval or consent of the Engineer, it must, if required by the Engineer, be uncovered for examination and properly restored at the Contractor's expense.

09.04 Reinspection of any work may be ordered by the Engineer. If such work is found to be in accordance with the Contract Documents, the Town shall pay the cost of reinspection and replacement. If such work is not in accordance with the Contract Documents, the Contractor shall pay such cost.

10.00 RIGHT TO INCREASE OR DECREASE WORK

10.01 The Town shall have the right to increase or decrease the amount of work herein specified as may be required.

11.00 RIGHT OF ENGINEER TO STOP WORK FOR WEATHER CONDITIONS

11.01 Should the work, in the opinion of the Engineer, be in danger by reason of inclemency of weather, or could not be finished in time to prevent such danger, the Contractor shall cease operations upon order of the Engineer, and shall not resume them until ordered to do so by the Engineer when the weather conditions are favorable. The Contractor shall, upon such orders, discontinue work, remove all materials or appliances for or in use upon the work, and place the streets in proper condition for use by the public during the time the work is suspended as herein provided, without cost to the Town.

12.00 CONTRACTOR TO BE RESPONSIBLE FOR IMPERFECT WORK OR MATERIALS

12.01 Any faithful work or imperfect material that may be discovered before the acceptance and the payment of the work shall be corrected upon the order of the Engineer. The acceptance and payment of the work does not in any manner relieve the Contractor of his obligation to construct work in the proper manner and the use of materials herein specified.

13.00 TOWN MAY NOTIFY CONTRACTOR IF WORK IS NOT CARRIED ON SATISFACTORILY

13.01 If, in the opinion of the Engineer, the Contractor is not proceeding with the work at a sufficient rate of progress so as to finish in the time specified, or has abandoned said work, or is not complying with the terms and stipulations or the Contract and specifications, the Engineer may serve notice on the Contractor to adopt such methods as will ensure the completion of the work in the time specified.

13.02 If, within five days after the Engineer has notified the Contractor that his work is not being carried on satisfactorily as before mentioned, the Engineer shall have the right to annul the Contract and manage the work under the direction of the Engineer, or re-let, for the very best interest of the Town as a new contract, the work under said new Contract shall be considered the responsibility of the defaulting Contractor.

13.03 Additional costs incurred over and above the original Contract shall be borne by the Performance Bond.

14.00 DEDUCTIONS FOR UNCORRECTED WORK

14.01 If the Engineer deems it inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefor.

14.02 The Contractor shall promptly remove from the premises all materials condemned by the Engineer as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Town, and shall bear the expense of making good all work by other contractors destroyed or damaged by such removal or replacement.

14.03 If the Contractor does not remove such condemned work and materials as promptly as possible after written notice, the Engineer may remove them and store the materials at the expense of the Contractor.

15.00 CLEANING UP

15.01 The Contractor must remove all debris of every description as the work progresses and leave the surroundings in a neat and orderly condition to the satisfaction of the Engineer.

15.02 Upon completion, and before acceptance and final payment, the Contractor shall remove from the site all equipment, forms, surplus material, rubbish and miscellaneous debris and leave the site in a neat and presentable condition.

16.00 ROYALTIES AND PATENTS

16.01 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Town of Glastonbury harmless from loss on account thereof, except that the Town of Glastonbury shall be responsible for all such loss when a particular manufacturer, product, or process is specified by the Town of Glastonbury.

01.00 NOTICE TO CONTRACTOR

01.01 Intent of Contract: The intent of the Contract is to prescribe a complete work or improvement that the Contractor undertakes to do, in full compliance with the specifications, plans, special provisions, proposal, and Contract. The Contractor shall perform all work in close conformity with the lines, grades, typical cross-sections, dimensions, and other data shown on the plans or as modified by written orders, including the furnishing of all materials, implements, machinery, equipment, tools, supplies, transportation, labor, and all other things necessary to the satisfactory prosecution and completion of the project.

01.02 The Contractor is hereby alerted to the fact that the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 816 (Form 816) and supplements thereto dated July 2014 are the governing specifications and are to be considered part of the Contract Documents. The Form 816 shall not be provided by the Town and any cost associated therewith shall be the responsibility of the Contractor. In case of any discrepancy between the Contract Drawings or Specifications and the Form 816, the matter shall immediately be submitted to the Engineer. The Engineer shall have sole authority in resolving any discrepancies.

01.03 Much time and effort has gone into this project in an effort to minimize impact on trees and adjacent properties. Extreme care shall be taken by the Contractor to honor commitments made by the Town. Prior to doing any work, the Contractor should meet with the Engineer to become familiar with the conditions encountered and commitments made.

01.04 Traffic Cones and Drums: Traffic Drums and 42-inch Traffic Cones shall have four six-inch wide stripes (two - white and two - orange) of flexible bright fluorescent sheeting. The material for the stripes shall be one of the following, or approved equal:

- 3M Scotchlite Diamond Grade Flexible Work Zone Sheeting, Model 3910 for the white stripes and Model 3914 for the orange stripes,
- Avery Dennison WR-7100 Series Reboundable Prismatic Sheeting, Model WR-7100 for the white stripes and Model WR-7114 for the orange stripes.

01.05 NCHRP 350 Requirements For Work Zone Traffic Control Devices:
CATEGORY 1 DEVICES (traffic cones, traffic drums, tubular markers, flexible delineator posts): Prior to using the Category 1 Devices on the project, the Contractor shall submit to the Engineer a copy of the manufacturer's self-certification that the devices conform to NCHRP Report 350.

CATEGORY 2 DEVICES (construction barricades, construction signs and portable sign supports): Prior to using Category 2 Devices on the project, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices (both sign and portable support tested together) conform to NCHRP Report 350 (TL-3).

NOTE: The portable wooden sign supports that have been traditionally used by most contractors in the State of Connecticut do NOT meet NCHRP Report 350 criteria and shall not be utilized on any project advertised after October 01, 2000.

Information regarding NCHRP Report 350 devices may be found at the following web sites:

FHWA: http://safety.fhwa.dot.gov/roadway_dept/road_hardware/index.htm

ATSSA: http://www.atssa.com/resources/NCHRP350Crashtesting.asp

01.06 Limitations on work hours are described in Special Conditions Section 17.02. The Contractor shall understand and strictly comply with these limitations.

02.00 COMMUNICATIONS

02.01 All notices, demands, requests, instructions, approvals, proposals, and claims must be in writing.

02.02 Any notice to, or demand upon, the Contractor shall be sufficiently given if delivered at the office of the Contractor stated on the signature page of the Agreement (or at such other office as the Contractor may, from time to time, designate) in a sealed, postage-prepaid envelope or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.

02.03 All papers required to be delivered to the Town shall, unless otherwise specified in writing to the Contractor, be delivered to the Town Engineer/Manager of Physical Services, 2155 Main Street, Glastonbury, CT 06033, and any notice to, or demand upon, the Town shall be delivered at the above address in a sealed, postage-prepaid envelope or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office or to such other representatives of the Town, or to such other address as the Town may subsequently specify in writing to the Contractor for such purpose.

02.04 Any such notice shall be deemed to have been given as of the time of actual delivery or, in case of mailing, when the same should have been received in due course of post or, in the case of telegrams, at the time of actual receipt, as the case may be.

03.00 PARTIAL USE OF IMPROVEMENTS

03.01 The Town may, at its election, give notice to the Contractor and place in use those sections of the work that have been completed, inspected and can be accepted as complying with the Contractor Documents and if, in its opinion, each such section is reasonably safe and fit for the use and accommodation for which it was intended, provided:

a. The use of such sections of the work shall not materially impede the completion of the remainder of the work by the Contractor.

b. The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.

c. The use of such sections shall in no way relieve the Contractor of his liability due to having used defective materials or to poor workmanship.

d. The period of guarantee shall not begin until the date of the final acceptance of all work required under this Contract.

04.00 INSURANCE

04.01 The Bidder shall, at its own expense and cost, obtain and keep in force during the entire duration of the Project or Work the following insurance coverage covering the Bidder and all of its agents, employees and sub-contractors and other providers of services and shall name the **Town of Glastonbury and its employees and agents as an Additional Insured** on a primary and non-contributory basis to the Bidders Commercial General Liability and Automobile Liability policies. **These requirements shall be clearly stated in the remarks section on the Bidders Certificate of Insurance.** Insurance shall be written with insurance carriers approved in the State of Connecticut and with a minimum Best's Rating of A-VIII. In addition, all carriers are subject to approval by the Town. Minimum Limits and requirements are stated below:

a. Worker's Compensation Insurance:

- Statutory Coverage
- Employer's Liability
- $500,000 each accident/$500,000 disease-policy limit/$500,000 disease each employee
- A Waiver of Subrogation shall be provided in favor of the Town of Glastonbury and its employees and agents.

b. Commercial General Liability:

- Including Premises and Operations, Products and Completed Operations, Personal and Advertising Injury, Contractual Liability and Independent Contractors
- Limits of Liability for Bodily Injury and Property Damage
  Each Occurrence: $1,000,000
  Aggregate: $2,000,000
  (The Aggregate Limit shall apply separately to each job.)
- A Waiver of Subrogation shall be provided in favor of the Town of Glastonbury and its employees and agents.

c. Automobile Insurance:

- Including all owned, hired, borrowed, and non-owned vehicle
- Limit of Liability for Bodily Injury and Property Damage
  Per Accident: $1,000,000
- A Waiver of Subrogation shall be provided in favor of the Town of Glastonbury and its employees and agents.

d. Umbrella of Excess Liability:

- State in the Remarks Section that coverage is follow form.
- Limit of Liability Each Occurrence $2,000,000
  Aggregate $2,000,000

e. Owner's and Contractor's Protective Liability Insurance:

With respect to the Contractor's Project operations and also those of its subcontractors, the Contractor shall carry, for and on behalf of the Town of Glastonbury, insurance which shall provide coverage of at least $1,000,000 for each accident or occurrence resulting in damages from (1) bodily injury to or death of persons and/or (2) injury to or destruction of property. Subject to that limit per accident or occurrence, the policy shall provide an aggregate coverage of at least $2,000,000 for all pertinent damages arising during the policy period

04.02 The Bidder shall direct its Insurer to provide a Certificate of Insurance to the Town before any work is performed. The Contractor shall be responsible to notify the Town **60 days** in advance with written notice of cancellation or non-renewal. The Certificate shall evidence all required coverage. The Bidder shall provide the Town copies of any such insurance policies upon request.

04.03 INDEMNIFICATION: To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Town and the State of Connecticut and its consultants, agents, and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, attorneys and other professionals and court and arbitration costs) to the extent arising out of or resulting from the performance of the Contractor's work, provided that such claim, damage, loss or expense is caused in whole or in part by any negligent act or omission by the Contractor, or breach of its obligations herein or by any person or organization directly or indirectly employed or engaged by the Contractor to perform or furnish either of the services, or anyone for whose acts the Contractor may be liable.

05.00 WORK BY OTHERS

05.01 Private utilities, contractors, developers or other parties may be expected to be working within the Contract area during this Contract. It shall be the responsibility of the Contractor to coordinate his work with the work being done by others in order that the construction shall proceed in an efficient and logical manner. The Contractor shall have no claim or claims whatever against the Town, the Engineer, or other parties due to delays or other reasons caused by the work by others or his failure to coordinate such work.

06.00 CONTRACTOR'S WORK AND STORAGE AREA

06.01 The Contractor shall contact the Town to determine if any specific locations will be designated, or gain its approval prior to using any area for storage of equipment, materials and trailers during the period of this Contract. The Contractor shall confine his work/storage area to the limits as designated or approved and shall be responsible for the security of the work/storage area. Upon completion of the Contract, the Contractor shall remove all equipment and materials, except as otherwise specified, and restore the site to its original condition as approved by the Engineer and at no cost to the Town.

07.00 DISPOSAL AREA

07.01 The Tryon Street Bulky Waste Facility will be available to the Contractor, at no charge, for disposal of materials that are accepted at that facility. Waste disposal guidelines for the Bulky Waste facility are published on the Town web site at the address shown below. Each bidder shall have reviewed and understand these guidelines prior to submitting a bid for the project.

http://www.glastonbury-ct.gov/Modules/ShowDocument.aspx?documentid=699

Acceptable materials generally include such materials as brush, stumps, demolition materials, and excess excavated earth materials. Unacceptable materials generally include such items as carpet, appliances, upholstered furniture; hazardous wastes such as pesticides, oil based paints and thinners; or other wastes as designated by the State Department of Environmental Protection. Demolition material cannot contain asbestos or other hazardous materials.

The Contractor shall obtain a disposal area for all other unsuitable or surplus materials at no cost to the Town.

08.00 DUST CONTROL

08.01 During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities so as to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use water or calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed, without additional compensation.

09.00 MAINTENANCE / GUARANTEE PERIOD

09.01 The Contractor shall be held responsible to the Town for maintenance for a minimum of one-year following completion of all work under this Contract with respect to defects, settlements, etc.

10.00 PROTECTION OF EXISTING UTILITIES

10.01 Prior to opening an excavation, effort shall be made to determine whether underground installations, (i.e., sewer, water, fuel, electric lines, etc.) will be encountered and, if so, where such underground installations are located. Before starting any excavation, the Contractor shall submit to the Engineer plans or details showing the proposed method the Contractor will use to support and protect all existing utilities during construction. The furnishing of such plans and details shall not serve to relieve the Contractor of any responsibility for the proper conduct of the work.

10.02 When the excavation approaches the estimated location of such an installation, the exact location shall be determined by careful probing or hand digging, and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.

10.03 There will be no additional payment for any work related to supporting and protecting all existing utilities during construction.

11.00 TIME FOR COMPLETION/NOTICE TO PROCEED

11.01 **It the Town's intent that substantial completion of the work included in this contract be achieved on or before November 30, 2016.** As such, the Town will schedule a pre-construction meeting immediately upon award of this contract and will issue a Notice to Proceed at this meeting. Contractors who submit a bid for this project shall be prepared to respond to this expedited schedule, and include all costs related to this schedule in their bid.

For the purposes of this contract substantial completion shall mean the completion of all roadway and utility improvements up to and including the finish course paving, curbing, installation of all concrete sidewalk and crosswalks, installation of other hardscapes, and final pavement marking and signing as required to allow for safe operation of the completed roundabout in the permanent proposed condition as depicted by the plans.

It is understood that landscaping work, including turf establishment and plant materials may not be able to be completed in the fall planting season of 2016. As such, this planting work shall be completed by May 31, 2017.

Within five (5) business days after the date of the Notice of Award, the Contractor must provide the appropriate bond and insurance certificates to the Town Purchasing Agent and must be issued a Notice to Proceed / Purchase Order for the Project prior to initiating any work.

12.00 LIQUIDATED DAMAGES

12.01 As actual damages for any delay in completion of the work that the Contractor is required to perform under this Contract are impossible to determine, the Contractor and the Sureties shall be liable for and shall pay to the Town the sum of $1,000.00 as fixed, agreed and liquidated damages for each calendar day of delay from the above-stipulated substantial completion date of November 30, 2016, or other completion dates as modified in writing by both parties, until such work is satisfactorily completed and accepted.

Such liquidated damages shall also apply to the completion date for final planting of May 31, 2017.

13.00 SCHEDULE OF DRAWINGS

13.01 The Contractor is hereby alerted that the plan set entitled "Hebron Avenue Roundabouts, New London Turnpike Intersection", including forty (40) sheets prepared by CDM Smith is to be considered part of these specifications.

14.00 CHANGES IN THE WORK

14.01 The Town reserves the right to perform portions of the work in connection with these plans and specifications. The reduction in the work to be performed by the Contractor shall be made without invalidating the Contract. Whenever work is done by the Town contiguous to other work covered by this Contract, the Contractor shall provide reasonable opportunity for the execution of the work and shall properly coordinate his work with that of the Town.

15.00 LAYOUT OF WORK

15.01 The Contractor is responsible to provide stake-out of the work in accordance with the plans and specification under the item for "Construction Staking". The Contractor shall protect all stakes from damage or destruction and shall be responsible to assure that the grade stakes have not been altered prior to actual construction.

16.00 REMOVAL AND STORAGE OF MATERIALS AND STRUCTURES FOUND ON THE WORK

16.01 All salvable materials, including traffic signal equipment, topsoil, gravel, fill materials, etc. and structures, including drainage pipes, catch basins and manhole frames and covers, guide railing, etc. that are not to remain in place or that are not designated for use in the work, shall be carefully removed by the Contractor and delivered to the Town Highway Garage located at 2380 New London Turnpike. All salvable materials removed and stored shall remain the property of the Town. The Engineer shall determine the materials or structures to be salvaged.

17.00 PROSECUTION AND PROGRESS

17.01 ADVANCE NOTICE: The Contractor shall give the Engineer a seven-day advance written notice of construction activities that will alter traffic patterns that result in lane shifts, detours, temporary closures of lane(s), permanent closure of lane(s), or lane reductions. This advance notification will allow the Town to publish news releases and/or provide public radio announcements to inform the public of revised traffic patterns or possible traffic delays. Failure of the Contractor to provide such timely notice shall be considered a breach of Contract and will subject the Contractor to stop work orders until such time as the seven-day notice has been satisfied.

17.02 ALLOWABLE HOURS OF OPERATION (WORK PERIOD):

Allowable hours of operation for milling and final wearing surface paving are limited to Sunday through Thursday, 7:00 PM to 6:00 AM.

Any work that requires alternating one-way traffic on Hebron Avenue or New London Turnpike shall be performed Monday through Friday during the hours of 6:00 AM and 11:00 AM, unless requested a minimum of 48 hours in advance and approved by the Town Engineer.

Normal work hours for all other construction shall be 6:00 AM to 6:00 PM, Monday through Friday. Work on weekends or holidays may be permitted by the Town with a minimum of 48 hours notice for the Town to schedule inspection staff.

17.03 CONSTRUCTION PHASING: Roadway construction shall be completed in the following phases (stages) as described on the Temporary Traffic Control Plans and described in the Maintenance and Protection of Traffic (MPT) Special Provisions. The temporary traffic control plans depict eight stages of construction of the roundabout, including four general stages as follows:

Stages 1A/1B – During Stage 1A, perform permanent widening at intersection corners and temporary widening in other areas outside of existing pavement to a level to match existing roadway pavement using shoulder closure traffic pattern, maintain all turn lanes for the intersection traffic signal operation until the end of this phase. After completion of

all pavement installation, remove existing intersection pavement markings, install temporary pavement markings and signing for temporary roundabout operation. Begin temporary roundabout operation during Stage 1B maintaining traffic flow in the circulatory roadway on a paved surface not less than 12 feet wide. Remove existing traffic signal equipment.

Stages 2A-2D – Construct each intersection approach leg in turn with appropriate road closure and detour plan in effect as described by MPT Plans. Complete all improvements within the work area of the approach indicated before proceeding to the next leg of the intersection, including utilities, drainage, splitter islands, and full depth pavement construction up to the binder course. Adjust traffic flow to utilize the future center island / truck apron for bypass of the work area when constructing the adjacent portion of the permanent circulatory roadway. Maintain traffic to business driveways within closure areas at all times.

Detouring of traffic during each of the Stage 2 phases of work are provided on the Temporary Traffic Contol Plans, TC-5 and Special Provisions.

Stage 3 – Construct the roundabout center island while maintaining traffic flow in the circulatory roadway. Adjust circulatory roadway width / location with traffic barrels as needed to define necessary work area.

Stage 4 – Construct final wearing surface during night time operation. Install temporary pavement markings and permanent signing. Install permanent epoxy pavement markings 21 days after wearing surface is installed.

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

The Contractor shall temporarily provide a 4H:1V traversable slope of suitable material in those areas where a longitudinal dropdown exists. The cost of furnishing, installing and removing this material shall be included in the contract lump sum for “Maintenance and Protection of Traffic.”

Temporary paved transitions shall be installed at locations of transverse drop-downs and temporary driveway ramps shall be installed as described in the Maintenance and Protection of Traffic Special Provision within the work area before the end of each allowable work period. The cost of furnishing, installing and removing this material shall be included in the contract lump sum for “Maintenance and Protection of Traffic.”

The Contractor shall ensure that suitable temporary access is provided to all residential and commercial driveways at all times as described in the Special Provision for Maintenance and Protection of Traffic.

18.00 EXTRA WORK AND RETAINAGE

18.01 Extra and cost plus work shall be governed by Article 1.04.05 and Article 1.09.04 of the Form 816.

18.02 Article 1.09.06 of the Form 816 is hereby modified such that the retainage shall be withheld in an amount equal to five (5) percent.

19.00 SUBMITTALS AND MATERIALS TESTING

19.01 The Contractor shall provide source and supply information, sieve analysis, and material samples for gravel subbase, process stone base, and other granular materials to the Town for review and approval. The Town shall retain a lab for testing of these materials as required and shall perform in place compaction testing at no expense to the Contractor.

19.02 Shop drawings / catalog cuts shall be provided by the Contractor for all pre-cast concrete structures, pipes and fittings, erosion control products, seed mixes, and other items to be supplied for review and approval by the Engineer as described in the specifications and the Form 816.

19.03 Pre-cast concrete materials shall be delivered to the job site during normal work hours and PC-1 forms shall be immediately provided to the Engineer for review. Any pre-cast concrete delivered without a PC-1 Form shall be immediately rejected.

19.04 Mix designs for all bituminous and portland cement concrete materials shall be provided by the Contractor to the Engineer for review and approval.

19.05 Certified Materials Test Reports and Materials Certificates shall be provided for all products and materials to be provided under this contract as described in these specifications and the Form 816.

TOWN OF GLASTONBURY * 2155 MAIN STREET * GLASTONURY * CT

BID / PROPOSAL NO: **GL-2017-04** **DATE DUE:** **08-02-16**

DATE ADVERTISED: **07-13-16** **TIME DUE:** **11:00 AM**

NAME OF PROJECT: **Hebron Avenue Roundabout At New London Turnpike**

In compliance with this Invitation to Bid, the Bidder hereby proposes to provide goods and/or services as per this solicitation in strict accordance with the Bid Documents, within the time set forth therein, and at the prices submitted with their bid response.

It is the responsibility of the Bidder to clearly mark the outside of the bid envelope with the Bid Number, Date and Time of Bid Opening, and it also **THE RESPONSIBILITY OF THE BIDDER TO CHECK THE TOWN'S WEBSITE BEFORE SUBMITTING BID FOR ADDENDA POSTED PRIOR TO BID OPENING.**

THE BIDDER ACKNOWLEDGES RECEIPT OF THE FOLLOWING ADDENDA AS REQUIRED:

Addendum #1 _____(Initial/Date) Addendum #2 _____ (Initial/Date) Addendum #3 _____(Initial/Date)

OTHER ITEMS REQUIRED WITH SUBMISSION OF BID PROPOSAL:

The following bid checklist describes items required for inclusion with the above-referenced bid proposal package. It is provided for the convenience of the bidders and, therefore, should not be assumed to be a complete list.

_____ 1. Included Bid Bond as per Section 10 of the Information for Bidders.

_____ 2. Included Disclosure of Past and Pending Mediation, Arbitration, and Litigation cases against the Bidder or its Principals as per Section 17 of the Information for Bidders.

_____ 3. Included Qualifications Statement as per Section 22 of the Information for Bidders.

_____ 4. Checked Town web site for Addenda and acknowledged Addenda on page BP-1.

_____ 5. Acknowledged Code of Ethics on page BP-7.

_____ 6. Included CHRO **Bidder Contract Compliance Monitoring Report**.

_____ 7. State of Connecticut DAS Contractor **Update Statement** (required with bid) as per Section 24.

_____ 8. State of Connecticut DAS Contractor **Prequalification Certificate** (required upon award)

_____ 9. Clearly marked envelope with Bid Number, Date, Time of opening, Bidder's Company Name and address.

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
1	0000151	A	CLEARING AND GRUBBING	L.S.	1		
2	0202000	A	EARTH EXCAVATION	C.Y.	2220		
3	0202100	A	ROCK EXCAVATION AND REMOVAL	C.Y.	15		
4	0202451	A	TEST PIT EXCAVATION	C.Y.	5		
5	0202513	A	REMOVAL OF CONCRETE SIDEWALK	S.Y.	637		
6	0202529		CUT BITUMINOUS CONCRETE PAVEMENT	L.F.	212		
7	0207000		BORROW	C.Y.	100		
8	0209001		FORMATION OF SUBGRADE	S.Y.	3968		
9	0212000	A	SUBBASE	C.Y.	921		
10	0212094	A	PROCESSED TRAPROCK SUBBASE	C.Y.	36		
11	0212300	A	PROCESSED STONE BASE	C.Y.	99		
12	0213100	A	STRUCTURAL FILL	C.Y.	364		
13	0219001	A	SEDIMENT CONTROL SACK	EA.	14		
14	0303050	A	BRICK PAVERS ON 8" CONCRETE BASE SLAB	S.F.	3652		
15	0303051	A	GRANITE PAVERS ON 8" CONCRETE BASE SLAB	S.F.	255		
16	0303052	A	GRANITE PAVERS ON STRUCTURAL FILL	S.F.	3272		
17	0303060	A	8" REINFORCED CONCRETE BASE SLAB FOR PAVERS	S.F.	3907		
18	0406002		TEMPORARY PAVEMENT	S.Y.	1045		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
19	0406010-1	A	BITUMINOUS CONCRETE CLASS 1	TON	606		
20	0406010-4	A	BITUMINOUS CONCRETE CLASS 4	TON	1212		
21	0406236		MATERIAL FOR TACK COAT	GAL	703		
22	0406285		FINE MILLING OF HMA (0" TO 4")	S.Y.	796		
23	0507001	A	TYPE "C" CATCH BASIN	EA.	8		
24	0507495	A	MODIFY EXISTING CATCH BASIN	EA.	1		
25	0507006	A	REPLACE CATCH BASIN TOP	EA.	4		
26	0507656		STANDARD STORM MANHOLE	EA.	3		
27	0507781	A	RESET MANHOLE TOP	EA.	10		
28	0507821	A	CONVERT CATCH BASIN TO TYPE "C-L" CATCH BASIN	EA.	1		
29	0507831	A	CONVERT CATCH BASIN TO MANHOLE	EA.	3		
30	0601651	A	RETAINING WALL (SITE NO. 1)	L.S.	1		
31	0651012	A	15" R.C. PIPE	L.F.	172		
32	0813021	A	5" GRANITE STONE CURBING	L.F.	100		
33	0813031	A	5" GRANITE CURVED STONE CURBING	L.F.	200		
34	0813042	A	5" X 20" GRANITE STONE CURBING	L.F.	893		
35	0813052	A	5" X 20" GRANITE CURVED STONE CURBING	L.F.	1792		
36	081305X	A	5" X 20" GRANITE CURBING - MOUNTABLE	L.F.	374		
37	0921001	A	CONCRETE SIDEWALKS	S.F.	5733		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
38	0921005	A	CONCRETE SIDEWALK RAMP	EA.	8		
39	0922001	A	BITUMINOUS CONCRETE SIDEWALK	S.Y.	333		
40	0922501	A	BITUMINOUS CONCRETE DRIVEWAY	S.Y.	169		
41	0944000	A	GRADING AND TOPSOILING	S.Y.	1504		
42	0949063	A	PENNISETUM ALOPECUROIDES 'HAMELN' HAMELN DWARF FOUNTAIN GRASS 2 GAL	EA.	108		
43	0949074	A	MICROBIOTA DECUSSATA SIBERIAN CARPET CYPRESS OAK - 1' HGT B.B.	EA.	129		
44	0949467	A	ROSA 'KNOCKOUT' KNOCKOUT ROSE - 3' HGT CONT	EA.	2		
45	0949493	A	GINKGO BILOBA ' PRINCETON SENTRY' 3"-3 1/2" CAL. B.B.	EA.	7		
46	0949606	A	ROOT BARRIER	L.F.	1100		
47	0949769	A	ACER RUBRUM "RED SUNSET" RED MAPLE 3"-3 1/2" CAL. B.B.	EA.	13		
48	0949803	A	ILEX CRENATA 'GREEN LUSTRE' GREEN LUSTRE HOLLY 2 1/2'-3' B.B.	EA.	28		
49	0949881	A	LIQUIDAMAR STYRACIFLUA SWEET GUM 3"-3 1/2" CAL. B.B.	EA.	14		
50	0949921	A	GERANIUM 'ROZANNE' ROZANNE GERANIUM - 1 GAL	EA.	40		
51	0949925	A	CERCIDIPHYLLUM JAPONICUM KATSURA TREE 3"-3 1/2" CAL. B.B.	EA.	1		
52	0949987	A	EUONYMUS KIAUTSCHOVICUS 'MANHATTEN' MANHATTEN EUONYMUS- 4-8' HGT CONT	EA.	6		
53	0949954	A	QUERCUS ROBUR "FASTIGIATA" FASTIGIATE ENGLISH OAK 3"-3 1/2" CAL. B.B.	EA.	10		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
54	0949999	A	PINE BARK MULCH	S.Y.	248		
55	0950005	A	TURF ESTABLISHMENT	S.Y.	1257		
56	0950008	A	GRAVEL MULCH	S.Y.	23		
57	0950050		IRRIGATION SYSTEM (SITE NO. A)	L.S.	1		
58	097XXXX	A	FLEXIBLE DELINEATOR POST	EA.	21		
59	0970006	A	TRAFFICPERSON (MUNICIPAL POLICE OFFICER)	EST	1		
60	0970007	A	TRAFFICPERSON (UNIFORMED FLAGGER)	HR.	100		
61	0971001	A	MAINTENANCE AND PROTECTION OF TRAFFIC	L.S.	1		
62	0975003		MOBILIZATION	L.S.	1		
63	0976001		BARRICADE WARNING LIGHTS - LOW INTENSITY	DAY	1000		
64	0977001		TRAFFIC CONE	EA.	208		
65	0978002		TRAFFIC DRUM	EA.	13		
66	0979003	A	CONSTRUCTION BARRICADE TYPE III	EA.	4		
67	0980001		CONSTRUCTION STAKING	L.S.	1		
68	1002121	A	UPLIGHT CONCRETE FOUNDATION	EA.	3		
69	1003621	A	TREE UPLIGHT (LED)	EA.	3		
70	1008467		3" RIGID METAL CONDUIT	L.F.	400		
71	1010001		CONCRETE HANDHOLE	EA.	8		
72	1118012	A	REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT	L.S.	1		

BIDDER NAME:_____

LINE NO.	ITEM NO.		ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT
73	1118051	A	TEMPORARY SIGNALIZATION	L.S.	1		
74	1131001		CHANGEABLE MESSAGE SIGN	DAY	100		
75	1206023	A	REMOVAL AND RELOCATION OF EXISTING SIGNS	L.S.	1		
76	1208932	A	SIGN FACE - SHEET ALUMINUM (TYPE IV RETROREFLECTIVE SHEETING)	S.F.	113		
77	1209005		PAINTED PAVEMENT MARKINGS 4" WHITE	L.F.	2044		
78	1209007		PAINTED PAVEMENT MARKINGS 4" YELLOW	L.F.	2071		
79	1209009		PAINTED PAVEMENT MARKINGS 12" WHITE	L.F.	254		
80	1209050		PAINTED PAVEMENT MARKINGS (GENERAL)	S.Y.	104		
81	12101XX	A	TRAFFIC PATTERN XD	S.Y.	36		
82	1210101	A	4" WHITE EPOXY RESIN PAVEMENT MARKINGS	L.F.	2044		
83	1210102	A	4" YELLOW EPOXY RESIN PAVEMENT MARKINGS	L.F.	2071		
84	1210104		8" WHITE EPOXY RESIN PAVEMENT MARKINGS	L.F.	161		
85	1210105	A	EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS	S.F.	89		
86	1210106		12" WHITE EPOXY RESIN PAVEMENT MARKINGS	L.F.	254		
87	1220013	A	CONSTRUCTION SIGNS - BRIGHT FLUORESCENT SHEETING	S.F.	116		
88	1302060	A	ADJUST GATE BOX (GAS)	EA.	1		
89	1302061	A	ADJUST GATE BOX (WATER)	EA.	2		
90	1303196		RELOCATE FIRE HYDRANT	EA.	1		

LINE NO.	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	EXT

TOTAL BID AMOUNT: $_____
(Numeric Bid Amount)

_____
Written Total Bid Amount

CODE OF ETHICS:
I/We have reviewed a copy of the Town of Glastonbury's Code of Ethics and agree to submit a Consultant Acknowledgement Form if I/We are selected. Yes_____ No_____ *

***Bidder is advised that effective August 1, 2003, the Town of Glastonbury cannot consider any bid or proposal where the Bidder has not agreed to the above statement.**

Respectfully submitted:

Type or Print Name of Individual	**Doing Business as (Trade Name)**
Signature of Individual	**Street Address**
Title	**City, State, Zip Code**
Date	**Telephone Number/Fax Number**
E-Mail Address	**SS# or TIN#**

(Seal – If bid is by a Corporation)

Attest

SPECIAL PROVISIONS

INDEX OF SPECIAL PROVISIONS

NOTICE TO CONTRACTOR - ROUNDABOUTS

The Contractor is hereby notified that certain conditions pertaining to the construction of the modern roundabout are required when relevant, as part of this contract.

Qualified/Unqualified Workers

U.S. Department of Labor
Occupational Safety & Health Administration (OSHA) www.osha.gov
Part Number 1910
Part Title Occupational Safety & Health Administration
Subpart S
Subpart Title Electrical
Standard Number 1910.333
Title Selection and use of work practices

Completion of this project will require Contractor employees to be near overhead utility lines. All workers and their activities when near utility lines shall comply with the above OSHA regulations. In general, unqualified workers are not allowed within 10 feet of overhead, energized lines. It is the contractor's responsibility to ensure that workers in this area are qualified in accordance with OSHA regulations.

The electric distribution company is responsible to provide and install all necessary anchors and guy strands on utility poles. It is the Contractors responsibility to coordinate with the utility company to ensure proper placement of the anchor. The Contractor will also reimburse the utility company the full cost for the installation of the anchor and guy.

This project includes the reconstruction and widening of the intersection of Hebron Avenue and New London Turnpike for the construction of a modern roundabout. The modern roundabout includes very detailed dimensioning of the approach roadways and curbing. The layout of the curbing is critical to the operation of the roundabout, requiring very detailed layout, installation and quality control of the construction of the curbing. The curbing geometry as detailed in the construction plans is provided for the contractor installation. All curbing shall be laid out, staked by an approved surveyor by the Town. Prior to installation of concrete for the curbing support, the contractor shall request approval by the Town to verify the curbing placement, layout prior to the pouring of the concrete.

The baseline data plans provided in the drawings detail the coordinates and geometry necessary for the installation of the curbing. For grading of the roundabout, the contractor is advised to utilize the baselines on the approaches for the approach profiles and grading. For the roundabout circle, the Contractor shall utilize the roundabout base line geometry.

The Contractor can be provided with the electronic drawings of the roundabout for further understanding of the complex grading of the approaches and roundabout. These drawings were developed in an Autocad Civil 3D format and include digital terrain models (surfaces) to replicate the existing and proposed contours.

The construction of the splitter islands is critical to effecting the correct traffic flow through the roundabout and must be constructed with extensive planning on the layout and installation of the curbing.

The contractor is made aware of an extensive construction staging program to allow for the orderly construction of the modern roundabout. The contractor shall follow the staging detailed in the temporary

traffic control plans unless otherwise permitted to vary from the plans. The Contractor may submit alternative construction staging plans for consideration by the Town.

The contractor will be required to work in a limited work area as he reconstructs each approach detailed in Stages 2A-2D. The contractor shall maintain pedestrian access across all approaches to the intersection. The Contractor may utilize the central island for storage of materials and equipment during Stages 1B – 3 with provision of maintaining signing and markings and flexible delineator posts per the plans.

All existing traffic control signal equipment will be removed including foundations as detailed in the construction drawings and special provisions.

Under Temporary Signalization the Contractor is required to keep in operation the following during Stage 1A: all vehicle and pedestrian signals including necessary support structures; all vehicle and pedestrian signals and detection.

The Contractor is advised that permanent and temporary easements are being secured for the four corners of the intersection to allow for the construction of the roundabout. These easements are shown on the Easement Plan in the drawing set and detail the permanent easements at the back of proposed sidewalks on each corner. Temporary easements are also being secured for additional work areas beyond the back of sidewalks for installation of the sidewalks, planting of trees and temporary sloping.

Existing span poles or utility poles cannot be double loaded without proper guying.

The contractor will be held liable for all damage to existing equipment resulting from his or his subcontractor's actions.

A credit will be deducted from monies due the Contractor for all maintenance calls responded to by Town of Glastonbury personnel.

All existing traffic appurtenances, in particular steel span poles, controller cabinets and pedestals shall be removed from the proposed roadway during the first stage of construction. The Contractor shall work with the utility companies to either relocate or install all traffic signal appurtenances prior to the roadway reconstruction.

The Contractor must install permanent or temporary spans in conjunction with utility company relocations. He then must either install the new signal equipment and controller or relocate the existing equipment.

The Contractor is advised of the proposed installation of 3-inch Rigid Metal Conduits across each approach of the roundabout with concrete handholes on either side, between the curbing and sidewalk. These conduits are shown on the Grading and Utility Plan and are for future rectangular rapid flashing beacon installations that may be installed by the Town under a separate contract as well as potential future lighting.

On the same plan, the Contractor is also advised of the proposed installation of water service to each of the islands including water spigots, shutoffs and meter enclosure. The water service will be standard MDC water service connections, details are included.

SECTION 1.05 CONTROL OF THE WORK

Article 1.05.02 - Plans, Working Drawings and Shop Drawings is supplemented as follows:

Subarticle 1.05.02 - (2) is supplemented by the following:

When required by the contract documents or when ordered by the Town of Glastonbury or the Engineer, The Contractor shall prepare and submit five (5) sets of catalog cuts and/or shop drawings for all traffic signal items to CDM Smith for approval before fabrication.

Joseph C. Balskus, PE, PTOE
Roundabout Project Manager
CDM Smith
111 Founders Plaza
Suite 1600
East Hartford, CT 06108

and one (1) set to the Town of Glastonbury Engineering Division.

Please forward to:

Stephen Braun
Assistant Town Engineer
2155 Main Street, P.O. Box 6523
Glastonbury, CT 06033-6523

Following approval of the shop drawings, the Engineer will provide one hard copy or PDF document of the approved submittal to the Town of Glastonbury, and two hard copies or one PDF document to the contractor. Engineer will retain one hard copy of the approved shop drawings.

SECTION 1.06 CONTROL OF MATERIALS

Article 1.06.01 - Source of Supply and Quality:

Add the following:

For the following items the contractor shall submit a complete description of the item, working drawings, catalog cuts and other descriptive literature which completely illustrates such items presented for formal approval. Such approval shall not change the requirements for a certified test report and materials certificate as may be called for. All shop drawings shall be submitted at one time, unless otherwise approved by the engineer.

Curbing
Reinforced Concrete Pipe
Electrical conduit
Water service piping (irrigation)
Water service equipment/fixtures
Retaining wall (central island)
Brick pavers
Granite block pavers
Tree uplight
Sign posts
Traffic Pattern XD

Article 1.06.07 - Certified Test Reports and Materials Certificate.

Add the following:

1) For the materials in the following items, a Certified Test Report will be required confirming their conformance to the requirements set forth in these plans or specifications or both. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, then Materials Certificates shall be required to identify the shipment.

Catch Basin Grates
Drainage Pipe
Electric Conduit
Concrete
Structural soil
Planting materials
Signing
Pavement markings

2) For the materials in the following items, a Materials Certificate will be required confirming their conformance to the requirements set forth in these plans or specifications or both.

Electrical conduit
Concrete
Bituminous Concrete
Handholes

SECTION 1.07 LEGAL RELATIONS AND RESPONSIBILITIES

Article 1.07.13 - Contractor's Responsibility for Adjacent Property, Facilities and Services is supplemented as follows:

The following company and representative shall be contacted by the Contractor to coordinate the protection of their utilities on this project 30 days prior to the start of any work on this project involving their utilities:

Town of Glastonbury
Daniel A. Pennington, PE
Manager of Physical Services/Town Engineer
2155 Main Street
Glastonbury, CT 06033-6523

Fiber Technologies Networks, LLC
Mr. Mark Schnauber,
Controller
300 Meridian Center
Rochester, New York 14624
(585) 697-5107

Connecticut Natural Gas Corporation, Engineering Department
Mr. Vasant C. Patel,
Manager - Utility Coordination
76 Meadow Street, 1st Floor
East Hartford, CT 06108
(860) 727-3114
vpatel@ctgcorp.com

Spectra Energy Operating Company, LLC (formerly: Algonquin Gas
Transmission Company)
Mr. Bradley E. Franzese,
Area Manager
252 Shunpike Road
Cromwell, CT 06416
(860) 635-0800 EXT: FAX: (860) 635-2632
befranzese@spectraenergy.com

Frontier Communications
Mr. Eric Clark,
Manager OSP Engineering
1441 North Colony Road
Meriden, CT 06450%4101
(203) 238-7407 EXT: FAX: (203) 237 8902
ec9795@att.com

CoxCom, Inc.
Mr. Thomas Derway,
Capital/Utility Coordinator
801 Parker Street
Manchester, CT 06045
(860) 432-5040 FAX: (860) 512-5115
thomas.derway@cox.com

Eversource
Mr. Wayne D. Gagnon,
Engineering Manager System Projects
107 Selden Street
Berlin, CT 06037
(860) 665-2473, FAX (860) 665-2002
gagnowd@nu.com

SECTION 1.08 PROSECUTION AND PROGRESS

Article 1.08.03 - Prosecution of Work:

Add the following:

The project will be constructed in various phases as described herein.

CONSTRUCTION PHASING: Roadway construction shall be completed in the following phases (stages) as described on the Temporary Traffic Control Plans and described in the Maintenance and Protection of Traffic (MPT) Special Provisions. The temporary traffic control plans depict eight stages of construction of the roundabout, including four general stages as follows:

Stages 1A/1B – 20 Calendar Days
During Stage 1A, perform permanent widening at intersection corners and temporary widening in other areas outside of existing pavement to a level to match existing roadway pavement using shoulder closure traffic pattern, maintain all turn lanes for the intersection traffic signal operation until the end of this phase. After completion of all pavement installation, remove existing intersection pavement markings, install temporary pavement markings and signing for temporary roundabout operation. Begin temporary roundabout operation during Stage 1B maintaining traffic flow in the circulatory roadway on a paved surface not less than 12 feet wide. Remove existing traffic signal equipment.

Temporary roundabout operations shall be commenced prior to the start of Glastonbury public schools Fall 2016, August 31.

Stages 2A-2D – 84 Calendar Days
Construct each intersection approach leg in turn with appropriate road closure and detour plan in effect as described by MPT Plans. Complete all improvements within the work area of the approach indicated before proceeding to the next leg of the intersection, including utilities, drainage, splitter islands, and full depth pavement construction up to the binder course. Adjust traffic flow to utilize the future center island / truck apron for bypass of the work area when constructing the adjacent portion of the permanent circulatory roadway. Maintain traffic to business driveways within closure areas at all times.

Detouring of traffic during each of the Stage 2 phases of work are provided in the MPT Special Provision.

Stage 3 – 14 Calendar Days
Construct the roundabout center island while maintaining traffic flow in the circulatory roadway. Adjust circulatory roadway width / location with traffic barrels as needed to define necessary work area.

Stage 4 – Complete by end of 2016 paving season
Construct final wearing surface during night time operation. Install final pavement markings and permanent signing. Install permanent epoxy pavement markings 21 days after wearing surface is installed.

Beyond Stage 4, the installation of final landscaping and hardscape is expected to be completed in the Spring 2017, by May 31, 2017.

New Work

Additional work, including work at a separate location, may be added to the contract in accordance with Article 1.04.05 of the Standard Specifications. This work may result in a contract extension, which would require an organization phase and a construction phase for the new location. If a contract extension is

granted for the additional work, liquidated damages for this portion of the work will be negotiated with the Contractor. Such an extension of time would not affect the time allowed for the original work in the contract. Original work, once started must be completed within the original construction phase, and liquidated damages will be assessed for any days beyond that phase which the Contractor takes to complete the original work.

ITEM # 0000151A CLEARING AND GRUBBING

General: The Contractor shall furnish all labor, materials, tools, and equipment necessary and shall do all work to prepare the site as indicated on the drawings and as herein specified.

Construction Methods:

Tree Removal: Removal of trees as indicated on the plans shall be performed by workman skilled in the area of tree removal under the supervision of a Connecticut Licensed Arborist. The Contractor shall mark all trees, shrubs, and plants to be removed in accordance with the plans and these specifications. The Engineer shall have 7 days to field review the markings and make any adjustments prior to the start of the clearing operation.

Trees and shrubs within the right-of-way or within any property owned by the Town of Glastonbury that are designated for removal must be posted as such by the Glastonbury Tree Warden (Mr. Greg Foran of the Parks and Recreation Department, 652-7686) for a period of 10 days prior to removal. **No trees or shrubs within the Town of Glastonbury right-of-way shall be cut or removed until such posting has been completed and subsequent approval given by the Tree Warden.**

In general, no trees, etc. in public streets and highways are to be cut or damaged in any way except as noted on the plans. Trees, bushes, and growing crops on other lands may be cut, removed, or trimmed only to the extent provided in the terms of the rights-of-way or access rights possessed by the Town, and also only within the limits and in the manner, if any, indicated by the Engineer or by the drawings or Special Conditions.

Tree Trimming: Trimming of trees by a Connecticut Licensed Arborist is included under this item as required for clearance of construction equipment and pedestrians below the tree canopy. When the canopy of a tree must be elevated for clearance above the proposed improvements, trimming shall be done around the entire circumference of the tree.

Tree Protection and Care of Property: The Contractor shall install high visibility construction fence at the drip line of the tree canopy as shown on the plans and as directed by the Engineer to protect existing trees that are not to be cut from damage during construction. The Engineer, at his sole discretion, may also direct the Contractor to enclose the trunks of trees adjacent to his work that are not to be cut with substantial wooden boxes of such height as may be necessary to protect them from injury from piled material, from equipment, from his operations, or otherwise due to his work. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees not to be cut, and particularly to overhanging branches and limbs.

Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. In case of cutting or unavoidable injury to branches, limbs, and trunks of trees, the cut or injured portions shall be neatly trimmed and covered with an application of grafting wax or tree-healing paint, as directed.

Cultivated hedges, shrubs, and plant that might be injured by the Contractor's operations shall be protected by suitable means or shall be dug up and temporarily replanted and maintained. After the construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of kind and quality at least equal to the kind and quality existing at the start of the work.

On paved surfaces, the Contractor shall not use or operate tractors, bulldozers, or other power-operated equipment, the treads of wheels that are so shaped as to cut or otherwise injure such surfaces.

Clearing: From areas to be cleared, the Contractor shall cut or otherwise remove all trees, saplings, brush, vines, and other vegetable matter such as snags, sawdust, bark, etc., and refuse. The area to be cleared shall be confined to the width shown on the plans or as stipulated in the Proposal. Vines, brush, and similar undergrowth shall be cut as close to the ground as practicable. Trees may be cut leaving a longer stump to facilitate their removal by power-operated equipment. No trees shall be cut or trimmed unless they are so indicated on the drawings.

Clearing shall also include removal and disposal of all items shown on the plans to be removed, or directed by the Engineer to be removed as part of the project, including, but not limited to, removal and disposal of existing concrete sidewalk, concrete steps, drainage structures, fences, and any and all other structures or materials not specifically listed in the Bid Proposal but required to be removed to accomplish the work.

All road signs, mail boxes, etc., shall be removed and reset as directed.

Grubbing: Grubbing shall consist of the complete removal of all tree stumps and roots larger than two inches in diameter to a minimum depth of 12-inches below the subgrade surface. All excavations made below the finished surface by the removal of trees, stumps, etc. shall be filled with suitable material and thoroughly compacted in such a manner that its surface will conform to the surrounding surface.

Stump grinding shall be used for stump removal where the potential for damage to adjacent improvements or underground utilities exists due to the excavation of stumps, or as directed by the Engineer. The requirements for grubbing noted above shall also apply to stump grinding operations.

Disposal: All materials removed during trimming, tree removal, and clearing and grubbing operations shall be disposed of by the Contractor in a manner satisfactory to the Engineer.

Measurement and Payment: Except as provided otherwise in the Bid Proposal or Special Conditions, this work shall be paid for at the Contract Lump Sum Price for “Clearing and Grubbing”, which price shall include protection of existing trees and vegetation, tree removal and tree trimming under the supervision of a Connecticut Licensed Arborist, clearing and grubbing within the limits of the work, stump grinding, removal and disposal of trees, roots, stumps, brush, concrete steps, and other objects, leveling of areas to accommodate the work, and all labor, materials, tools, and equipment necessary thereto.

ITEM # 0202000A EARTH EXCAVATION

ITEM # 0202513A REMOVAL OF CONCRETE SIDEWALK

General**:** This item shall conform to Section 2.02 ROADWAY EXCAVATION, FORMATION OF EMBANKMENT AND DISPOSAL OF SURPLUS MATERIAL, of the Form 816 amended as follows:

Section 2.02.05 of the Form 816 shall be amended as follows:

Basis of Payment:

Removal and disposal of existing drainage structures shall be paid for at the contract unit price as listed in the bid proposal for "Remove Existing Drainage Structure" as described elsewhere in these specifications.

Removal and disposal of existing concrete sidewalk slabs shall be paid for at the contract unit price per square yard for the item "Removal of Concrete Sidewalk." Sawcutting of concrete sidewalks shall not be measured for payment, but rather included in the contract unit price per square yard for "Removal of Concrete Sidewalk".

Other earth excavation necessary for sidewalk and driveway construction will not be measured for payment, but rather included in the unit cost for sidewalk or driveway construction as described elsewhere in these specifications.

Earth Excavation within the limits of full depth road construction shown on the plans shall be paid for at the contract unit price per cubic yard as listed in the bid proposal. The contract price for earth excavation shall include all labor equipment, materials, transportation, fuel, disposal, etc., for excavation of earth, on site relocation of earth products and transportation and/or disposal of surplus earth materials. All surplus earth materials shall be hauled off-site by the contractor and shall become property of the contractor. There shall be no separate payment for transportation or disposal of any surplus materials.

ITEM # 0202100A ROCK EXCAVATION AND DISPOSAL

General: The Contractor shall excavate rock (as defined below), if encountered, to the lines and grades indicated on the drawings or as directed, shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock.

In general, rock in pipe trenches shall be excavated so as to be not less than 6 inches from the pipe after it has been laid. Before the pipe is laid, the trench shall be backfilled to the correct subgrade with thoroughly compacted, suitable material or, when so specified or indicated on the drawings, with the same material as that required for bedding the pipe, furnished and placed at the expense of the Contractor.

Definition of Rock: The work "rock", whenever used as the name of an excavated material or material to be excavated, shall mean only boulders and pieces of concrete or masonry exceeding one-half (½) cubic yard in volume, or solid ledge which, in the opinion of the Engineer, requires for its removal drilling, and blasting, wedging, sledging, barring, or breaking up with a power-operated tool. No soft or disintegrated rock that can be removed with a hand pick or power-operated excavator or shovel, no loose, shaken, or previously blasted rock or broken stone in rock filings or elsewhere, and no rock exterior to the maximum limits of measurement allowed that may fall into the excavation will be measured or allowed as "rock".

Construction Methods:

Excess Rock Excavation: If rock is excavated beyond the limits of payment indicated on the drawings, specified, or authorized in writing by the Engineer, the excess excavation, whether resulting from overbreakage or other causes, shall be backfilled by and at the expense of the Contractor as specified before in this Section.

In pipe trenches, excess excavation below the elevation of the top of the bedding cradle or envelope shall be filled with material of the same type, placed and compacted in the same manner as specified for the bedding, cradle, or envelope.

In excavations for structures, excess excavation in the rock beneath foundations shall be filled with concrete which shall be Class A or Class B, at the option of the Contractor. Other excess excavation shall be filled with earth as specified in the Section entitled "Backfilling Around Structures" under BACKFILLING AND CONSOLIDATION.

Blasting: If explosives are used, all requirements for transportation, use and storage of Local, State, and Federal laws and regulations must be complied with and all necessary permits and licenses obtained by the Contractor at his expense. Permits and licenses must be shown to the Engineer upon request. Permits are issued through the Town of Glastonbury Fire Marshalls Office, and may require a pre / post blast survey.

Explosives must be carefully transported, stored, handled, and used. The Contractor will keep on the job only such quantities of explosives as may be needed for the work underway and only during such time as they are being used. Explosives shall be stored in a secure manner in locked containers and separate from all tools. Caps and detonators shall be stored separately from other explosives. When the need for explosives is ended, all such material remaining on the job shall be promptly removed from the premises. Care must be taken that no explosives, caps, or detonators are stolen or get into the hands of unauthorized persons, or left unguarded where they may cause accidents.

Explosives shall be of such power and placed and used in such quantities as will not make the excavation unduly large or shatter unnecessarily the rock upon or against which the main or structure is to be built, or

injure adjacent persons or property, those portions of the new work or structure as may already be in place, or other adjacent pipes, ducts, or other structures. The quantity of explosives fired at one blast must be small enough and the tie for blasting selected to avoid undue annoyance to persons owning or occupying the premises near the work.

The rock must be completely matted when blasts are fired to prevent damage or injury to persons or property or the scattering of broken fragments on the adjacent ground. Adequate warning shall be given to all persons in the vicinity before any blast is discharged.

When blasting is required, the operation shall be conducted with such care as not to cause damage to any of the existing underground utilities. Should such occur, the cost of repairs shall be the sole responsibility of the Contractor.

The Contractor shall notify each public utility or others having structures in proximity to the site, and others who may be affected, of his intention to use explosives. Said notice shall be given in accordance with the applicable regulations therefore, and sufficiently in advance to enable the involved agencies/companies/persons and the Contractor to take such steps as may be necessary to protect life and property. Such notice shall not, in any way, relieve the Contractor of responsibility for any damage resulting from his blasting operations.

When in sufficiently close proximity to existing gas, water, sanitary, storm, or other utilities and structures, and all services connected thereto, the Contractor shall remove the rock by methods other than blasting, if necessary, in order to protect said utilities and their services from damage. Approved methods other than blasting are barring and wedging, jackhammer, drilling, rock jacks, or other such hand or machinery methods that will not damage the adjacent utility.

No explosives shall be brought into, stored, or used on the site of any job by the Contractor unless and until he shall have furnished the Engineer with a satisfactory Certificate of Insurance showing that the risks arising from the presence of and use of explosives, and from blasting, are included within the insurance provided by the Contractor to secure his obligations to the Town. Insurance should also cover damage to underground utilities or other underground facilities.

When blasting for trench excavation, each shot sequence shall begin sufficiently ahead of completed work to prevent damage to the completed work, which must be properly protected prior to each shot.

The provisions herein shall apply where soil formation resembles rock, whether in trench, structure, or general excavation, even if it is of such nature that it is not classified and paid for as rock excavation and, if so ordered by the Engineer, will apply to openings cut through masonry, nested boulders, or other materials not herein classified as rock.

Blasting Records: An accurate blasting log must be maintained continuously for the duration of the Contract. The log shall record, for each shot, the location, amount of holes, depth, spacing, exact date and time of the blast, amount of explosives per hole, and the number of caps used. In addition, a sketch showing displacement of direct and delay caps for each shot shall be recorded.

Test Blasting and Monitoring Program: The Contractor shall employ an acceptable, independent vibration/blasting consultant to conduct test blasting prior to production blasting to devise suitable blasting procedures for production blasting, and to monitor production blasting. The vibration/blasting consultant shall be a Registered Professional Engineer in the State of Connecticut and shall have a minimum of ten years experience as a vibration/blasting consultant. The Contractor shall submit the name of the vibration/blasting consultant to the Engineer prior to starting the work.

The purpose of the test blasting is to develop control procedures for production blasting so that no disturbance or damage shall be done to utilities, equipment, buildings, structures, groundwater wells, or the aquifer.

Based on the results of the test blasting, the vibration/blasting consultant shall develop a suitable blasting program and distance-quantity of explosive tables of the production blasting. The blasting program and the distance-quantity tables shall be submitted to the Engineer 21 days prior to the commencement of production blasting. All production blasting operations shall be in accordance with the blasting program.

The vibration/blasting consultant shall also perform continuous monitoring of all initial blasting operations and intermittent monitoring of subsequent blasting, as deemed necessary by the vibration/blasting consultant. Blasts shall be monitored with a minimum of two 3-component seismometers that record the entire particle velocity wave train and not just peak velocities. Accurate, legible seismometer records of all monitored blasts shall be obtained, and one copy of all blast records shall be submitted to the Engineer within seven days after blasting.

Wells: The Contractor's attention is directed to the existence of active groundwater supply wells near the area of construction. The Contractor shall locate all wells within or near the project area that could be affected by his operations.

The Contractor shall conduct his operations so that no disturbance or damage shall be done to the groundwater supply wells or to the aquifer from which they draw water. The aquifer is herein defined as underlying soil and rock formations within a distance of 1,500 feet from the wells and the groundwater within those formations.

The Contractor shall be fully responsible for determining the methods and controls necessary so that his construction operations do not disturb groundwater wells or the aquifer, and do not change the quality or quantity of water reaching the well.

If evidence of a change in well water quality or well yield, or disturbance or damage to any utility, equipment, building, or structure is observed or reported to the Contractor, he shall immediately notify the Engineer and all blasting operations shall be discontinued and the Contractor's vibration/blasting consultant shall recommend revised blasting procedures. The Contractor shall initiate the revised procedures, once approved by the Engineer, before blasting is continued.

The Contractor shall furnish potable water to any home where the well is disrupted or the water is declared unfit for human consumption. The water shall be supplied in such quantity as necessary to allow the homeowner to function on a normal day-to-day basis without any significant inconvenience or expense. The water shall be delivered as frequently as necessary to assure its freshness. The Contractor shall continue to furnish water until the problem is resolved.

The Contractor shall be fully responsible for the restoration or replacement of all water supply wells, utilities, equipment, buildings, or structures damaged by his operations at no cost to the Town.

Shattered Rock: If the rock below normal depth is shattered due to drilling or blasting operations of the Contractor and the Engineer considers such shattered rock to be unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled with concrete as required, except that in pipe trenches, screened gravel may be used for backfill, if approved. All such removal and backfilling shall be done by and at the expense of the Contractor.

Preparation of Rock Surfaces: Whenever so directed during the progress of the work, the Contractor shall remove all dirt and loose rock from designated areas and shall clean the surface of the rock thoroughly using steam to melt snow and ice, if necessary. Water in depressions shall then be removed, as required,

so that the whole surface of the designated area can be inspected to determine whether seams or other defects exist.

The surfaces of rock foundations shall be left sufficiently rough to bond well with the masonry and embankments to be built thereon and, if required, shall be cut to rough benches or steps.

Before any masonry or embankment is built on or against the rock, the rock shall be scrupulously freed from all vegetation, fragments, ice, snow, and other objectionable substances. Picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means shall be used to accomplish this cleaning. All free water left on the surface of the rock shall be removed.

Removal of Boulders: Piles of boulders or loose rock encountered within the limits of earth embankments shall be removed to a suitable place of disposal.

Disposal of Excavated Rock: Excavated rock may be used in backfilling trenches subject to the following limitations:

Pieces of rock larger than permitted under the section entitled “Backfilling Pipe Trenches” shall not be used for this purpose.

The quantity of rock used as backfill in any location shall not be so great as to result in the formation of voids.

Rock backfill shall not be placed within 18 inches of the surface of the finished grade.

Surplus excavated rock shall be disposed of as specified for surplus excavated earth.

Backfilling Rock Excavations: Where the rock has been excavated and the excavation is to be backfilled, the backfilling above normal depth shall be done as specified L. If material suitable for backfilling is not available in sufficient quantity from other excavations, the Contractor shall, at his own expense, furnish suitable material from outside sources.

Compaction of Backfill Material: Consolidation of backfill material in a trench where rock has been blasted shall be obtained through the use of a water-jetting method, or as approved by the Engineer.

Measurement and Payment: Where rock (as defined in this Section) is encountered, it shall be stripped of the overlaying material and the Engineer will measure the same. All rock excavated before the Engineer shall have examined it shall be estimated by the Engineer based on obvious evidence of rock.

This work shall be paid for at the contract unit price for “Rock Excavation” as listed in the bid proposal. The quantity of rock excavation to be paid for shall be the number of cubic yards of rock in place, as if measured before excavation, that would have been removed if the excavation had been made everywhere exactly to the lines of payment shown in the table entitled “Maximum Trench Widths for Various Pipe Sizes” as described in the Special Provision for Earth Trench Excavation.

At manholes, catch basins, or other structures, rock excavation will be paid for on lines 12 inches beyond the outermost dimension of the structure.

ITEM # 0202451A TEST PIT EXCAVATION

Description: Excavate and backfill a designated area to determine the exact location of utility facilities which are near a proposed foundation.

Materials:

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

Construction Methods**:**
Keep affected utility 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. 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 foundation 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 vertical foot (vertical meter) for the rock actually removed in accordance with Article 10.02.04.

Basis of Payment:
This work will be paid for at the contract unit price per cubic yard 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 Foundation Excavation.

ITEM # 0204503A TRENCH DEWATERING

General: To ensure proper conditions at all time during construction, the Contractor shall provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdown) with which to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations. Such excavations shall be kept dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.

All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work, damage to pavements, other surfaces, or property. Suitable temporary pipes, flumes, or channels shall be provided for water that may flow along or across the site of the work.

Construction Methods:

Temporary Underdrains: Temporary Underdrains, if used, shall be laid in trenches beneath the grade of the structure. Trenches shall be of suitable dimensions to provide room for the chosen size of underdrain and its surrounding gravel. Underdrain pipe shall be acceptable PVC or ADS pipe of standard thickness. Sewer pipe of the quality known as “seconds” will be acceptable.

Underdrains, if used, shall be laid at an approved distance below the bottom of the normal excavation wrapped in Mirafi 140 or equal as outlined in Section 409.05 of these specifications, and entirely surrounded by graded gravel or crushed stone to prevent the admission of sand or other soil into the underdrains. The distance between the top of the bell of the underdrain pipe shall be at least three (3) inches unless otherwise permitted. The space between the underdrain and the pipe or structure shall be filled and crushed stone which shall be rammed, if necessary, and left with a surface suitable for laying the pipe or building the structure.

Drainage Wellpoint System: If required, the Contractor shall dewater the excavations by means of an efficient drainage system which will drain the soil and prevent saturated soil from flowing into the excavation. The wellpoints shall be designed especially for this type of service. The pumping unit shall be designed for use with the wellpoints and shall be capable of maintaining a high vacuum and of handling large volumes of air and water at the same time.

If required, the installation of the wellpoints and pump shall be done under the supervision of a competent representative of the manufacturer. The Contractor shall do all special work such as surrounding the wellpoints with sand or gravel or other work which is necessary for the wellpoint system to operate for the successful dewatering of the excavations.

Payment: This item will not be paid for separately. Rather, payment for trench dewatering shall be included in the unit price of the item associated therewith.

ITEM # 0205001A EARTH TRENCH EXCAVATION

General: The Contractor shall make excavations of normal depth in earth for trenches and structures; shall backfill such excavations to the extent necessary; shall furnish the necessary material and construct embankments and fills; and shall make miscellaneous earth excavations and do miscellaneous grading. All such work shall be done as indicated on the drawings and as herein specified.

The program of excavation, dewatering, sheeting and bracing shall be carried out in such manner as to eliminate all possibility of undermining or disturbing the foundations of existing structures or of work previously completed under this contract.

Excavation in general shall be in open trenches. Tunneling shall be done only to pass under obstructions such as pipes or duct or only as indicated on contract drawings, or in Special Provisions, or on written permission of the Engineer, and then only in accordance with those sections hereof which describe tunnel excavation, and subject to such further conditions as may have been described by drawings, Special Provisions, or as the Engineer may specify.

The Contractor shall make excavations in such manner and to such widths as will give suitable room for building the structures or laying and jointing the piping; shall furnish and place all sheeting, bracing, and supports; shall do all coffer damming, pumping and draining; and shall render the bottom of the excavations firm and dry and acceptable in all respects.

Construction Methods:

Trench Excavation: Where pipe is to be laid in gravel bedding or concrete cradle, the trench may be excavated by machinery to or to just below, the designated subgrade, provided that the material remaining at the bottom of the trench is no more than slightly disturbed.

Where pipe is to be laid directly on the trench bottom, the lower part of trenches in earth shall not be excavated to subgrade by machinery, but, just before the pipe is to be placed, the last of the material to be excavated shall be removed by means of hand tools to form a flat or shaped bottom, true to grade, so that the pipe will have a uniform and continuous bearing and support on firm and undisturbed material between joints except for limited areas where the use of pipe slings may have disturbed the bottom.

Depth of Trench: Trenches shall be excavated to such depths as will permit the pipe to be laid at the elevations, slopes or depths of cover indicated on the drawings, and at uniform slopes between indicated elevations.

Width of Trench: The methods and equipment used for excavation must be adapted to the conditions at the site and the dimensions of the required trench. The width of ground or street surfaces cut or disturbed shall, in general, be kept as small as practicable to accommodate the work and shall not be widened by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.

Width of pipe trenches shall be wide enough to provide sufficient space for shoring, for foundations, for drainage, for laying, jointing, inspecting, and backfilling of sides of pipe, or for building the required structures, and as near as feasible to the above described minimums, in order to reduce the load of backfill upon the top of the sewer; to provide lateral support for the fill and haunching on the sides of the pipe, and to insure that the pipe will not be pushed out of line while placing backfill.

The maximum permissible trench width to be paid by the Town varies with the diameter of the pipe (see table 403-1). Where the Contractor chooses not to use trench supports, the Contractor will still be paid as per maximum trench widths or actual trench width, whichever is the least.
Excavation for Special Foundations: Where concrete, stone or underdrain is required or ordered, excavation shall be carried down to the depth and lines required for such foundation or underdrain. If required by contract drawings or Special Provisions as part of the structure and included in the price, no additional payment for this additional excavation, as excavation, will be made. If the foundation is paid by the cubic yard or other specific item of proposal, such price for foundation shall include excavation therefore. Excavation for underdrain is included in price for underdrain.

Where the plans, Proposal or Special Provisions indicate certain foundations, they will be constructed and paid for as indicated.

Where the soil in subgrade is found to be soft, loose or freshly-filled earth, or unstable or unsuitable as a base for the proposed sewer or structure, the Engineer may, in his discretion, order it excavated to such depth and width as he may deem proper and replaced with gravel, crushed stone, concrete, plank or similar materials as he may direct.

If the excavation for foundation is made wider or deeper than required or ordered, or if excavation for concrete on sides of pipe is made wider than required or ordered, then no additional payment for the additional quantities of excavation or for additional foundation or side filling materials will be made, if being assumed that the added space was excavated for the convenience of, or by error of, the contractor.

Length of Trench and Space Occupied: Trenches must be constructed with a minimum of inconvenience and danger to the public and all other parties. To that end, the length of trench opened at any time, from point where ground is being broken to completed backfill and temporary surfacing, and also the amount of space in streets or public and private lands occupied by trench soil banks, equipment and supplies, shall to exceed the space or spaces considered reasonably necessary and expedient by the Engineer. In determining the length of open trench, the space for equipment, materials, supplies, etc. needed, the Engineer will consider the nature of the street or land where work is being done, depth and width of trench, types and methods of construction and equipment being used, inconvenience to the public or to private parties, possible dangers, limits or rights-of-way and other proper matters.

The Contractor must keep streets and premises near the work free from unnecessary obstructions, debris, etc. The Engineer may, at any time order all equipment, materials, surplus from excavations, debris, etc., lying outside reasonable limits of space, promptly removed; and should the Contractor fail to remove such materials within three days after notice to remove same, the Engineer may cause any part or all of such materials to be removed by such persons as he may employ, at the Contractor's expense, and may deduct the costs thereof from payment which may be or may become due to the contractor under this Contract. In any cases when public safety urgently demands it, the Engineer may cause such materials to be removed without prior notice.

Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one foot above the top of the pipe.

Dimensions of Trenches: Trenches shall be excavated to the lines indicated on contract drawings or as described for any particular structure by any contract document. In general, room shall be allowed for installing the pipe or other structure, for making and inspecting joints in pipe, for placing and compacting fill around and on both sides of pipe, for draining and pumping as needed, for removal of unsuitable materials, and for any other purpose incidental to the fulfillment of the Contract and these specifications.

Care must be taken to excavate to correct line, grade and width at all points.

In general, sides of trenches must be not less than four inches from outside of barrel of all pipe eight inches or less in size, six inches from outside of barrel of pipe ten inches or larger in size, or as shown by contract drawings. Except as otherwise provided, excavation shall conform closely to the form and grade of the bottom of the pipe or foundation required. To accomplish this, the Engineer may require that no earth shall be excavated by machinery nearer than six inches to the finished subgrade, and the last six inches of excavation in earth shall be carefully removed by hand labor to the exact lines and grade required, immediately prior to laying pipe or underdrain or building bottom of structure.

Maximum trench width for various pipe sizes are described below. Where the Contractor chooses not to use trench supports the Contractor will still be paid for any restoration work specified elsewhere in the contract as per maximum trench widths described below.

MAXIMUM TRENCH WIDTHS FOR VARIOUS PIPE SIZES

Size Pipe Nominal Inside Diameter	Maximum Width of Trench
6”	2.5 Feet
8”	4.0 Feet
10”	4.0 Feet
12”	4.0 Feet
15”	4.0 Feet
18”	4.0 Feet
21”	4.3 Feet
24”	4.5 Feet
27”	4.8 Feet
30”	5.1 Feet
33”	5.4 Feet
36”	5.7 Feet
39”	5.9 Feet
42”	6.3 Feet

Extent of Open Excavation: The extent of excavation open at any one time will be controlled by the conditions, but shall always be confined to the limits prescribed by the Engineer. At no time shall the extend of the open excavation go beyond two structures.

Trench Excavation in Fill: If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to a height of at least one foot above the top of the pipe, whichever is the lesser. Particular care shall be taken to ensure maximum consolidation of material under the pipe location. The pipe trench shall be excavated as though in undisturbed material.

Unauthorized Excavation: If the bottom of any excavation is taken out beyond the limits indicated or prescribed, the resulting void shall be backfilled at the Contractor’s expense with ¾” crushed stone if the excavation was for a pipeline not having a concrete cradle or encasement, or with Class B concrete if the excavation was for a masonry structure.

Cutting of Pavement: When the trench lies within a paved area, the trench shall be cut with an approved tool. All cuts shall be made to straight lines and shall be parallel and/or perpendicular to the center line of the trench.

Bridging Trenches: The Contractor shall, at no cost, provide suitable and safe bridges and other crossings where required for the accommodation of travel, and to provide access to private property during construction, and shall remove said structures thereafter.

Obstacles: Some obstructions, obstacles, or difficulties in the path of the work anticipated, or in the performance of the work, may have been indicated by drawings, Special Provisions, or in other contract documents. The omission of any indication or mention of any obstruction, obstacle or difficulty which a reasonable and careful contractor, bidder, or estimator might have anticipated, or any question as to adequacy of such indication as given, shall not entitle the Contractor to any extra or additional compensation for any loss or expense occasioned directly or indirectly by such obstruction, etc., not to any extension of time or waiver of any requirement of the Contract and Specifications. The Contractor shall be understood to have entered into the Contract with full knowledge that in any work involving excavation, operation in public highways or adjacent to other developments, some unforeseen obstacle, difficulties, unforeseen soil or ground water conditions, etc., may be encountered, and that the Contractor has included in the bid and contract obligations the assumptions of the risks and cost to which such obstacles, etc. may subject the bid.

The Town will make arrangements for clearance or avoidance of permanent obstruction by pipes and structures of public utilities and of public bodies, except as otherwise indicated on drawings or contract documents, where such obstruction is found in the space to be occupied by the pipe or structure to be built under the Contract. The Town will not assume the cost of temporary removal, support, protection, etc. of pipes, poles, and other structures which do not occupy the space to be occupied by the pipe or structure to be built for the Town, where removal, support, protection, etc. of such pipes, poles or structures is desired for the convenience of, or to save expense to, or to accommodate the equipment of the Contractor.

Ends of Certain Pipes to be Sealed: If any pipe, drain, culvert, connection or similar conduit is encountered and cut off or cut through incidental to the construction of the work, and if the said drain, etc. is not to continue to function or be used, the open end or ends of such pipes shall be securely and tightly closed by an adequate cover or bulkhead as directed by the Engineer. Except as a specific price for such closings was fixed in the Proposal, the cost of such covers, bulkheads, and the setting of them shall have been included in the price of prices bid for various other portions of the work in the Proposal and no additional payment will be made therefore.
In removing existing pipes or other structures, the Contractor shall use care to avoid damage to materials, and the Engineer shall include for payment only those new materials which are necessary to replace those unavoidably damaged.

The structures to which the provisions of the preceding three paragraphs shall apply include pipes, wires, and other structures which (a) are not indicated on the drawings or otherwise provided for, (b) encroach upon or are encountered near the substantially parallel to the edge of the excavation, and (c) in the opinion of the Engineer will impede progress to such an extent that satisfactory construction cannot proceed until they have been changed in location, removed (to be later restored), or replaced.

When fences interfere with the Contractor's operations, the Contractor shall remove and (unless otherwise specified) later restore them to at least as good condition as that in which they were found immediately before the work was begun, all without additional compensation. The restoration of fences shall be done as promptly as possible and not left until the end of the construction period.

Excavation Near Existing Structures: Attention is directed to the fact that there are pipes, drains, and other utilities in certain locations. Some of these have been indicated on the drawings, but no attempt has been made to show all of the services, and the completeness or accuracy of the information given is not guaranteed.

As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and the excavation shall be done by means of hand tools, as directed. Such manual excavation, when incidental to normal excavation, shall be included in the work to be done under items involving normal excavation.

Where determination of the exact location of a pipe or other underground structure is necessary for doing the work properly, the Contractor may be required to excavate test pits to determine such locations. When such test pits may be properly considered as incidental to other excavation, the Contractor shall receive no additional compensation, the work being understood to be included as a part of the excavation. When the Engineer orders test pits beyond the limits of excavation considered as part of the work, such test pits shall be paid for as specified under MEASUREMENT AND PAYMENT.

Protection of Existing Structures: All existing pipes, poles, wires, fences, curbing, property-line markers, and other structures which the Engineer decides must be preserved in place without being temporarily or permanently relocated shall be carefully supported and protected from injury by the Contractor. Should such items be injured, they shall be restored by the Contractor, without compensation therefore, to at least as good condition as that in which they were found immediately before the work was begun.

Relocation and Replacement of Existing Structures: Whenever the Contractor encounters certain existing structures as described below and is so ordered in writing, the Contractor shall do the whole or such portions of the work as he may be directed, to change the location of, remove and later restore, replace such structures, or to assist the owner thereof in so doing. For all such work, the Contractor shall be paid under such items of work as may be applicable, otherwise as Extra Work.

Backfilling and Consolidation: In general, and unless other material is indicated on the drawings or specified, material used for backfilling trenches and excavations around structures shall be suitable material which was removed in the course of making the construction excavations.

Frozen materials shall not be placed in the backfill nor shall backfill be placed upon frozen material. Previously frozen material shall be removed, or shall be otherwise treated a required before new backfill is placed.

Backfilling around Structures: The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected without distortion, cracking, or other damage. As soon as practical after the structures are structurally adequate and other necessary work has been done, special leakage tests, if required, shall be made. Promptly after the completion of such tests, the backfilling shall be started and then shall proceed until its completion. The best of the excavated materials shall be used in backfilling within two feet of the structure. Unequal soil pressures shall be avoided by depositing the material evenly around the structure.

Backfilling Pipe Trenches: As soon as practicable after the pipes have been laid and the joints have acquired a suitable degree of hardness, if applicable, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, the backfilling shall be started, and thereafter it shall proceed until its completion in accordance with pipe manufacturer recommendations.

With the exception mentioned below in this paragraph, trenches shall not be backfilled at pipe joints until after that section of the pipeline has successfully passed any specified tests required. Should the contractor wish to minimize the maintenance of lights and barricades and the obstruction of traffic, the contractor may, at his own risk, backfill the entire trench, omitting or including backfill at joints as soon as practicable after the joints have acquired a suitable degree of hardness, if applicable, and the related structures have acquired a suitable degree of strength. The contractor shall, however, be responsible for removing and later

replacing such backfill at no cost should the contractor be ordered to do so in order to locate and repair or replace leaking or defective joints or pipe.

Materials: The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. The materials and methods shall both be subject to the approval and direction of the Engineer. No stone or rock fragment larger than 12 inches in greatest dimension shall be placed in the backfill nor shall large masses of backfill material be dropped into the trench in such a manner as to endanger the pipeline. If necessary, a timber grillage shall be used to break the fall of material dropped from a height of more than five feet. Pieces of bituminous pavement shall be excluded from the backfill unless their use is expressly permitted, in which case they shall be broken up as directed.

Ho Pac Trench Consolidation: Where the trench backfill is consolidated by the "Ho Pac" method and the depth of the trench from the road or ground surface to the top of the pipe exceeds ten feet, the trench backfill shall be placed and consolidated in two lifts of equal depth.

The approved backfill material shall be placed and compacted at a moisture content between four and eight percent (based on dry density, by weight), or with two percent of the optimum moisture content as determined by the moisture density relationship test specified in ASTM D 1557, at the option of the Engineer. Compaction shall be by a "Ho Pac" vibratory compactor or approved equal, operating at a frequency between ten and 40 Hertz, placed directly on the backfill surface, and applied with the maximum practical force applicable by the backhoe to which it is attached. Compaction effort shall be continued until no further visible settlement occurs.

Miscellaneous Requirements: Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material. Only approved quantities of stone and rock fragments shall be used in the backfill. The Contractor shall, as part of the work done under the items involving earth excavation and rock excavation as appropriate, furnish and place all other necessary backfill material.

All voids left by the removal of sheeting shall be completely backfilled with suitable materials, thoroughly compacted.

Where required, excavated material which is acceptable to the Engineer for surfacing or pavement sub base shall be placed at the top of the backfill to such depths as may be specified elsewhere or as directed. The surface shall be brought to the required grade and stones raked out and removed.
Embankments Over Pipe: Where the top of the pipe is less than three feet below the surface of the ground, additional fill shall be placed to form an embankment to cover and protect the pipe. The top of such embankment shall not be less than three feet above the top of the pipe and not less than one foot wider than the outside diameter of the pipe, with side slopes no steeper than one and one half horizontal to vertical, or of such section as may have been indicated by drawings. Such embankments shall be made of suitable dry earth, well compacted. Embankments must be maintained to the full required dimensions during the maintenance period of the Contract, and any settlement, washout, or deficiency occurring or found during that time shall be rectified and embankments brought up to the required height, width and slopes.

In general, such embankments may be made with materials excavated on the job and not used for backfill elsewhere. Should there not be sufficient surplus material for embankments, or should it be unsuitable or inconveniently located, the Contractor shall secure and provide sufficient suitable material. In any case, where the Town has provided borrow pits from which the Contractor may obtain filling material, the Contractor must conform to the conditions for excavating and moving such material as established by acts of the Town in obtaining such rights, and by indications on drawings or in other contract documents.

Openings through embankments for the passage of water and other purposes will be provided as indicated on drawings or elsewhere, or as ordered.

Grass shall be seeded or turf placed on embankments if, where, and as provided in contract documents. In general, if grassing is not required, the Contractor may, at his option, grass embankments to facilitate his maintenance. The Engineer may order grassing where not otherwise required under the general provisions for additional work if he deems proper.

Care shall be taken that sewer and appurtenances are not damaged by equipment or methods used for making and maintaining embankments.

Except as specific provisions may have been made in the Proposal for a particular contract, no payment other than prices bid for pipe will be paid for building and maintaining embankments or securing material therefore.

If, however, a price per cubic yard was established by the Proposal for filling material placed in embankments and/or in fills at side of embankment to avoid the formation of depressions there, the quantity of such filling material will be estimated and paid as the actual quantity placed, up to, but not exceeding the lines or sections required, measured after the embankment or fill has been made.

Material for Filling and Embankments: Approved selected materials available from the excavations and not required for backfill around pipes or against structures may be used for filling and building embankments, except as otherwise specified. Material needed in addition to that available from construction operations shall be obtained from approved gravel banks or other approved deposits. The Contractor shall furnish, at no cost, all borrowed material needed on the work.

All material, whether from the excavations of from borrow, shall be of such nature that after it has been placed and properly compacted it will make a dense, stable fill. It shall not contain vegetation, masses of roots, individual roots more than 18 inches long or more than one half inch in diameter, stones over six inches in diameter, or porous matter. Organic matter shall not exceed minor quantities and shall be well distributed.

Preparation of Subgrade: The Contractor shall remove loam and topsoil, loose vegetable matter, stumps, large roots, etc. from areas upon which embankments will be built or material will be placed for grading. The subgrade shall be shaped as indicated on the drawings and shall be so prepared by forking, furrowing, or plowing so that the first layer of the new material placed thereon will be well bonded to it.

Placing and Compacting Material: After the subgrade has been prepared as hereinbefore specified, the material shall be placed thereon and built up in successive layers until it has reached the required elevation.

Layers shall not exceed 12 inches in thickness before compaction. In embankments at structures, the layers shall have a slight downward slope away from the structure. In other embankments, the layers shall be slightly dished toward the center. In general, the finer and less pervious materials shall be placed against the structures or in the center, and the coarser and more pervious materials, upon the outer parts of embankments.

Each layer of material shall be compacted by the use of approved rollers or other approved means so as to secure a dense, stable and thoroughly compacted mass. 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.

Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction. No compacting shall be done when the material is too wet, from either rain or too great an application of water, to compact it properly. At such times, the work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compaction.

Payment: This item will not be paid for separately. Rather, payment for earth trench excavation, backfilling, and the disposal of surplus excavated material shall be included in the unit price or lump sum price of the item associated therewith.

ITEM # 0212000A SUBBASE

This item shall conform to Section 2.12 SUBBASE, of the Form 816, amended as follows:

Materials: The material for this item shall conform to the requirements of Article M.02.01-Granular Fill, except that reclaimed miscellaneous aggregate shall not be used.

ITEM # 0212094 A PROCESSED TRAPROCK SUBBASE

2.12.01 Description:

This item shall include furnishing material for, placing, and constructing a traprock foundation in courses not to exceed 6 inches in thickness on a prepared base or subbase in accordance with these specifications and in conformity with the lines, grades and compacted thickness as shown on the plans, details, or as ordered by the engineer.

Required Submittals:

Material Certificate of Compliance:

Submit material certificate of compliance for Processed Traprock Subbase in accordance with the contract general requirements.

2.12.02 Materials:

Course and fine aggregates shall be combined and mixed by approved methods so that the resulting material shall conform to the following gradation requirements:

Large 2" Process Traprock:

Square Mesh Sieves	% Passing by Weight
Pass 2 1/2"	100
Pass 1 1/2"	90-100
Pass 3/4"	60-80
Pass 1/4"	40-55
Pass #40	5-20
Pass #100	2-12
Pass #200	0-5

Medium 1 ¼"Process Traprock:

Square Mesh Sieves	% Passing by Weight
Pass 2"	100
Pass 1 1/2"	90-100
Pass 3/4"	50-75
Pass 1/4"	25-45
Pass #40	5-20
Pass #100	2-12
Pass #200	0-5

Small ¾" Process Traprock:

Square Mesh Sieves	% Passing by Weight
Pass 1"	100
Pass 3/4"	90-100
Pass 3/8"	50-90
Pass #4	35-70

Pass #10	15-55
Pass #100	2-12
Pass #200	0-5

Course aggregate shall consist of sound, tough, durable fragments of rock of uniform quality throughout. It shall be free from soft disintegrated pieces, mud, dirt, organic or other injurious material. When tested by means of the Los Angeles abrasion machine using AASHTO method T-96-02, it shall not have a loss of more than 50 percent. When the fraction of the dry sample passing the No. 100 sieve is greater than 8% by weight, the sample shall be washed and the amount obtained by washing shall be added to the amount obtained by dry sieving. The resultant total amount of material passing the No. 100 sieve shall meet the above range.

Fine aggregate shall be natural sand, stone sand, screenings or any combination thereof. The fine aggregate shall be limited to material 95 percent of which passes a No. 4 sieve. The material shall be free from clay, loam and deleterious materials. Fine aggregate shall meet the material requirements of article M.05.01 of the State of Connecticut, Department of Transportation, Standard Specification for Roads, Bridges and Incidental Construction, Form 816, 2004.

2.12.03 Construction Methods:

The processed traprock shall be uniformly spread upon the prepared sub-grade directly from an approved stone spreader or box to such depths that each course will have a depth of 4” after compaction unless otherwise ordered. Dumping material on sub-grade from trucks and spreading with power graders and bulldozers will not be permitted except with the permission of the Engineer and except in areas inaccessible to the approved stone spreader.

The processed traprock shall be compacted by use of a power roller weighing at least 10 tons. Water shall be applied during rolling to obtain proper compaction. Rolling and wetting shall be continued until the voids in the material have been reduced to a minimum and until the course is thoroughly compacted to firm and uniform surface satisfactory to the Engineer. The compaction of each layer shall be at least 97 percent of the maximum dry density as obtained by the AASHTO Test T-180-01, Method D.

Should the base course material become churned up or mixed with the sub-grade material at any time, the Contractor shall, without additional compensation, remove the mixture, reshape and re-compact the sub-base, and replace the material removed with clean coarse material which shall be compacted and wetted until thoroughly compacted to firm uniform surface. Sand or stone dust shall be added to the surface during rolling to fill voids that may occur in the coarse aggregate.

When compaction of the bottom course has been completed, the aggregate for the top course shall be spread over it to such depth that, after final compaction, the total depths will equal the depth specified for the completed base.

Should any irregularities of surface develop during or after the compacting of either course, they shall be remedied by loosening the material already in place and removing or adding course aggregate as required after which the entire area, including the surrounding surface, shall be compacted, and the compacting continued until it is compacted satisfactorily to a uniform surface.

2.12.04 Method of Measurement:

All processed traprock base required for this work shall be measured for payment at the number of cubic yards for "Processed Traprock Subbase" completed and accepted, including all equipment, materials, tools, labor and incidental expenses thereto.

2.12.05 Basis of Payment:

This work will be paid for at the contract unit price per cubic yard for “Processed Traprock Subbase”, complete in place, which price shall include all materials, tools, equipment, labor and work incidental thereto.

Pay Item	Pay Unit
Processed Traprock Subbase	CY

ITEM # 0212300A PROCESSED STONE BASE

This item shall conform to Section 3.04 PROCESSED AGGREGATE BASE, of the Form 816, amended as follows:

Materials: The material for this item shall conform to the requirements of Article M.05.01, except that coarse aggregate shall be broken stone, and fine aggregate shall be stone sand, screenings, or a combination thereof.

NOTE: Basis of payment for this item shall include fine grading prior to paving. No separate payment shall be provided for such work.

ITEM # 0213100 A STRUCTURAL FILL

2.12.01 Description:

This item shall include furnishing material for, placing, and constructing a structural fill foundation in courses not to exceed 6 inches in thickness on a prepared base or subbase in accordance with these specifications and in conformity with the lines, grades and compacted thickness as shown on the plans, details, or as ordered by the engineer.

Required Submittals:

Material Certificate of Compliance:

Submit material certificate of compliance for Structural Fill in accordance with the contract general requirements.

2.12.02 Materials:

Pervious structure backfill consisting of broken or crushed stone, broke or crushed gravel. The material shall conform to CT DOT Standard Specifications M.02.05 items 1 or 2.
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2.12.03 Construction Methods:

The structural fill shall be uniformly spread upon the prepared sub-grade directly from an approved stone spreader or box to such depths that each course will have a depth of 6" after compaction unless otherwise ordered. Dumping material on sub-grade from trucks and spreading with power graders and bulldozers will not be permitted except with the permission of the Engineer and except in areas inaccessible to the approved stone spreader.

The structural fill shall be compacted by use of a power roller weighing at least 10 tons. Water shall be applied during rolling to obtain proper compaction. Rolling and wetting shall be continued until the voids in the material have been reduced to a minimum and until the course is thoroughly compacted to firm and uniform surface satisfactory to the Engineer. The compaction of each layer shall be at least 97 percent of the maximum dry density as obtained by the AASHTO Test T-180-01, Method D.

Should the base course material become churned up or mixed with the sub-grade material at any time, the Contractor shall, without additional compensation, remove the mixture, reshape and re-compact the sub-base, and replace the material removed with clean coarse material which shall be compacted and wetted until thoroughly compacted to firm uniform surface. Sand or stone dust shall be added to the surface during rolling to fill voids that may occur in the coarse aggregate.

When compaction of the bottom course has been completed, the aggregate for the top course shall be spread over it to such depth that, after final compaction, the total depths will equal the depth specified for the completed base.

Should any irregularities of surface develop during or after the compacting of either course, they shall be remedied by loosening the material already in place and removing or adding course aggregate as required after which the entire area, including the surrounding surface, shall be compacted, and the compacting continued until it is compacted satisfactorily to a uniform surface.

2.12.04 Method of Measurement:

All structural fill required for this work shall be measured for payment at the number of cubic yards for "Structural Fill" completed and accepted, including all equipment, materials, tools, labor and incidental expenses thereto.

2.12.05 Basis of Payment:

This work will be paid for at the contract unit price per cubic yard for “Processed Traprock Subbase”, complete in place, which price shall include all materials, tools, equipment, labor and work incidental thereto.

Pay Item	Pay Unit
Structural Fill	CY

ITEM # 0219001A SEDIMENT CONTROL SACK

General: This work shall consist of furnishing, installing, maintaining, and removing a sedimentation control sack for control of sediment entering catch basins within the project area as directed by the Engineer or as shown on the contract drawings.

Materials: Sediment control sacks shall be Siltsack® as manufactured by SI® Geosolutions or approved equal, and shall be manufactured from a specially designed woven polypropylene geotextile.

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

Construction Sequence: To install the sediment control sack in the catch basin, remove the grate and place the sack in the opening. Hold out approximately six inches of the sack outside the frame. This is the area of the lifting straps. Replace the grate to hold the sack in place.

When the restraint cord is no longer visible, the sediment control sack is full and should be emptied.

To remove the sediment control sack, take two pieces of 1” diameter rebar and place through the lifting loops on each side of the sack.

To empty the sediment control sack, place it where the contents will be collected. Place the rebar through the lift straps (connected to the bottom of the sack) and lift. This will turn the sedimentation control sack inside out and empty the contents. Clean out and rinse. Return the sedimentation control sack to its original shape and place back in the basin.

The sediment control sack is reusable. Once the construction cycle is complete, the sedimentation control sack shall be removed from the basin and cleaned. The sedimentation control sack shall then be provided to the Town for re-use.

Basis of Payment: Sediment control sacks shall be paid for as a unit for each sedimentation control sack provided and installed. Maintenance of the sediment control sacks and cleaning after completion of construction as described herein shall also to be included in this bid price.

ITEM # 0303001A CONCRETE FOR WALL

3.03.01 Description:

This item will consist of providing a reinforced concrete for the retaining wall as shown of the plans.

There will be no additional payment for dowels, wire mesh, anchors, expansion joint material, or saw cutting required for the completion of this work.

Required Submittals

Material Certificate of Compliance:

Submit material certificate of compliance for concrete in accordance with the contract general requirements.

3.03.02 Materials:

All materials for this work shall conform to the requirements of Section M.03 of the State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, for Class "F" concrete.

Test for air content of fresh concrete shall be made during construction. Because of effects of mixing and vibration, samples for air content preferably should be taken from concentrate after it has been placed by qualified technicians per ASTM C-231- 03 or C-238-51.

The concrete producer will be required to show that his plant and equipment meet all requirements as established by ASTM designation C-94-04, and shall also be currently approved by the State of Connecticut, Department of Transportation.

All concrete mix used must be accompanied by a certification issued by the concrete producer showing the time of day on the batch slip and the composition of the concrete mix; that is the amount and type of cement; water; kind of air-entering admixture and the retarder admixture if any; and also a certification that the mix will attain the minimum compressive strength of 4,000 psi in 28 days.

Any concrete mix without the time of day stamped on the accompanying batch slip will be receded immediately. Also the concrete mix shall must be placed within 1 1/2 hours of the time of day stamped on the batch slip, otherwise it will be rejected.

Reinforcing: The reinforcing for the wall shall be epoxy coated reinforcement bars conforming to ASTM A615, Grade 60 as shown on the plans. All reinforcing as shown on the plans shall meet CT DOT 816 Section M.06.01. Dowels for expansion joint shall be epoxy coated and conform to the requirements of ASTM A615/A for plain bars and shall be grade 60. The dowels shall be hot dipped galvanized in accordance with AASHTO M232m/m. Anchors for construction joints shall be 5/8" diameter dowel bars forged from ASTM A-615-04 grade deformed 60 steel reinforcing rods with 5/8" threaded splicer with nailing flange. Anchors shall be DB-SAE splicers as manufactured by the Richmond Screw Anchor Company, or approved equal.

3.03.03 Construction Methods:

All existing concrete pavement base adjacent to new concrete shall be cut with a concrete saw and the cut shall extend only to the top of the existing reinforcing wire mesh. The concrete below this reinforcement shall be removed with a pavement breaker. The existing reinforcing wire mesh shall be tied to the newly placed reinforcing wire mesh prior to placement of new concrete. In situations where this is not practical or reinforcing wire mesh is not present, anchors shall be provided in lieu of wire mesh. Anchors shall be DB-SAE splicers as manufactured by the Richmond Screw Anchor Company or approved equal with hooked 5/8” dowel bars forged from ASTM A-615-04 Grade 60 deformed rebar material (steel). Splicer to be 5/8” and threaded with nailing flange. Saw cutting for the full depth of the concrete base will be allowed if anchors are utilized exclusively in each repair location. No additional payment will be made for saw cutting under any circumstances.

MIXING AND TRANSPORTING CONCRETE

All concrete shall be plant-mixed or transit-mixed. If the concrete is mixed at the plant, it shall be transported to the job in truck mounted drum-type mixer agitators. Concrete shall be discharged from the truck at the job site not more than 1 1/2 hour after water is introduced into the batch. Measuring, batch in, mixing, agitation and transporting of the concrete shall be as specified in AASHTO "SPECIFICATIONS FOR READY MIXED CONCRETE" M157-97, latest revision.

REINFORCING

Longitudinal wires for wire mesh shall be spaced 6" on centers and transverse wires spaced 12" on centers. The wire mesh shall be placed 4"± 1/2" above the bottom surface of the concrete. Adjacent pieces of mesh shall be lapped at least 8". The mesh shall be placed so that wires spaced 6" apart are parallel to curbs and traffic lanes.

Longitudinal Joints

Joints shall be neatly formed and shall be a butt type joints, with anchors placed at the midpoint of the slab. Abutting slabs at longitudinal joints shall be tied together with anchors spaced 2 foot on center. Anchors shall be DBSAE splicers as manufactured by the Richmond Screw Anchor Company or approved equal with hooked 5/8” dowel bars forged from ASTM A-615-04 Grade 60 deformed rebar material (steel). Splicer to be 5/8” and threaded with nailing flange. Saw cutting for the full depth of the concrete base will be allowed if anchors are utilized exclusively in each repair location. No additional payment will be made for saw cutting under any circumstances. If the construction phasing allows a pour from curb to curb, a longitudinal control joint shall be cut along the centerline in accordance with the requirements for transverse control joints.

Transverse Control Joints

Transverse control joints shall be placed every forty feet (40') or as otherwise indicated on the plans or ordered by the Engineer. Joints shall be a depth of one third the depth of the slab and a minimum width of one quarter inch (1/4"). The following methods are acceptable for the formation of joints:

Formed grooves shall be made by depressing an approved tool or device into the plastic concrete. The tool or device shall remain in place until the concrete has attained its initial set and shall then be removed without disturbing adjacent concrete.

Sawed joints shall be created by sawing grooves in the surface of the pavement with an approved concrete saw. After each joint is sawed, the saw cut and adjacent concrete surface shall be thoroughly cleaned. Sawing of the joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling, usually 4 to 24 hours. All joints shall be sawed before uncontrolled

shrinkage cracking occurs. If necessary, the sawing operations shall be carried on both day and night, regardless of weather conditions. A standby saw shall be available in the event of breakdown. Sawing shall be discontinued if a crack develops ahead of the saw. In general, all joints shall be sawed in sequence. If extreme conditions make it impracticable to prevent erratic cracking by early sawing, the contraction joint groove shall be formed prior to initial set of concrete, as provided above.

Transverse Construction Joints

Transverse construction joints shall be placed whenever the placing of concrete is suspended for more than 30 minutes or when new concrete base is to be constructed adjacent to the existing concrete base. When a joint falls within 5 feet of a utility structure, adjust the location to fall on the center of round structures and at or between the corners of rectangular structures.

Joints shall be neatly formed and should be a butt type joint with anchors placed at the midpoint in the slab. Anchors shall be DB-SAE splicers as manufactured by the Richmond Screw Anchor Company or approved equal with hooked 5/8" dowel bars forged from ASTM A-615-04 Grade 60 deformed rebar material (steel). Splicer to be 5/8" and threaded with nailing flange. Saw cutting for the full depth of the concrete base will be allowed if anchors are utilized exclusively in each repair location. No additional payment will be made for saw cutting under any circumstances.

Sealing Joints

All control and expansion joints shall be filled with joint-sealing material before the pavement is opened to traffic and as soon after completion of the curing period as is feasible. Just before sealing, each joint shall be thoroughly cleaned of all foreign material, and joint faces shall be clean and surface-dry when seal is applied. The joint seal material shall be applied hot and shall be stirred during heating to prevent localized overheating and shall be AC-20. The sealing material shall be applied to each joint opening as directed by the Engineer. The joint filling shall be done without spilling material on the exposed surfaces of the concrete. Any excess material on the surface of the concrete shall be removed immediately and the pavement surface cleaned. The use of sand or similar material to cover the seal shall not be permitted. Joint-sealing material shall not be placed when the air temperature in the shade is less than 50 degree F., unless approved by the Engineer.

PLACING OF CONCRETE

The concrete shall be discharged and placed in a manner which will prevent separation of coarse aggregate and mortar. Concrete shall always be placed starting at the low end of the section and working upgrade.

Before placement of the concrete, the subbase shall be thoroughly moistened. This shall be done far enough in advance of placement to allow absorption of water to a depth of at least 1", leaving a moist but not muddy surface.

The finished thickness of the concrete base shall be at least 8". The concrete shall be placed to a uniform cross section consistent with the proposed cross slope and flush with existing concrete base.

The time elapsing from the time water is added to the mix until the concrete is placed shall not exceed 90 minutes. In hot weather, the maximum allowable time may be reduced by the Engineer.

CURING CONCRETE

Normal Condition: All cement concrete shall be cured. The surface of the concrete shall be covered immediately after the initial set in such a manner that the surface is not damaged and shall be kept covered for at least the minimum cure time for the concrete mix being used. Enough cover material shall be placed to cover the edges after forms have been removed.

Covering shall be burlap or cotton mats kept saturated, waterproof double sheet asphalt cemented Kraft paper reinforced in both directions, meeting ASTM specifications C-171-03.

Kraft paper, if used, shall be lapped at least 12", the lap and edges of the paper shall be securely weighted down with continuous planks, piles of earth or other material to keep edges down tight. Rocks and stones shall not be used. Before reusing paper covers, they shall be checked for tears, or holes and shall be repaired. Covers which have become unserviceable will be rejected by the Engineer.

NOTE: No liquid membrane-forming compound will be allowed for curing.

Cold Weather Protection: When concrete is being placed and the air temperature may be expected to drop below 35 degree F, such concrete shall be protected by first covering as specified in (a) above, upon which cover shall be placed a layer of hay or straw, 6" to 8" in thickness, over which another layer of paper or mats shall be spread and the edges of these covers shall be firmly fastened in place. The protecting material shall remain in place for such time as the Engineer may direct, and any concrete incurred by frost action shall be removed and replaced at the contractor's expense.

Use of New Concrete: Construction equipment shall be excluded from the concrete surface until the specific cure time has taken place. Any damage to the pavement from traffic or any other causes shall be repaired by the contractor at his own expense. Concrete cylinder testing will be used to determine the strength of concrete. Testing will be coordinated and paid for by the contractor.

3.03.04 Method of Measurement:

This work will be measured for payment at the number of cubic yards for “Concrete For Wall" completed and accepted, including all equipment, materials, tools, labor and incidental expenses thereto.

3.03.05 Basis of Payment:

This item shall be paid for (including the installation of rebars, dowels, anchors, expansion joint material, and saw cutting) by inclusion in lump sum price for 0601651A.

ITEM # 0303050A BRICK PAVERS ON 8" CONCRETE BASE SLAB

3.03.01 Description: The work of this item includes furnishing all materials, equipment, supplies, accessories, incidentals, labor and supervision, and performing all operations required to furnish and install brick pavers on a 8" concrete base slab as shown on the drawings, as specified herein, and as is additionally required to properly complete the work, including furnishing and installing the bituminous setting bed, neoprene-modified asphalt setting adhesive, colored sand/cement joint filler mixture, and expansion joints.

Required Submittals:

A. Samples: Furnish not less than ten individual clay brick pavers of each size, type and color as samples, showing extreme variations in color and texture. Do not order brick for project until Engineer's approval of field sample panel.

B. Manufacturer's Product Data: Manufacturer's product data shall be submitted for the following items:
1. Brick Pavers
2. Sand joint filler
3. Neoprene-modified asphalt setting adhesive
4. Bituminous setting bed
5. Expansion joints and joint sealant

C. Test Report:

1. Test report of brick pavers shall be submitted.
   a. Testing shall be done by an independent testing laboratory. Test procedures shall conform to ASTM C-67-03 methods, as applicable. Test report shall indicate, as a minimum, the following:
      - Compressive strength, psi
      - Absorption, 5 hr. submersion in cold water.
      - Absorption, 24 hr. submersion in cold water.
      - Maximum saturation coefficient.
      - Initial rate of absorption (suction).
      - Abrasion index.
      - Freeze-thaw.
      - Tolerance to saline conditions.
      - Efflorescence.
2. Job Mix Formula (JMF) for bituminous setting bed shall be submitted.

D. Statements of Qualifications: Submit to identify and exhibit qualifications as specified in Article 3.03.02, herein.

3.03.02 Quality Assurance:

A. Installer Qualifications: Installations of paving system shall be by firm that can exhibit proof of a minimum five (5) years of prior successful experience with paving installations of equivalent type and similar scope of this Project.

1. Paving Installation Foreman: Installation firm for paving and surfacing of this Project shall have on staff a supervising Foreman assigned full time to this Project, beginning with the provision of mock-up installations, who shall be a competent, English-speaking supervisor, and who shall have at least 10 years' stone installation experience.

2. Use numbers of skilled workmen equal to work requirement or occasion. The skilled workmen shall be thoroughly trained and experienced in the necessary crafts**,** and shall be completely familiar with **the** specific requirements and methods needed for performance of the work in this Section.

3.03.03 Materials:

Brick Paving Units

The paving units shall be as manufactured by The Belden Brick Company P.O. Box 20910 Canton, Ohio 44701 Phone (330) 456-0031, or approved equal. The bricks shall be 4" x 8" x 2 ¾" thick and have chamfered edges with lugs. The compressive strength shall average greater than 15,900 psi minimum. The average cold water absorption shall not be greater than 6% with no individual unit testing greater than 7%. Absorption test results may not be achieved through the use of sealers or other products applied to the clay paver. Resistance of 50 freeze-thaw cycles, when tested in accordance with ASTM C67. In addition, the clay paver must pass CSA-A231.2 freeze thaw test in saline solution without the use of sealers or other products applied to the paver. A test report must be submitted by the manufacturer. Dimensional tolerances should meet the PX standard. The dimensional tolerances around the mean values for length, width, and depth shall be 1/16". The pavers should be solid units without core holes or other perforations. The pavers shall meet or exceed ASTM C1272 Heavy Vehicular Paving Brick.

Brick Paver Descriptions:

NOTE: Paver colors and names are based on Belden Brick product descriptions.

Truck Apron: Color: Regimental Full Range
Pattern: Soldier course border along both curbs at top and bottom of apron with herringbone pattern field.

Crosswalks: Color: Regimental Red
Pattern: Herringbone

Bituminous Setting Bed

Asphalt cement to be used in the bituminous setting bed shall conform to AASHTO D3381. Viscosity grade shall be AC 10 or AC 20.

Fine aggregate to be used in the bituminous setting bed shall be clean, hard sand with durable particles and free from adherent coatings, lumps of clay, alkali salts, and organic matter. Aggregate shall be uniformly graded from "Coarse" to "fine" with 100% by weight passing the No. 4 sieve, 2-10% by weight passing the No. 200 Sieve, and shall meet the gradation requirements when tested in accordance with ASTM C-136-01.

Fine aggregate shall be dried and shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees F at the asphalt plant. The approximate proportion of materials shall be 7% asphalt cement and 93% fine aggregate. Each ton of material shall be apportioned by weight in the approximate ratio of 150 lbs asphalt cement to 1850 lb sand. The Contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet specified requirements and the Engineer's approval.

Neoprene-Modified Asphalt Setting Adhesive

Neoprene modified asphalt setting adhesive shall meet the following requirements:

Mastic (asphalt adhesive):

a) Solids (base) content by volume = 75 + 5%.
b) Weight = 8 to 8.5 lb./gal
c) Solvent vehicle - Varsol (over 75 degrees F flash).

Base (2% neoprene, 10% fibers, 82% asphalt):

a) Melting point (ASTM D-36-95) = 200 degrees F, minimum,
b) Penetration at 77 degrees F 3.5 oz. load 5 second = 23 to 27.
c) Ductility (ASTM D-113-99 at 77 degrees F 3/16"/minute) = 50 in. minimum.

Sand Joint Filler

1. Sand shall be a clean, washed, uniformly well graded masonry sand conforming to ASTM C-144-03, except that the fineness modulus shall be 2.25 +/- 0.10 Sand shall be from a single approved source. Source of supply shall not be changed during course of the work without written permission of the Engineer. Color to be approved by Engineer

Water

Water shall be potable, free of injurious contaminants.

Expansion Joints

Provide pre-molded rubber expansion joints as recommended by the paver manufacturer and approved by the Engineer.

Expansion Joint Sealant

Provide elastomeric caulk sealant as recommended by paver manufacturer and approved by Engineer.

3.03.04 Construction Methods:

Sample Panels

Display Panel: Construct a display panel, 3' x 3' (minimum size), for each paver type, size, color, and finish specimen in this Item for use by the Engineer in selecting pavers for project.

Display panel shall exhibit color range, texture, bond, jointing, patterns, and workmanship. A maximum of six display panels will be required. Display panels shall be portable with suitable lifting handles.

Delivery, Storage, and Handling

Pavers shall be carefully packed by the supplier for shipment. Pavers shall be stored off the ground and protected against staining and other damage.

Pavers damaged in any manner shall be receded and replaced with new materials at no additional cost.

Protection of Finished Surfaces

Finished surfaces adjacent to the paving work shall be adequately protected from soiling, staining, and other damage during construction.

Acceptability of Concrete Base

Contractor shall examine the concrete base slab to determine its adequacy to receive the asphalt setting bed and brick paving. Concrete shall have fully cured. Evidence of inadequate concrete base shall be immediately brought to the attention of the Engineer. Concrete base shall be paid for under Item No. 0303060A – 8" Reinforced Concrete Base for Pavers.

Start of work of this item shall constitute acceptance of concrete base slab.

Bituminous Setting Bed

Bituminous setting bed shall be installed over the fully cured concrete base. Control bars ¾" deep shall be placed directly over the concrete base. If grades must be adjusted, place wood chocks under depth control bars already set to bring the bars to proper grades. Set two bars parallel to each other to serve as guides for the striking board. The depth control bars must be set carefully so that the pavers, when laid on the setting be will be at the proper line and grade.

While still hot (not less than 270 degrees F) some of the bituminous bed material shall be placed between the parallel depth control bars. This bed shall be pulled with the striking board over the control bars several times. After each pass, low porous spots shall be showered with fresh bituminous material to produce a smooth, firm, and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. After the depth control bars and wood chocks have been removed, carefully fill all depressions that remain.

The setting bed shall be rolled with a power roller to a nominal depth of ¾" while still hot. The thickness of the setting bed shall be adjusted so that when the Licks are placed and rolled, the top surface of the pavers will be at the required finished grade.

A coating of neoprene-modified asphalt setting adhesive shall be applied by mopping, squeegeeing, or troweling over the top surface of the bituminous setting bed so as to provide a bond under the pavers. If adhesive is trowel-applied, trowel shall be serrated type with serration not to exceed 1/16".

After the neoprene-modified asphalt setting adhesive is applied, carefully place the pavers by hand in straight courses with hand tight joints and with a uniform, smooth top surface. All setting shall be done by skilled masons under adequate supervision.

Pavers shall be set true to the required lines and grades in the pattern detailed on the Drawings. Brick pavers shall be neatly cut and fitted at all perimeters and closures with joints uniform in width to that of adjacent paving. Pavers shall be cut with a water-cooled, cut-offwheel masonry saw using a diamond blade. Pavers with chips, cracks, stains or other defects which might be visible in the finished work, or which might cause such defects in the future, shall not be used.

Joint Treatments

Joints between pavers shall be hand tight and shall be uniform in width.

Joint filler mixture shall be swept dry into the joints between pavers until the joints are completely filled. Surface shall be swept clean.

Expansion Joints

Install expansion joints at interruptions in brickwork, in long spans, at curbs, at dissimilar materials, and as additionally directed by the Engineer.

ADA Warning Strip

The Detectable Warning Strip for new construction shall be set directly in poured concrete according to the plans and the manufacturer's specifications or as directed by the Engineer. The contractor shall place two 25 pound concrete blocks or sandbags on each tile to prevent the tile from floating after installation in wet concrete.

Cleaning and Protection of Brick Surfaces

After completion of paver paving, surfaces shall be carefully cleaned, removing all dirt, excess joint filler mixture, and all stains.

3.03.05 Method of Measurement: Brick Pavers on 8" Concrete Base Slab will be measured on a per square foot basis, complete, in-place, as shown on the Drawings, as specified herein, and as directed by the Engineer. The 8" concrete base slab will be measured for payment under other items.

3.03.06 Basis of Payment: Brick Pavers on 8" Concrete Base Slab will be paid for at the contract unit price per square foot for "Brick Pavers on 8" Concrete Base Slab" which will be full compensation for furnishing and installing brick pavers, complete, in- place, including furnishing and installing the bituminous setting bed, neoprene-modified asphalt setting adhesive, sand joint filler and expansion joints.

Pay Item	Pay Unit
Brick Pavers on 8" Concrete Base Slab	SF

ITEM # 0303051A GRANITE PAVERS ON 8" CONCRETE BASE SLAB

Description: The work of this item includes furnishing all materials, equipment, supplies, accessories, incidentals, labor and supervision, and performing all operations required to furnish and install granite pavers on a 8" concrete base slab as shown on the drawings, as specified herein, and as is additionally required to properly complete the work, including furnishing and installing the mortar setting bed, colored sand/cement joint filler mixture, and expansion joints.

Required Submittals:

A. Samples: Furnish not less than ten individual granite pavers of each size, type and color as samples, showing extreme variations in color and texture. Do not order granite for project until Engineer's approval of field sample panel.

B. Manufacturer's Product Data: Manufacturer's product data shall be submitted for the following items:
1. Granite Pavers
2. Coloring additive for sand/cement joint filler mixture
3. Mortar setting bed

C. Test Report:

1. Test report of granite pavers shall be submitted.
a. Testing shall be done by an independent testing laboratory. Test procedures shall conform to ASTM C-67-03 methods, as applicable. Test report shall indicate, as a minimum, the following:

- Compressive strength, psi
- Absorption, 5 hr. submersion in cold water.
- Absorption, 24 hr. submersion in cold water.
- Maximum saturation coefficient.
- Initial rate of absorption (suction).
- Abrasion index.
- Freeze-thaw.
- Tolerance to saline conditions.
- Efflorescence.

Materials:

Granite Paving Units

The granite paving units shall be 4"x4"x4" and shall conform to CT DOT M.12.06.

Mortar
Mortar for the bed and joints shall conform to CT DOT M.11.04.

Water

Water shall be potable, free of injurious contaminants.

Construction Methods:

Sample Panels

Display Panel: Construct a display panel, 5’ x 5’ (minimum size), for each paver type, size, color, and finish specimen in this Item for use by the Engineer in selecting pavers for project.

Display panel shall exhibit color range, texture, bond, jointing, patterns, and workmanship. A maximum of six display panels will be required. Display panels shall be portable with suitable lifting handles.

Delivery, Storage, and Handling

Pavers shall be carefully packed by the supplier for shipment. Pavers shall be stored off the ground and protected against staining and other damage.

Pavers damaged in any manner shall be receded and replaced with new materials at no additional cost.

Protection of Finished Surfaces

Finished surfaces adjacent to the paving work shall be adequately protected from soiling, staining, and other damage during construction.

Acceptability of Concrete Base

Contractor shall examine the concrete base slab to determine its adequacy to receive the asphalt setting bed and brick paving. Concrete shall have fully cured. Evidence of inadequate concrete base shall be immediately brought to the attention of the Engineer.

Start of work of this item shall constitute acceptance of concrete base slab.

Pavers shall be set true to the required lines and grades in the pattern detailed on the Drawings. Brick pavers shall be neatly cut and fitted at all perimeters and closures with joints uniform in width to that of adjacent paving. Pavers shall be cut with a water-cooled, cut-offwheel masonry saw using a diamond blade. Pavers with chips, cracks, stains or other defects which might be visible in the finished work, or which might cause such defects in the future, shall not be used.

Joint Treatments

Joints between pavers shall be hand tight and shall be uniform in width.

Joint filler mixture shall be swept dry into the joints between pavers until the joints are completely filled. Surface shall be swept clean. Swept surface shall then be thoroughly dampened with a low-volume fine spray of water.

Cleaning and Protection of Paver Surfaces

After completion of paver paving, surfaces shall be carefully cleaned, removing all dirt, excess joint filler mixture, and all stains.

Method of Measurement: Grantie Pavers on 8” Concrete Base Slab will be measured on a per square foot basis, complete, in-place, as shown on the Drawings, as specified herein, and as directed by the Engineer. The 8” concrete base slab will be measured for payment under other items.

Basis of Payment: Granite Pavers on 8” Concrete Base Slab will be paid for at the contract unit price per square foot for "Granite Pavers on 8” Concrete Base Slab” which will be full compensation for furnishing and installing masonry pavers, complete, in- place, including furnishing and installing the bituminous setting bed, neoprene-modified asphalt setting adhesive, colored sand/cement joint filler and expansion joints.

Pay Item	Pay Unit
Granite Pavers on 8” Concrete Base Slab	SF

ITEM #0303060A 8" REINFORCED CONCRETE BASE SLAB FOR PAVERS

Description: This item shall include the construction of a reinforced concrete slab on a processed traprock foundation in the locations and to the dimensions and details shown on the plans or as ordered by the Engineer all in accordance with these specifications.

Required Submittals:

Material Certificate of Compliance:

Submit material certificate of compliance for concrete and Processed Traprock in accordance with the contract general requirements.

Materials:

Foundation

All foundation material under concrete slab shall be processed traprock conforming to the following:

Small ¾" Processed Traprock:

Square Mesh Sieves	% Passing by Weight
Pass 1"	100
Pass 3/4"	90-100
Pass 3/8"	50-90
Pass #4	35-70
Pass #10	15-55
Pass #100	2-12
Pass #200	0-5

Concrete

All materials for this work shall conform to the requirements of Section M.03 of the State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, for Class "F" concrete.

Test for air content of fresh concrete shall be made during construction. Because of effects of mixing and vibration, samples for air content preferably should be taken from concentrate after it has been placed by qualified technicians per ASTM C-231- 03 or C-238-51.

The concrete producer will be required to show that his plant and equipment meet all requirements as established by ASTM designation C-94-04, and shall also be currently approved by the State of Connecticut, Department of Transportation.

All concrete mix used must be accompanied by a certification issued by the concrete producer showing the time of day on the batch slip and the composition of the concrete mix; that is the amount and type of cement; water; kind of air-entering admixture and the retarder admixture if any; and also a certification that the mix will attain the minimum compressive strength of 4,000 psi in 28 days.

Any concrete mix without the time of day stamped on the accompanying batch slip will be receded immediately. Also the concrete mix shall must be placed within 1 1/2 hours of the time of day stamped on the batch slip, otherwise it will be rejected.

Reinforcing
Wire mesh reinforcing to be famished in the concrete base under this item shall be plain finish, 6 inches X 6 inches, No. 10 gage welded steel wire mesh meeting ASTM specifications A-185-02.

Construction Methods:

Foundation

The processed traprock foundation shall be placed in two (2) equal courses the full width of the excavated area. Each course shall be compacted satisfactorily to a uniform surface with at least two passes of a motor driven vibratory compactor. Additional fine material shall be added to the top course to fill any voids that may have developed during compaction and to bring the completed foundation to true line and cross section to completed thickness of 8 inches. The top of the completed traprock foundation shall be below and parallel to the finished grade of the sidewalk or adjacent granite curb as shown on the drawings.

Should the sub-base material become churned up or mixed with the bottom course material at any time, the contractor shall, without additional compensation, remove the mixture, reshape and recompact the sub-base, and replace the material removed with clean coarse material which shall be compacted to a firm uniform surface.

Placing Concrete

The concrete shall be discharged and placed in a manner which will prevent separation of coarse aggregate and mortar. Concrete shall always be placed starting at the low end of the section and working upgrade.

Before placement of the concrete, the foundation shall be thoroughly moistened. This shall be done far enough in advance of placement to allow absorption of water to a depth of at least 1 inch, leaving a moist but not muddy surface.

The finished thickness of the concrete base shall be at least 8 inches. The concrete shall be placed to a uniform cross section consistent with the proposed cross slope and parallel to finished grade.

The time elapsing from the time water is added to the mix until the concrete is placed shall not exceed 90 minutes. In hot weather, the maximum allowable time may be reduced by the Engineer.

Finishing Concrete

The surface of the concrete shall be struck off to an elevation consistent with site details and be bull-floated to a smooth surface and broom finished.

Expansion Joints

Expansion material (½ inch thickness) as specified above shall be placed between new sidewalk and all existing walk, curbing, manholes, vaults, buildings and other structures.

Grade
The concrete at the expansion joints shall not be raised above the general surface of the walk.

Trim
All expansion joint material shall be neatly trimmed off flush with the surface of the walk.

Curing

All concrete base slab shall be cured as follows:

Immediately following the final finishing and as soon as possible without marring, the concrete shall be covered with cotton matting or waterproof paper for 72 hours.

Cotton matting, if used, shall be in good condition, shall be saturated with water prior placement, shall be suitably fastened down to prevent movement and shall be moist for the entire period it is in place.

Waterproof paper if used, shall be lapped at least 12 inches, shall cover the entire surface shall overlap all edges of the walks. The laps edges of the paper shall be securely weighted down with continuous planking, or piles of earth or other material to hold and keep all edges down tight.

Before use, all waterproof paper shall be checked for tears and holes, and all tears holes shall be repaired. Covers, which become unserviceable, will be replaced as ordered by the Engineer.

Wherever waterproof paper, if used, is found to have blown off or otherwise uncovered concrete before the end of the 72 hour period, the Contractor will be required to remove the paper and immediately cover the concrete with cotton and kept moist for an additional 24 hours.

When the concrete is poured during cold weather (night temperature below 42 degrees F) the concrete shall be protected by a layer of hay at least 6 inches thick and covered with waterproof paper or by other means acceptable to the Engineer. This protection shall be provided in addition to the curing procedure specified above and shall be maintained for at least four days after the day the concrete was poured.

Curing compounds shall not be used under any circumstances.

Method of Measurement:

This work will be measured by the actual number of square feet of completed and accepted 8” concrete base slab for pavers.

Basis of Payment:

This work will be paid for at the contract unit price per square foot for 8” Reinforced Concrete Base Slab For Pavers” complete in place, which price shall include doweled expansion, backfill, disposal of surplus material, processed traprock base, reinforced, equipment, tools, materials and labor incidental thereto.

Pay Item	Pay Unit
8” Reinforced Concrete Base Slab For Pavers	SF

ITEM # 0402901A GRANITE BLOCK PAVING

4.02.01 Description:

A. Work of this Section includes setting new granite paving including:

1. Granite paving units in patterns indicated, with sand-swept joints, and laid down on a sand setting bed over Structural Soil.
2. Granite paving units in patterns indicated, with mortared joints, laid down on a mortar setting bed over 8" reinforced concrete base.

B. Sequence paving and surfacing installations with work specified in other sections and shown on drawings, to receive materials for installation, and to match other materials of Project when furnished as specified in this Section.

C. Preparation of sand **s**etting bed and provision of steel edge restraints for complete installation.

D. Providing Field Samples/Mock-ups constructed to show portions of complete construction as representative of finished work:

1. Granite paving at tree pit on structural soil in a sand setting bed with sand joints.
2. Granite paving at truck blisters on reinforced concrete base in a mortar setting bed with mortared joints

4.02.02 Required Submittals:

A. Samples: Furnish not less than ten individual granite pavers of each size, type and color as samples, showing extreme variations in color and texture. Do not order granite for the project until Engineer's approval of field sample panel.

B. Manufacturer's Product Data shall be submitted for the following items:
   a. Submit Material Certification and Analysis Report for sand along with a one pound sample.
   b. Mortar joint and setting bed
   c. Pavement edging

B. Statements of Qualifications: Submit to identify and exhibit qualifications as specified in Article 4.02.03, herein.

C. Field Sample/Mock-ups**:** Construct at earliest possible time and at approved location before proceeding with respective work. Provide and construct to show appearance, workmanship, and finish of the granite paving, complete and in coordination with work of other Sections in these Specifications, as applicable:

1. Granite Pavement**:** Install paving surfacing mockups for both types of granite pavement. Size shall be a minimum 5 feet by 5 feet. Mock-up shall be complete and shall illustrate all base course construction, setting methods, final surface texture granite paver size and finish, and jointing representative of design conditions. Coordinate with material requirements as specified for all other adjacent and related materials.

2. The Field Samples/Mock-ups surfacing must be approved by Owner/Designer before actual paving work may proceed. If necessary, remove and reconstruct Field

Sample/Mock-up surfacing until approved. Approved sample surfacing shall serve as standard of acceptance for paving and surfacing work of this Section.

4.02.03 Quality Assurance

B. Installer Qualifications: Installations of paving system shall be by firm that can exhibit proof of a minimum five (5) years of prior successful experience with paving installations of equivalent type and similar scope of this Project.

3. Paving Installation Foreman: Installation firm for paving and surfacing of this Project shall have on staff a supervising Foreman assigned full time to this Project, beginning with the provision of mock-up installations, who shall be a competent, English-speaking supervisor, and who shall have at least 10 years' stone installation experience.

4. Use numbers of skilled workmen equal to work requirement or occasion. The skilled workmen shall be thoroughly trained and experienced in the necessary crafts**,** and shall be completely familiar with the specific requirements and methods needed for performance of the work in this Section.

4.02.04 Product Handling and Protection

A. Store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Component materials such as sand shall be stored with provisions for good drainage.

B. Protect paver units until ready for installation. Handle paving materials to prevent chipping, breakage, soiling or other damage.

C. Store granite paving units on wood skids or pallets, covered with non-staining, waterproof membrane, sheeting, or enclosure to protect them from detrimental weather conditions. Place and stack skids to distribute weight evenly and to prevent breakage or cracking. Allow air to circulate around the pavers during extended periods of storage.

4.02.05 Project / Site Conditions

A. Environmental Requirements:

- Prevent wind or rain disturbance of setting materials, protect from stormwater sheet flow from adjacent areas, and generally maintain optimum installation conditions.

- Do not install paving in conditions of standing water. Surface and subsurface drainage must be assured at all times.

- Cold Weather Protection:

a. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen sub-grade or setting beds.

b. Temperature: Do not install paving systems when the ambient temperature is below 40° F, or when there is frost in the base course, or at any other time when weather conditions are unsuitable for the type of material being placed.

4.02.06 Stone Materials

A. Characteristics and Quality:

- Stone shall be sound stock, and free from defects impairing strength, durability or appearance, such as cracks, seams, starts, holes, flaws or imperfections which have been patched or filled.

- Stone shall be uniformly consistent in color, value, graining texture, and other features to the extent inherent in each stone type.

- Units shall be clean, split-face cobbles, 4" deep, and with 4"x 4" face sizes.

Color: light gray.

4. Stone shall be cut to sizes, shapes, dimensions, and details shown on the drawings for each type and condition. There shall be no deviation from jointing shown or specified.

5. Exposed surfaces and edges of stone units shall be free from cracks, broken corners, chipped edges, scratches, or defects affecting appearances. No patching or hiding of defects will be permitted.

6. Shop Cutting, Drilling and Fitting: Include all cutting, drilling, and fitting of stone required to accommodate the work of other trades and to fit conditions on-site. In cutting and fitting, carefully cut and grind edges to a neat, tight, fit. Cutting shall be in such a manner so as not to impair strength or appearance.

4.02.07 Installation Materials

A. Sand Setting Bed Material: Provide clean, washed natural sand aggregate with material and grading in accordance with ASTM C-33.

B. Structural Soil Composition: As specified under "Structural Soil" in Item #0944105A.

C. Sand Joint Treatment (Filler): Sand shall conform to the following gradation in accordance with ASTM C144-84 and shall be a combination of manufactured sand and natural sand:

Sieve Size	**Percent Fines by Weight**
No. 4	100
No. 8	95 – 100
No. 16	70 – 100
No. 30	40 – 75
No. 50	20 – 40
No. 100	10 – 25
No. 200	0 – 10
% Fracture, by weight, Minimum:	75
Sand Equivalent, Minimum	40

1. The fracture requirement shall be at least two mechanically fractured faces and will apply to material retained on each sieve size No. 50 and above.

2. Color of Sand: Provide natural light color (not white) selected and approved by Owner/Designer, and as determined by color selection of joint filler.

3. Mortar for bedding and joints shall conform to CT DOT 11.04. It shall be non- staining. Use light gray cement color as approved by Owner / Engineer. Provide one source used to suit conditions specified.

a) Color of cement for final joint treatment: Use light gray cement color as approved by Owner/Designer.

D. Water – shall be potable and free of injurious contaminants.

E. Geotextile Filter Fabric
Acceptable products include but are not limited to:

A. "Hydronet Filter Fabric", Atlantic Geotextiles
20100 E 35th Drive, Aurora, CO 80011-8160
800-233-1510 or 303-373-1234
woven recycled polypropylene

A. "Filter Fabric", Invisible Structures, Inc.
20100 E 35th Drive, Aurora, CO 80011-8160
800-233-1510 or 303-373-1234
100% recycled HDPE non-woven filter fabric

A. "Hydronet Filter Fabric", EnviroSafe Products Corporation
355 Eisenhower Pky; Livingston, NJ 07039
973-535-1414
100% recycled PET & PVC

A. Or approved equal.

F. Edge Restraint

1. Steel Edging
a. Acceptable Manufacturers:

1. Border Concepts Inc., Charlotte, NC 28247 [www.BorderConcepts.com]
2. The J.D. Russell Company, Fraser, MI 48026 [www.jdrussellco.com]
3. Ryerson Co., Jersey City, NJ [www.jtryerson.com]
4. Or approved equal.

b. Provide ¼ inch thick by 5-inch deep edging with 15-inch long steel stakes. Color: Black as provided by manufacturer.

4.02.08 Surface Preparation

A. Layout of Work: Accurately lay out paving work to patterns and conditions shown on drawings and encountered on the site, and specified for installation. Provide additional control points and stakeouts as required to effect correct alignments and grade elevations. Advise Owner / Engineer of any discrepancies or on-site conditions detrimental to critical layouts and obtain approved correction.

B. When ready for setting, all paving units shall be clean and free from stain, dirt, or dust. If necessary, rinse well with clean water.

C. Verification of Structural Soil Installation:

A. Verify base course has been installed and compacted to proper depths and density as specified in Item #0944105A.

D. Acceptability of Concrete Base:
   a. Contractor shall examine the reinforced concrete base slab to determine its adequacy to receive the granite paving. Concrete shall have cured fully. Evidence of inadequate concrete base shall be immediately brought to the attention of the Engineer. Start of work shall constitute acceptance of the concrete base slab.

4.02.09 Paving Surface Installations

A. General:

- Pattern: Lay granite pavers in patterns indicated on drawings.

2. Granite pavers shall be cut or drilled as appropriate to conditions to fit around items penetrating grade and to adjust pattern/slope conditions of paving design as approved. Cut around site objects only, such as lights, manholes, etc. Execute cutting with a high-speed masonry saw producing squared, clean, and sharp edges.

   b. Granite pavers which are cut or split, such as required to accommodate utility elements or other adjacent conditions, shall have a minimum 4” depth, with a 2”x3” face size.

3. The surface edge of one paver unit shall be level with the next adjacent pavers so that no voids, rocking motions, or tripping hazards are encountered. In addition, comply with specified tolerances.

4. Tolerances

   a. Variation of Slope and Grade: Check slope and grade of installed paving units with a 12-foot long straightedge. Surface shall be true to grades and slopes indicated within 1/8” in 10 feet.

   b. Offset at Joints: Do not exceed plus or minus 1/32”.

   c. Joint width: Maximum 3/4”.

B. Dry Setting Bed Over Structural Soil

1. Install geotextile fabric over compacted base course (structural soil).

2. Provide a uniform bedding plane parallel to the finished pavement surface. The bed material shall be screeded to a surface tolerance of plus or minus 3/16-inch, giving a compacted thickness of 1 inch. The screeded course will be compacted with a light vibratory roller. The compacted bed material shall then be screeded again to a depth of 1/4-inch.

3. Pavers shall be installed to fit together accurately with joint widths as indicated on Drawings.

4. After a substantial area has been installed, a plate vibrator with soft protective pad shall be used to compact the paving stones into place and to vibrate the setting bed material up into the joints.

5. Joint Treatments:

a. If joint treatment installations are performed more than two (2) days after paver unit installation, or at such other times as conditions warrant, use a powered air blower to clean paving joints of debris before applying joint treatment.

b. For sand joints: Initial joint filler treatment of sand shall be spread and broom swept over the installed pavers. Next, at least one pass of the plate vibrator shall be made to consolidate the joint material in the joints. Sand shall then be swept into the joints until joints are filled flush to the top of the paving stones. Sweep excess material clean from the paving surface.

C. Installation of Edge Restraint

1. Lay edging on compacted Structural Soil Planting base course perpendicular to curb line to form tree pit to the dimensions shown on the plans and details.

2. Anchor each length of edge restraint with stakes at 12” centers and at corners.

D. Mortar Setting Bed over 8” Reinforced Concrete Base for Pavers

1. The reinforced concrete base shall have a clean, even surface.

2. Granite pavers shall be set on a mortar bed and settled into place using a heavy wooden rammer (or similar) to the line and grade required. Pavers shall be straight and true for full depth on mortar bed.

3. For mortar joints: Fog spray paving surface and filled joints lightly with water. After settlement of joint filler, repeat procedure of joint filler installation and add cement to sand and fog spray until joints are completely filled and compacted flush to surface. Verify complete filling after a period of at least 5 days and repeat filling procedure as necessary. Upon approved completion of the foregoing, the cobble paver surfaces shall be cleaned and washed down.

4.02.10 Cleaning and Repairing

A. Remove all cement, mortar, or stains from granite paving surface not more than six (6) days after installation of joint treatment. Use clean water and stiff bristle brushes to clean cement stains. Do not use wire brushes, acid type cleaning agents, or other cleaning compounds with caustic or harsh fillers.

B. Protect finished granite paving surface from ongoing construction activity. If construction activity must cross surfaces of finished paved surfaces, place clean plywood or planks in the lane of traffic flow and restrict traffic to protected areas.

C. Replace or repair defective, broken or damaged pavers or system components. Defective setting beds shall be removed and replaced. Unfilled or defective joints shall be repaired in compliance with specification requirements for installations.

1. System defects shall include, but not be restricted to, non-solid foundations, heaving, loosening under service conditions, uneven joints, uneven settling, stains, marks, evidence of improper bedding or alignment, and other imperfections of material and workmanship impairing performance, suitability for intended use or appearance.

4.02.11 Method of Measurement:

A. Granite Pavers on Structural Soil will be measured on a per square foot basis, complete, in-place as shown on the Drawings, as specified herein, and as directed by the Engineer. The Structural Soil will be measured for payment under other items.

B. Granite Pavers on 8" Reinforced Concrete Base will be measured on a per square foot basis, complete, in-place as shown on the Drawings, as specified herein, and as directed by the Engineer. The 8" Reinforced Concrete Base will be measured for payment under other items.

4.02.12 Basis of Payment:

A. Granite Pavers on Structural Soil will be paid for at the contract unit price per square foot for "Granite Pavers on Structural Soil" which will be full compensation for furnishing and installing granite pavers, sand setting bed and sand joint filler, complete and in-place.

B. Granite Pavers on 8" Reinforced Concrete Base will be paid for at the contract unit price per square foot for "Granite Pavers on 8" Reinforced Concrete Base" which will be full compensation for furnishing and installing granite pavers, mortar setting bed, mortar joints and expansion joints complete and in-place.

Pay Item	Pay Unit
Granite Pavers on Structural Soil	SF
Granite Pavers on 8" Reinforced Concrete Base	SF

ITEM # 0406010-1 BITUMINOUS CONCRETE CLASS 1

ITEM # 0406010-4 BITUMINOUS CONCRETE CLASS 4

Description: Where reference is made to bituminous concrete, it shall also refer to hot-mix asphalt (HMA) mixtures using the Marshall or Superpave mix-design method.

Work under this section shall consist of the production, delivery and placement of a non-segregated, smooth and dense bituminous concrete mixture brought to proper grade and cross section. This section shall also include the method and construction of longitudinal joints. The Contractor shall furnish Quality Control Plans for both plant production and placement of HMA mixtures.

The terms listed below as used in this specification are defined as:

Course: A lift or multiple lifts comprised of the same HMA mixture placed as part of the pavement structure.

Dispute Resolution: A procedure used to resolve conflicts resulting from discrepancies between the Engineer and the Contractor's density results that may affect payment.

Hot Mix Asphalt (HMA): A bituminous concrete mixture.

Disintegration: Wearing away or fragmentation of the pavement. Disintegration will be evident in the following forms: Polishing, weathering-oxidizing, scaling, spalling, raveling, potholes or loss of material.

Lift: A single HMA mixture placed at a defined thickness.

Marshall: A HMA mixture design designated as "Bituminous Concrete Class ( )."

Superpave: A HMA mixture design designated as "HMA S*." Where "S" indicates Superpave and * indicates the sieve related to the nominal maximum aggregate size of the mix. For example Superpave 0.50 inch is now designated as HMA S0.5.

Segregation: A non-uniform distribution of a HMA mixture in terms of volumetrics, gradation or temperature.

Quality Assurance (QA): All those planned and systematic actions necessary to provide confidence that a product or facility will perform as designed.

Quality Control (QC): The sum total of activities performed by the vendor (producer, manufacturer, and contractor) to ensure that a product meets contract specification requirements.

Materials: All materials shall conform to the requirements of Section M.04 of the Form 816, (latest edition) as amended and available on the Connecticut Department of Transportation webs site.

1. Materials Supply: The HMA mixture must be from one source of supply and originate from one HMA Plant unless authorized by the Engineer.

2. Recycle Option: The Contractor has the option of recycling reclaimed asphalt pavement (RAP) or Crushed Recycled Container Glass (CRCG) in HMA mixtures in accordance with Section M.04. CRCG shall not be used in the final lift of the surface course.

Construction Methods:

1. Material Documentation: All vendors producing bituminous concrete must have their truck-weighing scales, storage scales, and mixing plant automated to provide a detailed ticket.

Delivery tickets must include the following information:
State of Connecticut printed on ticket.
Name of producer, identification of plant, and specific storage bin (silo) if used.
Date and time of day.
Mixture Designation (If RAP is used, the plant printouts shall include RAP dry weight, percentage and daily moisture content.) Class 3 mixtures for machine-placed curbing must state "curb mix only".
Net weight of mixture loaded into truck (When RAP is used, RAP moisture shall be excluded from mixture net weight).
Gross weight (Either equal to the net weight plus the tare weight or the loaded scale weight).
Tare weight of truck – Daily scale weight.
Project number, purchase order number, name of contractor (if contractor other than producer).
Truck number for specific identification of truck.
Individual aggregate, RAP, and virgin asphalt high/target/low weights shall be printed on batch plant tickets (For drum plants and silo loadings, the plant printouts shall be printed out at 5 minute intervals maintained by the vendor for a period of three years after the completion of the project).

The net weight of mixture loaded into the truck must be equal to the cumulative measured weight of its components.

The Contractor must notify the Engineer immediately if, during the production day, there is a malfunction of the weighing or recording system in the automated plant or truck-weighing scales. Manually written tickets containing all required information will be allowed for one hour, but for no longer, provided that each load is weighed on State-approved scales. At the Engineer's sole discretion, trucks may be approved to leave the plant if a State inspector is present to monitor weighing. If such a malfunction is not fixed within forty-eight hours, mixture will not be approved to leave the plant until the system is fixed to the Engineer's satisfaction. No damages will be considered should the State be unable to provide an inspector at the plant.

The State reserves the right to have an inspector present to monitor batching and /or weighing operations.

2. Transportation of Mixture: Trucks with loads of bituminous concrete being delivered to State projects must not exceed the statutory or permitted load limits referred to as gross vehicle weight (GVW). The Contractor shall furnish a list of all vehicles and allowable weights transporting mixture.

The State reserves the right to check the gross and tare weight of any delivery truck. A variation of 0.4 percent or less in the gross or tare weight shown on the delivery ticket and the certified scale weight shall be considered evidence that the weight shown on the delivery ticket is correct. If the gross or tare weight varies from that shown on the delivery ticket by more than 0.4 percent, the Engineer will recalculate the net weight. The Contractor shall take action to correct discrepancy to the satisfaction of the Engineer.

If a truck delivers mixture to the project and the ticket indicates that the truck is overweight, the load will not be rejected but a "Measured Weight Adjustment" will be taken in accordance with Section 112.4.

The mixture shall be transported from the mixing plant in trucks that have previously been cleaned of all foreign material and that have no gaps through which mixture might inadvertently escape. The use of kerosene, gasoline, fuel oil, or similar products for the coating of the inside of truck bodies is prohibited.

Truck body coating and cleaning agents must not have a deleterious effect on the transported mixture. When acceptable coating or agents are applied, truck bodies shall be raised immediately prior to loading to

remove any excess agent in an environmentally acceptable manner. The Contractor shall take care in loading trucks uniformly so that segregation is minimized.

Loaded trucks shall be tightly covered with waterproof covers acceptable to the Engineer. Mesh covers are prohibited. The front and rear of the cover must be fastened to minimize air infiltration. The Contractor shall assure that all trucks are in conformance with this specification. Trucks found not to be in conformance shall not be allowed to be loaded until re-inspected to the satisfaction of the Engineer.

3. Paving Equipment: The Contractor shall have the necessary paving and compaction equipment at the project site to perform the work. All equipment shall be in good working order and any equipment that is worn, defective or inadequate for performance of the work shall be repaired or replaced by the Contractor to the satisfaction of the Engineer. The use of solvents or fuel oil as a release agent on any paving equipment (i.e., rollers, pavers, transfer devices, etc.) is strictly prohibited.

Refueling of equipment is prohibited in any location on the paving project where fuel might come in contact with bituminous concrete mixtures already placed or to be placed. Solvents for use in cleaning mechanical equipment or hand tools shall be stored clear of areas paved or to be paved. Before any such equipment and tools are cleaned, they shall be moved off the paved or to be paved area; and they shall not be returned for use until after they have been allowed to dry.

Pavers: Each paver shall have a receiving hopper with sufficient capacity to provide for a uniform spreading operation and a distribution system that places the mix uniformly, without segregation. The paver shall be equipped with and use a vibratory screed system with heaters or burners. The screed system shall be capable of producing a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Pavers with extendible screed units as part of the system shall have auger extensions and tunnel extenders as necessary. Automatic screed controls for grade and slope shall be used at all times unless otherwise authorized by the Engineer. The controls shall automatically adjust the screed to compensate for irregularities in the preceding course or existing base. The controls shall maintain the proper transverse slope and be readily adjustable, and shall operate from a fixed or moving reference such as a grade wire or floating beam.

Rollers: All rollers shall be self-propelled and designed for compaction of bituminous concrete. Rollers types shall include steel-wheeled, pneumatic or a combination there of and may be capable of operating in a static or dynamic mode. Rollers that operate in a dynamic mode shall have drums that use a vibratory or oscillatory system or combination of. The vibratory system achieves compaction through vertical amplitude forces. Rollers with this system shall be equipped with indicators that provide the operator with amplitude, frequency and speed settings/readouts to measure the impacts per foot during the compaction process. The oscillatory system achieves compaction through horizontal shear forces. Rollers with this system shall be equipped with frequency indicators. Rollers can operate in the dynamic mode using the oscillatory system on concrete structures such as bridges and catch basins if at the lowest frequency setting.

Pneumatic tire rollers shall be self-propelled and equipped with wide-tread compaction tires capable of exerting an average contact pressure from 60 to 90 pounds per square inch uniformly over the surface, adjusting ballast and tire inflation pressure as required. The Contractor shall furnish evidence regarding tire size; pressure and loading to confirm that the proper contact pressure is being developed and that the loading and contact pressure are uniform for all wheels.

4. Seasonal Requirements: Paving shall be divided into two seasons, In-Season and Extended Season; In-Season shall be from May 1 – September 30, and Extended Season shall be from October 1- April 30. In no case shall the final lift of HMA be placed during the extended season unless otherwise authorized or directed by the Engineer. No HMA mixes shall be placed when the air or base temperature is below 32°F. HMA for temporary pavement will be subject to the seasonal requirements unless otherwise authorized or directed by the Engineer.

Additional Requirements for Extended Season:

The minimum mixture temperature for all HMA mixtures in the delivery truck prior to discharge into the paver or transfer vehicle hopper shall be 290°F. The temperature will be taken from the initial discharge of mixture from the truck. If found to be below the minimum requirement, the truck will not be allowed to unload remaining mixture.

The Contractor shall use a minimum of 3 rollers with operators for paving lengths greater than 1000 feet. Two rollers must be capable of operating in the dynamic mode.

The Contractor's Quality Control Plan shall include a section on Extended Season Paving and address paver speed, roller patterns and balancing mixture delivery and placement operations to meet specification requirements.

5. Superpave Test Section: The Engineer may require the Contractor to place a test section whenever the requirements of this specification or M.04 are not met.

The Contractor shall submit the quantity of mixture to be placed and the location of the test section for review and acceptance by the Engineer. The equipment used in the construction of a passing test section shall be used throughout production.

If a test section fails to meet specifications, the Contractor shall stop production, make necessary adjustments to the job mix formula, plant operations, or procedures for placement and compaction. The Contractor shall construct test sections, as allowed by the Engineer, until all the required specifications are met. All test sections shall also be subject to removal as set forth in Section 1.06.04 of the Form 816.

6. Transitions for Roadway Surface: Transitions shall be formed at any point on the roadway where the pavement surface deviates, vertically, from the uniform longitudinal profile as specified on the plans. Whether formed by milling or by bituminous concrete mixture, all transition lengths shall conform to the criteria below unless otherwise specified.

Permanent Transitions: A permanent transition is defined as any transition that remains as a permanent part of the work. All permanent transitions, leading and trailing ends shall meet the following length requirements:

a) Roadways greater than 35 MPH = 30 feet per inch of vertical change (thickness)
b) Roadways 35 MPH or less = 15 feet per inch of vertical change (thickness).
c) Bridge Overpass and underpass transition length will be 75 feet either
    (1) Before and after the bridge expansion joint, or
    (2) Before or after the parapet face of the overpass.

In areas where it is impractical to use the above described permanent transition lengths the use of a shorter permanent transition length may be permitted when approved by the Engineer.

Temporary Transitions: A temporary transition is defined as a transition that does not remain a permanent part of the work. All temporary transitions shall meet the following length requirements:

a) Roadways greater than 35 MPH
    (1) Leading Transitions = 15 feet per inch of vertical change (thickness)
    (2) Trailing Transitions = 6 feet per inch of vertical change (thickness)

b) Roadways 35 MPH or less

(1) Leading and Trailing = 4 feet per inch of vertical change (thickness)

Note: Any temporary transition to be in-place over the winter shutdown period, holidays, or during extended periods of inactivity (more than 7 calendar days) shall conform to the "Permanent Transition" requirements shown above.

7. Spreading and Finishing of Mixture: Prior to the placement of the bituminous concrete, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance. Immediately before placing the mixture, the area to be surfaced shall be cleaned by sweeping or by other means acceptable to the Engineer. The HMA mixture shall not be placed whenever the surface is wet or frozen. The temperature of the mix at time of placement must be between 265°F and 325°F. The Engineer will verify the mix temperature by means of a probe or infrared type of thermometer. Rejection of mixture based on temperature will only be allowed if verified by means of a probe type thermometer.

Placement: The HMA mixture shall be placed and compacted to provide a smooth, dense surface with a uniform texture and no segregation at the designed thickness and dimensions indicated in the plans and specifications. The maximum paver speed during placement shall not exceed 40 ft/min unless authorized by the Engineer.

When unforeseen weather conditions prevent further placement of the mix, the Engineer is not obligated to accept or place the bituminous concrete mixture that is in transit from the plant.

In advance of paving, traffic control requirements shall be set up daily, maintained throughout placement, and shall not be removed until all associated work including density testing is completed.

The Contractor shall inspect the newly placed pavement for defects in the mixture or placement before rolling is started. Any deviation from standard crown or section shall be immediately remedied by placing additional mixture or removing surplus mixture. Such defects shall be corrected to the satisfaction of the Engineer.

Where it is impractical due to physical limitations to operate the paving equipment, the Engineer may permit the use of other methods or equipment. Where hand spreading is permitted, the mixture shall be placed by means of suitable shovels and other tools, and in a uniformly loose layer at a thickness that will result in a completed pavement meeting the designed grade and elevation.

Placement Tolerances: Each lift of HMA placed at a uniform design thickness shall meet the following requirements for thickness and area. Any pavement exceeding these limits shall be subject to an HMA adjustment or removal. Lift tolerances will not relieve the Contractor from meeting the final designed grade. Lifts of designed non-uniform thickness, i.e. wedge or shim course, shall not be subject to thickness and area adjustments.

a) Thickness- Where the total thickness of the lift of mixture exceeds that shown on the plans beyond the tolerances shown in Table 2, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating a HMA adjustment.

TABLE 2 - Thickness Tolerances

Mixture Designation	Lift Tolerance
Class 4 and HMA S1	+/- $^{3}/_{8}$ inch
Class 1, 2 and 12 and HMA S0.25, S0.375, S0.5	+/- ¼ inch

Where the thickness of the lift of mixture is less than that shown on the plans beyond the tolerances shown in Table 2, the Contractor, with the approval of the Engineer, shall take corrective action in accordance with this specification.

b) Area- Where the width of the lift exceeds that shown on the plans by more than the designed thickness of each lift, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating a HMA adjustment.

c) Delivered Weight of Mixture - When the delivery ticket shows that the truck exceeds the allowable gross weight for the vehicle type the quantity of tons representing the over weight will be documented by the Engineer for use in calculating a HMA adjustment.

Transverse Joints: All transverse joints shall be formed by saw-cutting a sufficient distance back from the previous run, existing bituminous concrete pavement or bituminous concrete driveways to expose the full thickness of the lift. A brush of tack coat shall be used on any cold joint immediately prior to additional bituminous concrete mixture being placed.

Tack Coat Application: A thin uniform coating of tack coat shall be applied to the pavement immediately before overlaying and be allowed sufficient time to break (set). All surfaces in contact with the HMA that have been in place longer than 3 calendar days shall have an application of tack coat. The tack coat shall be applied by a non-gravity pressurized spray system that results in uniform overlapping coverage at a target application rate of 0.07 + 0.02 gallons per square yard for a non-milled surface and a target application rate of 0.12 + 0.02 gallons per square yard for a milled surface. For areas where both milled and un-milled surfaces occur, the tack coat shall be a target application rate of 0.07 + 0.02 gallons per square yard. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall not be heated in excess of 160°F and shall not be further diluted.

Compaction: The Contractor shall compact the mixture to meet the density requirements as stated in Section 4.06.03-11 and eliminate all roller marks without displacement, shoving, cracking, or aggregate breakage.

The Contractor shall only operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting on concrete structures such as bridges and catch basins. The use of the vibratory system on concrete structures is prohibited.

Rollers operating in the dynamic mode shall be shut off when reversing directions.

If the Engineer determines that the use of compaction equipment in the dynamic vibratory mode may damage highway components, utilities, or adjacent property, the Contractor shall provide alternate compaction equipment. The Engineer may allow the Contractor to operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting.

These allowances will not relieve the Contractor from meeting pavement compaction requirements.

Surface Requirements: The pavement surface of any lift shall meet the following requirements for smoothness and uniformity. Any irregularity of the surface exceeding these requirements shall be corrected by the Contractor.

a) Smoothness- Each lift of the surface course shall not vary more than ¼ inch from a Contractor-supplied 10 foot straightedge. For all other lifts of HMA, the tolerance shall be 3/8 inch. Such tolerance will apply to all paved areas.

b) Uniformity- The paved surface shall not exhibit segregation, rutting, cracking, disintegration, flushing or vary in composition as determined by the Engineer.

8. HMA Longitudinal Joint Construction Methods: Unless noted on the plans or the contract documents or directed by the Engineer, the Contractor shall use Method I- Notched Wedge when constructing longitudinal joints where lift thicknesses are between 1½ and 3 inches. Method II shall be used for lifts less than 1½ inches or greater than 3 inches. During placement of multiple lifts of HMA, the longitudinal joint shall be constructed in such a manner that it is located at least 6 inches from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines.

Method I - Notched Wedge Joint:

A notched wedge joint shall be constructed, as shown in the figure using a device attached to the paver screed that is capable of producing a uniform slope.

The taper portion of the joint must be placed over the longitudinal joint in the lift immediately below. The top vertical notch must be located at the centerline or lane line in the final lift. The requirement for paving full width “curb to curb” as described in Method II will be waived in those areas where the notched wedge joint is utilized.

The taper portion of the wedge joint shall be compacted and not be exposed to traffic for more than 5 calendar days.

The existing pavement surface under the wedge joint must have an application of tack coat material. Prior to placing completing pass (hot side), an application of tack coat must be applied to the tapered section.

Any exposed wedge joint must be located to allow for the free draining of water from the road surface.

The Engineer reserves the right to define the paving limits when using a wedge joint that will be exposed to traffic.

Method II - Butt Joint:

When adjoining HMA passes are placed, the Contractor shall utilize equipment that creates a near vertical edge (refer to figure). The completing pass (hot side) shall have sufficient mixture so that the compacted thickness is not less than the previous pass (cold side). The end gate on the paver should be set so there is an overlap onto the cold side of the joint.

The Contractor shall not allow any butt joint to be incomplete at the end of a work shift unless otherwise allowed by the Engineer. When using this method, the Contractor is not allowed to leave a vertical edge exposed at the end of a work shift and must complete paving of the roadway full width “curb to curb.”

Method III- Butt Joint with Hot Poured Rubberized Asphalt Treatment: When required by the contract or allowed by the Engineer, Method III may be used.

All of the requirements of Method II must be met with Method III. In addition, the longitudinal vertical edge must be treated with a hot poured rubberized asphalt material prior to placing a completing pass. The rubberized asphalt material shall be applied in accordance with the manufacturer’s recommendation so as to provide a uniform coverage and avoid excess bleeding onto the newly placed pavement.

9. Contractor Quality Control (QC) Requirements for HMA Placement: A Quality Control Plan (QCP) shall be required for any project that has a total of 2500 tons or more of HMA.

Quality Control is defined as all those planned and specified actions or operations necessary to produce bituminous concrete that will meet contract specification requirements. The Contractor shall be responsible for quality control throughout the production and placement operations. Therefore, the Contractor must ensure that the materials, mixture and work provided by Subcontractors, Suppliers and Producers also meet contract specification requirements.

Quality Control Plan: Prior to placement and production, the Contractor shall submit a QCP to the Engineer for approval. The QCP shall include separate sections for HMA Plant Production and for HMA Placement which shall describe the organization and procedures which the Contractor shall use to administer quality control. The QCP shall include the procedures used to control the HMA production and placement process, to determine when immediate changes to the processes are needed, and to implement the required changes. The QCP must address the actions, inspection, sampling and testing necessary to keep the production and placement operations in control, to determine when an operation has gone out of control and to respond to correct the situation and bring it back into control.

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications. The Quality Control Manager shall be directly responsible to the Contractor and shall have the authority to make decisions where the quality of the work or product is concerned. All sampling, inspection and test reports shall be reviewed and signed by the Quality Control Manager prior to submittal to the Engineer.

Approval of the QCP will be based on the inclusion of all of the required information. Approval of the QCP does not imply any warranty by the Engineer that adherence to the plan will result in production of HMA that complies with these specifications. It shall remain the responsibility of the Contractor to demonstrate such compliance. The Contractor may propose in writing a supplement to the QCP as work progresses and must propose a supplement whenever there are changes in production or placement of HMA or to quality control procedures or personnel. HMA production and placement may be suspended by the Engineer until the revisions to the QCP have been put into effect.

The Quality Control Plan shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor.

Quality Control Inspection, Sampling and Testing: The Contractor shall perform all quality control sampling and testing, provide inspection, and exercise management control to ensure that HMA production and placement conforms to the requirements as outlined in its QCP during all phases of the work.

a) Control Charts: The Contractor shall develop and maintain control charts and shall be distributed as directed by the Engineer. The control charts shall identify the project, test number, test parameter, applicable upper and lower specification limits, and test data. The control charts shall be used as part of the quality control system to document variability of the HMA production and placement process. The control charts shall be kept current. The control charts shall be updated each day of HMA production, and up-to-date copies shall be distributed prior to the beginning of the next day's production of HMA.

b) Records of Inspection and Testing: For each day of HMA production and placement, the Contractor shall document all test results and inspections on forms approved by the Engineer. The document shall be certified by the Quality Control Manager or his representative that the information in the document is accurate, and that all work complies with the requirements of the contract.

The Contractor shall submit sampling, testing and inspection documents to the Engineer within 24 hours or by noon of the next day's HMA production. If the document is incomplete or in error, a copy of the document will be returned to the Contractor with the deficiencies noted by the Engineer. The Contractor shall correct

the deficiencies and return the updated document to the Engineer by the start of the following working day. When errors or omissions in the sampling, inspection or testing documents repeatedly occur, the Contractor shall correct the procedures by which the documents are produced.

If control charts, sampling, testing and inspection documents are not distributed or provided as required within the time specified the Engineer may require work to be suspended until the missing documents have been provided.

Additional requirements for HMA plant production are defined in Section M.04 of the Form 816, as amended.

10. Core Correlation Procedure for Density Testing of HMA: Core correlation is required for all limited access highways and any other roadways in which 10,000 tons or more HMA mixture is placed.

This procedure describes the frequency and the method the Contractor shall use to obtain pavement cores from the project. Coring shall be performed the first time a HMA lift requiring density testing is placed. Prior to receiving core results, the HMA density acceptance will be determined using a nuclear density gauge correlated to the standard block located at the Department's Material Testing Laboratory. The gauge will be correlated to the core results once they are known.

The Contractor shall provide a minimum of one set of cores (5 cores per set) for each lift that will be tested for density. The Contractor may be required to provide additional sets of cores under the following conditions:

a) A change in source of component aggregates.
b) Any change in the average Gmm greater than 0.030 as indicated in the plant test results representing cored mixture.
c) Change in materials supplied in Section 4.06.02-1.

The Contractor shall extract 5 cores (6 inch diameter-wet sawed) from sampling locations determined by the Engineer. The Engineer will witness the extraction and labeling of cores. The cores shall be labeled by the Contractor with number, location, date and delivered in a safe manner to ensure no damage occurs (i.e., core 1M for first mat core; core 1J for first joint core, etc) to Department personnel as directed by the Engineer. The cores will be tested by the Engineer in accordance with AASHTO T 331(M).

Any cores that are damaged or obviously defective while being obtained will be replaced with new cores from a location within a 2 foot radius.

Core holes shall be filled immediately upon core extraction by removing any free water, applying tack coat to the cut surface, filling with same HMA mixture, and compacting with hand compactor or other mechanical means to the maximum compaction possible. The field mixture shall be compacted to 1/8 inch above the finished pavement prior to opening the roadway to traffic.

11. Acceptance Inspection, Sampling and Testing: Inspection, sampling, and testing to be used by the Engineer shall be performed at the minimum frequency specified in Section M.04 and stated herein.

Sampling for acceptance shall be established using a statistically based procedure of random sampling approved by the Engineer.

HMA Plant Material Acceptance: The Contractor shall provide the required acceptance sampling, testing and inspection during all phases of the work in accordance with Section M.04.

HMA Density Acceptance: All acceptance testing will be performed by the Engineer for the completed pavement course on roadways and bridges in accordance with the Department's density testing procedures.

Each lift designed to a compacted lift of 1½ inches or more shall have the HMA pavement including the longitudinal joints compacted to 94.5 +/- 2.5 percent of the maximum theoretical gravity. Bituminous Concrete Class 4 and HMA S1 are excluded from the longitudinal joint density requirements.

12. Density Dispute Resolution Process: The Contractor and Engineer will work in partnership to avoid potential conflicts and to resolve any differences that may arise during quality control or acceptance testing for density. Both parties will review their sampling and testing procedures and results and share their findings. If the Contractor disputes the Engineer's test results, the Contractor must submit in writing a request to initiate the Dispute Resolution Process within 10 calendar days of the placement of the mixture. No request for dispute resolution will be allowed unless the Contractor provides quality control results supporting its position. Should the dispute not be resolved through evaluation of existing testing data or procedures, the Engineer may authorize the Contractor to obtain representative core samples of the pavement. The core samples must be extracted no later than 30 calendar days from the date of Engineer's authorization. Core samples shall be located using the stratified random sampling procedure in accordance with ASTM D 3665 as determined by the Engineer. Core samples shall be extracted and filled using the procedure outlined in the Core Correlation Procedure. The densities from the 5 representative cores will be averaged for determining the final HMA density acceptance including any payment adjustments, in accordance with Section 112.4-2 that may apply.

13. Corrective Work Procedures: Any portion of the completed pavement that does not meet the requirements of the specification shall be corrected at the expense of the Contractor. Any corrective courses placed as the final wearing surface shall not be less than 1½ inches in thickness after compaction.

If pavement placed by the Contractor does not meet the specifications, and the Engineer requires its replacement or correction, the Contractor shall:

a) Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
- Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.
- Proposed work schedule.
- Construction method and sequence of operations.
- Methods of maintenance and protection of traffic.
- Material sources.
- Names and telephone numbers of supervising personnel.

b) Perform all corrective work in accordance with the Contract and the approved corrective procedure.

14. Protection of the Work: The Contractor shall protect all sections of the newly finished pavement from damage that may occur as a result of the Contractor's operations for the duration of the Project. Prior to the Engineer's authorization to open the pavement to traffic, the Contractor is responsible to protect the pavement from damage.

15. Joints and Cracks in Bituminous Concrete Pavement: Work under this section shall consist of constructing new joints or repairing existing joints and cracks.

Equipment: All equipment necessary for the work shall meet the following requirements:

a) Kettle: The unit shall be a combination melter and pressurized applicator of a double-boiler type with space between the inner and outer shells filled with oil or other material not having a flash point of less than 600°F. The kettle shall include a temperature control indicator and mechanical agitator. The kettle shall be capable of maintaining the material at a temperature within 15°F of the manufacturer's recommended temperature.

b) Compressor: The compressor shall have a sufficient capacity and length of hose to enable a continuous sealing operation.

c) Saw: The saw shall be capable of providing a straight cut of uniform depth and width.

Joint Seal Material: Material that is heated or cooled beyond the manufacturer's recommended temperature range shall be discarded.

Sawing and Sealing Joints in Bituminous Concrete Pavement: Work under this item shall consist of making a straight-line saw cut transversely across the final lift of HMA pavement directly over the new and existing Portland Cement concrete (PCC) transverse joints. The sawing and sealing of joints shall be completed for HMA pavements with a total depth of 3 inches or greater. The saw cut shall be immediately cleaned and sealed with a joint seal material. The sawing and sealing shall commence within one week of the completion of the final lift of pavement and be a continuous operation until all joints have been completed.

Prior to the paving operation, the Contractor shall establish sufficient controls to locate each transverse joint. This work shall include setting markers at each joint to reference its location and alignment, and having each of these markers tied and referenced. A written procedure for this work shall be submitted to the Engineer for review prior to commencement of such work.

The saw cut will be made by using diamond saw blades with a gang blade arrangement in order to achieve the joint detail as shown on the plans. The saw cut will be in a straight line across the pavement directly over the joint. Transverse joints shall extend to a point 2 feet beyond the underlying PCC pavement. The sawed joints shall be cleaned with compressed air to the satisfaction of the Engineer.

Immediately following the cleaning, the joint seal material shall be installed. When cooled, the top of the sealant material shall be recessed a minimum of 1/16 inch but not greater than 1/8 inch below the adjacent pavement surface. The roadway shall not be opened to traffic until the material has become tack free. Any depression in the sealer greater than 1/8 inch shall be brought up to the specified limit by further addition of joint seal material. Care shall be taken during the sealing operation to ensure that overfilling and spilling of material is avoided.

Any reflective cracking attributable to improper joint referencing or construction shall be repaired at the expense of the Contractor, in a manner approved by the Engineer for a period of one year from the date of completion of any sawed and sealed portion of final pavement.

Cleaning and Sealing Joints and Cracks in Pavement: Work under this item shall consist of cleaning existing joints and cracks of all dirt, dust, loose joint material, and all deleterious matter with compressed air as directed by and to the satisfaction of the Engineer. After a sufficient number of joints and cracks have been cleaned so as to ensure a continuous operation, all joints and cracks shall be sealed with joint seal material.

Cutting and Sealing Joints in the Bituminous Concrete Shoulder: When PCC pavement is the final wearing surface a longitudinal saw cut at the interface of the bituminous concrete shoulder and PCC pavement shall be made. The saw cut shall be made in the bituminous concrete shoulder to expose the abutting edge of the PCC pavement. The size of the saw cut shall be ½ inch wide by 1½ inches deep.

Kerf Cut in Bituminous Concrete Pavement: If the final lift of pavement will not be completed prior to winter shutdown, each exposed course shall have a ¼ inch by ¼ inch kerf cut above the new and existing transverse joints. The kerf shall be cut with a saw or abrasive wheel approved by the Engineer. The kerf cut shall not be sealed.

16. Cut Bituminous Concrete Pavement: Work under this item shall consist of making a straight-line cut in the bituminous concrete pavement to the lines delineated on the plans or as directed by the Engineer. The cut shall provide a straight, clean, vertical face with no cracking, tearing or breakage along the cut edge.

Method of Measurement:

1. Bituminous Concrete Class ( ) or HMA S* : The quantity of bituminous concrete measured for payment will be determined by the documented net weight in tons accepted by the Engineer in accordance with this specification and Section M.04 of the Form 816, as amended.

2. HMA Adjustments: Adjustments may be applied to bituminous concrete quantities and will be measured for payment using the following formulas:

Yield Factor for Adjustment Calculation = 0.0575 Tons/SY/inch

Actual Area = [(Measured Length (ft)) x (Avg. of width measurements (ft))]

Actual Thickness (t) = Total tons delivered / [Actual Area (SY) x 0.0575 Tons/SY/inch]

a) Area: If the average width exceeds the allowable tolerance, an adjustment will be made using the following formula. The tolerance for width is equal to the designed thickness (in.) of the lift being placed.

Tons Adjusted for Area (TA) = [(L x Wadj)/9] x (t) x 0.0575 Tons/SY/inch = (-) Tons

Where: L = Length (ft)
(t) = Actual thickness (inches)
Wadj = (Designed width (ft) + tolerance /12) - Measured Width)

b) Thickness: If the actual thickness is less than the allowable tolerance, the Contractor shall submit a repair procedure to the Engineer for approval. If the actual thickness exceeds the allowable tolerance, an adjustment will be made using the following formula:

Tons Adjusted for Thickness (TT) = A x tadj x 0.0575 = (-) Tons

Where: A = Area = {[L x (Designed width + tolerance (lift thickness)/12)] / 9}
tadj = Adjusted thickness = [(Dt + tolerance) - Actual thickness]
Dt = Designed thickness (inches)

c) Weight: If the quantity of bituminous concrete representing the mixture delivered to the project is in excess of the allowable gross vehicle weight (GVW) for each vehicle, an adjustment will be made using the following formula:

Tons Adjusted for Weight (TW) = GVW – DGW= (-) Tons

Where: DGW = Delivered gross weight as shown on the delivery ticket or measured on a certified scale.

d) Mixture Adjustment: If the quantity of bituminous concrete representing the produced mixture exceeds one or more of the production tolerances for Marshall (Table 3) or Superpave mix designs (Table 3A & 3B) , an adjustment will be made using the following formulas. The Department's Division of Material Testing will calculate the daily adjustment values for TMD and TSD.

(1) Marshall Design- The tolerances shown in Table 3 for gradation and binder content will be used to determine whether a mixture adjustment will apply. If the mixture does not meet the requirements of Section M.04 of the Form 816, an adjustment will be computed using the following formula:

Tons Adjusted for Marshall Design (TMD) = M x 0.10

Where: M= Tons of bituminous concrete mixture exceeding tolerances in Table 3

TABLE 3
TOLERANCES FOR CONSECUTIVE TESTS (MARSHALL)

Classes	Criteria	% Tolerances (+/-)
-	Binder	0.4
1, 2, 4, 5, 5A & 5B	#200	2.0
1, 2, 4	#50	4
1, 2, 5, 5A & 5B	#30	5
1, 2, 4, 5, 5A & 5B	#8	6
1, 2, 4, 5, 5A & 5B	#4	7
1, 2, 4, 5, 5A & 5B	3/8 & ½ inch	8

(2) Superpave Design- The adjustment values in Table 3A & 3B shall be calculated for each sub lot based on the Air Void and Liquid Binder Content test results for that sub lot. The total adjustment for each day's production (lot) will be computed using tables and the following formulas:

Tons Adjusted for Superpave Design (TSD) = (AVa + APb) x Tons

Adjustment for Air Void = AVa = [(Va1 + Va2 + Vai +…+ Van)] / n

Where: Va = Total air void adjustment value for the lot
Vai = Adjustment value from Table 3A resulting from each sub lot
n = number of air void tests in a production lot

TABLE 3A
ADJUSTMENT VALUES FOR AIR VOIDS (SUPERPAVE)

Adjustment Value (AVa) (%)	HMA S0.25, S0.375, S0.5, S1 Air Voids (Va)
+2.5	3.5 - 4.5
0.0	3.0 - 3.4 or 4.6 - 5.0
- 5.0	2.7 - 2.9 or 5.1 - 5.3
- 10.0	2.3 – 2.6 or 5.4 – 5.7
-20.0	$\leq$ 2.2 or $\geq$ 5.8

Adjustment for Liquid Binder = APb = [(APb1 + APb2 + APbi + …+ APbn)] / n

Where: APb = Total liquid binder adjustment value for the lot
APbi = Adjustment value from Table 3B resulting from each sub lot
n = number of binder tests in a production lot

TABLE 3B
ADJUSTMENT VALUES FOR LIQUID BINDER (SUPERPAVE)

Adjustment Value(APb) (%)	HMA S0.25, S0.375, S0.5, S1 Pb (refer to Table M.04.03-5)
0.0	Equal to or above the min. liquid content

- 10.0	Below the min. liquid content

e) Density Adjustment: The quantity of bituminous concrete measured for payment for a designed compacted lift of pavement 1½ inches or greater may be adjusted for density. Separate density adjustments will be made for each lot and will not be combined to establish one density adjustment.

Tons Adjusted for Density (TD) = {[PAM x .40] + [PAJ x .60]} X Tons accepted

Where:

TD = Total tons adjusted for density for each lot
PAM = Mat density percent adjustment from Table 4
PAJ = Joint density percent adjustment from Table 4

TABLE 4
Adjustment values for pavement density

Average % Density	% Adjustment for non-bridge lots	% Adjustment for bridge lots
97.1 – 100	-2.5	- 2.5
94.5 – 97.0	+2.5	+2.5
92.0 – 94.4	0.0	0.0
91.0 – 91.9	-2.5	- 10.0
89.1 – 90.9	-15.0	- 30.0
87.0 – 89.0	-30.0	- 50 or Remove and Replace
86.9 or less	Remove and Replace	Remove and Replace

3. Transitions for Roadway Surface: The installation of permanent transitions shall be measured under the appropriate item used in the formation of the transition.

- The quantity used for the installation of temporary transitions shall be measured for payment under the appropriate HMA item used in the formation of the transition. The installation and removal of a bond breaker, and the removal and disposal of any temporary transition formed by milling or with bituminous concrete pavement is not measured for payment.

4. Cut Bituminous Concrete Pavement: The quantity of bituminous concrete pavement cut will be measured in accordance with Article 2.02.04 of the Form 816.

5. Sawing and Sealing Joints: The quantity of sawed and sealed joints measured for payment will be the actual number of linear feet of joints sawed and sealed in the bituminous concrete pavement surface approved by the Engineer.

6. Kerf Cut in Bituminous Concrete Pavement: The quantity of kerf cuts measured for payment will be the actual number of linear feet of kerf cuts in the bituminous concrete pavement surface approved by the Engineer.

7. Cleaning and Sealing Joints and Cracks: The quantity of cleaned and sealed joints and cracks measured for payment will be the actual number of pounds of joint seal material accepted by the Engineer. Weights as marked on the shipping containers shall be used; or if directed by the Engineer, scales shall be furnished by and at the expense of the Contractor, and the joint seal material weighed in a manner satisfactory to the Engineer.

8. Material for Tack Coat: The quantity of tack coat will be measured for payment by the number of gallons furnished and applied on the Project and approved by the Engineer.

a. Container Method- Material furnished in a container will be measured to the nearest ½ gallon. The volume will be determined by either measuring the volume in the original container by a method approved by the Engineer or using a separate graduated container capable of measuring the volume to the nearest ½ gallon. The container in which the material is furnished must include the description of material, including lot number or batch number and manufacturer or product source.

b. Truck Method- The Engineer will establish a weight per gallon of the bituminous material based on the specific gravity at 60ºF for the material furnished. The number of gallons furnished will be determined by weighing the material on scales furnished by and at the expense of the Contractor.

Basis of Payment:

1. Bituminous Concrete Class ( ), HMA S*: The furnishing and placing of bituminous concrete will be paid for at the Contract unit price per ton for "Bituminous Concrete, Class ( )" or “HMA S* ( ).”

All costs associated with providing illumination of the work area are included in the general cost of the work. All costs associated with constructing the notched wedge joint are included in the general cost of the work. All costs associated with obtaining cores for core correlation and dispute resolution are included in the general cost of the work.

2. HMA Adjustment Cost: The “HMA Adjustment Cost" will be calculated using the formula shown below if all of the measured adjustments in Section 112.4 do not equal a value of zero. 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.

Formula: [TT + TA + TW + (TMD or TSD) + TD] x Unit Price = Est.

Where: Unit Price = Contract unit price per ton per type of mixture
TT = Total tons of each adjustment calculated in Section 112.4
Est. = Pay Unit represented in dollars representing HMA incentive or disincentive.

The estimated cost figure if included in the bid proposal or estimate 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.

3. Transitions for Roadway Surface: The installation of permanent transitions shall be paid under the appropriate item used in the formation of the transition. The quantity used for the installation of temporary transitions shall be paid under the appropriate HMA item used in the formation of the transition. The installation and removal of a bond breaker, and the removal and disposal of any temporary transition formed by milling or with bituminous concrete pavement is included in the general cost of the work.

4. The cutting of bituminous concrete pavement will be paid in accordance with Article 2.02.05 of the Form 816.

5. The sawing and sealing of joints will be paid for at the Contract unit price per linear foot for "Sawing and Sealing Joints".

6. Kerf cuts will be paid for at the Contract unit price per linear foot for "Kerf Cut in Bituminous Concrete Pavement".

7. The cleaning and sealing of joints and cracks will be paid for at the Contract unit price per pound for "Cleaning and Sealing Joints and Cracks".

8. Material for tack coat will be paid for at the Contract unit price per gallon for "Material for Tack Coat".

ITEM # 0507001A TYPE "C" CATCH BASIN

ITEM # 0507003A REMOVE EXISTING CATCH BASIN

ITEM # 0507495A MODIFY EXISTING CATCH BASIN

ITEM # 0507821A CONVERT CATCH BASIN TO TYPE "C-L" CATCH BASIN

ITEM # 0507831A CONVERT CATCH BASIN TO MANHOLE

These items shall conform to Section 5.07 CATCH BASINS, MANHOLES, AND DROP INLETS of the Form 816, modified as follows:

Construction Methods: Trench excavation, dewatering, and backfill for these items shall be according to the special provisions for EARTH TRENCH EXCAVATION and TRENCH DEWATERING, included elsewhere in these specifications.

Manholes shall not be included under this item, but shall conform to the special provisions for MANHOLES and RESET MANHOLE provided elsewhere in these specifications.

Method of Measurement: There will be no measurement for trench excavation in the installation or removal of the various drainage appurtenances.

Basis of Payment: The work under these items shall be paid for at the unit contract price each for type of catch basins and drop inlets complete in place and shall include all materials, tools, equipment, and labor necessary to complete the excavation and installation of units in conformity with the plans, or as specified.

The work associated with removal and disposal of existing catch basins shall be measured and paid for each catch basin removed under the item "Remove Existing Catch Basin" as listed in the bid proposal. The payment for removal and disposal of existing catch basin shall include all materials, tools, equipment, and labor necessary to complete the excavation and removal of these units in conformity with the plans, or as specified.

ITEM # 0507006A REPLACE CATCH BASIN TOP

These items shall conform to Section 5.07 CATCH BASINS, MANHOLES, AND DROP INLETS of the Form 816, modified as follows:

Construction Methods: Trench excavation, dewatering, and backfill for these items shall be according to the special provisions for EARTH TRENCH EXCAVATION and TRENCH DEWATERING, included elsewhere in these specifications.

Method of Measurement: Replacement of catch basin tops will be paid for as a unit, which shall include all work related to resetting the basin top as required as well as the cost for the new catch basin top. When replacing catch basin tops, there will be no measurement for any work related to resetting the top, including excavation; cutting, removal and replacement of pavement; or pervious material and backfill.

Basis of Payment: This work shall be paid for at the contract unit price for “Replace Catch Basin Top” as listed in the bid proposal for each catch basin top replaced complete in place, regardless of type, and shall include all materials, tools, equipment, and labor necessary to complete installation and resetting of the top as required including excavation, removal and replacement of paving, cutting, and pervious backfill in conformity with the plans and as specified.

ITEM # 0507781A RESET MANHOLE TOP

General: Under this item shall be included the alteration or reconstruction of existing manholes in conformity with the lines, grades, dimensions, and details shown on the plans, or as ordered, and in accordance with the provisions of these specifications for the various materials and work which constitute the completed structure.

Construction Methods: Frames, covers and tops which are to be reset shall be removed from their present beds, the walls or sides shall be rebuilt to conform to the requirements of the new construction and the tops, frames and covers reset, or the grates or covers may be raised by extensions of suitable height approved by the Engineer.

Method of Measurement: Resetting tops, frames and covers will be measured as units. When resetting tops, frames and covers, there will be no measurement for excavation; cutting, removal and replacement of pavement; pervious material and backfill.

Payment: Reset Units will be paid for at the contract unit price each for "Reset Manhole," of the type specified, respectively, complete in place, which price shall include excavation, pervious material, backfill, cutting of pavement, removal and replacement of pavement structure, extensions, concrete masonry units, mortar, and all materials, equipment, tools and labor incidental thereto.

ITEM # 0601651A RETAINING WALL

6.01.01 Description: This item will consist of designing, furnishing and constructing a retaining wall in the location, grades, and to the dimensions and details shown on the contract drawings, and in accordance with these specifications. The Contractor shall install stone veneer and blue stone cap on a reinforced cast-in-place concrete wall. The cast-in-place concrete wall shall be constructed per Item #0303001A.

6.01.02 Materials: Materials shall conform to the following requirements and those not listed below shall be as prescribed within the Standard Specifications for Roads, Bridges and Incidental Construction, including supplemental specifications and applicable special provisions.

1 – Stone Facing: The stone facing can be natural stone weathered fieldstone with a thickness of 6 inches (Country Weathered stone as supplied by Connecticut Stone, Milford, CT or Equal).

2 - Cap: The wall cap shall be rock face Pennsylvania bluestone, uniform in color, 2" thick, 3' long pieces (min.) supplied by Connecticut Stone, Milford, CT or equal.

3 - Wall: The wall shall be cast in place concrete (Class F) as specified in Item #0303001A and shown on the plans and details.

4 – Setting Pins for Bluestone cap stones: The setting pins for the bluestone cap stones shall be ½" diameter stainless steel dowels. Epoxy in place.

5 - Backfill Material: The material for backfill shall be Pervious Structure Backfill conforming to the requirements of Articles M.02.05 and M.02.06.

6 – Mortar: Mortar for bedding and joints shall conform to CT DOT 11.04. It shall be non-staining and be tinted to match the stone facing. Color to be approved by Owner / Engineer. Hold mortar back from face of stone.

7 – Joint Sealer for Bluestone Cap: Caulk joints of bluestone cap. Caulk color to match bluestone. Color to be approved by Engineer.

6.01.03 Construction Methods: All construction methods for items not listed below shall be in accordance with the detailed requirements prescribed for the construction of the several contract items entering into the completed structure as specified in the Standard Specifications for Roads, Bridges, and Incidental Construction.

1 - Installation: The foundation for the structure shall be graded level or as shown on the plans. If rock is encountered in the excavation, it shall be removed to provide a level area, but not greater than the pay limits shown on the plans.

Prior to wall construction, the foundation, if not in rock, shall be compacted as directed by the Engineer. Any foundation soils found to be unsuitable shall be removed and replaced.

A processed stone pad shall be provided as shown on the plans. Allowable elevation tolerances are +1.5 inches, and -2.5 inches, from the design elevation.

The materials for the wall shall be handled carefully and installed in accordance with manufacturer's recommendations and specifications. Special care shall be taken in setting the bottom course of stone facing to true line and grade.

All stones above the first course shall interlock with the lower courses by means of connecting pins. Vertical joints shall be staggered with each successive course as shown on the working drawings. Vertical tolerances and horizontal alignment tolerances measured from the face line shown on the plans shall not exceed 0.5 inches when measured along a 8 foot straightedge. The overall tolerance of the wall from top to bottom shall not exceed 0.5 inch per 8 foot of wall height or 1 inch total, whichever is the lesser, measured from the face line shown on the plans. A bond breaker shall be placed between the veneer stones and any adjacent cast-in-place concrete.

2 - Backfilling: Backfill placement shall closely follow erection of each course of panels. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the facing panels. Any wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Engineer. Any backfill material placed within the reinforced soil mass which does not meet the requirements of this specification shall be corrected or removed and replaced at the Contractor's expense.

Backfill shall be compacted to 95 percent of the maximum density as determined by AASHTO T-99, Method C or D (with oversize correction, as outlined in Note 7).

The moisture content of the backfill material prior to and during compaction shall be uniform throughout each layer. Backfill material shall have a placement moisture content less than or equal to the optimum moisture content. Backfill material with a placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniform and acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with AASHTO T-99, Method C or D (with oversize correction, as outlined in Note 7).

If 30 percent or more of the backfill material is greater than 19 mm in size, AASHTO T-99 is not applicable. For such a material, the acceptance criterion for control of compaction shall be either a minimum of 70 percent of the relative density of the material as determined by a method specification provided by the wall supplier, based on a test compaction section, which defines the type of equipment, lift thickness, number of passes of the specified equipment, and placement moisture content.

The maximum lift thickness after compaction shall not exceed 10 inches, regardless of the vertical spacing between layers of soil reinforcements. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density. Prior to placement of the soil reinforcements, the backfill elevation at the face shall be level with the connection after compaction. From a point approximately 1000 mm behind the back face of the panels to the free end of the soil reinforcements the backfill shall be 50 mm above the attachment device elevation unless otherwise shown on the plans.

Compaction within 1000 mm of the back face of the panels shall be achieved by at least three passes of a lightweight mechanical tamper, roller or vibratory system. The specified lift thickness shall be adjusted as warranted by the type of compaction equipment actually used. Care shall be exercised in the compaction process to avoid misalignment of the panels or damage to the attachment devices. Heavy compaction equipment shall not be used to compact backfill within 1000 mm of the wall face.

At the end of each day's operation, the Contractor shall slope the last level of backfill away from the wall facing to direct runoff of rainwater away from the wall face. The Contractor shall control and divert runoff at the ends of the wall such that erosion or washout of the wall section does not occur. In addition, the Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

6.01.04 Method of Measurement: This work will be paid for on a lump sum basis and will not be measured for payment.

6.01.05 Basis of Payment: This work will be paid for at the contract lump sum for “Retaining Wall", complete in place, which price shall include all work shown within the pay limits shown on the plans for the retaining wall including but not limited to the following:

1. Excavation for the wall
2. The furnishing, placing and compacting of pervious structure backfill within the maximum payment lines.
3. Processed stone leveling pad.
4. Stone facing and bluestone cap.
5. Any other work and materials shown on the plans for the construction of the wall.

The price shall also include all materials, equipment, tools and labor incidental thereto.

If bedrock or large boulders (greater than one cubic meter) are encountered in the excavation, the payment for it's removal will be made under the item "Structure Excavation - Rock".

Pay Item	Pay Unit
Retaining Wall	Lump Sum

ITEM # 0651012A 15" R.C. PIPE

This item shall conform to Section 6.51 CULVERTS of the Form 816, modified as follows:

Construction Methods: Trench excavation, dewatering, and backfill for these items shall be according to the special provisions for EARTH TRENCH EXCAVATION and TRENCH DEWATERING, included elsewhere in these specifications.

Method of Measurement: There will be no direct measurement for trench excavation and there will be no measurement for payment for gravel fill, bedding material, or for the cost of connecting proposed drainage systems with existing systems, but the cost thereof shall be included in the contract unit price per linear foot for the size and type of pipe being installed.

Basis for Payment: The work under these items will be paid for at the contract unit price per linear foot of pipe and size specified, complete in place including trench excavation, gravel fill, bedding material and all other materials, equipment, tools, and labor incidental thereto.

ITEM # 0813021A 5" GRANITE STONE CURBING

ITEM # 0813031A 5" GRANITE CURVED STONE CURBING

ITEM # 0813042A 5" X 20" GRANITE STONE CURBING

ITEM # 0813052A 5" X 20" GRANITE CURVED STONE CURBING

ITEM # 081305X 5" X 20" MOUNTABLE GRANITE STONE CURBING

8.13.01 Description:

This curbing shall include excavating in front and back of existing curb, removing curb, stockpiling curb to be reset or disposing of the existing curb as determined by the Engineer, and saw cutting and excavating old concrete or other foundation. This item shall also include saw cutting and excavating for; furnishing and placing new processed trap rock; class 'C' concrete at joints for straight granite stone curb; class 'C' concrete foundation and backfill for full length of granite curved stone curb and radial granite curb driveway return; furnishing and setting to line and grade new granite stone curb, new granite curved stone curb and radial granite curb driveway return; mountable curbing for truck apron, furnishing and placing new backfill, concrete and processed trap rock; caulking curb joints; making all necessary pavement repairs and grading behind the curb where necessary.

This item also includes transition lengths (curved or straight) when matching existing top of curb elevations at the beginning and ends of curbing limits or at sidewalk ramps. The transition length of curb shall be one continuous 6 foot length. No additional payment(s) will be made for transition lengths.

This item shall include trimming damaged ends of existing curb stones and cutting existing curb stones to a shorter length, both trimming and cutting to produce a new end which is square with the planes of the top and face of the curb. This item shall also include cutting curb stones horizontally in locations where the depth of curb stones must be reduced to clear obstacles or utilities.

5" Granite Stone Curbing and 5" Granite Curved Stone Curbing shall only be used in areas where needed to clear existing utility conflicts upon approval of the Engineer.

Required Submittals

Material Samples:

Submit material samples for granite curb in accordance with the contract general requirements.

8.13.02 Materials:

All new granite curb supplied for use shall be 5" x 20", 5" x 14" or radial granite curb driveway return and shall conform to the following:

General: Curbstones shall be hard and durable granite of light color and uniform texture neither stratified nor laminated. Curbstones shall be free from seams, cracks and evidence of weakening or disintegration and shall be of a good smooth splitting appearance. Granite shall come from a quarry previously approved by the Engineer.

Should the Contractor request use of granite from a quarry not previously approved, he shall submit samples sufficiently in advance of need to allow the Engineer opportunity to judge the stone both as to quality and appearance. All curbstones for a given project shall come from one quarry and be all of one type. Granite when tested shall have a French coefficient of wear of not more than 32. Test sample shall conform to the requirements of ASTM C-615-03.

Dimensions: Straight curb shall be 6 inches by 20 inches or 6 inches by 14 inches (as ordered by the Engineer) depth shall be nominal depth plus or minus 1 inch, minimum curb length to be 6 feet (except for closures to be not less than 4 feet) minimum width at bottom to be nominal width minus 1 inch for two thirds the length with an absolute minimum of minus 2 inches for the remaining one third.

All curbs to be set on radius 75 feet or less shall be 5 inches by 20 inches or 5 inches by 14 inches (as ordered by the Engineer) cut to arc with radian joints, depth shall be 20 inches plus or minus 1 inch (14 inches plus or minus 1 inch), minimum length to be 4 feet, minimum width at bottom to be 5 inches for two thirds the length with an absolute minimum of 4 inches for the remaining one third.

Straight curb to be set on radius over 75 feet to 500 feet shall be 5 inches with ends trimmed so that face and top joint fit properly, depth to be 20 inches plus or minus 1 inch (14 inches plus or minus 1 inch), minimum length to be 4 feet, maximum length to be 6 feet, minimum length at bottom to be 5 inches for two thirds the length with absolute minimum of 4 inches for the remaining one third.

Finish: The curbstone shall have a top surface free from wind and drill holes, it shall be sawed to an approximately true 1/8 inch. The front and back arris lines shall be straight and true with no variation from a straight line greater than 1/8 inch. On the back surface there shall be no projection for 3 inches down which would fall outside a batter of 4 inches in 12 inches from the back arris line. The front face shall be at right angles to the plane of the top or battered not more than one inch in twelve inches, and shall be quarry split or sawn, free from drill holes in the exposed face. The front face shall have no projections greater than 3/4 of an inch or depression greater than 1/2 inch measured from the vertical plane of the face through the top arris line for a distance of 8 inches down from the top.

For the remaining distance there shall be no projections or depressions greater than 1 inch measured in the same manner. The arris lines at the ends shall be pitched with no variation from the plane of the face greater than 1/8 inch. The ends of all stones shall be square with the planes of the top and face, and so finished that when the stones are placed end to end as closely as possible, no space more than 1/4 inch shall show in the joint for the full width of the top and down on the face for 8 inches. On curb stones having a length of 6 feet or more, the remainder of the end may break back not over 6 inches, on shorter curbstones, they shall not break back more than 4 inches. The bottom surface shall be sawn or quarry split to an approximately true plane. Half drill holes will not be permitted in the arris line of the back. Front arris line may be rounded to a radius not over 1/2 inch. If sawn, the curbstone shall be thoroughly cleaned of any iron rust or iron particles.

Granite curb returns shall be 20 inches deep and shall conform to the detail shown in the contract drawings and all material requirements in this specification.

Small processed trap rock: Course and fine aggregates shall be combined and mixed by approved methods so that the resulting material shall conform to the following gradation requirements:

Small ¾" Process Traprock:

Square Mesh Sieves	% Passing by Weight
Pass 1"	100
Pass 3/4"	90-100
Pass 3/8"	50-90

Pass #4	35-70
Pass #10	15-55
Pass #100	2-12
Pass #200	0-5

Course aggregate shall consist of sound, tough, durable fragments of rock of uniform quality throughout. It shall be free from soft disintegrated pieces, mud, dirt, organic or other injurious material. When tested by means of the Los Angeles abrasion machine using AASHTO method T-96-02, it shall not have a loss of more than 50 percent. When the fraction of the dry sample passing the No. 100 sieve is greater than 8% by weight, the sample shall be washed and the amount obtained by washing shall be added to the amount obtained by dry sieving. The resultant total amount of material passing the No. 100 sieve shall meet the above range.

Fine aggregate shall be natural sand, stone sand, screenings or any combination thereof. The fine aggregate shall be limited to material 95 percent of which passes a No. 4 sieve. The material shall be free from clay, loam and deleterious materials. Fine aggregate shall meet the material requirements of article M.05.01 of the State of Connecticut, Department of Transportation, Standard Specification for Roads, Bridges and Incidental Construction, Form 816, 2004 as amended.

Concrete: All materials for this work shall conform to the requirements of Section M.03 of the State of Connecticut Standard, Department of Transportation, Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, as amended, for Class “C” concrete.

Caulk: Caulking compound shall be a material which complies with ASTM C-920, Type S, Grade NS, Class 25 sealing compound, polyurethane based elastomeric, single component, moisture cured sealant, capable of 25% joint movement. The color of the compound shall be cement mortar gray.

Mountable granite curbing shall be provided in accordance with these provisions as well as the details on the drawings.

8.13.03 Construction Methods:

All curbing installations shall be laid out in the field and prior to placement of concrete footings, be approved by the Engineer. The contractor shall notify the Engineer at least two business days in advance of final curbing layout for approval prior to concrete placement.

The curbing shall be marked in the field by a licensed land surveyor in accordance with the detailed coordinates for the curb lines, radii’s and recessed curbing points.

Excavation: The Contractor shall excavate to a depth of 36” below the top of finished curb grade. The street pavement shall be removed to a width of at least 6” in front of the curb to facilitate proper setting and backfilling. Bituminous concrete and macadam pavement in front and back of the curb shall be cut to neat straight lines before excavation to minimize pavement damage.

Where there is good sod behind the curb, the sod shall be removed before excavation and saved for re-use.

Where there is a dummy joint 18” to 24” behind the curb, the Engineer may require the Contractor to saw the joint prior to excavating behind the curb. Saw cutting will be included in this item.

Where concrete base pavement is encountered excavation shall include removal of all existing concrete or other foundations. Saw cutting the concrete base shall also be included in this item.

Where the distance between the back of the curb and sidewalk is 12" or less, or where trees are encountered immediately behind the curb, the Engineer may order the Contractor to excavate by hand to avoid damage to the walk or trees.

Setting Curb: The curb shall be set to line and grade established by the Engineer. Maximum variation from established line and grade shall be 1/4". The finished curb shall present a neat appearance free from irregularities of line and grade.

For curved stone curb, masonry blocking used to hold the curb in place shall be allowed to remain when backfilling is completed.

For radial granite curb driveway return, all blocking used to hold the curb in place shall be removed before backfilling is completed.

Foundation and Backfill: All foundation and backfill shall be placed in layers not over six inches thick and each layer shall be thoroughly compacted using motor driven powered vibratory compactor.

For granite stone curbing, all curb joints shall be set in concrete 6" from either edge and shall not be less than 6" below bottom of the curb.

For curve granite stone curb, cement concrete shall be placed as foundation and backfill material around the curb in accordance with the standard detail drawings. The Contractor shall use a very stiff mix and shall spade and tamp to eliminate all voids, especially under the curb.

For curve granite stone curb, where a concrete surface is to be placed behind a curb, the concrete backfill shall be placed in back of the curb to 5" below top of curb for 5" concrete sidewalks, and 8" below top of curb for sidewalk ramps as applicable and in front of the curb to the base of the pavement encountered which is five inches below gutter grade for flexible base and 9" below top of curb for rigid base.

For curve granite stone curb, where bituminous surface is to be replaced behind the curb, concrete backfill shall be placed in back of the curb to 6" below top of curb, new processed trap rock shall be placed on top of the concrete to two inches below the top of the curb and shall be thoroughly compacted.

For granite stone curbing, backfill shall be placed in back of the curb to six inches below the top of the curb for loam and seeding and concrete walk, and two inches below for bituminous surface. Backfill in front of the curb shall be placed to 5" below gutter grade in streets with flexible base pavement and to 11" below gutter grade in streets with concrete base pavement.

For mountable curbing, it shall be installed as shown on the typical sections for proper mounting and backing of the curbing within the truck apron and northeast and southeast corners. Pavers shall be set flush with the top of the curbing with expansion joint and sealant as shown on the details.

Caulking: All curb joints shall be filled with caulking compound with either pneumatic or ratcheted hand gun or with other equipment as approved by the Engineer. At approximately 50-foot intervals, a 1/2-inch joint shall not be filled with caulking compound but left free for expansion.

Cutting or Trimming: The contractor shall employ appropriate cutting tools to produce a clean, square, and plumb cut for a neat appearance when reset. For vertical cuts, the ends shall be finished so that when stones are placed end to end as closely as possible, no space more than one half inch wide shall show in the joint for the full width of the top or down on the face for 9". The remainder of the joint may break back not more than 4" from the plane of the joint. The Engineer may require the cut to be made with the stone in place in the ground. Horizontal cuts shall be made in a manner that allows for a 2" vertical clearance of the

object or utility interference with the bottom of the curb stone. Horizontal cuts which exceed 1/3 the depth of the stone to be cut require the engineers approval prior to cutting.

In the trimming and cutting of damaged curbstones, the portion cut off shall be kept to a minimum.

If in making a cut, the Contractor damages the curb so as to make it unusable, the Contractor shall furnish, at no cost to the Town a piece of suitable curb cut to proper length to replace the damaged curb.

8.13.04 Methods of Measurements:

This work will be measured for payment by the actual number of linear feet of stone curbing or curved stone curbing installed and accepted.

Measurement shall be made along the top arris line of face of curb. Curbing to be set on a radius of 100 feet or less will be measured for payment as curved stone curb.

The work for radial granite curb driveway return will be measured for payment by the number of each Radial Granite Curb Driveway Return installed and accepted by the Engineer.

Cutting or trimming existing or proposed curb will not be measured for payment.

8.13.05 Basis of Payment:

Payment for this work will be made at the contract unit price per linear foot for 5” Granite Stone Curbing, 5” Granite Curved Stone Curbing, “5” x 20” Granite Stone Curbing”, or “5” x 20” Granite Curved Stone Curbing”, as the case may be, of the type and size specified, complete in place, which price shall include all materials, equipment, tools and labor incidental thereto, and all excavation, backfilling, disposal of surplus material and all drainage openings.

Payment for this work will be made at the contract unit price per each “Radial Granite Curb Driveway Return,” installed and accepted, including all equipment, materials, tools, labor and incidental expenses.

There will be no direct payment for furnishing, placing and compacting processed traprock, cutting or trimming existing or proposed curb, beveling or rounding the ends of the ends of the curbing, pointing the joints with mortar, repair of disturbed areas in front and back of curb and the 12” maximum grassed area in back of curb, but the cost of this work shall be considered as included in the general cost of the work.

Pay Item	Pay Unit
5” Granite Stone Curbing	L.F.
5” Granite Curved Stone Curbing	L.F.
5” x 20” Granite Stone Curbing	L.F.
5” x 20” Granite Curved Stone Curbing	L.F.
5” x 20” Mountable Granite Stone Curbing	L.F.

ITEM # 0921001A CONCRETE SIDEWALKS

ITEM # 0921005A CONCRETE SIDEWALK RAMPS

General: The Contractor is to construct sidewalks to lines and grades as shown on the drawings or at locations as directed by the Engineer. The sidewalks shall be of monolithic construction and five inches thick, except at industrial and commercial driveways where it shall be eight inches thick and reinforced with 6" x 6" 10/10 steel mesh. Sidewalk construction shall include the removal of existing and construction of new house lateral walks where new sidewalk grades make it necessary. The sidewalk shall pitch to the street at a slope of ¼-inch per foot or as directed by the Engineer.

Pedestrian sidewalk ramps are to be constructed to the lines and grades shown on the plans at locations directed by the Engineer, and shall be a minimum of five inches thick. This work shall also include furnishing and installing Detectable Warning Strips in the locations and to the dimensions and details shown on the plans or as ordered by the Engineer.

Materials:

Base Course: The material used for base course construction shall conform to the requirements of Section M.02.01-Granular Fill of the Form 816 for Item 1 Broken or crushed stone. Gravel or reclaimed miscellaneous aggregate shall not be used. Base course shall consist of sound, tough, and durable stone and shall be free of thin or elongated pieces, lumps of clay, soil, loam, or vegetative matter. All material shall be approved by the Engineer prior to its use.

Forms: The forms used shall be five-inch steel or 2" x 6" wood firmly supported and staked to the line and grade given by the Engineer. **2"x4" wood forms shall not be used and shall be cause for immediate rejection of sidewalk.** The forms shall be free from warp and shall be of sufficient strength to resist springing out of shape. All forms shall be cleaned and oiled before use.

Concrete: The concrete furnished shall conform with respect to composition, transportation, mixing and placing, to Class F Cement Concrete 4,400 PSI, as specified by the State of Connecticut Department of Transportation in its latest specification and revisions. An approved air-entraining admixture shall be used to entrain 5% to 7% air in the concrete.

Concrete Curing Compound / Sealer: **All concrete sidewalks shall be treated using Repel 100 by Kingdom Products curing compound / sealer or approved equal** meeting ASM C309, Type 1, Class A and B.

Detectable Warning Strips: The Detectable Warning Strip shall be a replaceable tactile warning surface tile as manufactured by ADA Solutions, Inc of P.O. Box 3, North Billerica MA 01862 Tel: 800.372.0519 Fax: 978.262.9125 www.adatile.com or approved equal. Tile shall be brick red in color (Federal Color # 20109) and all attachment hardware shall be stainless steel. The tile shall conform to the dimensions shown on the plans or as directed by the Engineer.

Dowels: Smooth metal dowels, 5/8-inch in diameter, measuring 18 inches in length shall be installed using plastic sleeves within all expansion and contraction joints, concrete driveway aprons, at concrete sidewalk ramps, and at the last end section of each sidewalk slab poured at the end of each working day.

Plastic sleeves of the size required for accepting the 5/8-inch by 18-inch smooth metal dowels shall be "Speed Dowel" sleeves as manufactured by Greenstreak, 3400 Tree Court Industrial Blvd, St. Louis, MO 63122, telephone number (800) 551-5145 or approved equal. Plastic sleeves shall be installed according to manufacturer instructions and as directed by the Engineer.

Smooth metal dowels shall be 5/8-inch in diameter and 18 inches in length. All metal dowels shall conform to the requirements of ASTM A615 Grade 60.

Expansion Joints: At maximum intervals of 15 feet, an expansion joint shall be placed to the full depth of the concrete slab. The material for expansion joints shall be either ¼-inch thick cork asphalt or $^{3}/_{8}$-inch thick asphalt impregnated bonded cellular fiber, or approved equal. Expansion joints of the same material shall also be placed at points abutting existing structures.

Construction Methods:

Limits of Disturbance: The Contractor is to exercise caution to prevent unnecessary damage to lawns, trees, bushes, or any other existing improvements. If, in the opinion of the Engineer, existing improvements are damaged due to the carelessness of the Contractor, the same shall be repaired or replaced at the Contractor's expense.

Earthwork: The Contractor shall remove and dispose of grass, rubbish, and other objectionable materials within the limits of the sidewalk construction. The Contractor shall perform all excavation necessary to construct sidewalks to the grades as shown on the construction plans. Excavation shall include the saw cutting, removal, and disposal of bituminous concrete and concrete sidewalks, driveways, and pavements, including curbing and tree roots, where necessary, due to the new sidewalk grade and as shown on the plans or as directed by the Engineer. Existing house lateral walks and driveways adjacent to the sidewalk shall be removed and base graded and prepared for a smooth connection. The Contractor shall remove and dispose of all excess material.

Suitable excavated material shall be re-used within the project limits as directed by the Engineer to form embankment for sidewalks where required. Embankment formation shall be completed as described in Article 2.02.03 of the Form 816, and shall meet the proposed subgrade elevations described on the plans or directed by the Engineer. Excess earth materials shall become the property of the Contractor and shall be disposed of at no additional cost to the Town.

Base Course Installation: The processed stone base course shall be spread upon the prepared subgrade to such depth as to give a compacted thickness of eight (8) inches. The material shall be uniformly spread in two layers of equal depth in the entire base course excavation and each layer shall be wetted and compacted to a firm even surface with a roller weighing not less than 500 pounds or by use of pneumatic tampers or vibratory compactors.

Installation of Dowel: Dowels are also to be installed between new and existing concrete slabs. Where new or repaired walks abut up against existing concrete sidewalks, the Contractor shall drill two holes measuring ¾-inches in diameter and 12 inches in depth into the existing concrete slab. The dowels, with plastic sleeve, shall be set into the existing sidewalk slab prior to the placement of concrete. The dowels are to be level with the latitude pitch of the sidewalk and shall conform to details of these specifications.

Concrete Work: The surface finish shall be struck off, forcing coarse aggregate below mortar surface. After strike-off, the surface shall be worked and floated with a wooded, aluminum, or magnesium float followed by steel troweling. The slab shall then be broomed cross-wise with a fine hair broom. The outside edges of the slab shall be edged with a ¼-inch radius tool. All edging lines shall be removed.

The Detectable Warning Strip shall be set directly in poured concrete according to the plans and the manufacturer's specifications or as directed by the Engineer. The Contractor shall place two 11.34 Kg concrete blocks or sandbags on each tile to prevent the tile from floating after installation in wet concrete.

Curing Compound / Sealer Application: The Contractor shall apply the approved curing compound / sealer using a 3/8" nap roller or low pressure sprayer at a rate of 200 to 300 square feet per gallon and according to manufacturer installation instructions or as directed by the Engineer. Concrete surface shall be clean and free of any surface contaminants when applying sealer. When applying sealer to fresh concrete the bleed water must be off the surface as this water can inhibit proper function of the sealer. Any areas where the sealer puddles shall be immediately spread to other areas where absorption can

occur to avoid undesirable appearance of finished surface. Sealer shall not be applied if rain is forecast within 24 hours, or if ambient temperature at the time of application is below 50 degrees or above 80 degrees Fahrenheit, or as directed by the Engineer.

Newly constructed sidewalk surfaces shall be protected from all foot or vehicular traffic for a period of seven days. The Contractor shall have on the job, at all times, sufficient polyethylene film or waterproof paper to provide complete coverage in the event of rain.

Temperature: No concrete is to be placed when air temperature is below 40°F, or at 45°F and falling, unless prior approval is given by the Engineer. In the event weather conditions may be such that concrete that is not completely cured is subject to freezing, the Contractor shall provide a minimum of a six-inch layer of hay, straw, or thermal blankets for protection. Any concrete laid during cold weather that is damaged by freezing shall be the responsibility of the Contractor and shall be replaced at his expense.

Final Grading: Upon completion of sidewalk construction, the Contractor is to re-grade the areas between sidewalks and curbs, if the typical section indicates a grass plot, and disturbed areas back of the sidewalk. The Contractor shall backfill and compact these areas so as to conform to the typical cross-section. The upper four inches of the backfill shall be loam or topsoil, loose and friable and free of sticks, rocks, roots, weeds, or other unsuitable material.

Basis of Payment:
"Concrete Sidewalk" shall be measured and paid for at the contract unit price per square foot as contained in the Bid Proposal, which price shall include the processed stone base course underneath sidewalks, excavation, grading, and all other materials and all labor, tools, and equipment necessary for completion of the work.

"Concrete Sidewalk Ramps" shall be measured and paid for as a unit at the contract unit price for each ramp as contained in the Bid Proposal, which price shall include the processed stone base course underneath sidewalks, excavation, grading, detectable warning tile and all other materials and all labor, tools, and equipment necessary for completion of the work.

Sawcutting of concrete sidewalk slabs will not be measured for payment.

Removal, and disposal of existing concrete sidewalk sections shall be paid for at the contract unit price per square yard for "Removal of Concrete Sidewalk" as listed in the Bid Proposal, which price shall include all labor, material, tools, and equipment incidental thereto.

ITEM # 0922001A BITUMINOUS CONCRETE SIDEWALK

ITEM # 0922501A BITUMINOUS CONCRETE DRIVEWAY

Description: This item shall consist of bituminous concrete surfaced sidewalk or driveway constructed on a gravel or reclaimed miscellaneous aggregate base course in the locations and to the dimensions and details shown on the plans or as directed by the Engineer and in accordance with these specifications. This item shall also include the removal and disposal of existing bituminous pavement necessary for driveway replacement work.

This item shall also include the construction of temporary sidewalks within the project limits as shown on the Temporary Traffic Control Plans and/or as directed by the Engineer.

Materials: Materials for this work shall conform to the following requirements:

1. Base Course: The material used for base course construction shall conform to the requirements of Section M.02.01 of the Form 816 for broken or crushed stone.

2. Bituminous Concrete Surface: Materials for this surface shall conform to the requirements of Section M.04, Class 2.

Construction Methods:

1. Sawcutting: Portions of the driveway or driveway aprons to be replaced shall be saw cut, and the existing pavement removed and disposed of by the Contractor.

2. Excavation: Excavation, including removal of any existing sidewalk, or driveway, shall be made to the required depth below the finished grade, as shown on the plans or as directed by the Engineer. All soft and yielding material shall be removed and replaced with suitable material.

3. Forms: When the bituminous concrete is spread by hand, forms shall be used. Forms shall be of metal or wood, straight, free from warp and of sufficient strength to resist springing from the impact of the roller. If made of wood, they shall be of 2-inch (38-millimeter) surfaced plank except that at sharp curves thinner material may be used; if made of metal, they shall be of an approved section. All forms shall be of a depth equal to the depth of the sidewalks or driveways and shall be securely staked, braced, and held firmly to the required line and grade. All forms shall be cleaned and oiled each time they are used.

4. Base Course: Processed stone base course shall be uniformly spread to the required depth and thoroughly compacted with a roller with a mass of not less than 500 pounds (226 kilograms).

5. Bituminous Concrete Surface: The edges of existing pavement shall be painted with an asphalt emulsion prior to the placement of permanent pavement. Hot laid bituminous concrete shall be placed so as to give a three-inch compacted surface, or a surface that has a depth equal to the existing driveway surface, whichever is greater.

This surface shall be constructed in accordance with the requirements of Section 4.06, except that the material may be spread by hand and thoroughly compacted by multiple passes of a power-driven roller weighing (with a mass) of not less than 500 pounds (226 kilograms). The finished surface shall be free from waves or depressions.

6. Backfilling and Removal of Surplus Material: The sides of the sidewalk or driveway shall be backfilled with suitable material thoroughly compacted and finished flush with the top of the sidewalk or driveway. All surplus material shall be removed and the site left in a neat and presentable condition to the satisfaction of the Engineer. In sections inaccessible to the roller, the base course, surface course and backfill shall be hand-tamped with tampers weighing not less than 12 pounds (with a mass of not less than 5.5 kilograms), the face of which shall not exceed 50 square inches (32,000 square millimeters) in area.
Method of Measurement: This work will be measured for payment as follows:

1. Bituminous Concrete Driveway—Bituminous Concrete Sidewalk: This work will be measured by the actual number of square yards of completed and accepted sidewalk or driveway.

2. Excavation: Excavation below the finished grade of the sidewalk or driveway, including removal and disposal of existing bituminous concrete, backfilling, and disposal of all surplus materials will not be measured for payment; but the cost shall be included in the price bid for the sidewalk or driveway. Excavation above the finished grade of a proposed sidewalk or driveway, when necessary for the proper installation, will be classified and paid for as described in the Section 2.02 of the Form 816.

3. Base Course: This work will not be measured for payment but the cost thereof shall be included in the price bid for the sidewalk or driveway.

Basis of Payment: This work will be paid for at the contract unit price per square yard (square meter) for "Bituminous Concrete Sidewalk" or "Bituminous Concrete Driveway," as the case may be, complete in place, which price shall include all excavation as specified above, backfill, disposal of surplus material, gravel or reclaimed miscellaneous aggregate base, and all equipment, tools, labor and materials incidental thereto.

ITEM # 0944000A TOPSOIL

9.44.01—Description: This work shall consist of furnishing, placing and shaping topsoil in areas shown on the plans or where directed by the Engineer. The topsoil shall be placed to a depth of 6 inches for turf establishment unless stated otherwise in the contract.

9.44.02—Material: The material shall conform to the requirements of Subarticle M.13.01-1.

9.44.03—Construction Methods: The areas on which topsoil is to be placed shall be graded to a reasonably true surface. Topsoil shall then be spread and shaped to the lines and grades shown on the plans, or as directed by the Engineer. The required depth to which the topsoil is to be placed is to be the depth after settlement of the material has taken place. All stones, roots, debris, sod, weeds and other undesirable material shall be removed. After shaping and grading, all trucks and other equipment shall be excluded from the topsoiled area to prevent excessive compaction. The Contractor shall perform such work as required to provide a friable surface for seed germination and plant growth prior to seeding.

During hauling and spreading operations, the Contractor shall immediately remove any material dumped or spilled on the shoulders or pavement.

It shall be the Contractor's responsibility to restore to the line, grade and surface all eroded areas with approved material and to keep topsoiled areas in acceptable condition until the completion of the construction work.

9.44.04—Method of Measurement: This work will be measured for payment by the number of cubic yards of area on which the placing of topsoil has been completed and the work accepted.

9.44.05—Basis of Payment: Payment for this work will be made as follows:

Furnishing and Placing Topsoil: This work will be paid for at the contract unit price per cubic yard for "Furnishing and Placing Topsoil" which price shall include all materials, equipment, tools, labor and work incidental thereto.

Pay Item	Pay Unit
Furnishing and Placing Topsoil	C.Y.

ITEM # 0944105A STRUCTURAL SOIL

9.44.01 Description:

This item shall include furnishing material for, placing, and constructing a structural soil foundation in courses not to exceed 6 inches in thickness on a prepared base or subbase in accordance with these specifications and in conformity with the lines, grades and compacted thickness as shown on the plans, details, or as ordered by the engineer.

Required Submittals:

A. At least 30 days prior to ordering materials, the installing contractor shall submit to the engineer representative samples, certificates, manufacturer's literature and test results for materials specified below. No materials shall be ordered until the required samples, certificates, manufacturer's literature, producer's current license and test results have been reviewed and approved by the landscape architect and/or engineer. The engineer reserves the right to reject any material that does not meet CU-Structural Soil specifications. Delivered materials shall closely match the approved samples.

B. Submit from licensed producer, ½ cubic foot representative sample of clay loam, one cubic foot representative sample of crushed stone, and one cubic foot representative sample of CU- Structural Soil mix for approval. In the event of multiple source fields for clay loam, submit a minimum of one set of samples per source field or stockpile. The samples of all clay loam, crushed stone, and CU-Structural Soil shall be submitted to the engineer as a record of the soil color and texture.

C. Submit soil test analysis reports for sample of clay loam from an independent soil-testing laboratory. The testing laboratory for particle size and chemical analysis may include a public agricultural extension service agency.

1. Submit a mechanical analysis of the clay loam sample and particle size analysis including the following gradient of mineral content:

USDA Designation	Size in mm.
Gravel	+2 mm
Sand	0.05 – 2 mm
Silt	0.002-0.05 mm
Clay	minus 0.002 mm

Sieve analysis shall be performed and compared to USDA Soil Classification System.

Sieve analysis shall be done by a combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM D422 after destruction of organic matter by hydrogen peroxide.

2. Submit a chemical analysis, performed in accordance with current AOAC Standards, including the following:

a. pH and buffer pH.
b. Percent organic matter as determined by the loss of ignition of oven dried samples. Test samples shall be oven dried to a constant weight at a temperature of 230 degrees F, plus or minus 9 degrees.

c. Analysis for nutrient levels by parts per million.
d. Soluble salt by electrical conductivity of a 1:2 soil/water sample measured in Millimho per cm.
e. Cation Exchange Capacity (CEC).
f. Carbon/Nitrogen Ratio.

D. Submit one cubic foot sample of crushed stone which will be used in production of CU-Soil.

1. Provide particle size analysis:

USDA Designation	Size in mm.
3”	+76 mm
2 1/2”	63-76 mm
2”	50-63 mm
1 1/2”	37-50 mm
1”	25-37 mm
¾”	19-25 mm
Fine gravel	2-19 mm

2. Provide the manufacturers analysis of the loose and rodded unit weight

3. Losses from LA Abrasion tests- not to exceed 40%

4. Minimum 90% with 2 or more fractured faces

5. Percent pore space analysis

E. At the engineer’s discretion, the sample of CU-Structural Soil may be tested for the following:

1. Compaction in accordance with ASTM D698/AASHTO T99 without removing oversize aggregate

2. California Bearing Ratio in accordance with ASTM D1883- soaked CBR shall equal or exceed a value of 50

3. Measured dry-weight percentage of stone in the mixture

F. The approved CU-Structural Soil sample shall be the standard.

G. Any deviation from the specified crushed stone and clay loam specifications shall be approved by Amereq, Inc.

H. Approved supplier: Certificate showing material is from an approved supplier (CU-Structural Soil or equal). Approved suppliers of CU-Structural Soil include:

a. Read Custom Soils

Farmington, CT

Contact: Neil Lajeunesse, 860-808-8536 cell, 800-924-5335 office

b. Grillo Services LLC

Milford, CT

Contact: Mike Grillo, 203-877-5070

I. Delivery, Storage, and Handling: Delivered CU-Structural Soil shall be at or near optimum

compaction moisture content as determined by AASHTO T 99 (ASTM D 698) and should not be placed in frozen, wet or muddy sites. Protect CU-Structural Soil from exposure to excess water and from erosion at all times. Do not store CU-Soil unprotected. Do not allow excess water to enter site prior to compaction. If water is introduced into the CU-Soil after grading, allow water to drain to optimum compaction moisture content.

J. Examination of Conditions: All areas to receive CU-Structural Soil shall be inspected by the installing contractor before starting work and all defects such as incorrect grading, compaction, and inadequate drainage shall be reported to the engineer prior to beginning this work.

K. Quality Assurance: The work of this section should be performed by a contracting firm which has a minimum of five years experience. Proof of this experience shall be submitted for approval.

9.44.02 Materials:

Clay Loam

A. Soil shall be a “loam” with a minimum clay content of 20% or a “clay loam” based on the “USDA classification system” as determined by mechanical analysis (ASTM D-422) and it shall be of uniform composition, without admixture of subsoil. It shall be free of stones, lumps, plants and their roots, debris and other extraneous matter. It shall not contain toxic substances harmful to plant growth. Clay loam shall contain not less than 2% or more than 5% organic matter as determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F., plus or minus 9 degrees.

B. Mechanical analysis for the loam or clay loam shall be as follows:

Textural Class	% of Total Weight
Gravel	less than 5%
Sand	20-45%
Silt	20-50%
Clay	20-40%

C. Chemical analysis: Meet, or be amended to meet the following criteria:

1. pH between 5.5 to 6.5
2. Percent organic matter 2% - 5% by dry weight
3. Adequate nutrient levels
4. Soluble salt less than 1.0 mmho/cm
5. Cation Exchange Capacity (CEC) greater than 10
6. Carbon/Nitrogen ratio less than 33:1

D. Loam or clay loam shall not come from USDA - classified prime farmland.

Fertilizer (if needed)

A. Should nutrient analysis suggest that the loam or clay loam need additional nutrients, it shall be amended by Amereq’s licensed producer.

Sulfur (if needed)

A. Sulfur shall be a commercial granular, 96% pure sulfur, with material and analysis appearing on the labeled container.

B. Sulfur used to lower pH shall be a ferrous sulfate formulation.

C. Application rates shall be dependent on soil test results.

Lime (if needed)

A. Agricultural lime containing a minimum of 85% carbonates.

B. Application rates shall be dependent on soil test results.

Crushed Stone

A. The size of the crushed stone shall be 0.75 inches to 1.5 inches allowing for up to 10% being greater than 1.5 inches, and up to 10% less than 0.75 inches.

B. Acceptable aggregate dimensions will not exceed 2.5:1.0 for any two dimensions.

C. Minimum 90% with two or more fractured faces.

D. Results of Aggregate Soundness Loss test shall not exceed 18%.

E. Losses from LA Abrasion tests shall not exceed 40%.

Hydrogel

A. Hydrogel shall be a coated potassium propenoate-propenamide copolymer (Gelscape Hydrogel Tackifier) as manufactured by Amereq, Inc. 800-832-8788 or equal.

Water

A. The installing contractor shall be responsible to furnish his own supply of water (if needed) free of impurities, to the site.

CU-Structural Soil

A. A uniformly blended urban tree mixture of crushed stone, clay loam and Gelscape Hydrogel Tackifier, as produced by an Amereq-licensed company or equal, mixed in the following proportion:

Material	Unit of Weight
specified crushed Stone	100 units dry weight
specified clay loam	20 – 25 units (to achieve minimum CBR of 50)
Gelscape Hydrogel Tackifier	0.035 units dry weight
moisture	ASTM D698/AASHTO T-99 optimum moisture

9.44.03 Construction Methods:

CU-Soil Mixing and Quality Control Testing

A. All CU-Structural Soil mixing shall be performed at the licensed producer's yard using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. No mixing of CU-Structural Soil at the project site shall be permitted.

Maintain adequate moisture content during the mixing process. Soils and mix components shall easily shred and break down without clumping. Soil clods shall easily break down into a fine crumbly texture. Soils shall not be overly wet or dry. The licensed producer shall measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.

B. Raw materials shall be mixed off-site, only at the licensed producer's facility, on a flat asphalt or concrete paved surface to avoid soil contamination.

C. Should the independent laboratory test results of the clay loam reveal a need to amend it, to meet specifications, the amending materials should be added to the clay loam following the rates and recommendations provided by Amereq.

Underground Utilities and Subsurface Conditions

A. The installing contractor shall notify the engineer of any subsurface conditions which will affect the contractor's ability to install the CU-Soil.

B. The installing contractor shall locate and confirm the location of all underground utility lines and structures prior to the start of any excavation.

C. The installing contractor shall repair any underground utilities or foundations damaged during the progress of this work.

Site Preparation

A. Do not proceed with the installation of the CU-Structural Soil material until all walls, curb footings and utility work in the area have been installed. For site elements dependent on CU-Structural Soil for foundation support, postpone installation of such elements until immediately after the installation of CU-Structural Soil.

B. Install subsurface drain lines as shown on the plan drawings prior to installation of CU-Structural Soil material.

C. Excavate and compact the proposed subgrade to depths, slopes and widths as shown on the drawings. Maintain all required angles of repose of the adjacent materials as shown on the drawings. Do not over excavate compacted subgrades of adjacent pavement or structures.

D. Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope parallel to the finished grade and/or toward the subsurface drain lines as shown on the drawings.

E. Clear the excavation of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout silts or other material harmful to plants have been spilled into the subgrade material, excavate the soil sufficiently to remove the harmful material. Fill any over excavation with approved fill and compact to the required subgrade compaction.

F. Do not proceed with the installation of CU-Structural Soil until all utility work in the area has been installed. All subsurface drainage systems shall be operational prior to installation of CU-Structural Soil.

G. Protect adjacent walls, walks and utilities from damage. Use ½" plywood and/or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.

1. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.

2. Any damage to the paving or architectural work caused by the installing contractor shall be repaired, as directed by the engineer.

H. Maintain all silt and sediment control devices required by applicable regulations. Provide adequate methods to assure that trucks and other equipment do not track soil from the site

onto adjacent property and the public right of way.

Installation of CU-Structural Soil Material

A. Install CU-Structural Soil in 6 inch lifts and compact each lift.

B. Compact all materials to at least 95% Proctor Density from a standard compaction curve AASHTO T 99 (ASTM D 698). No compaction shall occur when moisture content exceeds maximum as listed herein. Delay compaction if moisture content exceeds maximum allowable and protect CU-Structural Soil during delays in compaction with plastic or plywood as directed by the engineer.

C. Bring CU-Structural Soil to finished grades as shown on the drawings. Immediately protect the CU-Structural Soil from contamination by toxic materials, trash, debris, water containing cement, clay, silt or materials that will alter the particle size distribution of the mix with plastic or plywood as directed by the engineer.

D. The engineer may periodically check the material being delivered, prior to installation for color and texture consistency with the approved sample provided by the installing contractor as part of the submittal for CU-Structural Soil. If the engineer determines that the delivered CU-Soil varies significantly from the approved samples, the engineer shall contact the licensed producer.

E. Engineer shall ensure that the delivered structural soil was produced by the approved CU-Soil licensee by inspecting weight tickets showing source of material.

F. CU-Soil should not be stockpiled long-term. Any CU-Soil not installed immediately should be protected by a tarp or other waterproof covering.

Fine Grading

A. After the initial placement and rough grading of the CU-Structural Soil but prior to the start of fine grading, the installing contractor shall request review of the rough grading by the engineer. The installing contractor shall set sufficient grade stakes for checking the finished grades.

B. Adjust the finish grades to meet field conditions as directed. Provide smooth transitions between slopes of different gradients and direction. Fill all dips with CU-Soil and remove any bumps in the overall plane of the slope.

1. The tolerance for dips and bumps in CU-Structural Soil areas shall be a 3” deviation from the plane in 10’.

All fine grading shall be inspected and approved by the engineer prior to the installation of other items to be placed on the CU-Structural Soil.

C. The engineer will inspect the work upon the request of the installing contractor. Request for inspection shall be received by the engineer at least 10 days before the anticipated date of inspection.

Acceptance Standards

A. The engineer will inspect the work upon the request of the installing contractor. Request for inspection shall be received by the engineer at least 10 days before the anticipated date of inspection.

Clean-up

A. Upon completion of the CU-Structural Soil installation operations, clean areas within the contract limits. Remove all excess fills, soils and mix stockpiles and legally dispose of all waste materials, trash and debris. Remove all tools and equipment and provide a clean, clear site. Sweep, do not wash, all paving and other exposed surfaces of dirt and mud until the paving has been installed over the CU-Structural Soil material. Do no washing until finished materials covering CU-Structural Soil material are in place.

9.44.04 Method of Measurement:

All structural soil required for this work shall be measured for payment at the number of cubic yards for "Structural Soil" completed and accepted, including all equipment, materials, tools, labor and incidental expenses thereto.

9.44.05 Basis of Payment:

This work will be paid for at the contract unit price per cubic yard for “Structural Soil”, complete in place, which price shall include all materials, tools, equipment, labor and work incidental thereto.

Pay Item	Pay Unit
Structural Soil	CY

ITEM # 0945060A PINE BARK MULCH

ITEM # 0949063A PENNISETUM ALOPECUROIDES 'HAMELN' – HAMELN DWARF FOUNTAIN GRASS 2 GAL

ITEM # 0949074A MICROBIOTA DECUSSATA – SIBERIAN CARPET CYPRESS – 1' HGT B.B.

ITEM # 0949467A ROSA 'KNOCKOUT' – KNOCKOUT ROSE – 3' HGT CONT

ITEM # 0949493A GINGKO BILOBA 'PRINCETON SENTRY' 3"- 3-1/2" CAL. B.B.

ITEM # 0949769A ACER RUBRUM "RED SUNSET" – RED MAPLE 3"- 3-1/2" CAL. B.B.

ITEM # 0949803A ILEX CRENATA 'GREEN LUSTRE' – GREEN LUSTRE HOLLY 2-1/2 – 3' B.B.

ITEM # 0949881A LIQUIDAMBAR STYRACIFLUA – SWEETGUM 3"- 3-1/2" CAL. B.B.

ITEM # 0949921A GERANIUM 'ROZANNE' – ROZANNE GERANIUM – 1 GAL

ITEM # 0949925A CERCIDIPHYLLUM JAPONICUM – KATSURA TREE 3"- 3-1/2" CAL. B.B.

ITEM # 0949954A QUERCUS ROBUR 'FASTIGIATA' – FASTIGIATE ENGLISH OAK 3"- 3-1/2" CAL. B.B.

ITEM # 0949987A EUONYMUS KIAUTSCHOVICUS 'MANHATTAN' – MANHATTAN EUONYMUS – 4-8' HGT CONT

ITEM # 0950008A GRAVEL MULCH

9.49.01 Description:

The work under this item shall consist of furnishing, planting, staking, and mulching trees – Ginkgo biloba 'Princeton Sentry', Acer Rubrum "Red Sunset" Red Maple, Liquidambar styraciflua, Sweetgum, Cercidiphyllum japonicum Katsura Tree, and Quercus robur 'Fastigiata' Fastigiate English Oak; shrubs - Ilex crenata 'Green Lustre' Green Lustre Holly, Microbiota Decussata Siberian Carpet Cypress Oak, Rosa 'Knockout' Knockout Rose, and Euonymus kiautschovicus 'Manhattan'; perennials - Pennisetum alopecuroides 'Hameln' Hameln Dwarf Fountain Grass and Geranium 'Rozanne' Rozanne Geranium indicated on the plans. It shall also include all incidental operations, such as the care of the plant material and the replacement of dead or unsatisfactory materials before final acceptance of the contract.

9.49.02 Materials:

Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

Topsoil: A mineral soil taken from the A Horizon of a well-drained site and having a USDA soil texture classification of a Clay Loam or Loam. ASTM D 5268, pH range of 5.5 to 7, a minimum of 2 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.

Planting Soil: Native, imported or manufactured soil modified to become topsoil; mixed with soil amendments.

Soil shall be loose and friable, free from refuse, stumps, roots, brush, weeds, rocks and stones 1" in overall dimensions.

Soil Test Analysis: Submit certified soil physical and chemical test analysis for planting soil by approved, independent testing agencies stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of planting soil. Make submittals at least three (3) weeks prior to delivery of material to site.

The acceptable textural classes for planting soil shall be:

* Loamy Sand, with not more than 80% sand
* Sandy Loam
* Loam
* Silt Loam, with not more than 60% silt
* Clay Loam, with not more than 30% clay
* Sandy Clay Loam, with not more than 30% clay

Fertilizer shall be commercial grade as recommended by soil test report.

Organic Mulch material shall be shall be a native shredded pine bark, 100 percent organic, having a moisture content not exceeding 40 percent, free of any disease or insects. The particles shall pass a 1 inch square mesh and be retained on a 1/8 inch square mesh.

Gravel Mulch at individual tree pits in granite pavers in splitter islands shall be rounded ¼" to 3/8" pea gravel – gray color to match granite pavers. Color to be approved by Owner or Engineer.

All plants shall be nursery-grown, first-class representatives of their normal species or varieties. They shall have well-furnished branch systems together with vigorous fibrous root systems. Plant List: Investigate sources of supply prior to submitting bid. Confirm that size, variety and quantity of plant material specified on Plant List can be supplied. Failure to take this precaution will not relieve the successful bidder from his responsibility for furnishing and installing all plant material in strict accordance with the Contract requirements and without additional expense to the Owner.

Substitutions will not be permitted unless substantiated written proof is supplied that a specified plant is not obtainable. In this situation a proposal to use the nearest equivalent size or variety with an equitable adjustment of Contract Price will be considered.

Plant material sources: Submit proposed sources for all plant material within 30 days of award of contract. Provide name and location of nursery, contract person, and telephone number.

Nursery-grown trees shall conform to the requirements as specified in the current edition of "U.S. American Standards for Nursery Stock."

All plants shall be subject to inspection and approval by a ConnDOT Landscaping Department representative, Engineer, and the Contractor shall be represented during the inspection.

All trees shall be high branched, having a 4 foot minimum branching height.

Tree Staple shall be 36" Tree Staple stabilizer (2-4" cal. trees) or 42" (4-6" cal. trees) as provided by Tree Staple Inc. which is located at: 1390 Valley Rd. Suite 2B ; Stirling, NJ 07980; Toll Free Tel: 877-873-3749; Tel: 908 626-9300; Fax: 908-626-9707; Email: request info (sales@treestaple.com); Web: www.treestaple.com or approved equivalent. Install according to planting detail and per manufacturer's instructions.

9.49.03 Construction Methods:

Schedule and Work Plan: Submit detailed schedule and Work plan, indicating start and finish dates of planting activities, including layout, soil preparation, delivery of plant material from nursery sources, excavation, and installation. If planting work is being installed in phases, submit plan with definable areas outlined and keyed, and provide schedule for planting work within each area.

Planting Season: Unless otherwise specified or directed by the Engineer, the planting seasons shall be those indicated below. No planting shall be done in frozen ground or when snow covers the ground, or the soil is otherwise in an unsuitable condition for planting.

Deciduous Material Planting Seasons

Spring: March 1 - May 15 (inclusive)
Fall: October 15 to Ground Freezes

Evergreen Material Planting Seasons

Spring: March 1 – June 1 (inclusive)
Fall: August 15 - October 1st (inclusive)

Locations: Plants shall be planted in locations as shown on the plans or as directed by the Engineer. The Contractor shall properly locate trees to carry out the intent of the plans. Trees near street intersections shall be planted no less than 25' from any street corner for safety in sight at cross streets. In the event that rock or underground construction work or other obstructions are encountered in any planting pit, the Engineer shall be notified immediately and the plant not planted until special instructions are given, or alternative locations are selected.

Digging, Handling and Protection: Plants shall be handled at all times in accordance with the best horticultural practices so the roots or balls are adequately protected from sun and drying winds. Balled and burlapped plants shall be dug with firm, natural balls of soil of a sufficient diameter to encompass fibrous and feeding roots. The depth of the planting pit shall be coordinated with the height of the root ball in the field and adjusted accordingly. The soil below the ball must be well compacted to avoid settling.

Preparation for Planting: Pits - Reasonable care shall be exercised to have pits dug and prepared prior to moving trees to their respective locations for planting to ensure that they will not be unnecessarily exposed to drying elements or physical damage.

Pit preparation shall include the excavation to the required depth, removal and disposal of existing unsuitable material and the furnishing of planting soil and peat backfill mixture.

Diameter: Diameter of pits for trees shall be as indicated on the plans and details. The depth of pits for trees shall be enough to accommodate the ball when the tree is set to finished grade allowing for 12" of compacted soil in the bottom of tree's pits.

Soil Preparation: Soil used in the pits shall be planting soil as herein before specified, thoroughly mixed equally with a mixture of five parts of peat humus and one part of fertilizer (5-10-5) to twenty parts of acceptable planting soil.

Tree Staple Staking: Install in accordance with manufacturer's recommended installation instructions for project conditions and the following.

Leaving burlap intact, heel the plant's root ball into place.

Remove plastic safety caps from tree staples.

Set each tree staple opposite the other and against the outside edge of the root ball. The shorter prong shall be positioned over the root ball, halfway between the trunk and the ball's outer edge.

Drive each tree staple into the ground until the cross bar is recessed one to two inches below the surface of the root ball. Alternate between hitting either of the prongs to insure that the tree staples are completely below-grade.

Place safety caps on exposed ends.

Cut back burlap, leaving material under cross bars.

Fill and finish planting using best practices.

When balled and burlapped trees are set, planting soil mixture shall be compacted and watered to fill all voids. All burlap, ropes or wires shall be rolled down one-third of the way from the top of the ball. A shallow basin slightly larger than pit shall be formed to contain water. Backfill for the planting pits shall be with approved planting soil mixture, up to the surrounding elevations.

Pruning - All dead wood, sucker branches, and all broken or badly bruised branches shall be removed with a clean cut. Perform pruning with clean, sharp tools. If other pruning is required and approved by engineer, perform in accordance with American Association of Nurseryman Standards to preserve the nature and character of the plant.

Mulching -All trees shall be mulched with a 3" layer of pine bark mulch or gravel mulch within two days of planting. This mulch shall entirely cover the area of the planting pit.

Water - Water used in this work will be clean, pure water furnished by the Owner. Hoses, connections, and other watering equipment required for the work shall also be furnished by the Contractor.

Maintenance: Submit full and complete written program for maintenance of the planting including detailed watering program specific to plant type requirements. Maintenance shall begin immediately after each plant is planted and shall continue for two (2) years after initial acceptance. The two year period does not begin until all plant materials stipulated in the contract have been planted. When the plant establishment period begins at the end of the spring planting season, an inspection to determine the acceptability of plant establishment will be held by the Contractor and the Engineer no later than November 1st in the following year. When the plant establishment period begins at the end of the fall planting season, an inspection to determine the acceptability of plant establishment will be held by the Contractor and the Engineer by August 1st of the second year. All plants shall be watered (a minimum of once per week from April 1st to October 1st or as necessary to keep the plant materials in their best condition-applied slowly to penetrate the entire root zone), remulched, weeded, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected until two year final acceptance. Ornamental grasses shall be cut to 4” above the crown of the plant using a sickle or a hedge trimmer in late February or March. Settled plants shall be re-set to proper grade and position, planting saucer restored, and dead material removed. Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit. Upon completion of planting and prior to initial acceptance, the Contractor shall remove any excess soil and debris from the site and repair any damage to structures, etc., resulting from the planting operation. Dangerous conditions shall be repaired immediately.

Any damage to lawn areas, sidewalks or pavement as the result of planting operations shall be repaired by the Contractor at no additional cost to the Town or State and to the satisfaction of the Engineer.

All replacements shall be plants of the same kind and size as specified in the plant list. They shall be furnished and planted as specified under Planting Operations. The cost shall be replacement resulting from removal, loss, or damage due to vandalism.

Warranty: All plants shall be warranted by the Contractor to be true to name and size, and in vigorous growing conditions and shall be warranted by the Contractor for two (2) years after all plant material is installed.

During the warranty period, the Contractor shall replace, in accordance with the contract, any plants that are dead, or in the opinion of the Engineer or representative, in an unhealthy or unsightly condition due to dead branches, excessive pruning, or other causes at no additional cost to the Town or State.

Replacement shall be made as soon as weather or season conditions permit as directed by the Engineer. The Contractor's responsibility for replacing plants shall end with final acceptance by the Town. Cost is considered to be included in the Bid and Contract price. Guarantee all replaced material for a period of 2 years from date of replacement.

9.49.04 Method of Measurement:

1. Planting-The quantity of which payment will be made is the number of each size and kind of plant counted in place, planted, and accepted.
2. Mulching- This work will be measured for payment by the number of square yards surface measurement of the specified thickness for the area on which pine bark or gravel mulch has been completed and accepted.

9.49.05 Basis of Payment:

Payment for this work will be made at the contract unit price each for the kind and size of tree, shrub, and perennial completed and accepted in place. The unit price shall include all excavation and preparation, tree staples, planting soil to the depths indicated on the details, mulching, watering, and maintenance as well as any other materials, equipment, tools, labor, transportation, operations, and all work incidentals thereto.

Pay Item	Pay Unit
Pine Bark Mulch	S.Y.
Ginkgo biloba 'Princeton Sentry'	Each
Acer Rubrum “Red Sunset” -Red Maple	Each
Liquidambar styraciflua- Sweetgum	Each
Cercidiphyllum japonicum- Katsura Tree	Each
Quercus robur 'Fastigiata' -Fastigiate English Oak	Each
Ilex crenata 'Green Lustre' -Green Lustre Holly	Each
Rosa 'Knockout' -Knockout Rose	Each
Microbiota Decussata -Siberian Carpet Cypress	Each
Euonymus kiautschovicus 'Manhattan'	Each
Pennisetum alopecuroides 'Hameln' -Hameln Dwarf Fountain Grass	Each
Geranium 'Rozanne' -Rozanne Geranium	Each
Gravel Mulch	S.Y.

ITEM #0949493A GINKO BILOBA 'PRINCETON SENTRY' 3" - 3½" CAL. B.B

ITEM #0949769A ACER RUBRUM "RED SUNSET" RED MAPLE 3" - 3½" CAL. B.B

ITEM #0949881A LIQUIDAMBAR STYRACIFLUA SWEETGUM 3" - 3½" CAL. B.B

ITEM #0949925A CERCIDIPHYLLUM JAPONICUM KATSURA TREE 3" - 3½" CAL. B.B

ITEM #0949954A QUERCUS ROBUR "FASTIGIATA" FASTIGIATE ENGLISH OAK 3" - 3½" CAL. B.B

ITEM #0949999A PINE BARK MULCH

9.49.01 Description:

The work under this item shall consist of furnishing, planting and mulching the deciduous trees – Ginkgo biloba 'Princeton Sentry', Acer Rubrum "Red Sunset" Red Maple, Liquidambar styraciflua, Sweetgum, Cercidiphyllum japonicum Katsura Tree, and Quercus robur 'Fastigiata' Fastigiate English Oak indicated on the plans. It shall also include all incidental operations, such as the care of the living trees and the replacement of dead or unsatisfactory trees or materials before final acceptance of the contract.

9.49.02 Materials:

Soil material to be used for pit backfill may originate from the "A" or "B" horizon as defined on the soil profile of the Soil Science of America.

Planting soil shall be made loose and friable, shall be free from refuse, stumps, roots, brush, weeds, rocks and stones 2" in overall dimensions.

The acceptable textural classes for planting soil shall be:

* Loamy Sand, with not more than 80% sand
* Sandy Loam
* Loam
* Silt Loam, with not more than 60% silt
* Clay Loam, with not more than 30% clay
* Sandy Clay Loam, with not more than 30% clay

Fertilizer shall be commercial grade 5-10-5 fertilizer.

Mulch material shall be pine bark mulch..

All trees shall be nursery-grown, first-class representatives of their normal species or varieties. They shall have well-furnished branch systems together with vigorous fibrous root systems.

Nursery-grown trees shall conform to the requirements as specified in the current edition of "U.S. American Standards for Nursery Stock."

All trees shall be subject to inspection and approval by a ConnDOT Landscaping Department representative, Engineer, and the Contractor shall be represented during the inspection.

All trees shall have a 4 foot minimum branching height.

9.49.03 Construction Methods:

Planting Season: Unless otherwise specified or directed by the Engineer, the planting seasons shall be those indicated below. No planting shall be done in frozen ground or when snow covers the ground, or the soil is otherwise in an unsuitable condition for planting.

Planting Seasons

Spring: March 1 - May 15
Fall: October 15 to Ground Freezes

Locations: Trees shall be planted in locations as shown on the plans or as directed by the Engineer. The Contractor shall properly locate trees to carry out the intent of the plans. Trees near street intersections shall be planted no less than 25' from any street corner for safety in sight at cross streets. In the event that rock or underground construction work or other obstructions are encountered in any tree pit, the Engineer shall be notified immediately and the tree not planted until special instructions are given, or alternative locations are selected.

Digging, Handling and Protection: Trees shall be handled at all times in accordance with the best horticultural practices so the roots or balls are adequately protected from sun and drying winds. Balled and burlapped trees shall be dug with firm, natural balls of soil of a sufficient diameter to encompass fibrous and feeding roots. The depth of the planting pit shall be coordinated with the height of the root ball in the field and adjusted accordingly. The soil below the ball must be well compacted to avoid settling.

Preparation for Planters: Pits - Reasonable care shall be exercised to have pits dug and prepared prior to moving trees to their respective locations for planting to ensure that they will not be unnecessarily exposed to drying elements or physical damage.

Pit preparation shall include the excavation to the required depth, removal and disposal of existing unsuitable material and the furnishing of planting soil and peat backfill mixture.

Diameter: Diameter of pits for trees shall be a minimum of 2' greater than the diameter of the root-ball. The depth of pits for trees shall be enough to accommodate the ball when the tree is set to finished grade allowing for 12" of compacted soil in the bottom of tree's pits.

Soil Preparation: Soil used in the pits shall be planting soil as herein before specified, thoroughly mixed equally with a mixture of five parts of peat humus and one part of fertilizer (5-10-5) to twenty parts of acceptable planting soil.

Planting Operations: Staking - Stakes shall be equally spaced around each tree and the end treated with wood preservative, and shall be driven vertically into the ground to a depth below the finished grade in such a manner as not to injure the ball or roots. Trees shall be fastened to each stake at a height of approximately 5' by means of two (2) strands of #12 gage galvanized wire and hose as above stakes shall be uniform in height.

When balled and burlapped trees are set, planting soil mixture shall be compacted and watered to fill all voids. All burlap, ropes or wires shall be rolled down one-third of the way from the top of the ball. A shallow basin slightly larger than pit shall be formed to contain water. Backfill for the planting pits shall be with approved planting soil mixture, up to the surrounding elevations.

Wrapping - Promptly after planting, the trunks of all trees shall be spiraled from the ground line to the height of the second branches. All wrapping shall be neat and snug and the material shall be held in place by a suitable cord.

Pruning - All newly planted trees shall be pruned in accordance with American Association of Nurseryman Standards to preserve the nature and character of the plant.

All dead wood, sucker branches, and all broken or badly bruised branches shall be removed. In addition, one-fourth to one-third of the wood shall be removed by thinning-out and shortening branches to balance root loss due to transplanting.

Cuts over 1" in diameter shall be painted with approved tree paint. Paint shall cover all exposed cambium as well as other exposed living tissue.

Mulching -All trees shall be mulched with a 4" layer of pine bark mulch within two days of planting. This mulch shall entirely cover the area of the planting pit and extend to the tree grate.

Mulch - Mulch shall be pine bark mulch and be free from leaves, twigs, or other foreign material.

Water - Water used in this work will be clean, pure water furnished by the Contractor. Hoses, connections, and other watering equipment required for the work shall also be furnished by the Contractor.

Maintenance: Maintenance shall begin immediately after each tree is planted and shall continue until acceptance. All trees shall be watered (a minimum of once per month for a minimum of three months), remulched, weeded, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected until accepted. Settled trees shall be re-set to proper grade and position, planting saucer restored, and dead material removed. Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit. Upon completion of planting and prior to acceptance, the Contractor shall remove any excess soil and debris from the site and repair any damage to structures, etc., resulting from the planting operation. Dangerous conditions shall be repaired immediately.

Any damage to lawn areas, sidewalks or pavement as the result of planting operations shall be repaired by the Contractor at no additional cost to the Town or State and to the satisfaction of the Engineer.

All replacements shall be trees of the same kind and size as specified in the plant list. They shall be furnished and planted as specified under Planting Operations. The cost shall be replacement resulting from removal, loss, or damage due to vandalism.

Warranty: All trees shall be warranted by the Contractor to be true to name and size, and in vigorous growing conditions and shall be warranted by the Contractor for one (1) year after planting.

During the warranty period, the Contractor shall replace, in accordance with the contract, any trees that are dead, or in the opinion of the Engineer or representative, in an unhealthy or unsightly condition due to dead branches, excessive pruning, or other causes at no additional cost to the Town or State.

Replacement shall be made as soon as weather or season conditions permit as directed by the Engineer. The Contractor's responsibility for replacing trees shall end with final acceptance by the Town.

9.49.04 Method of Measurement:

1. Planting-The quantity of which payment will be made is the number of each size and kind of tree counted in place, planted, and accepted.

2. Mulching- This work will be measured for payment by the number of square yards surface measurement of the specified thickness for the area on which pine bark mulch has been completed and accepted

9.49.05 Basis of Payment:

Payment for this work will be made at the contract unit price each for the kind and size of tree completed and accepted in place. The unit price shall include all materials, mulching, equipment, tools, labor, transportation, operations, and all work incidentals thereto.

Pay Item	Pay Unit
Ginkgo biloba 'Princeton Sentry', 3”-3½" B.B	Each
Acer Rubrum “Red Sunset” Red Maple, 3”-3½" B.B	Each
Liquidambar styraciflua, Sweetgum,, 3”-3½" B.B	Each
Cercidiphyllum japonicum Katsura Tree, 3”-3½" B.B	Each
Quercus robur 'Fastigiata' Fastigiate English Oak, 3”-3½" B.B	Each
Pine Bark Mulch	S.Y..

ITEM #0949606A ROOT BARRIER

09.49.01 Description:

This item shall include furnishing material for and placing tree root barrier on a prepared base or subbase in accordance with these specifications and in conformity with the lines, grades and compacted thickness as shown on the plans, details, or as ordered by the engineer.

Required Submittals:

A. Material Certificate of Compliance:

Submit material certificate of compliance for materials in accordance with the contract general requirements. Product data and complete installation instructions for item specified.

B. Samples
Submit one full length panel of tree root barrier.

C. Approved supplier: Certificate showing material is from an approved supplier (Deep Root Partners, L.P. San Francisco, CA 1-800-458-7668 or approved equal).

9.49.02 Materials:

DeepRoot Tree Root Barrier (UB24-2) or equal 24" wide by 24" depth; black 85 mil wall thickness injection molded 50% post-consumer recycled polypropylene panels with UV inhibitors. 7/16" wide intregral molded 85 mil thickness double top edge attached to vertical root deflecting ribs; bottom edge attached to vertical root deflecting ribs, integral molded 85 mil thickness by 2-inch deep vertical root directing ribs spaced at 6-inch on center; intregral molded 85 mill thickness by 2 inch long by 3/8 inch wide horizontal anti-lift ground lock tabs, min. 9 per panel.

9.49.03 Construction Methods:

Install on properly prepared base and subgrade with accordance with manufacturer's instructions. Connect panels together as required. Dig the trench, place the tree root guide in the trench with the vertical root directing ribs facing inwards to the root ball and align with the hardscape, set 2" below finish grade of sidewalk. The double top edge shall be ½" above finished soil grade. Using the hardscape as a guide, backfill and compact to requirements against the tree root guides to promote a clean, smooth fit to the paving. Trees and plants shall be immediately installed after placement of root barrier.

9.49.04 Method of Measurement:

All root barrier required for this work shall be measured for payment at the number of linear feet for "Root Barrier" completed and accepted, including all equipment, materials, tools, labor and incidental expenses thereto.

9.49.05 Basis of Payment:

This work will be paid for at the contract unit price per linear foot for "Root Barrier", complete in place, which price shall include all materials, tools, equipment, labor and work incidental thereto.

Pay Item	Pay Unit
Root Barrier	LF

ITEM # 0950005A TURF ESTABLISHMENT

General: The work included in this item shall consist of providing an accepted uniform stand of established perennial turf grasses or wetland vegetation by furnishing and placing fertilizer, seed, and mulch on all areas to be treated as shown on the plans or where designated by the Engineer.

The work will also include the installation of erosion control matting of the type indicated where shown on the plans or as directed by the Engineer.

Materials: The materials for this work shall conform to the requirements of Section M.13 of the Form 816, except as noted below.

Seed mix for roadside areas shall consist of 70% Red Fescue, 20% Kentucky Blue Grass, and 10% Perennial Rye Grass or other mix for high maintenance lawn areas as approved by the Engineer.

The wetland seed mix to be used shall be 25% New England Roadside Matrix Wet Meadow Seed Mix and 75% New England Erosion Control / Restoration Mix, as listed within New England Wetland Plants, Inc.'s catalog or approved equal.

Erosion Control Matting shall be a product approved by the Connecticut Department of Transportation for the intended application as described in the “Qualified Products List” publication, latest edition.

Hydroseeding, when required by the Engineer, shall be performed using a homogenous slurry consisting of wood fiber mulch, fertilizer, live seed, and organic tackifiers conforming to Section M.13 of the Form 816.

Material certificates shall be provided for all materials supplied under this item.

Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible and which are approved by the Engineer.

1. Preparation of the Seedbed:
(a) Level areas, medians, interchanges and lawns: These areas shall be made friable and receptive for seeding by disking or by other approved methods to the satisfaction of the Engineer. In all cases the final prepared and seeded soil surface shall meet the lines and grades for such surface as shown in the plans, or as directed by the Engineer.

(b) Slope and Embankment Areas: These areas shall be made friable and receptive to seeding by approved methods which will not disrupt the line and grade of the slope surface. In no event will seeding be permitted on hard or crusted soil surface.

(c) All areas to be seeded shall be reasonably free from weeds taller than 3 inches. Removal of weed growth from the slope areas shall be by approved methods, including hand-mowing, which do not rut or scar the slope surface, or cause excessive disruption of the slope line or grade. Seeding on level areas shall not be permitted until substantially all weed growth is removed. Seeding on slope areas shall not be permitted without removal or cutting of weed growth except by written permission of the Engineer.

2. Seeding Season: The calendar dates for seeding shall be:
Spring—March 15 to June 15
Fall—August 15 to October 15

All disturbed soil areas shall be treated during the seeding seasons as follows:
(a) Areas at final grade: Seeding will be accomplished.
(b) "Out-of-season" seedings shall be performed in the same manner as "in-season" seedings. Since acceptable turf establishment is less likely, the Contractor shall be responsible for "in-season" reseeding until the turf stand conforms to this specification.

(c) During "out-of-season" periods unseeded areas shall be treated in accordance with Section 2.10, Water Pollution Control.

3. Seeding Methods: The seed mixture shall be applied by any agronomically acceptable procedure. The rate of application shall be no less than 175 pounds per acre or according to manufacturer instructions. Fertilizer conforming to M.13.03 shall be initially applied at a rate of 320 pounds per acre during or preceding seeding. When wood fiber mulch is used, it shall be applied in a water slurry at a rate of 2,000 pounds per acre with or immediately after the application of seed, fertilizer and limestone.

When hydroseeding is required by the Engineer, it shall be performed by a qualified Contractor who has a minimum of three year experience in the successful performance of this work and has been approved by the Engineer. Hydroseed mix shall be applied in a slurry consisting of wood fiber mulch, fertilizer, live seed, and organic tackifiers with each component applied at the rate described above. The slurry shall be hydraulically sprayed on the soil surface as required to form a blotter-like ground cover with a uniform coating. Contractor shall exercise special care as required to prevent slurry from being sprayed onto adjacent paved areas, sidewalks, buildings, or signs. All slurry sprayed onto adjacent surfaces shall be cleaned at the Contractor's expense.

When the grass seeding growth has attained a height of 6 inches, the specified areas designated herein shall be mowed to a height of 3 inches. Following mowing, all seeding grass areas (mowed and un-mowed) shall receive a uniform application of fertilizer hydraulically placed at the rate of 320 pounds per acre.

4. Compaction: The Contractor shall keep all equipment and vehicular and pedestrian traffic off areas that have been seeded to prevent excessive compaction and damage to young plants. Where such compaction has occurred, the Contractor shall rework the soil to make a suitable seedbed; then re-seed and mulch such areas with the full amounts of the specified materials, at no extra expense to the State.

5. Stand of Perennial Turf Grasses: The Contractor shall provide and maintain a uniform stand of established turf grass or wetland vegetation having attained a height of 6 inches consisting of no less than 100 plants per square foot throughout the seeded areas until the entire project has been accepted.

6. Establishment: The Contractor shall keep all seeded areas free from weeds and debris, such as stones, cables, baling wire, and he shall mow at his own expense, on a one-time-only basis, all slopes 4:1 or less (flatter) and level turf established (seeded) areas to a height of 3 inches when the grass growth attains a height of 6 inches. Clean-up shall include, but not be limited to, the removal of all debris from the turf establishment operations on the shoulders, pavement, and/or elsewhere on adjacent properties publicly and privately owned.

7. Erosion Control Matting: Erosion control matting shall be installed following seeding where called for on the plans or as directed by the Engineer. Staples shall be installed as per Manufacturer's recommendations. Where two lengths of matting are joined, the end of the up-grade strip shall overlap the down-grade strip. The Contractor shall maintain and protect the areas with erosion control matting until such time as the turf grass is established. The Contractor shall replace or repair at his own expense any and all erosion control matting areas damaged by fire, water or other causes including the operation of construction equipment. No mowing will be required in the locations where erosion control matting is installed.

Method of Measurement: This work will be measured for payment by the number of square yards of surface area of accepted established perennial turf grass or wetland vegetation as specified or by the number of square yards surface area of seeding actually covered and as specified.

Restoration of areas disturbed for staging, storage of materials, or other area disturbed for the convenience of the Contractor will not be measured for payment.

Erosion control matting will be measured by the number of square of surface area of erosion control matting installed and accepted.

Basis of Payment: This work will be paid for at the contract unit price per square yard for "Turf Establishment", “Turf Establishment-Hydroseeding” or “Wetland Seeding”, which price shall include all materials, mowing, maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for work completed, but not accepted.

Erosion control matting will be paid for at the contract unit price per square yard for "Erosion Control Matting" complete in place and accepted, which price shall include the hay mulch, netting, staples, maintenance, equipment, tools, labor, and work incidental thereto

ITEM # 0950019A TURF ESTABLISHMENT LAWN

9.50.01—Description: The work included in this item shall consist of providing an accepted uniform stand of established perennial turf grasses by furnishing and placing fertilizer, seed, and mulch on all areas to be treated as shown on the plans or where designated by the Engineer.

9.50.02—Materials: The materials for this work shall conform to the requirements of Section M.13.

9.50.03—Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible and which are approved by the Engineer.

1. Preparation of the Seedbed:

(a) Level areas, medians, interchanges and lawns: These areas shall be made friable and receptive for seeding by disking or by other approved methods to the satisfaction of the Engineer. In all cases the final prepared and seeded soil surface shall meet the lines and grades for such surface as shown in the plans, or as directed by the Engineer.

(b) Slope and Embankment Areas: These areas shall be made friable and receptive to seeding by approved methods which will not disrupt the line and grade of the slope surface. In no event will seeding be permitted on hard or crusted soil surface.

(c) All areas to be seeded shall be reasonably free from weeds taller than 3 inches. Removal of weed growth from the slope areas shall be by approved methods, including hand-mowing, which do not rut or scar the slope surface, or cause excessive disruption of the slope line or grade. Seeding on level areas shall not be permitted until substantially all weed growth is removed. Seeding on slope areas shall not be permitted without removal or cutting of weed growth except by written permission of the Engineer.

2. Seeding Season: The calendar dates for seeding shall be:

Spring—March 15 to June 15
Fall—August 15 to October 15
All disturbed soil areas shall be treated during the seeding seasons as follows:
(a) Areas at final grade: Seeding will be accomplished.
(b) "Out-of-season" seedings shall be performed in the same manner as "in-season" seedings. Since acceptable turf establishment is less likely, the Contractor shall be responsible for "in-season" reseeding until the turf stand conforms to 9.50.03-5.
(c) During "out-of-season" periods unseeded areas shall be treated in accordance with Section 2.10, Water Pollution Control.

3. Seeding Methods: The grass seed mixture shall be applied by any agronomically acceptable procedure. The rate of application shall be no less than 175 pounds per acre.

State-certified seed of grass species, as follows with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

Hart's Wear 'n Tear Lawn Seed Mixture, Proportioned by weight as follows:

35 percent Kentucky Bluegrass
35 percent Creeping Red Fescue
20 percent Fiesta 4 Perennial Ryegrass
10 percent Express II Perennial Ryegrass

Seed Company: The Chas. C. Hart Seed Co. 304 Main Street Wethersfield, CT 06109
1-800-326-HART or equal.

Fertilizer conforming to M.13.03 shall be initially applied at a rate of 320 pounds per acre during or preceding seeding. When wood fiber mulch is used, it shall be applied in a water slurry at a rate of 2,000 pounds per acre with or immediately after the application of seed, fertilizer and limestone. When the grass seeding growth has attained a height of 6 inches, the specified areas designated herein shall be mowed to a height of 3 inches. Following mowing, all seeding grass areas (mowed and un-mowed) shall receive a uniform application of fertilizer hydraulically placed at the rate of 320 pounds per acre.

4. Compaction: The Contractor shall keep all equipment and vehicular and pedestrian traffic off areas that have been seeded to prevent excessive compaction and damage to young plants. Where such compaction has occurred, the Contractor shall rework the soil to make a suitable seedbed; then re-seed and mulch such areas with the full amounts of the specified materials, at no extra expense to the State.

5. Stand of Perennial Turf Grasses: The Contractor shall provide and maintain a uniform stand of established turf grass species having attained a height of 6 inches consisting of no less than 100 plants per square foot throughout the seeded areas until the entire project has been accepted.

6. Establishment: The Contractor shall keep all seeded areas free from weeds and debris, such as stones, cables, baling wire, and he shall mow at his own expense, on a one-time-only basis, all slopes 4:1 or less (flatter) and level turf established (seeded) areas to a height of 3 inches when the grass growth attains a height of 6 inches.

Clean-up shall include, but not be limited to, the removal of all debris from the turf establishment operations on the shoulders, pavement, and/or elsewhere on adjacent properties publicly and privately owned.

9.50.04—Method of Measurement: This work will be measured for payment by the number of square yards of surface area of accepted established perennial turf grass as specified or by the number of square yards surface area of seeding actually covered and as specified.

9.50.05—Basis of Payment: This work will be paid for at the contract unit price per square yard for "Turf Establishment" which price shall include all materials, mowing, maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for work completed, but not accepted.

Pay Item	Pay Unit
Turf Establishment	S.Y.

ITEM # 0950050A IRRIGATION SYSTEM

09.49.01 Description:

This item shall include furnishing all labor, materials, supplies, equipment, tools and transportation, and perform all operations in connection with and reasonably incidental to the complete installation of the irrigation system, and guarantee/warranty as shown on the drawings, conformance with Metropolitan District Commission Standard Specification and Details and as specified herein. Items of work specifically included are:

Coordination of Utility Locates (“Call Before You Dig”)

Excavation, installation, and backfill of tap into MDC water main

Excavation, installation, and backfill of water meter enclosure in the central island

Verification of existing static pressure

Maintenance period

Irrigation pipe, couplings, spigots

Electrical connections

Required Submittals:

A. Deliver four (4) copies of all required submittals to the Engineer per Control of Work.

B. Materials List: Include pipe, fittings, mainline components, water emission components, control system components. Quantities of materials need not be included.

C. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for equipment shown on the materials list.

D. Shop Drawings: Submit shop drawings called for in the installation details. Show products required for proper installation, their relative locations, and critical dimensions. Note modifications to the installation detail.

E. Project Record Drawings: Submit project record (as-built) drawings to Owner prior to commencement of maintenance period.

9.49.02 Materials:

Spigots shall be as shown on the Drawings or equal thereto in quality, construction, and performance as approved by the Engineer.

Riser and Swing Joints

All spigots shall be mounted on PVC swing joints. Joint compound approved by fitting manufacturer shall be used on movable fittings.

Feeder Lines

Reduction in feeder lines to spigots shall be made at the riser. Where short feeders are not sized they shall be of same size as shown for spigots. No feeder shall be smaller than 3/4-in for any spigot.

Gate Valves

All gate valves 3-in in diameter and smaller shall be domestic manufacture type or equal. Unless otherwise shown, they shall be rated for 100 psi steam and 150 psi water, oil or gas. The body, bonnet, stem stuffing box and packing nut shall be brass.

Polyvinyl Chloride Pipe

Polyvinyl chloride pipe and fittings shall be rigid high impact Type 1, Schedule 40, meeting commercial standard CS-207-60 and physical characteristics shall conform to latest ASTM Specifications D256, D696, D695, D785, D792, and D1599. Such pipe shall be unplasticized rigid polyvinyl chloride pipe as manufactured by U.S. Pipe and Foundry; Celanese Plastics Co.; Plastiline, Inc., or equal. Fittings shall be unplasticized "Sloan" rigid polyvinyl chloride pipe fittings. R & G Sloane Mfg. Division; Celanese Plastics Co.; Plastiline, Inc. or equal.

The jointing and installation of polyvinyl chloride pipe and fittings shall conform strictly to the manufacturer's recommendations. All PVC joints to have clean solvent welds.

Galvanized Steel Pipe

All galvanized steel pipe and fittings shall be standard weight and conform to ASTM A53. All burrs shall be removed and pipe ends shall be reamed out to size of bore. Pipe joint cement shall be used only on male threads.

Electric Controller and Wiring

The controller shall be as shown on the Drawings or equal having a 26 volt output to operate electric valves of 3.75 watt requirement. It shall have a 48 hour dial with 0 to 60 minute timing per station, and each of the stations to have individual switch for cutting out if required. The controller shall be housed in the location shown on the Drawings.

All wiring in the same trench shall be color coded to differentiate each system. Bradey markers shall also be attached to wires at both the controller and each valve to facilitate servicing and maintenance.

Electric Valves

The electric valves shall be 24 Volts, normally closed type as shown on the Drawings or equal. Valves to have flow control adjusting stem and built-in regulator for control of closing time. Valve to have bleeder valve to open electric valve manually. Closing time shall not be less than 4 seconds.

Valve Boxes

All electric valves to be housed in valve boxes. Valve boxes shall be extension type of proper length for trench depth with material and construction conforming to AWWA Specifications

(Nelson VB-12 or equal). A valve number shall be stenciled on the inside of the valve box lid to correspond with that valve number and system at the controller.

Irrigation Meter Box

Meter box to be per drawings.

Concrete Thrust Blocks

Concrete thrust blocks shall be installed at all high stress areas.

9.49.03 Construction Methods:

EXCAVATION AND BACKFILLING

A. All excavation, backfill and grading necessary to complete the work shall be made by the Contractor and included in bid price of the work. Edge of trench shall not run closer than 6-in to edge of pavement. Heads shown at edge of pavement shall be located by use of lateral stubs off main line.

All PVC branch lines shall have a minimum cover of 12-in, all main lines 18-in, and all pipe under roadways 24-in.

Roadway Crossings

The sleeves under pavement shall be Schedule 40 PVC. The PVC irrigation pipe, according to the size as indicated on the plan will be placed inside the Schedule 40 PVC sleeve prior to placement of the sleeve. The PVC irrigation line shall be capped on both ends to prevent foreign material from entering the pipe.

The pipe sleeves shall extend at least 12-in beyond the curb line into the planting area. The PVC irrigation lines shall extend at least two feet into the planting area. All sleeves shall have a minimum cover of 24-in. The ends of all sleeves shall be marked and flagged to prevent them from being lost.

All excavation, except as directed, shall be backfilled to the original grade, or such grade as shown on the Drawings or directed. Backfilling shall be carefully placed around pipe and in areas shown on the Drawings as "Compacted Fill" with materials approved by the Engineer in layers not over 6-in thick and thoroughly compacted by hand tampers weighing not less than 20 pounds, or by approved mechanical tampers. Ponding will be permitted only with the written permission of the Engineer, providing sufficient water is used uniformly throughout the operation. The Contractor will be charged for all water furnished by the Owner. No ponding will be permitted adjacent to walls. No backfilling with bulldozers will be permitted adjacent to pipe lines. In no case will backfilling be permitted to be placed so as to damage the work. No rock will be permitted in the backfill within one foot of any pipe. The backfilling shall be done so as to prevent after-settlement, and shall be left with a smooth surface. Should the work be suspended for any reasons for any considerable time, the excavation shall be backfilled at the Contractor's expense when so ordered by the Engineer. Backfill around polyvinyl chloride pipe shall be carefully placed by experienced labor and thoroughly consolidated without shock to the pipe, and carried up uniformly on both sides of the pipe. After backfilling is complete, all excess materials shall be disposed of by the Contractor. No excess material shall be placed in any public right-of-way except with the written permission of the Owner.

Wiring from 110 Volt source to controller to be in conduit, wiring from controller to electric valves to be direct burial irrigation wire of the size specified on the landscaping and irrigation Drawings. Individual hot wires and grounds shall be run from the controller to each electric valve. All wiring in trench shall be bundled and placed to the side of the pipe.

DELAY OF INSTALLATION

Any spigots to be installed at tree locations shall not be installed until tree has been planted.

CLEANING AND TESTING OF SYSTEM

Prior to installing spigots, the lines shall be thoroughly flushed with water to remove all stone and sand particles from the system. Threaded caps shall be installed on all risers, beginning with the one closest to the water source and working out to the end of all lateral lines. Backfilling of the trench may begin at this time, however, all pipe joints and riser connections shall be left exposed for leakage testing.

Prior to installation of heads and swing joints and at the direction of the Engineer all head locations within a representative portion of the system shall be capped off and the following hydrostatic leakage test shall be performed.

The pressure required for hydrostatic leakage tests shall be 100 psi. The Contractor shall provide temporary plugs and blocking necessary to maintain the required test pressure. Corporation cocks at least 3/4-in in diameter shall be provided at each pipe dead end in order to bleed air from the line.

Hydrostatic pressure and leakage test shall conform with Section 13 of AWWA C600-54T Specification with the exception that the Contractor shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.

Pipe lines shall be filled with water and all air removed and a pressure of 100 psi shall be maintained in the pipe for the period of not less than two hours by means of a force pump to be furnished by the Contractor. Accurate means shall be provided for measuring the water required to maintain this pressure. The amount of water required is a measure of the leakage. Each individual system excluding the main feed lines, when tested under a pressure of 100 psi, shall show a leakage not exceeding 60 gallons per 24 hours. All visible leaks at exposed joints and all leaks evident at the surface where pipe is covered shall be repaired and leakage minimized, regardless of total leakage, as shown by test. The amount of allowable leakage on the individual loops (main feed lines) shall not exceed that allowed in AWWA C600. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be removed and replaced. Additional pipe lines may be tested in other sections as directed by the Engineer, by shutting gates or installing temporary plugs as required.

INSPECTIONS

In all cases, where inspection of the system work is required and/or where portions of the work are specified to be performed under the direction and/or inspection of the Engineer, at least 24 hours advance notice of the time when such inspection and/or direction is required shall be given the Engineer.

All necessary re-excavation or alterations to the system needed because of failure of the Contractor to have the required inspections shall be performed at the Contractor's expense.

ADJUSTMENTS TO SYSTEM

At the end of 90 days from acceptance, the Contractor shall check the entire irrigation system and adjust where necessary.

GUARANTEES

All labor and materials shall be guaranteed by the Contractor against all defects and malfunctions due to faulty workmanship or defective material for a period of one year from the date of final acceptance by the Owner. The Contractor shall furnish the Owner with a certificate of this guarantee. Upon being informed by the Owner of any defects or malfunctions, the Contractor shall make all necessary repairs and/or replacements in a reasonably expedient manner at no additional cost to the Owner.

Emergency repairs, when necessary, may be made by the Owner without relieving the Contractor of his guarantee obligation.

The Contractor shall be obligated to repair any settling of backfilled trenches which may occur during the guarantee period. The Contractor is also obligated to restore any and all damaged plant-ings, paving, or improvements within the period of guarantee.

If the Contractor does not respond to the Owner's request for repair work within a period of 3 days, the Owner may proceed with such necessary repairs and charge the Contractor for all expenses incurred in the repair work.

WARRANTY AND GUARANTEE CERTIFICATES

The Contractor shall furnish a certificate of warranty registration and a guarantee of work and materials for a one year period from date of final acceptance of the system.

Final payment for the system shall not be made unless this certification is presented to the Owner.

9.49.04 Method of Measurement:

All irrigation system required for this work shall be measured for payment as a lump sum, for the "Irrigation System" completed and accepted, including all equipment, materials, tools, labor and incidental expenses thereto.

9.49.05 Basis of Payment:

This work will be paid for at the contract unit price lump sum for “Irrigation System”, complete in place, which price shall include all materials, tools, equipment, labor and work incidental thereto.

Pay Item	Pay Unit
Irrigation System	LS

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ITEM # 097XXXXA FLEXIBLE DELINEATOR POST

Description:
Work under this Item includes providing and installing a flexible delineator post for temporary traffic control operations. The post shall be affixed to existing, temporary or permanent pavement as shown on the plans and provide for temporary traffic control during construction operations.

Materials:
The post shall be a minimum 3 inch outside diameter and extend to a maximum 42 inches above the surface. The post shall be constructed of a flexible plastic that is resistant to ultraviolet light, ozone, repeated strikes from vehicles and hydrocarbons. The post shall be from a supplier who has supplied these on other projects in New England and include references from other municipalities.

It shall include a reactive spring assembly that rebounds to upright position when struck. It shall include a retro-reflective sheeting of approximately 4 inches x 12 inches at the top of the post.

The post shall be either yellow or white, with yellow for left side of road use and white for right side of road use. The post shall meet MUTCD specifications.

The surface mounting unit shall be the same color and include a fixed base of a nominal 8 inch square and be affixed to the pavement surface with fasteners to withstand vehicle impacts.

Construction Methods:
The posts shall be used to delineate construction zones as shown on the plans and as directed by the Engineer. The posts shall be place with a nominal 5-foot spacing and/or as directed. Removable or quick release bases are acceptable if frequent entry to a construction work zone is warranted.

Method of Measurement:
The work of providing and installing the post will be measured for payment by the number of each flexible delineator post installed.

Basis of Payment:
This work shall be paid for at the Contract unit price, which shall include all equipment, supplies, fasteners, post, labor and incidentals thereto for the complete installation of a flexible delineator post.

Pay Item	Pay Unit
Flexible Delineator Post	EA.

ITEM # 0970006A TRAFFICPERSON (MUNICIPAL POLICE OFFICER)

ITEM # 0970007A TRAFFICPERSON (UNIFORMED FLAGGER)

This item shall conform to Section 9.70 TRAFFICPERSON, of the Form 816, amended as follows:

Description: Add the following to the first paragraph of Section 9.70.01

"Trafficpersons shall consist of uniformed flaggers meeting acceptable criteria or extra duty officers of the Glastonbury Police Department. The Contractor shall provide Uniformed Flaggers meeting the requirements of this specification as required for safe traffic operations in the project area. Extra-duty police officers will be used only when specifically required by the Police Chief, as the Local Traffic Authority, who will make this determination based on the Contractor's proposed operations, traffic volumes, and traffic conditions."

"All work under this item shall be paid only for the duration of the Contract as contained in the Special Conditions under 'Time for Completion/Notice to Proceed' and for any time extensions granted in writing by the Town. Payment for police officers required after the duration of the Contract and approved time extensions shall be made directly by the Town and such costs deducted from future payments due the Contractor."

Basis of Payment: Replace Section 9.70.05 with the following:

"There will be no direct payment for safety garments or STOP/SLOW paddles. All costs associated with furnishing safety garments and STOP/SLOW paddles shall be considered included in the general cost of the item.

1. Trafficperson - Uniformed Flagger: Uniformed flaggers will be paid for at the contract unit price per hour for "Trafficperson (Uniformed Flagger)" as listed in the bid proposal, which price shall include all compensation, insurance benefits, and any other cost or liability incidental to the furnishing of the trafficpersons ordered."

2. Trafficperson - Police Officer: The sum of money shown on the bid proposal as "Estimated Cost" for this work will be considered the bid price even though payment will be made as described below. The estimated cost figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figures will be disregarded and the original price will be used to determine the total amount for the contract.

Police Officers will be paid for at the actual hourly rate charged for extra-duty police officers services by the Town (monthly statement or receipted bills) plus a 5% markup. Use of a Town police vehicle requested by the Engineer will be paid at the actual rate charged by the Town plus a 5% markup. The rate charged by the Town for use of a Uniformed Town Police Officer and/or an official Town Police vehicle shall not be greater than the rate it normally charges others for similar services.

ITEM # 0971001A 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":

The Town of Glastonbury CHIEF OF POLICE, acting in the capacity of the LOCAL TRAFFIC AUTHORITY, shall be the sole and final authority for the Maintenance and Protection of Traffic.

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

The Contractor is advised to review the Temporary Traffic Control (TTC) Plans in the Construction Documents for the suggested construction staging of the modern roundabout. Substantial roundabout temporary operation shall commence prior to start of Glastonbury Public Schools Fall 2016 schedule.

The TTC Plans depict the eight stages of construction (four general), as follows:

Stages 1A/1B – During Stage 1A, perform permanent widening at intersection corners and temporary widening in other areas outside of existing pavement to a level to match existing roadway pavement using shoulder closure traffic pattern, maintain all turn lanes for the intersection traffic signal operation until the end of this phase. After completion of all pavement installation, remove existing intersection pavement markings, install temporary pavement markings and signing for temporary roundabout operation. Begin temporary roundabout operation during Stage 1B maintaining traffic flow in the circulatory roadway on a paved surface not less than 12 feet wide. Remove existing traffic signal equipment.

Stages 2A-2D – Construct each intersection approach leg in turn with appropriate road closure and detour plan in effect as described by MPT Plans. Complete all improvements within the work area of the approach indicated before proceeding to the next leg of the intersection, including utilities, drainage, splitter islands, and full depth pavement construction up to the binder course. Adjust traffic flow to utilize the future center island / truck apron for bypass of the work area when constructing the adjacent portion of the permanent circulatory roadway. Maintain traffic to business driveways within closure areas at all times.

Four catch basins in the roundabout shall be set to match the pavement grade during each stage, approximately 1.5 inches below finish grade to allow for drainage during the stage 2 construction.

In addition, detour signing patterns shall be employed for each of the closures in Stage 2. These signing patterns are included herein and shall be in place prior to each approach closure.

Stage 3 – Construct the roundabout center island while maintaining traffic flow in the circulatory roadway. Adjust circulatory roadway width / location with traffic barrels as needed to define necessary work area.

Stage 4 – Construct final wearing surface during night time operation. Reset rounabout catch basin tops to final grade. Install final pavement markings and permanent signing. Install permanent epoxy pavement markings 21 days after wearing surface is installed.

The following limitations are noted for each roadway

New London Turnpike

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

Where turn lanes exist, the Contractor shall provide an additional 10 feet of travel path to be used for turning vehicles only. This additional 10 feet of travel path shall be a minimum length of 75 feet. It shall be implemented so that sufficient storage, taper length, and turning radius are provided.

Excepted therefrom 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 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet and there shall be no more than one alternating one-way operation within the project limits without prior approval of the Engineer.

In lieu of the alternating one-way operation, the Contractor shall be allowed to close one approach to thru traffic flow for construction of the splitter islands, curbing and other needs. The closure shall be with permission from the Glastonbury Police Department with their acceptance of a detour plan for the closed approach.

The Contractor shall maintain access at all times to pedestrian ramps, any driveways (except where closure is required), sidewalks, and traffic signal push buttons (Stage 1 only).

Hebron Avenue

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path 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 shall maintain and protect at least an alternating one-way traffic operation, on a paved travel path not less than 11 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet and there shall be no more than one alternating one-way traffic operation within the project limits without prior approval of the Engineer.

In lieu of the alternating one-way operation, the Contractor shall be allowed to close one approach to thru traffic flow for construction of the splitter islands, curbing and other needs. The closure shall be with permission from the Glastonbury Police Department with their acceptance of a detour plan for the closed approach.

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:

General

The Contractor shall schedule operations such that all open excavations are backfilled or steel plated by the end of each active work period. The installation of steel plates shall be approved by the Town of Glastonbury Public Works Department prior to installation. Trenches and other excavations within the travelway that are backfilled shall be brought up to finished grade and paved with bituminous concrete pavement prior to reopening the roadway to vehicular traffic.

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3-foot shoulder between the work area and travel lanes, with traffic drums spaced every 20 feet. 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 Contractor, during the course of active construction work on overhead signs and structures, shall close the lanes directly below the work area for the entire length of time overhead work is being undertaken. At no time shall an overhead sign be left partially removed or installed.

If applicable, when an existing sign is removed, it shall be either relocated or replaced by a new sign during the same working day.

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

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

Traffic Signals

Until the commencement of Stage 1A operations, any loop detectors disturbed by the Contractor's operations shall be made operational. During Stage 1A operations, detection for the traffic signal temporary operation shall be made inoperative due to the contractor operations and the traffic signal placed in minimum recall mode for the side street and left turn advance phases.

Existing Signing

The Contractor shall maintain all existing overhead and side-mounted 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 and as directed by the Engineer.

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. 42-inch traffic cones and approved traffic drums are to be utilized for lane closures as well as flexible delineator posts.

Requirements for Winter

The Contractor shall schedule a meeting with representatives from the Town of Glastonbury 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.

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 trafficperson 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 I – MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT MILES PER HOUR	MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE
30 OR LESS	180
35	250
40	320
45	540
50	600
55	660
65	780

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 4c 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 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.

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 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.

In addition to the use of traffic cones and drums, flexible delineator posts shall be used for the central island protection of traffic from Stage 1B through Stage 3 to allow for large semitrailer trucks to utilize the area for turning.

Portable Variable Message Signs shall be deployed on Hebron Avenue and New London Turnpike in advance

9.71.03 Construction Methods

Signing Patterns

The Contractor shall provide such safety measures, pavement markings, traffic control devices, incidental flagmen, and signs deemed necessary to safeguard and guide the traveling public through the work zones as ordered by the Engineer, included in the approved maintenance scheme, or as shown on the plan. The Contractor shall erect, maintain, move, adjust, clean, relocate, store all signs, barricades, drums, traffic cones, and delineators when, where, and as directed by the Engineer. The use of unauthorized or unapproved signs, barricades, drums, traffic cones, or delineators will not be permitted.

All signs in any one signing pattern shall be mounted at the same height above the pavement. The Contractor shall keep all signs in proper position, clean and legible at all times. The Contractor shall maintain the site so that no weeds, shrubbery, construction materials, equipment or soil will obscure any sign, light, or barricade. Signs that no longer pertain to the project conditions shall be removed or adjusted from the view of traffic. 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. Traffic drums shall be used to delineate raised catch basins and other hazards.

Pavement Markings

During construction, the Contractor shall maintain all pavement markings on paved surfaces on all roadways throughout the limits of the project.

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

NOTE: Painted pavement markings will not be allowed as a substitution for either the permanent pavement markings or the Temporary Plastic Pavement Marking Tape on the final course of bituminous concrete pavement.

Dust Control

The Contractor shall be responsible for taking all steps necessary to minimize dust emanating from the project and for keeping the street free of accumulations of sand or similar materials. When ordered by the Engineer, the

Contractor shall remove snow and take care of ice on temporary, new and existing sidewalks within the limits of the project. No additional payment will be made for this work.

Article 9.71.05 – Basis of Payment

When the item of "Maintenance and Protection of Traffic" appears in the contract, this work will be paid for at the contract lump sum price for "Maintenance and Protection of Traffic." This price shall include all material, equipment, tools, labor, transportation, operations and all work incidental thereto. The amount of the lump sum paid in any given period shall be proportional to the percentage of the total of all other work completed. All materials including construction signs, barricades, traffic cones, traffic drums, and miscellaneous materials associated with the Work in this Item, and the costs for labor, equipment and services involved in the erection, maintenance, moving, adjusting, cleaning, relocating and storing of signs, barricades, drums, traffic cones and delineators furnished by the Contractor as well as all costs of labor and equipment involved in the maintenance of traffic lanes and detours, except for pavement markings, ordered or included in the approved scheme for maintenance of traffic.

Should the Contractor fail to perform any of the work required under this item, the Town may perform or arrange for others to perform such work. In those instances, the Town will deduct money due or money to become due to the contractor all expenses connected with the execution of this work. This money shall be deducted even if the Town expense exceeds the price bid for this work by the Contractor.

The contract lump sum price for “Maintenance and Protection of Traffic” shall also include temporarily relocating existing signs and sign supports as many times as deemed necessary and furnishing, installing, and removing temporary sign supports and foundations if necessary during construction of the project.

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 (AA), (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

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

METRIC CONVERSION CHART (1" = 25mm)

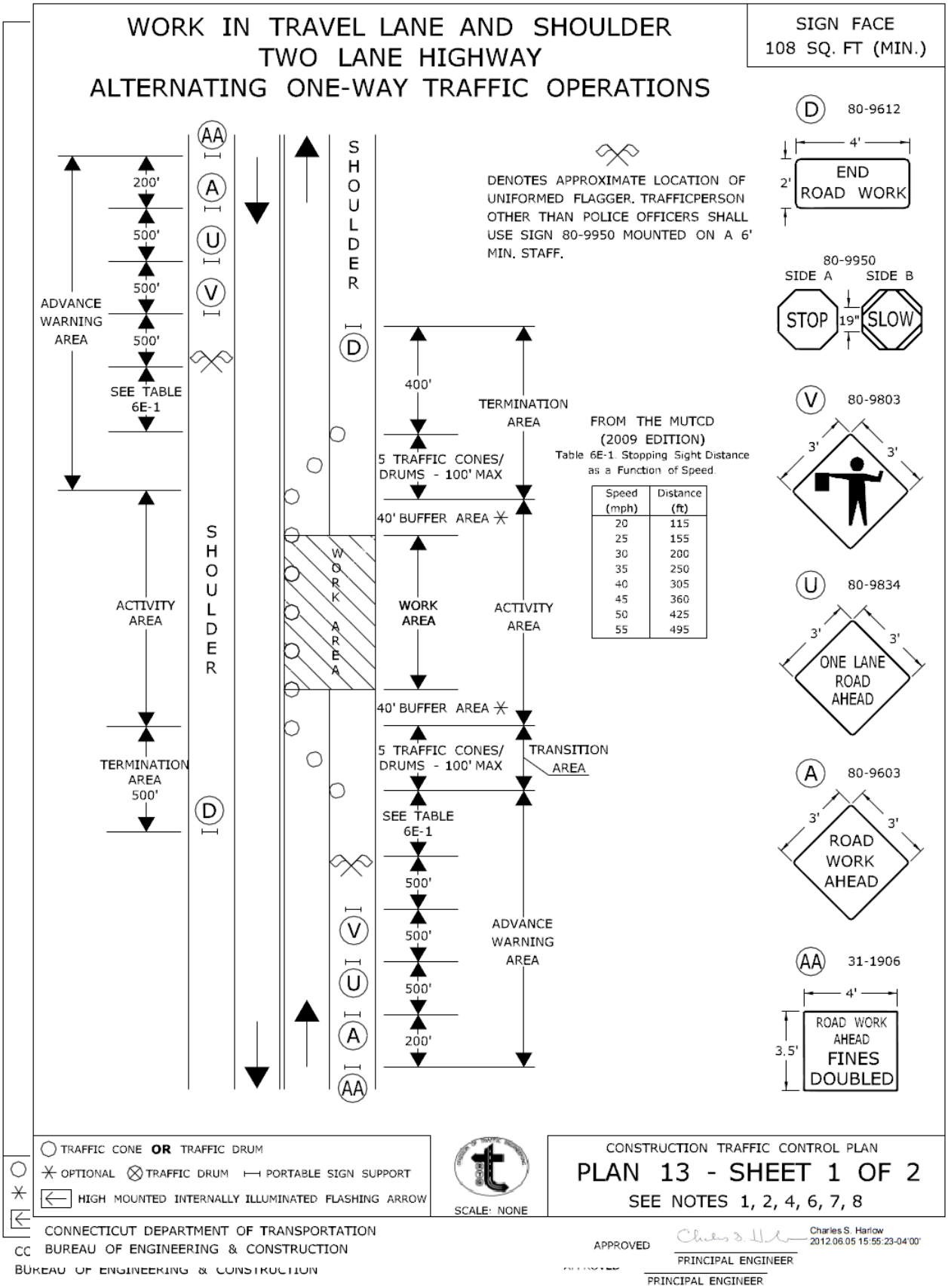
ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC
12"	300mm	42"	1050mm	72"	1800mm
18"	450mm	48"	1200mm	78"	1950mm
24"	600mm	54"	1350mm	84"	2100mm
30"	750mm	60"	1500mm	90"	2250mm
36"	900mm	66"	1650mm	96"	2400mm

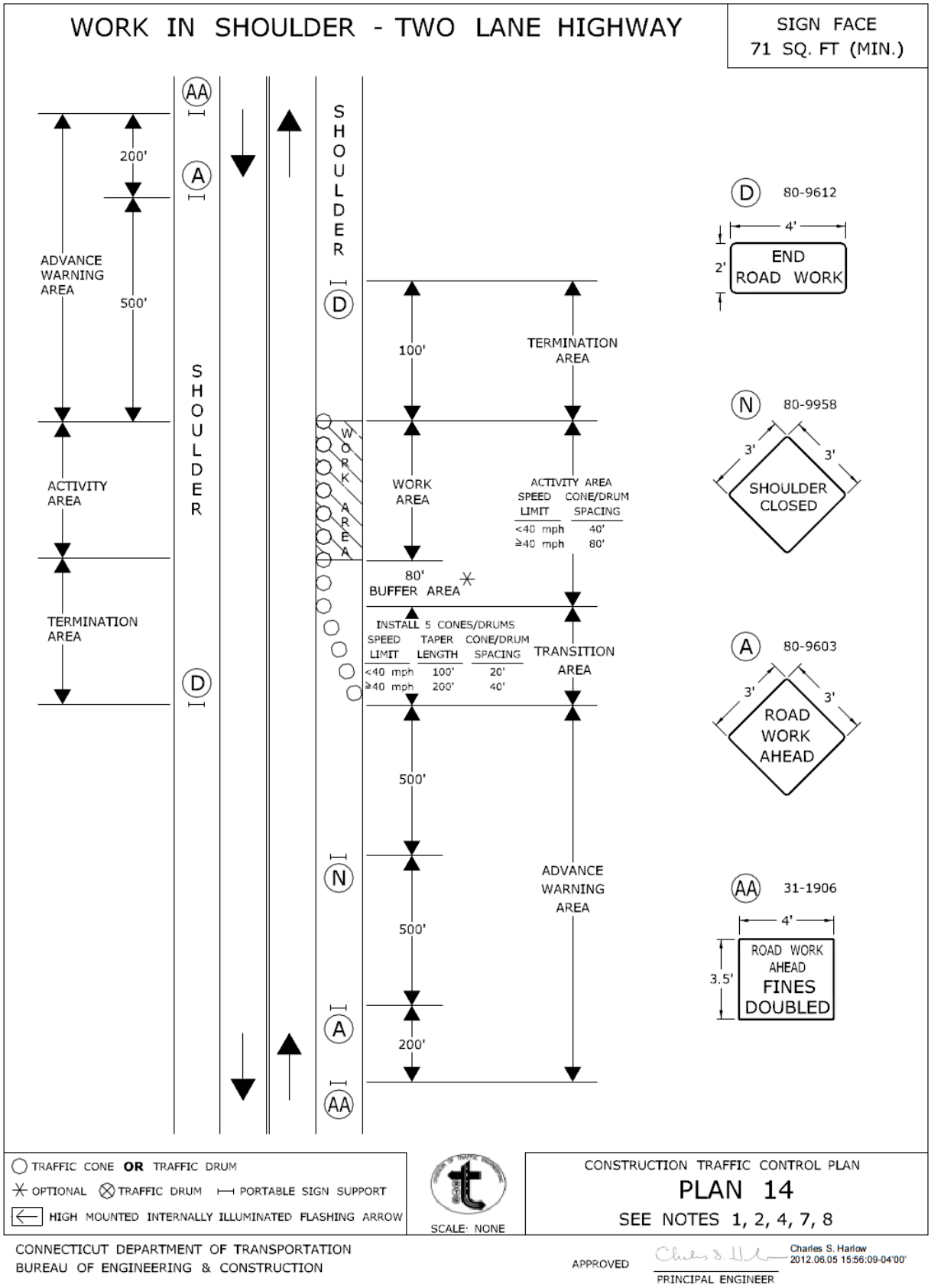
SCALE: NONE

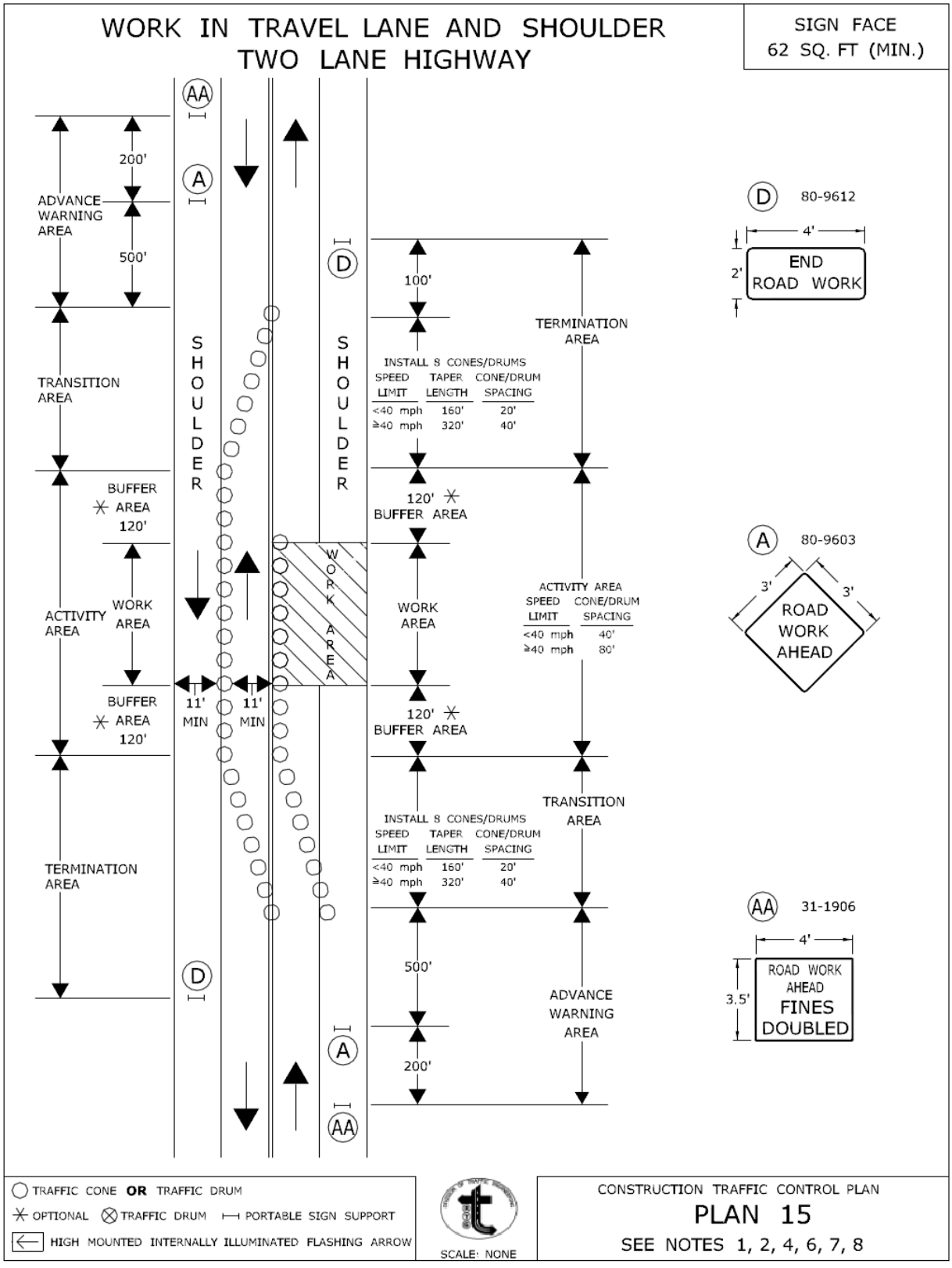
CONSTRUCTION TRAFFIC CONTROL PLAN
NOTES

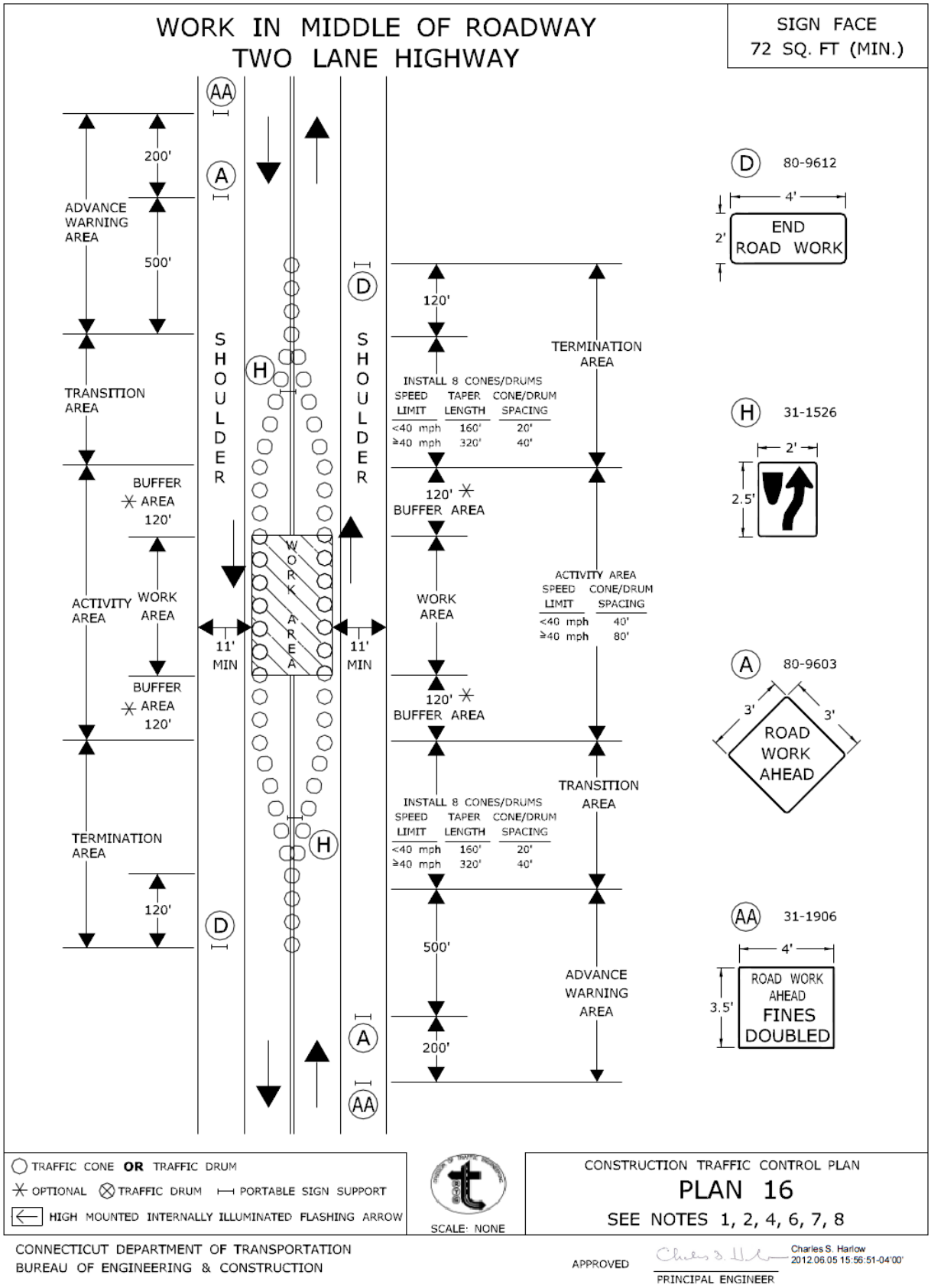
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

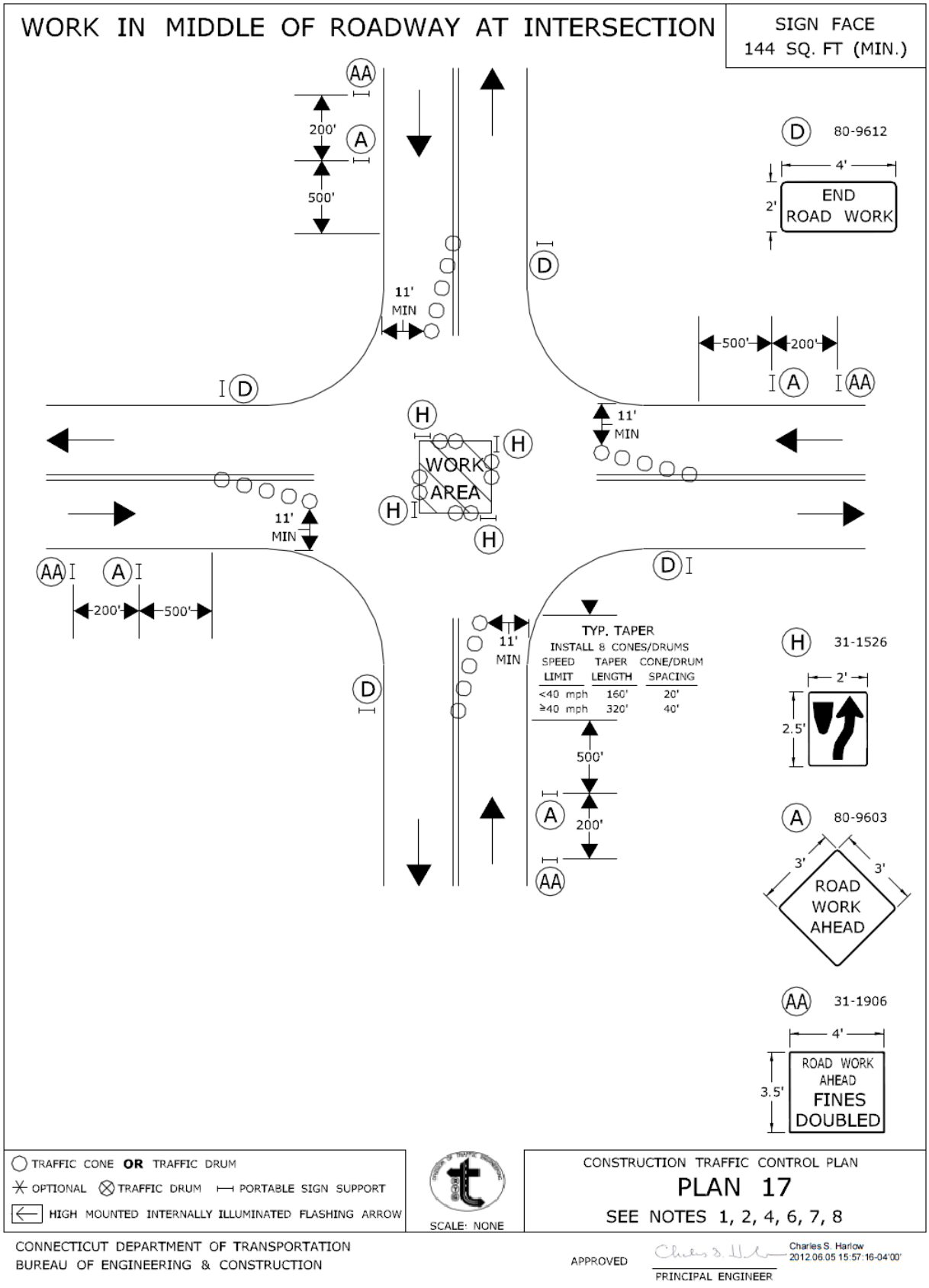
APPROVED Charles S. Harlow 2012.06.05 15:50:35-04'00'
PRINCIPAL ENGINEER

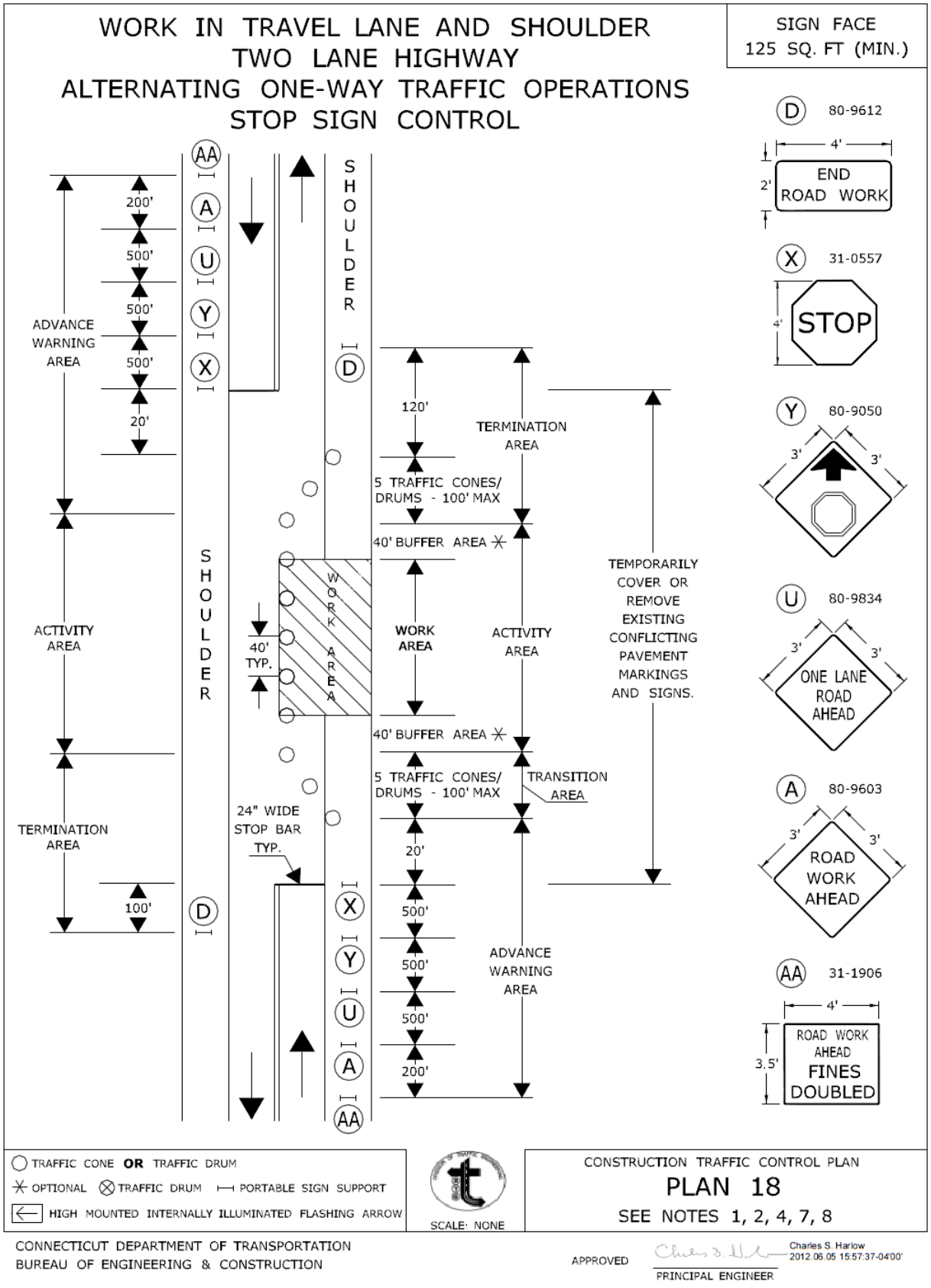

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS
SIGN FACE
108 SQ. FT (MIN.)
DENOTES APPROXIMATE LOCATION OF UNIFORMED FLAGGER. TRAFFICPERSON OTHER THAN POLICE OFFICERS SHALL USE SIGN 80-9950 MOUNTED ON A 6' MIN. STAFF.
ADVANCE WARNING AREA
200'
500'
500'
500'
SEE TABLE 6E-1
ACTIVITY AREA
TERMINATION AREA 500'
SHOULDER
WORK AREA
SHOULDER
400'
TERMINATION AREA
5 TRAFFIC CONES/ DRUMS - 100' MAX
40' BUFFER AREA
WORK AREA
ACTIVITY AREA
40' BUFFER AREA
5 TRAFFIC CONES/ DRUMS - 100' MAX
TRANSITION AREA
SEE TABLE 6E-1
500'
500'
500'
200'
ADVANCE WARNING AREA
FROM THE MUTCD (2009 EDITION)
Table 6E-1 Stopping Sight Distance as a Function of Speed
Speed (mph) | Distance (ft)
20 | 115
25 | 155
30 | 200
35 | 250
40 | 305
45 | 360
50 | 425
55 | 495
D 80-9612
4'
2'
END ROAD WORK
80-9950
SIDE A SIDE B
STOP 19" SLOW
V 80-9803
3' 3'
U 80-9834
3' 3'
ONE LANE ROAD AHEAD
A 80-9603
3' 3'
ROAD WORK AHEAD
AA 31-1906
4'
3.5'
ROAD WORK AHEAD
FINES DOUBLED
TRAFFIC CONE OR TRAFFIC DRUM
OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW
SCALE: NONE
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 1 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION
APPROVED
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:55:23-04'00'


WORK IN SHOULDER - TWO LANE HIGHWAY
SIGN FACE
71 SQ. FT (MIN.)
AA
A
D
N
200'
500'
ADVANCE WARNING AREA
ACTIVITY AREA
TERMINATION AREA
SHOULDER
SHOULDER
WORK AREA
100'
WORK AREA
TERMINATION AREA
ACTIVITY AREA
SPEED LIMIT
CONE/DRUM SPACING
<40 mph 40'
≥40 mph 80'
80' BUFFER AREA
INSTALL 5 CONES/DRUMS
SPEED LIMIT
TAPER LENGTH
CONE/DRUM SPACING
<40 mph 100' 20'
≥40 mph 200' 40'
TRANSITION AREA
500'
ADVANCE WARNING AREA
500'
200'
D 80-9612
4'
2'
END ROAD WORK
N 80-9958
3'
3'
SHOULDER CLOSED
A 80-9603
3'
3'
ROAD WORK AHEAD
AA 31-1906
4'
3.5'
ROAD WORK AHEAD
FINES DOUBLED
TRAFFIC CONE OR TRAFFIC DRUM
OPTIONAL
TRAFFIC DRUM
PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW
SCALE: NONE
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 14
SEE NOTES 1, 2, 4, 7, 8
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION
APPROVED
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:56:09-04'00'


WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
SIGN FACE
62 SQ. FT (MIN.)
ADVANCE WARNING AREA
200'
500'
TRANSITION AREA
BUFFER AREA 120'
ACTIVITY AREA
WORK AREA
BUFFER AREA 120'
TERMINATION AREA
SHOULDER
SHOULDER
WORK AREA
11' MIN
11' MIN
100'
TERMINATION AREA
INSTALL 8 CONES/DRUMS
SPEED LIMIT | TAPER LENGTH | CONE/DRUM SPACING
<40 mph | 160' | 20'
≥40 mph | 320' | 40'
120' BUFFER AREA
WORK AREA
120' BUFFER AREA
ACTIVITY AREA
SPEED LIMIT | CONE/DRUM SPACING
<40 mph | 40'
≥40 mph | 80'
TRANSITION AREA
INSTALL 8 CONES/DRUMS
SPEED LIMIT | TAPER LENGTH | CONE/DRUM SPACING
<40 mph | 160' | 20'
≥40 mph | 320' | 40'
500'
ADVANCE WARNING AREA
200'
D 80-9612
4'
2'
END ROAD WORK
A 80-9603
3'
3'
ROAD WORK AHEAD
AA 31-1906
4'
3.5'
ROAD WORK AHEAD
FINES DOUBLED
TRAFFIC CONE OR TRAFFIC DRUM
OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW
SCALE: NONE
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 15
SEE NOTES 1, 2, 4, 6, 7, 8
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION
APPROVED
Charles S. Harlow
2012.06.05 15:56:29-04'00'
PRINCIPAL ENGINEER


WORK IN MIDDLE OF ROADWAY
TWO LANE HIGHWAY
SIGN FACE
72 SQ. FT (MIN.)
AA
A
D
H
200'
500'
ADVANCE WARNING AREA
TRANSITION AREA
BUFFER AREA 120'
ACTIVITY AREA
WORK AREA
BUFFER AREA 120'
TERMINATION AREA
120'
SHOULDER
SHOULDER
WORK AREA
11' MIN
11' MIN
120'
TERMINATION AREA
INSTALL 8 CONES/DRUMS
SPEED LIMIT | TAPER LENGTH | CONE/DRUM SPACING
<40 mph | 160' | 20'
≥40 mph | 320' | 40'
120' BUFFER AREA
WORK AREA
ACTIVITY AREA
SPEED LIMIT | CONE/DRUM SPACING
<40 mph | 40'
≥40 mph | 80'
120' BUFFER AREA
TRANSITION AREA
INSTALL 8 CONES/DRUMS
SPEED LIMIT | TAPER LENGTH | CONE/DRUM SPACING
<40 mph | 160' | 20'
≥40 mph | 320' | 40'
500'
ADVANCE WARNING AREA
200'
D 80-9612
4'
2'
END ROAD WORK
H 31-1526
2'
2.5'
A 80-9603
3'
3'
ROAD WORK AHEAD
AA 31-1906
4'
3.5'
ROAD WORK AHEAD
FINES DOUBLED
TRAFFIC CONE OR TRAFFIC DRUM
OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW
SCALE: NONE
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 16
SEE NOTES 1, 2, 4, 6, 7, 8
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION
APPROVED
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:56:51-04'00'


WORK IN MIDDLE OF ROADWAY AT INTERSECTION
SIGN FACE
144 SQ. FT (MIN.)
AA
200'
A
500'
11'
MIN
D
80-9612
4'
2'
END
ROAD WORK
500'
200'
H
WORK
AREA
TYP. TAPER
INSTALL 8 CONES/DRUMS
SPEED LIMIT | TAPER LENGTH | CONE/DRUM SPACING
<40 mph | 160' | 20'
≥40 mph | 320' | 40'
31-1526
2'
2.5'
80-9603
3'
3'
ROAD
WORK
AHEAD
31-1906
4'
3.5'
ROAD WORK
AHEAD
FINES
DOUBLED
TRAFFIC CONE OR TRAFFIC DRUM
OPTIONAL
TRAFFIC DRUM
PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW
SCALE: NONE
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 17
SEE NOTES 1, 2, 4, 6, 7, 8
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION
APPROVED
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:57:16-04'00'


WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS
STOP SIGN CONTROL
SIGN FACE
125 SQ. FT (MIN.)
D 80-9612
4'
2'
END
ROAD WORK
X 31-0557
4'
STOP
Y 80-9050
3'
3'
U 80-9834
3'
3'
ONE LANE
ROAD
AHEAD
A 80-9603
3'
3'
ROAD
WORK
AHEAD
AA 31-1906
4'
3.5'
ROAD WORK
AHEAD
FINES
DOUBLED
AA
A
U
Y
X
D
SHOULDER
SHOULDER
ADVANCE
WARNING
AREA
200'
500'
500'
500'
20'
ACTIVITY
AREA
TERMINATION
AREA
100'
40'
TYP.
WORK AREA
120'
TERMINATION
AREA
5 TRAFFIC CONES/
DRUMS - 100' MAX
40' BUFFER AREA
WORK
AREA
ACTIVITY
AREA
40' BUFFER AREA
5 TRAFFIC CONES/
DRUMS - 100' MAX
TRANSITION
AREA
20'
500'
500'
500'
200'
ADVANCE
WARNING
AREA
TEMPORARILY
COVER OR
REMOVE
EXISTING
CONFLICTING
PAVEMENT
MARKINGS
AND SIGNS.
24" WIDE
STOP BAR
TYP.
TRAFFIC CONE OR TRAFFIC DRUM
OPTIONAL
TRAFFIC DRUM
PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW
SCALE: NONE
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 18
SEE NOTES 1, 2, 4, 7, 8
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION
APPROVED
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:57:37-04'00'

ITEM # 0979003A CONSTRUCTION BARRICADE TYPE III

General: The Contractor shall furnish construction barricades to conform to the requirements of NCHRP Report 350 (TL-3) and to the requirements stated in Article 9.71 "Maintenance and Protection of Traffic," as shown on the plans and/or as directed by the Engineer.

Materials: Prior to using the construction barricades, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices conform to NCHRP Report 350 (TL-3).

Alternate stripes of white and orange Type III or Type VI reflective sheeting shall be applied to the horizontal members as shown on the plans. Application of the reflective sheeting shall conform to the requirements specified by the reflective sheeting manufacturer. Only one type of sheeting shall be used on a barricade and all barricades furnished shall have the same type of reflective sheeting. Reflective sheeting shall conform to the requirements of Article M.18.09.01.

Construction barricades shall be designed and fabricated so as to prevent them from being blown over or displaced by the wind from passing vehicles. Construction barricades shall be approved by the Engineer before they are used.

Construction Methods: Ineffective barricades, as determined by the Engineer and in accordance with the ATSSA guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

Barricades that are no longer required shall be removed from the project and shall remain the property of the Contractor.

Method of Measurement: Construction Barricade Type III will be measured for payment by the number of construction barricades required and used.

Basis of Payment: "Construction Barricade Type III" required and used will be paid for at the Contract unit price per each. Each barricade will be paid for once, regardless of the number of times it is used.

ITEM # 1002121A UPLIGHT CONCRETE FOUNDATION

10.02.01 Description:

Work under this item shall consist of furnishing and installing a steel reinforced cast-in-place concrete foundation for each uplight at the locations and to the dimensions and details shown on the plans or as directed by the Engineer. The work shall include excavation, forming, steel reinforcing bars, conduit, ground rod, grounding conductor, anchor bolts and anchor bolt installation, concrete placement, concrete finishing, form removal, backfilling and compaction.

Required Submittals

Shop Drawings:

Submit shop drawings for foundations in accordance with the contract general requirements.

10.02.02 Materials:

Portland Cement Concrete: Concrete shall conform to Class "A" and shall meet the requirements of Article M.03.01 of The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816, 2004, as amended.

Reinforcing: Reinforcing bars to be furnished and placed under this item shall be "Deformed Bars", ASTM A-615-04 Grade 60, of the sizes and lengths indicated on the plans in the Reinforcing Schedule. Steel reinforcement bars shall be placed in the exact positions shown on the plans or as directed by the Engineer.

Anchor Bolts: The dimensions shall be shown on the plans or as recommended by the manufacturer and the bolts shall be made of steel conforming to ASTM F-1554-99, Grade 55. Anchor bolts, hex nuts, flat washers and split lock washers shall be hot-dip galvanized in accordance with the requirements of ASTM A-153-03, Class C.

Field welding and field bending of anchor bolts is prohibited. If installed anchor bolts do not fit the base plate, the Contractor shall remove and replace the foundation.

The contractor shall ensure anchor bolts are plumb in the foundation. A minimum anchor bolt embedment of at least 3 feet is required.

Rock Anchors: Shall conform to the Article M.15.03 of Form 816.

Electrical Conduit: Rigid galvanized steel conduit conforming to the requirements of Article M.15.09 of Form 816.

Ground Rod: ¾" X 10' solid copper rod.

Ground Conductor: No. 6 AWG solid copper.

Ground Conductor to Ground Rod Connection: Exothermic weld connection equal to Cadweld as manufactured by Erico Products Company or approved equal.

10.02.03 Construction Methods:

The foundations shall be completed the day the foundation is excavated. Foundations shall be installed in conjunction with the installation of hand holes or pull boxes provided for under other items.

Forms shall be built true to lines and grades designated, shall be strong, stable, firm, mortar-tight and adequately braced or tied, or both. They shall be designed and constructed to withstand all loads and pressures including those imposed by concrete placement, taking full account of the stresses due to the rate of placement, effect of vibration and conditions brought about by construction methods. Provide a ¾" chamfer at all exposed edges, if required by the drawings. Form material in contact with concrete shall be of a quality to provide the required concrete surface smoothness and shall be treated with a commercially available form-release compound, which will not damage, discolor or adhere to the concrete. Concrete may be placed against the sides of the excavation; however, the exposed portion of the foundations shall be formed to the size indicated on the plans. When in the judgment of the Engineer, unusual soil conditions prevent excavation to neat lines as shown on the plans, the complete foundation shall be formed.

The finished elevation of the top of the foundation shall be as shown on the plans.

Steel reinforcing and anchor bolts shall be set in the form prior to concrete placement. The anchor bolts shall be mounted in a template to maintain the proper spacing of the bolts. The bolts shall be secured to the reinforcing steel cage using short pieces of steel reinforcing bars and tie wire.

Conduits for power supply shall be placed in the forms at the locations indicated. The conduits shall extend 2" above the top of the concrete foundation and shall be centered in the top of the foundation. The conduits shall be held in place with the anchor bolt template. All conduits shall be installed and capped, with standard pipe caps, prior to concrete placement. Caps shall remain in-place until the cable is installed.

After initial set of the concrete, the forms shall not be jarred. Forms shall not be removed until after the concrete has hardened properly and not less than 24 hours after the concrete has been placed. Concrete surfaces exposed to conditions causing premature drying shall be protected by covering within two (2) hours of placing. The external surface of the hardened concrete shall be finished immediately after the removal of the forms. All voids on the surface shall be filled and finished to conform to the surrounding concrete surface. The entire exposed surface shall be thoroughly wet with a brush and rubbed with a No. 16 carborundum stone or an abrasive of equal quality, bringing the surface to a paste. The rubbing shall be continued sufficiently to remove all form marks and projections, producing a smooth, dense surface without pits or irregularities.

Backfill to be furnished and placed under this item shall be bank or crushed aggregate conforming to Article M.02 of Form 816, with a maximum size of ¾". Aggregate shall conform to the gradation requirements of M.02.06, Grade C of Form 816, except 100 percent shall pass a 19mm square mesh sieve. Backfill shall be thoroughly compacted to 95% optimum dry density.

The Contractor shall allow sufficient time for foundations to cure before placing any strain on the foundations. Poles and bracket arms or mast arms shall not be installed for a minimum of fourteen calendar days after the concrete has been placed..

When the foundation is to be installed over an existing CL&P service feed, the Contractor shall locate the conduit with service cable and shall contact the utility company representative to de-energize the feed. Once the service feed is de-energized and disconnected at the CL&P handhole or manhole, the Contractor shall cut the conduit beyond the foundation limits and the cable shall be pulled from the handhole or manhole. After the foundation excavation, a connecting rigid metal conduit shall be installed through the foundation form to restore the continuity of the feed. This connecting rigid metal conduit will be paid under Item No. 1008465 – 2" Rigid Metal Conduit.

If rock is encountered during the course of excavation, the Engineer shall determine whether the rock to be excavated to full depth or usage of rock anchors at partial depth.

10.02.04 Method of Measurement:

Uplight concrete foundation shall be measured for payment by the number of units installed and accepted. This measurement shall include the electrical conduit sweeps, which shall extend 2 feet outside of the foundation.

10.02.05 Basis of Payment:

The work will be paid for at the contract unit price each for “Upllight Concrete Foundation” installed, which price shall include all materials, labor, equipment, tools, forms, excavation, rock anchors, hand excavation of test pit to locate utilities in the proximity of foundation, disposal of surplus material, concrete, electrical conduit sweeps, conduit caps, ground rod, sleeves, ground bushings, bonding wire, anchor bolts, backfill, restoration of existing service feed(s) disturbed by foundation excavation and incidental expenses thereto. When rock is encountered within the limits of the excavation, this removal will be paid for at the contract unit price per vertical feet for "Rock in Foundation Excavation".

Pay Item	Pay Unit
Uplight Concrete Foundation	Each

ITEM # 1003621A TREE UPLIGHT

10.03.01 Description:

Work under this item shall consist of furnishing and installing three (3) uplights for tree located in the center of the roundabout at location shown on the plans and details. The work shall include furnishing and installing uplights, power pipe, inline fuse, and coordinating with local utility representatives. Installation shall include installing the lights plumb, connection of power supply, installing inline fuse, wiring, attaching the ground connection to the concrete bases and verifying the proper operation of the fixture(s) and GFI receptacle to the satisfaction of the engineer.

Required Submittals

Material Certificate of Compliance:

Submit material certificate of compliance for uplights, power pipes and transformers in accordance with the contract general requirements.

Shop Drawings:

Submit shop drawings for uplights, power pipes and transformers in accordance with the contract general requirements.

10.03.02 Materials:

Uplight:

DeltaStar (catalog #DS-LED-e66-MFL-A9-BZW-12-11-A-360SL) with Power Pipe System (catalog #PP-J-18-T-Tre20-B-BZW-SF) as manufactured by B-K Lighting, Madera, California or equal.

In-grade Transformer:

In-grade transformer shall be catalog #75VA HP2RM with inline fuse as manufactured by B-K Lighting, Madera, California or equal. Transformer shall be installed in concrete base per manufacturers recommendations.

Concrete Bases:

All materials for this work shall conform to the requirements of Section M.03 of the State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004, for Class “F” concrete.

Test for air content of fresh concrete shall be made during construction. Because of effects of mixing and vibration, samples for air content preferably should be taken from concentrate after it has been placed by qualified technicians per ASTM C-231- 03 or C-238-51.

The concrete producer will be required to show that his plant and equipment meet all requirements as established by ASTM designation C-94-04, and shall also be currently approved by the State of Connecticut, Department of Transportation.

All concrete mix used must be accompanied by a certification issued by the concrete producer showing the time of day on the batch slip and the composition of the concrete mix; that is the amount and type of cement; water; kind of air-entering admixture and the retarder admixture if any; and also a certification that the mix will attain the minimum compressive strength of 4,000 psi in 28 days.

Any concrete mix without the time of day stamped on the accompanying batch slip will be receded immediately. Also the concrete mix shall must be placed within 1 1/2 hours of the time of day stamped on the batch slip, otherwise it will be rejected.

10.03.03 Construction Methods:

Construction methods for this work shall be in accordance with the manufacturer's recommendations. The contractor shall be responsible for coordinating all necessary prerequisite work with Eversource. This shall include, but not be limited to installing uplights per manufacturers recommendations, coordinating and verifying new conduit installations. Eversource shall be responsible for pulling new wiring from energy source to first uplight location and energizing new lighting system. The contractor shall be responsible for installing all underground conduit in accordance with Eversource requirements.

10.03.04 Method of Measurement:

This work will be measured for payment by the number of "Tree Uplights" of the type and size specified, complete and accepted in place.

10.03.05 Basis of Payment:

This work will be paid for at the Contract unit price each for "Tree Uplight" of the type and size specified, complete in place, which price shall include all materials and labor.

Pay Item	Pay Unit
Tree Uplight	Each

ITEM # 1118012A REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT

Section 11.18: Replace the entire section with the following:

11.18.01 – Description:

Remove all abandon traffic signal equipment. Restore the affected area. Where indicated on the plans remove and reinstall existing traffic signal equipment to the location(s) shown.

11.18.02 – Materials:

The related sections of the following specifications apply to all incidental and additional material required for the proper relocation of existing equipment and the restoration of any area affected by this work.

- Division III, “Materials Section” of the Standard Specifications.
- Current Supplemental Specifications to the Standard Specifications.
- Applicable Special Provisions to the Standard Specifications.
- Current Department of Transportation, Functional Specifications for Traffic Control Equipment.

Article 11.18.03 - Construction Methods:

Schedule/coordinate the removal and/or relocation of existing traffic signal equipment with the installation of new equipment to maintain uninterrupted traffic signal control. This includes but is not limited to vehicle signals and detectors, pedestrian signals and pushbuttons, co-ordination, and pre-emption.

Abandoned Equipment

The contract traffic signal plan usually does not show existing equipment that will be abandoned. Consult the existing traffic signal plan for the location of abandoned material especially messenger strand, conduit risers, and handholes that are a distance from the intersection. A copy of the existing plan is usually in the existing controller cabinet. If not, a plan is available from the Division of Traffic Engineering upon request.

Unless shown on the plans it is not necessary to remove abandoned conduit in-trench and conduit under-roadway

When a traffic signal support strand, rigid metal conduit, down guy, or other traffic signal equipment is attached to a utility pole, secure from the pole custodian permission to work on the pole. All applicable Public Utility Regulatory Authority (PURA) regulations and utility company requirements govern. Keep utility company apprised of the schedule and the nature of the work. Remove all abandoned hardware, conduit risers, and down guys, Remove anchor rods, to 6” (150mm) below grade.

When underground material is removed, backfill the excavation with clean fill material. Compact the fill to eliminate settling. Remove entirely the following material: pedestal foundation; controller foundation; handhole; pressure sensitive vehicle detector complete with concrete base. Unless otherwise shown on the plan, remove steel pole and mast arm foundation to a depth of 2 feet (600mm) below grade. Restore the excavated area to a grade and condition compatible with the surrounding area.

- If in an unpaved area apply topsoil and establish turf in accordance with Section 9.44 and Section 9.50 of the Standard Specifications.

- If in pavement or sidewalk, restore the excavated area in compliance with the applicable Sections of Division II, "Construction Details" of the Standard Specifications.

Relocated Equipment

In the presence of the Engineer, verify the condition of all material that will be relocated and reused at the site. Carefully remove all material, fittings, and attachments in a manner to safeguard parts from damage or loss. Replace at no additional cost, all material which becomes damaged or lost during removal, storage, or reinstallation.

Salvage Equipment

Salvage Material	Stock No.	Value
Controller Cabinet, Complete including but not limited to the following: Conflict Monitor Coordination Equipment Vehicle Detection Equipment	330-03-7010	$ 500.00
Controller Unit	330-03-7005	$ 500.00
Aluminum Pedestal		
8 foot (2.4 m)	330-16-7108	$ 100.00
4 foot, 4 inch (1.3 m)	330-16-7112	$ 100.00
Steel Span Pole, 30' (9.0 m)	330-16-7050	$ 250.00
Steel Span Pole, all other lengths	330-16-7016	$ 250.00

All material not listed as salvage becomes the property of the Contractor. Properly handle, transport, then dispose in a suitable dump or recycle this material. Comply with all Federal and State hazardous waste laws and regulations.

In the presence of the Engineer, verify the condition and quantity of salvage material prior to removal. After removal transport and store the material protected from moisture, dirt, and other damage. Coil and secure copper cable separate from other cable such as galvanized support strand.

Within 4 working days of removal, return the Town owned salvage material to the Department of Public Works. Supply all necessary manpower and equipment to load, transport, and unload the material. The condition and quantity of the material after unloading will be verified by the Engineer.

Contact Town Engineer at least 24 hours prior to delivery.

Municipal Owned Traffic Signal Equipment

Return all municipal owned material such as pre-emption equipment to the Town.

Article 11.18.04 – Method of Measurement:

This work will be measured as a Lump Sum.

Article 11.18.05 – Basis of Payment:

This work will be paid for at the contract lump sum price for "Removal and/or Relocation of Traffic Signal Equipment" which price shall include relocating signal equipment and associated hardware, all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of signal equipment/materials designated for salvage and all equipment, material, tools and labor incidental thereto. This price shall also include removing and disposing of traffic signal equipment not to be salvaged and all equipment, material, tools and labor incidental thereto.

Payment is at the contract lump sum price for "Removal and/or Relocation of Traffic Signal Equipment" inclusive of all labor, vehicle usage, storage, and incidental material necessary for the complete removal of abandoned equipment/material and/or relocation of existing traffic signal equipment/material. Payment will also include the necessary labor, equipment, and material for the complete restoration of all affected areas.

A credit will be calculated and deducted from monies due the Contractor equal to the listed value of salvage material not returned or that has been damaged and deemed unsalvageable due to the Contractor's operations.

ITEM # 1118051A TEMPORARY SIGNALIZATION (SITE NO. 1)

Description:
The Contractor shall keep the traffic signal completely operational at all times during construction through the use of existing signal equipment, temporary signal equipment, new signal equipment, or any combination thereof during Stage 1A shown on the Temporary Traffic Control Plans and/or as directed by the Engineer.

Materials:

- Pertinent articles of the Standard Specifications
- Supplemental Specifications and Special Provisions contained in this contract

Construction Methods:

Preliminary Inspection

In the presence of the Engineer and a representative from Town, inspect and document the existing traffic signal's physical and operational condition prior to Temporary Signalization (TS). Include but do not limit the inspection to the following:

- Controller Assembly (CA)
  - Controller Unit (CU)
  - Detection Equipment
  - Pre-emption Equipment
  - Coordination Equipment
- Vehicle and Pedestrian Signals
- Vehicle and Pedestrian Detectors
- Emergency Vehicle Pre-emption System (EVPS) *
- Interconnect Cable and Splice Enclosures
- Support Structures
- Handholes, Conduit and Cable

It may be necessary to repair or replace equipment that is missing, damaged, or malfunctioning. Develop a checklist of items for replacement or repair after the inspection. If authorized by the Engineer, this work will be considered "Extra Work" under Article 1.09.04.

TS Plan

At least 5 days prior to implementation of each Stage 1A, submit a 1:40 scale TS plan for each location to the Engineer for review and comment. Include but do not limit the plan to the following:

- Survey Ties
- Dimensions of Lanes, Shoulders, and Islands
- Slope Limits
- Clearing and Grubbing Limits
- Signal Phasing and Timing
- Location of Signal Appurtenances such as Supports, Signal Heads, Pedestrian Push buttons, Pedestrian Signals
- Location of Signing and Pavement Markings (stop bars, lane lines, etc.)
- Location, method, and mode of Temporary Detection

Review of the TS plan does not relieve the Contractor of ensuring the TS meets the requirements of the MUTCD. A copy of the existing traffic signal plan for State-owned traffic signals is available from the Division of Traffic Engineering upon request. Request existing traffic signal plans for Town-owned traffic signals from the Town. Do not implement the TS plan until all review comments have been addressed.

Earthwork

Perform the necessary clearing and grubbing and the grading of slopes required for the installation, maintenance, and removal of the TS equipment. After TS terminates restore the affected area to the prior condition and to the satisfaction of the Engineer.

Maintenance and Protection of Traffic
Furnish, install, maintain, relocate, and remove signal-related signing (lane-use, signal ahead, NTOR, etc.) and pavement markings as needed. Install, relocate, and/or remove equipment in a manner to cause no hazard to pedestrians, traffic or property. Maintain traffic as specified in the Special Provisions "Prosecution and Progress" and "Maintenance and Protection of Traffic."

Electrical Service and Telephone Service at Existing Signalized Intersections
If the electrical service or the telephone service source must be changed or relocated make all arrangements with the utility company and assume all charges. The party previously responsible for the monthly payment of service shall continue to be responsible during TS.

Temporary Signalization
Furnish, install, maintain, relocate, and remove existing, temporary, and proposed traffic signal equipment and all necessary hardware; modify or furnish a new CA; reprogram the CU phasing and timing; as many times as necessary for each stage/phase of construction to maintain and protect traffic and pedestrian movements as shown on the plans or as directed by the Engineer.

Inspection
When requested by the Engineer, the TS will be subject to a field review by a representative of the Division of Traffic Engineering and/or the Town, which may generate additional comments requiring revisions to the temporary signal.

Detection
Only when directed by the Engineer shall the contractor provide vehicle detection on the existing or temporary alignment for all intersection approaches that have existing vehicular detection.

The Contractor shall keep existing pedestrian pushbuttons accessible and operational at all times during Stage 1A including temporary measures for access to the push buttons and ensure visibility to the pedestrian walk/don't walk signals.

Emergency Vehicle Pre-emption System (EVPS)
Furnish, install, maintain, relocate, and remove the equipment necessary to keep the existing EVPS operational as shown on the plan. Do not disconnect or alter the EVPS without the knowledge and concurrence of the Engineer and the EVPS owner. Schedule all EVPS relocations so that the system is out of service only when the Contractor is actively working. Ensure EVPS is returned to service and is completely operational at the end of the work day. Keep the EVPS owner apprised of all changes to the EVPS.

Coordination
Furnish, install, maintain, relocate, and remove the equipment necessary to keep the intersection coordinated to adjacent signals as shown on the plan. Do not disconnect the interconnect without the approval of the Engineer.

Maintenance
Once TS is in effect, assume maintenance responsibilities of the entire installation. Notify the Engineer for the project records the date that Temporary Signalization begins. Notify the following parties that maintenance responsibility has been transferred to the Contractor:

Town Engineer
Local Police Department

Provide the Engineer a list of telephone numbers of personnel who will be on-call during TS. Respond to traffic signal malfunctions by having a representative at the site within three hours from the initial contact. Within twenty-four (24) hours have the traffic signal operating according to plan.

If the Engineer determines that the nature of a malfunction requires immediate attention and/or the Contractor does not respond within three (3) hours, then an alternate maintenance service will be called to repair the signal. Expenses incurred by the alternate maintenance service for each call will be deducted from monies due to the Contractor with a minimum deduction of $1,000. The alternate maintenance service may be the owner of the signal or another qualified electrical contractor.

Duration
Temporary Signalization shall commence when any existing signal equipment is disturbed, relocated, or altered based on the inspection checklist in any way for the TS.

Ownership
Existing equipment, designated as salvage, remains the property of the owner. Salvable equipment will be removed and delivered to the owner upon completion of use. Temporary equipment supplied by the Contractor remains the Contractor's property unless noted otherwise.

Method of Measurement:
Temporary Signalization shall be paid only once per site on a percentage of the contract Lump Sum price. Fifty percent (50%) shall be paid when Stage 1A is operational as shown on the plan or to the satisfaction of the Engineer. Fifty percent (50%) shall be paid when Stage 1B commences.

Basis of Payment:
This work shall be paid at the contract Lump Sum price for "Temporary Signalization (Site No. 1)." This price includes the preliminary inspection, TS plan for each stage/phase, furnishing, installing, maintaining, relocating and revising traffic signal equipment, controller assembly modifications, controller unit program changes such as phasing and timing, removing existing, temporary, and proposed traffic signal equipment, arrangements with utility companies, towns or cities including the fees necessary for electric and telephone service, clearing and grubbing, grading, area restoration and all necessary hardware, materials, labor, and work incidental thereto.

All material and work for signing and pavement markings is paid for under the appropriate Contract items.

All Contractor supplied items that will remain the Contractor's property shall be included in the contract Lump Sum price for "Temporary Signalization."

Any items installed as part of the permanent installation are not paid for under this item but are paid for under the bid item for that work.

ITEM # 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 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 that are to be relocated so that they are not damaged. Any material that is damaged shall be replaced by the Contractor at no additional cost.

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 sheet aluminum signs designated for relocation, all new sign posts and associated hardware for signs designated for relocation, all 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 sheet aluminum signs, 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 sheet aluminum signs, sign posts, and sign supports designated for scrap and all equipment, material, tools and labor incidental thereto.

ITEM # 1208928A SIGN FACE SHEET ALUMINUM (TYPE IV RETRO-REFLECTIVE SHEETING)

Description: This item shall consist of furnishing and installing sign face-sheet aluminum signs of the type specified, metal sign posts, mast arm-mounted sign brackets at locations indicated on the plans or as ordered and in conformance with the plans and these specifications.

All traffic and parking signs shall conform to the latest revision of the “Manual on Uniform Traffic Control Devices” conventional road size, the “Standard Highway Signs” book and the “Connecticut Department of Transportation Catalog of Signs”.

This item shall also include the installation of Town of Glastonbury Street Name signs on the mast arms as shown on the plans.

Materials:
Reflective sheeting shall conform to the requirements of Article M.18.09.01, Type IV.

Sheet aluminum sign blanks shall be 0.08 inches thick and conform to the requirements of Article M.18.13.

Silk screening of Type IV reflective sheeting shall conform to the requirements specified by the reflective sheeting manufacturer.

Metal sign posts sign supports shall meet the requirements of the Connecticut Department of Transportation galvanized Type IV, 3 lbs/ft breakaway channel posts and conform to the requirements of Article M.18.14.

Sign mounting bolts shall conform to the requirements of Article M.18.15.

The Town street name signs at the locations shown on the plans are 18" tall by a length appropriate for the size of street name with 8" white reflective letters and a 1/2 white reflective border and reflective sheeting. The street name sign sheeting is 3m high intensity prismatic sheeting, white and a color to be determined by the Town.

The street name signs shall list the text of the street name in capital letters, with the street/road/boulevard abbreviated as necessary and in small capitals. The Town of Glastonbury Town Seal shall be shown on the sign face as well.

The color of the street name signs will be determined by the Town during the shop drawing review process.

Construction Methods: Placement and dimensions of copy, border and mounting holes shall conform to details of the Department of Transportation for Regulatory Warning and Guide signs which are available for inspection at the Department of Transportation office. Non-reflective copy, border and background shall be applied by the silk-screen process in a manner specified by the reflective sheeting manufacturer. The silk screening of all copy, border and background on Type III reflective sheeting shall be accomplished prior to the application of the reflective sheeting to the finished aluminum sign blank. Type IV reflective sheeting shall be of the heat activated adhesive type and shall be applied in a manner specified by the reflective sheeting manufacturer.

Reflective sheeting shall be applied in such a manner that the finished sign will be wrinkle and bubble free. No splices of the reflective sheeting will be permitted on any sign face under 30 square feet (2.7 square meters) in area with one dimension of 4 feet (1.2 meters) or less and no more than one splice will be permitted on any one sign without the approval of the Engineer.

Direct application of cutout Type IV reflective sheeting copy and border shall conform to the requirements specified by the reflective sheeting manufacturer. Cutout copy and border shall be applied directly to clean, dust free reflective sheeting background panels. Borders shall be cut neatly and butt-joined at corners and panel joints. Type I or Type II reflective sheeting used for direct applied cutout copy and border shall be uniform in brightness and
color.

The fabrication of aluminum sign blanks including cutting to size and shape and the punching of mounting holes shall be completed prior to metal degreasing and the application of reflective sheeting. Aluminum sign blanks shall be free of buckles, warp, dents, cockles, burrs and defects resulting from fabrication. Mast arm-mounted sign brackets shall be installed as shown on the plans.

After complete fabrication of the sign as indicated on the plans and in conformance with the requirements contained in the specifications, the sign shall be mounted on the type of support indicated on the plans after the support has been satisfactorily installed at its proper location. The reinforcing plate shall be installed as shown on the plans.

Metal sign posts shall be driven or the holes augered and the backfill thoroughly tamped after the posts have been set level and plumb. Parapet and mast arm mounted sign supports shall be installed as shown on the plans and shall be level and plumb.

The Contractor shall submit the templates for the street name signs for review and approval prior to ordering the signs.

Method of Measurement: This work will be measured for payment by the number of square feet of sign face-sheet aluminum of the type specified, installed and accepted.

Basis of Payment: This work will be paid for at the Contract unit price per square foot for "Sign Face-Sheet Aluminum" of the type specified complete in place, which price shall include the completed sign, metal sign post(s), mast arm-mounted brackets, Town seal placement on street name signs, mounting hardware, including reinforcing plates, and all materials, equipment, labor and work incidental thereto.

ITEM # 12101XXA TRAFFIC PATTERNXD

Description:

A durable imprinted aggregate reinforced preformed thermoplastic pavement marking system (herein "TRAFFIC PATTERNXD") that provides a textured, highly attractive and durable topical treatment to the surface of asphalt pavement. Typically the system replicates, in relief, the grout lines common to brick or other types of unit pavers, but may also be used to create other patterns. It is intended for use on asphalt pavements to create traffic calming solutions and decorative crosswalks, medians, intersections and through areas in parking lots. It provides a seamless, aesthetic look without the trip hazards and ongoing maintenance often associated with pavers and stamped concrete.

Materials:
The aggregate reinforced preformed thermoplastic is typically supplied in panels measuring 2 ft. x 2 ft. [±⅛ in.] (.61m x .61m [±3mm])

The System shall be provided in a brick color and running bond pattern.

The System shall utilize a resilient, aggregate reinforced preformed thermoplastic product which contains a minimum of thirty percent (30%) intermixed anti-skid/anti-slip elements and where the top surface contains anti-skid/anti-slip elements. These anti-skid/anti-slip elements must have a minimum hardness of 6 (Mohs scale).

The System must be resistant to the detrimental effects of motor fuels, antifreeze, lubricants, hydraulic fluids, etc.

The System manufacturer must be ISO 9001:2008 certified for design, development and manufacturing of preformed thermoplastic, and provide proof of current certification.

Must be composed of an ester modified rosin impervious to degradation by motor fuels, lubricants, etc. in conjunction with aggregates, pigments, binders, and anti-skid/anti-slip elements. Pigments and anti-skid/anti-slip elements must be uniformly distributed throughout the material. The material conforms to AASHTO designation M249, with the exception of the relevant differences due to the material being supplied in a preformed state, being non-reflective, and potentially being of a color different from white or yellow.

Pigments:

White: The material shall be manufactured with sufficient titanium dioxide pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected.

3.1.2 Other Colors: The pigment system must not contain heavy metals nor any carcinogen, as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.

Skid Resistance: The surface of the material shall contain factory applied anti-skid/anti-slip elements with a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum skid resistance value of 60 BPN when tested according to ASTM E 303.

Slip Resistance: The surface of the material shall contain factory applied anti-skid/anti-slip elements with a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum static friction of coefficient of 0.6 when tested according to ASTM C 1028 (wet and dry), and a minimum static coefficient of friction of 0.6 when tested according to ASTM D 2047.

Thickness: The material must be supplied at a minimum thickness of 150 mil (3.8mm).

Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.

Storage Life: The material may be stored for 12 months, if stored indoors and protected from the elements.

Transverse Lines to Supplement System Application: Supplied as white, retroreflective preformed thermoplastic line stripe material in 90 mil (2.3 mm) or 125 mil (3.2 mm) thicknesses, material is available in 6 in. (.15m), 8 in. (.20m) or 12 in. (.30m) widths. This preformed thermoplastic material may be supplied and applied by the certified applicator in conjunction with the System, and is available from the System manufacturer. (Consult the manufacturer's published application instructions for the preformed thermoplastic line stripe material selected, for proper application methods.)

Construction Methods:
The System must be able to be applied to asphalt surfaces without preheating the application surface to a specific temperature.

The System must be able to be applied in temperatures down to 45ºF (7ºC) without any special storage, preheating or treatment of the material before application.

The System is applied to asphalt pavement using proprietary reciprocating infrared heating equipment. A two-part epoxy sealer specified by the manufacturer must be applied to the substrate prior to preformed thermoplastic application to ensure proper adhesion, and to provide reinforcement for larger volumes of material. Immediately following sealer application, panels of aggregate reinforced preformed thermoplastic are positioned properly on the asphalt substrate. The preformed thermoplastic is then heated to the required melting temperature. Additional aggregate may be applied to the preformed thermoplastic surface as needed following the melting process, to achieve added friction properties and a uniform surface appearance. As the material is cooling, it is imprinted with a vibratory plate compactor and a template made from 3/8 in. (9.5 mm) flexible wire rope in the required design to create crisp, clean lines which define the pattern.

The System must be able to be applied to asphalt surfaces without preheating the application surface to a specific temperature.

The System must be able to be applied in temperatures down to 45ºF (7ºC) without any special storage, preheating or treatment of the material before application.

The System is applied to asphalt pavement using proprietary reciprocating infrared heating equipment. A two-part epoxy sealer specified by the manufacturer must be applied to the substrate prior to preformed thermoplastic application to ensure proper adhesion, and to provide reinforcement for larger volumes of material. Immediately following sealer application, panels of aggregate reinforced preformed thermoplastic are positioned properly on the asphalt substrate. The preformed thermoplastic is then heated to the required melting temperature. Additional aggregate may be applied to the preformed thermoplastic surface as needed following the melting process, to achieve added friction properties and a uniform surface appearance. As the material is cooling, it is imprinted with a vibratory plate compactor and a template made from 3/8 in. (9.5 mm) flexible wire rope in the required design to create crisp, clean lines which define the pattern. For crosswalks, it is typically demarcated by applying white preformed thermoplastic transverse lines on both sides of the installation

Stamping Templates: A wire rope template is required in the execution of the System. The template is used for imprinting the defined pattern once the preformed thermoplastic has been applied. The wire rope diameter for the imprinting template used for the specified pattern is 3/8 in. (9.5mm). The stamping templates are distributed by the System manufacturer.

Heating Equipment: The System manufacturer shall distribute reciprocating infrared heating equipment designed specifically to elevate the temperature of the preformed thermoplastic material and asphalt pavement

without adversely affecting it. The primary heating unit must employ a bank of propane-fired infrared heaters, mounted on a track device that allows the heater bank to reciprocate back and forth over a designated area, thereby allowing the operator to monitor the temperature of the preformed thermoplastic at all times during the pavement heating process.

A smaller, mobile infrared heater distributed by the System manufacturer is designed specifically to heat areas such as borders and narrow areas that are inaccessible to the primary heaters. This secondary heater also allows the operator to monitor the temperature of the preformed thermoplastic at all times during the heating process.

An approved hand-held propane heat torch distributed by the System manufacturer shall be used to heat isolated areas of the preformed thermoplastic.

Sealer: A two-part epoxy sealer specified and distributed by the System manufacturer must be applied to the substrate prior to material application to ensure proper adhesion, and to provide reinforcement for larger volumes of material.

Specialized Sealer Dispensing Gun: Used to dispense the required two-part epoxy sealer onto the substrate. The sealer dispensing guns are distributed by the System manufacturer.

Hand Held Finishing Tool: Enables the applicator to complete the imprinting of the thermoplastic in areas around permanent structures, such as curbs and manholes covers, which may be inaccessible to the stamping template. The hand held finishing tools are distributed by the System manufacturer.

Aggregate: Supplemental anti-skid/anti-slip elements to be applied to the surface of the molten thermoplastic as needed, if the factory applied anti-skid/anti-slip elements embed too deeply into the surface of the molten thermoplastic material during the heating process. (Embedded aggregate is exposed upon wear for extended skid resistance.) The aggregate is distributed by the System manufacturer.

Air Powered Spray Hopper: Used to spray supplemental anti-skid/anti-slip elements (aggregate) on the surface of the molten preformed thermoplastic in a uniform manner. The air powered spray hoppers are distributed by the System manufacturer.

Vibratory Plate Compactor (700-900 lb.): Shall be used for pressing the 3/8” (9.5mm) wire rope stamping templates into the thermoplastic to create the specified pattern in both the thermoplastic and asphalt substrate. The System manufacturer does not supply vibratory plate compactors.

Manufacturer Certified Applicator Requirement: The System shall be supplied and applied only by an applicator certified by the System manufacturer. The applicator shall provide proof of current certification before commencing work. The Certified Applicator shall follow the System manufacturer’s current published application procedures.

Substrate Condition: The System must only be applied to a stable, high quality asphalt pavement substrate over a stable base that is free of defects, as per the manufacturer published Substrate Guide. The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

Procedure: The System is applied to asphalt pavement using proprietary reciprocating infrared heating equipment. The material must be able to be applied at ambient and road temperatures down to 45ºF (7ºC) without any preheating of the pavement to a specific temperature. A two-part epoxy sealer specified by the manufacturer must be applied to the substrate prior to preformed thermoplastic application. Immediately following sealer application, the panels of aggregate reinforced preformed thermoplastic are positioned properly on the asphalt substrate with the aggregate side facing up. The preformed thermoplastic is then heated to the required melting temperature. Additional aggregate may be applied to the preformed thermoplastic surface as

needed following the melting process. As the material is cooling it is imprinted with a stamping template made from 3/8 in. (9.5 mm) flexible wire rope in the required design using a vibratory plate compactor. The preformed thermoplastic material is then allowed to cool thoroughly before being opened to vehicle or pedestrian traffic. (Consult the manufacturer's published application procedures for complete information.)

Method of Measurement:
The work of providing and installing the Streetprint XD pavement will be measured for payment by the square yard of material installed and accepted.

Basis of Payment:
This work shall be paid for at the Contract unit price per square yard, which shall include all equipment, supplies, materials, labor and incidentals thereto for the complete installation of a Streetprint XD.

Pay Item	Pay Unit
Streetprint XD	SY.

ITEM # 1210101A 4" WHITE EPOXY RESIN PAVEMENT MARKINGS

ITEM # 1210102A 4" YELLOW EPOXY RESIN PAVEMENT MARKINGS

ITEM # 1210105A EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS

This item shall conform to Section 12.10 EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS, CONNECTICUT SUPPLEMENTAL SPECIFICATION and Section 12.11 REMOVAL OF PAVEMENT MARKINGS, of the Form 816 amended as follows:

Delete "SYMBOLS AND LEGENDS" from the title of the special provision.

Construction Methods:

Section 12.10.03 Construction Methods of the Form 816 is amended as follows:

Delete the entire section titled "WARRANTY" under item number 3. Performance and Warranty.

It was determined by the Office of Construction that the First Year warranty requirement is not necessary because early test results generally depict the outcome of pavement markings.

Section 12.11.04 of the Form 816 shall be amended to read, "The work of removing existing pavement markings shall not be measured for payment."

Section 12.11.05 shall be amended to read "There will be no separate payment for this item." All of the work of removing existing pavement markings shall be included in the unit prices for pavement markings or other items associated thereto.

ITEM # 1220013A CONSTRUCTION SIGNS – BRIGHT FLUORESCENT SHEETING

General: The Contractor shall furnish construction signs with bright fluorescent sheeting and their required portable supports or metal sign posts that conform to the requirements of NCHRP Report 350 (TL-3). The construction signs and their required portable supports or metal sign posts shall conform to the signing requirements stated in Article 9.71 "Maintenance and Protection of Traffic", as shown on the plans and/or as directed by the Engineer.

Materials: Prior to using the construction signs and their portable supports, the Contractor shall submit to the Engineer a copy of the Letter of Acceptance issued by the FHWA to the manufacturer documenting that the devices (both sign and portable support tested together) conform to NCHRP Report 350 (TL-3).

Portable sign supports shall be designed and fabricated so as to prevent signs from being blown over or displaced by the wind from passing vehicles. Portable sign supports shall be approved by the Engineer before they are used. Mounting height of signs on portable sign supports shall be a minimum of 1 foot and a maximum of 2 feet, measured from the pavement to the bottom of the sign.

All sign faces shall be rigid and reflectorized. Sheet aluminum sign blanks shall conform to the requirements of Article M.18.13. Metal sign posts shall conform to the requirements of Article M.18.14. Application of reflective sheeting, legends, symbols, and borders shall conform to the requirements specified by the reflective sheeting manufacturer. Attachments shall be provided so that the signs can be firmly attached to the portable sign supports or metal posts without causing damage to the signs. A Materials Certificate and Certified Test Report conforming to Article 1.06.07 shall be required for the reflective sheeting.

The following types of construction signs shall not be used: mesh, non-rigid, roll-up, corrugated or waffle board types substrates, foam core and composite aluminum sign substrates.

Reflective sheeting shall conform to the following:
The fluorescent orange prismatic retroreflective sheeting shall consist of prismatic lenses formed in a transparent fluorescent orange synthetic resin, sealed, and backed with an aggressive pressure sensitive adhesive protected by a removable liner. The sheeting shall have a smooth surface.

Physical Properties:
A. Photometric - Coefficient of Retroreflection RA
When the sheeting applied on test panels is measured in accordance with ASTM E 810, it shall have minimum coefficient of retroreflection values as shown in Table I. The rotation angle shall be as designated by the manufacturer for test purposes, the observation angles shall be 0.2 degrees and 0.5 degrees, the entrance angles (component B1) shall be -4 degrees and +30 degrees.

TABLE I
Minimum Coefficient of Retroreflection R_A
Candelas per footcandle per square foot

Observation Angle (deg.)	Entrance Angle (deg.)	R_A Orange
0.2	- 4	200
0.2	+ 30	90
0.5	- 4	80
0.5	+ 30	50

The rotation shall be as designated by the manufacturer.

B. Daytime Color

Color shall conform to the requirements of Table II. Daytime color and maximum spectral radiance factor (peak reflectance) of sheeting mounted on test panels shall be determined instrumentally in accordance with ASTM E 991. The values shall be determined on a Hunter Lab Labscan 6000 0/45 Spectrocolorimeter with option CMR 559 (or approved equal 0/45 instrument with circumferential viewing illumination). Computations shall be done in accordance with ASTM E 308 for the 2 degree observer.

TABLE II
Color Specification Limits** (Daytime)

Color	1		2		3		4		Reflectance Limit Y (%)	
	X	Y	X	Y	X	Y	X	Y	MIN	MAX
Orange (new)	.583	.416	.523	.397	.560	.360	.631	.369	28	-
Orange (weathered)	.583	.416	.523	.397	.560	.360	.631	.369	20	45

Maximum Spectral Radiance Factor, new: 110%, min.
weathered: 60%, min.

** The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 standard colorimetric system measured with standard illuminant D65.

C. Nighttime Color

Nighttime color of the sheeting applied to test panels shall be determined instrumentally in accordance with ASTM E 811 and calculated in the u', v' coordinate system in accordance with ASTM E 308. Sheeting shall be measured at 0.33 degrees observation and -4 degree entrance at rotation as determined by the manufacturer for test purposes. Color shall conform to the requirements of Table III.

TABLE III
Color Specification Limits ** (Nighttime)

Color	1		2		3		4	
	u'	v'	u'	v'	u'	v'	u'	v'
Orange (new and weathered)	.400	.540	.475	.529	.448	.522	.372	.534

D. Resistance to Accelerated Weathering

The retroreflective surface of the sheeting shall be weather resistant and show no appreciable cracking, blistering, crazing, or dimensional change after one year's unprotected outdoor exposure in south Florida, south-facing and inclined 45 degrees from the vertical, or after 1500 hours exposure in a xenon arc weatherometer in accordance with ASTM G26, Type B, Method A. Following exposure, panels shall be washed in a 5% HCL solution for 45 seconds, rinsed thoroughly with clean water, blotted with a soft clean cloth and brought to equilibrium at standard conditions. After cleaning, the coefficient of retroreflection shall be not less than 100 when measured as in D.2, below, and the color is expected to conform to the requirements of Tables II and III for weathered sheeting. The sample shall:

1. Show no appreciable evidence of cracking, scaling, pitting, blistering, edge lifting or curling or more than 0.031 inch shrinkage or expansion.

2. Be measured only at angles of 0.2 degrees observation, -4 degrees entrance, and rotation as determined by the manufacturer for test purposes. Where more than one panel of color is measured, the coefficient of retroreflection shall be the average of all determinations.

E. Impact Resistance
The retroreflective sheeting applied according to the manufacturer's recommendations to a test panel of alloy 6061-T6, 0.040 inch by 3 inches by 5 inches and conditioned for 24 hours, shall show no cracking outside the impact area when the face of the panel is subjected to an impact of 100 inch-pounds, using a weight with a 0.625 inch diameter rounded tip dropped from a height necessary to generate an impact of 100 inch-pounds, at test temperatures of both 32° F and 72° F.

F. Resistance to Heat
The retroreflective sheeting, applied to a test panel as in E., above, and conditioned for 24 hours, shall be measured in accordance with Paragraph A. at 0.2 degree observation and -4 degree entrance angles at rotation as determined by the manufacturer for test purposes and exposed to 170° ± 5° F for 24 hours in an air circulating oven. After heat exposure the sheeting shall retain a minimum of 70% of the original coefficient of retroreflection.

G. Field Performance:
Retroreflective sheeting processed and applied to sign blank materials in accordance with the sheeting manufacturer's recommendations, shall perform effectively for a minimum of 3 years. The retroreflective sheeting will be considered unsatisfactory if it has deteriorated due to natural causes to the extent that: (1) the sign is ineffective for its intended purpose when viewed from a moving vehicle under normal day and night driving conditions; or (2) the coefficient of retroreflection is less than 100 when measured at 0.2 degrees observation and -4 degree entrance. All measurements shall be made after sign cleaning according to the sheeting manufacturer's recommendations.

Construction Methods: Ineffective signs, as determined by the Engineer and in accordance with the ATSSA guidelines contained in "Quality Standards for Work Zone Traffic Control Devices", shall be replaced by the Contractor at no cost to the State.

Signs and their portable sign supports or metal posts that are no longer required shall be removed from the project and shall remain the property of the Contractor.

Method of Measurement: Construction Signs - Bright Fluorescent Sheeting will be measured for payment by the number of square feet of sign face. Sign supports will not be measured for payment.

Basis of Payment: "Construction Signs - Bright Fluorescent Sheeting" required and used on the project will be paid for at the Contact unit price per square foot as listed in the bid proposal. This price shall include the furnishing and maintenance of the signs, portable sign supports, metal sign posts and all hardware. Each sign and support or posts will be paid for once, regardless of the number of times it is used.

ITEM # 1302060A ADJUST GATE BOX (GAS)

Description: This work consists of adjusting existing gas gate boxes to new grades indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. Adjustment of gas gate boxes shall be performed under the direct supervision of Connecticut Natural Gas (CNG) personnel. The contractor shall contact John Bonville of CNG at 860-982-3815 a minimum of 48 hours prior to his anticipated date that this work is to be performed.

Materials: Any materials required for the adjustment of boxes shall conform to the applicable section of the Form 816 or the specification of CNG.

Construction Methods: Gas gate boxes shall be carefully loosened from the surrounding material and adjusted to the designated new grades. The Contractor shall then carefully place approved granular material around the gate boxes and hand tamp this material until it is well compacted.

The Contractor must maintain access to the gate boxes at all times. If a gas gate box is damaged due to improper construction methods, the Contractor shall replace the damaged unit with the corresponding new unit at no additional cost to the Town.

Method of Measurement: "Adjust Gas Gate Boxes" will be measured by the number of such units actually adjusted in accordance with the Plans and/or as directed by the Engineer.

Basis of Payment: The accepted quantities of "Adjust Gate Box (Gas)" will be paid for at the contract unit price per each as listed in the Proposal. Each and every adjustment authorized by the Engineer will be paid for. The price shall constitute full and complete compensation for all labor, materials, and equipment including excavation, backfill, compaction, adapter collar and for all other incidentals required to finish the work, complete and accepted by both the Engineer and the representative of the particular utility company involved.

ITEM # 1302061A ADJUST GATE BOX (WATER)

Description: Reference to the "District" in this item refers to "The Metropolitan District".

The Contractor shall adjust to final grade, the gate boxes and covers appurtenant to the water mains as required and furnish and install extension rings, extension stems, air valve extensions, covers, and additional top or bottom sections if necessary, as shown on the Contract Drawings or as directed by the Engineer in accordance with these specifications.

The District shall be contacted a minimum of 48 hours prior to initiating the adjustment of any water gate boxes so that an inspector can be provided for this work. The Contractor shall contact Mr. Rich Norris at (860) 278-7850 extension 3450 to arrange an inspector for this work.

Materials: The Contractor shall furnish standard District cast iron Dwyer type gate box sections as required and extension stems if necessary.

All additional materials, including any resurfacing materials and any additional fill required, shall be furnished and placed by the Contractor. Gravel shall conform to Article M.02.01.

Construction Methods: The Contractor shall carefully excavate around the gate boxes, remove the boxes, install extension stems and air valve extensions, if necessary, reinstall the present gate box if reusable, adjust the box to final grade using extension rings if applicable, and refill the excavation. Care shall be taken to prevent material from filling the inside of the gate box.

Extension stems will be required if the gate box is raised 24-inches or more. Extension stems shall be fabricated according to the detail shown on sheet WS-25 of the District's "Developers Manual."

Any damage done to District facilities by the Contractor shall be repaired or replaced by the Contractor at his expense.

Method of Measurement: The number of adjust gate boxes, complete with extension stems, air valve extensions, gate box extension rings, covers, and additional top or bottom sections, if necessary, measured for payment shall be the actual number of each box reset.

Basis of Payment: This work will be paid for at the contract unit price listed in the bid proposal for "Adjust Gate Box" complete in place, which price shall include the cost of furnishing material, including labor and equipment to incorporate them into the work. It shall also include the clearing, trenching and disposal of excavated materials, refilling trenches, furnishing the additional material for refilling, grading, sheeting, bracing, and pumping.

PREVAILING WAGE INFORMATION

Minimum Rates and Classifications for Heavy/Highway Construction

ID#: **H** 22388

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number:

Project Town: Glastonbury

FAP Number:

State Number:

Project: Hebron Avenue And New London Turnpike Roundabout Construction

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	33.48	28.76
2) Carpenters, Piledrivermen	32.00	24.42

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2a) Diver Tenders	32.00	24.42
3) Divers	40.46	24.42
03a) Millwrights	32.47	24.84
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	46.95	20.15
4a) Painters: Brush and Roller	32.02	20.15
4b) Painters: Spray Only	35.02	20.15
4c) Painters: Steel Only	34.02	20.15

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4d) Painters: Blast and Spray	35.02	20.15
4e) Painters: Tanks, Tower and Swing	34.02	20.15
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	38.65	24.42+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	35.22	31.99 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	40.62	29.71
----LABORERS---- -		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	28.55	18.90

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9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	28.80	18.90
10) Group 3: Pipelayers	29.05	18.90
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	29.05	18.90
12) Group 5: Toxic waste removal (non-mechanical systems)	30.55	18.90
13) Group 6: Blasters	30.30	18.90
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	29.55	18.90
Group 8: Traffic control signalmen	16.00	18.90

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Group 9: Hydraulic Drills	29.30	18.90
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	32.22	18.90 + a
13b) Brakemen, Trackmen	31.28	18.90 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		
14) Concrete Workers, Form Movers, and Strippers	31.28	18.90 + a
15) Form Erectors	31.60	18.90 + a

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----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	31.28	18.90 + a
17) Laborers Topside, Cage Tenders, Bellman	31.17	18.90 + a
18) Miners	32.22	18.90 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	38.53	18.90 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	38.34	18.90 + a

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20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	36.41	18.90 + a
21) Mucking Machine Operator	39.11	18.90 + a
----TRUCK DRIVERS----(*see note below)		
Two axle trucks	28.83	21.39 + a
Three axle trucks; two axle ready mix	28.93	21.39 + a
Three axle ready mix	28.98	21.39 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	29.03	21.39 + a

Four axle ready-mix	29.08	21.39 + a
Heavy duty trailer (40 tons and over)	29.28	21.39 + a
Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	29.08	21.39 + a
----POWER EQUIPMENT OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over, Tunnel Boring Machines. (Trade License Required)	38.55	23.55 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	38.23	23.55 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	37.49	23.55 + a

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Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	37.10	23.55 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	36.51	23.55 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	36.51	23.55 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	36.20	23.55 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	35.86	23.55 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	35.46	23.55 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	35.03	23.55 + a

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Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	32.99	23.55 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	32.99	23.55 + a
Group 12: Wellpoint Operator.	32.93	23.55 + a
Group 13: Compressor Battery Operator.	32.35	23.55 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	31.21	23.55 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	30.80	23.55 + a
Group 16: Maintenance Engineer/Oiler	30.15	23.55 + a

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Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	34.46	23.55 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	32.04	23.55 + a

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

20) Lineman, Cable Splicer, Technician	45.43	6.25% + 20.70
21) Heavy Equipment Operator	40.89	6.25% + 18.56
22) Equipment Operator, Tractor Trailer Driver, Material Men	38.62	6.25% + 17.99

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23) Driver Groundmen	24.99	6.25% + 11.81
23a) Truck Driver	34.07	6.25% + 16.60
----LINE CONSTRUCTION----		
24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20

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28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

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Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra $3.00 premium in addition to the hourly wage rate and benefit contributions:

1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)

2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson

3) Cranes (under 100 ton rated capacity)

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

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Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

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CHRO CONTRACT COMPLIANCE
REGULATIONS NOTIFICATION TO BIDDERS

COMMISSION ON HUMAN RIGHTS AND OPPORTUNITIES
CONTRACT COMPLIANCE REGULATIONS
NOTIFICATION TO BIDDERS
(Revised 09/3/15)

The contract to be awarded is subject to contract compliance requirements mandated by Sections 4a-60 and 4a-60a of the Connecticut General Statutes; and, when the awarding agency is the State, Sections 46a-71(d) and 46a-81i(d) of the Connecticut General Statutes. There are Contract Compliance Regulations codified at Section 46a-68j-21 through 43 of the Regulations of Connecticut State Agencies, which establish a procedure for awarding all contracts covered by Sections 4a-60 and 46a-71(d) of the Connecticut General Statutes.

According to Section 46a-68j-30(9) of the Contract Compliance Regulations, every agency awarding a contract subject to the contract compliance requirements has an obligation to "aggressively solicit the participation of legitimate minority business enterprises as bidders, contractors, subcontractors and suppliers of materials." "Minority business enterprise" is defined in Section 4a-60 of the Connecticut General Statutes as a business wherein fifty-one percent or more of the capital stock, or assets belong to a person or persons: "(1) Who are active in daily affairs of the enterprise; (2) who have the power to direct the management and policies of the enterprise; and (3) who are members of a minority, as such term is defined in subsection (a) of Section 32-9n." "Minority" groups are defined in Section 32-9n of the Connecticut General Statutes as "(1) Black Americans . . . (2) Hispanic Americans . . . (3) persons who have origins in the Iberian Peninsula . . . (4)Women . . . (5) Asian Pacific Americans and Pacific Islanders; (6) American Indians . . ." An individual with a disability is also a minority business enterprise as provided by Section 4a-60g of the Connecticut General Statutes. The above definitions apply to the contract compliance requirements by virtue of Section 46a-68j-21(11) of the Contract Compliance Regulations.

The awarding agency will consider the following factors when reviewing the bidder's qualifications under the contract compliance requirements:

(a) the bidder's success in implementing an affirmative action plan;
(b) the bidder's success in developing an apprenticeship program complying with Sections 46a-68-1 to 46a-68-17 of the Administrative Regulations of Connecticut State Agencies, inclusive;
(c) the bidder's promise to develop and implement a successful affirmative action plan;
(d) the bidder's submission of employment statistics contained in the "Employment Information Form", indicating that the composition of its workforce is at or near parity when compared to the racial and sexual composition of the workforce in the relevant labor market area; and
(e) the bidder's promise to set aside a portion of the contract for legitimate minority business enterprises. See Section 46a-68j-30(10)(E) of the Contract Compliance Regulations.

INSTRUCTIONS AND OTHER INFORMATION

The following BIDDER CONTRACT COMPLIANCE MONITORING REPORT must be completed in full, signed, and submitted with the bid for this contract. The contract awarding agency and the Commission on Human Rights and Opportunities will use the information contained thereon to determine the bidders compliance to Sections 4a-60 and 4a-60a CONN. GEN. STAT., and Sections 46a-68j-23 of the Regulations of Connecticut State Agencies regarding equal employment opportunity, and the bidder's good faith efforts to include minority business enterprises as subcontractors and suppliers for the work of the contract.

1) Definition of Small Contractor

Section 4a-60g CONN. GEN. STAT. defines a small contractor as a company that has been doing business under the same management and control and has maintained its principal place of business in Connecticut for a one year period immediately prior to its application for certification under this section, had gross revenues not exceeding fifteen million dollars in the most recently completed fiscal year, and at least fifty-one percent of the ownership of which is held by a person or persons who are active in the daily affairs of the company, and have the power to direct the management and policies of the company, except that a nonprofit corporation shall be construed to be a small contractor if such nonprofit corporation meets the requirements of subparagraphs (A) and (B) of subdivision 4a-60g CONN. GEN. STAT.

MANAGEMENT: Managers plan, organize, direct, and control the major functions of an organization through subordinates who are at the managerial or supervisory level. They make policy decisions and set objectives for the company or departments. They are not usually directly involved in production or providing services. Examples include top executives, public relations managers, managers of operations specialties (such as financial, human resources, or purchasing managers), and construction and engineering managers.

BUSINESS AND FINANCIAL OPERATIONS: These occupations include managers and professionals who work with the financial aspects of the business. These occupations include accountants and auditors, purchasing agents, management analysts, labor relations specialists, and budget, credit, and financial analysts.

MARKETING AND SALES: Occupations related to the act or process of buying and selling products and/or services such as sales engineer, retail sales workers and sales representatives including wholesale.

LEGAL OCCUPATIONS: In-House Counsel who is charged with providing legal advice and services in regards to legal issues that may arise during the course of standard business practices. This category also includes assistive legal occupations such as paralegals, legal assistants.

COMPUTER SPECIALISTS: Professionals responsible for the computer operations within a company are grouped in this category. Examples of job titles in this category include computer programmers, software engineers, database administrators, computer scientists,systems analysts, and computer support specialists

ARCHITECTURE AND ENGINEERING: Occupations related to architecture, surveying, engineering, and drafting are included in this category. Some of the job titles in this category include electrical and electronic engineers, surveyors, architects, drafters, mechanical engineers, materials engineers, mapping technicians, and civil engineers.

OFFICE AND ADMINISTRATIVE SUPPORT: All clerical-type work is included in this category. These jobs involve the preparing, transcribing, and preserving of written communications and records; collecting accounts; gathering and distributing information; operating office machines and electronic data processing equipment; and distributing mail. Job titles listed in this category include telephone operators, bill and account collectors, customer service representatives, dispatchers, secretaries and administrative assistants, computer operators and clerks (such as payroll, shipping, stock, mail and file).

BUILDING AND GROUNDS CLEANING AND MAINTENANCE: This category includes occupations involving landscaping, housekeeping, and janitorial services. Job titles found in this category include supervisors of landscaping or housekeeping, janitors, maids, grounds maintenance workers, and pest control workers.

CONSTRUCTION AND EXTRACTION: This category includes construction trades and related occupations. Job titles found in this category include boilermakers, masons (all types), carpenters, construction laborers, electricians, plumbers (and related trades), roofers, sheet metal workers, elevator installers, hazardous materials removal workers, paperhangers, and painters. Paving, surfacing, and tamping equipment operators; drywall and ceiling tile installers; and carpet, floor and tile installers and finishers are also included in this category. First line supervisors, foremen, and helpers in these trades are also grouped in this category..

INSTALLATION, MAINTENANCE AND REPAIR: Occupations involving the installation, maintenance, and repair of equipment are included in this group. Examples of job titles found here are heating, ac, and refrigeration mechanics and installers; telecommunication line installers and repairers; heavy vehicle and mobile equipment service technicians and mechanics; small engine mechanics; security and fire alarm systems installers; electric/electronic repair, industrial, utility and transportation equipment; millwrights; riggers; and manufactured building and mobile home installers. First line supervisors, foremen, and helpers for these jobs are also included in the category.

MATERIAL MOVING WORKERS: The job titles included in this group are Crane and tower operators; dredge, excavating, and lading machine operators; hoist and winch operators; industrial truck and tractor operators; cleaners of vehicles and equipment; laborers and freight, stock, and material movers, hand; machine feeders and offbearers; packers and packagers, hand; pumping station operators; refuse and recyclable material collectors; and miscellaneous material moving workers.

PRODUCTION WORKERS: The job titles included in this category are chemical production machine setters, operators and tenders; crushing/grinding workers; cutting workers; inspectors, testers sorters, samplers, weighers; precious stone/metal workers; painting workers; cementing/gluing machine operators and tenders; etchers/engravers; molders, shapers and casters except for metal and plastic; and production workers.

White (not of Hispanic Origin)- All persons having origins in any of the original peoples of Europe, North Africa, or the Middle East. Black(not of Hispanic Origin)- All persons having origins in any of the Black racial groups of Africa. Hispanic- All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.	Asian or Pacific Islander- All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes China, India, Japan, Korea, the Philippine Islands, and Samoa. American Indian or Alaskan Native- All persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.

BIDDER CONTRACT COMPLIANCE MONITORING REPORT

PART I - Bidder Information

Company Name Street Address City & State Chief Executive	Bidder Federal Employer Identification Number _____ Or Social Security Number_____
Major Business Activity (brief description)	Bidder Identification (response optional/definitions on page 1) -Bidder is a small contractor. Yes __No __ -Bidder is a minority business enterprise Yes __No __ (If yes, check ownership category) Black ___ Hispanic___ Asian American___ American Indian/Alaskan Native ___Iberian Peninsula___ Individual(s) with a Physical Disability___ Female ___
Bidder Parent Company (If any)	- Bidder is certified as above by State of CT Yes__ No__
Other Locations in Ct. (If any)	

PART II - Bidder Nondiscrimination Policies and Procedures

1. Does your company have a written Affirmative Action/Equal Employment Opportunity statement posted on company bulletin boards? Yes__ No__	7. Do all of your company contracts and purchase orders contain non-discrimination statements as required by Sections 4a-60 & 4a-60a Conn. Gen. Stat.? Yes__ No__
2. Does your company have the state-mandated sexual harassment prevention in the workplace policy posted on company bulletin boards? Yes__ No__	8. Do you, upon request, provide reasonable accommodation to employees, or applicants for employment, who have physical or mental disability? Yes__ No__
3. Do you notify all recruitment sources in writing of your company's Affirmative Action/Equal Employment Opportunity employment policy? Yes__ No__	9. Does your company have a mandatory retirement age for all employees? Yes__ No__
4. Do your company advertisements contain a written statement that you are an Affirmative Action/Equal Opportunity Employer? Yes __No __	10. If your company has 50 or more employees, have you provided at least two (2) hours of sexual harassment training to all of your supervisors? Yes__ No__ NA__
5. Do you notify the Ct. State Employment Service of all employment openings with your company? Yes __No __	11. If your company has apprenticeship programs, do they meet the Affirmative Action/Equal Employment Opportunity requirements of the apprenticeship standards of the Ct. Dept. of Labor? Yes __No __NA __
6. Does your company have a collective bargaining agreement with workers? Yes__ No__ 6a. If yes, do the collective bargaining agreements contain non-discrim ination clauses covering all workers? Yes__ No__ 6b. Have you notified each union in writing of your commitments under the nondiscrimination requirements of contracts with the state of Ct? Yes__ No__	12. Does your company have a written affirmative action Plan? Yes __No __ If no, please explain. 13. Is there a person in your company who is responsible for equal employment opportunity? Yes __No __ If yes, give name and phone number. _____

Part III - Bidder Subcontracting Practices

1. Will the work of this contract include subcontractors or suppliers? Yes__ No__

1a. If yes, please list all subcontractors and suppliers and report if they are a small contractor and/or a minority business enterprise. (defined on page 1 / use additional sheet if necessary)

1b. Will the work of this contract require additional subcontractors or suppliers other than those identified in 1a. above? Yes__ No__

PART IV - Bidder Employment Information

Date:

JOB CATEGORY *	OVERALL TOTALS	WHITE (not of Hispanic origin)		BLACK (not of Hispanic origin)		HISPANIC		ASIAN or PACIFIC ISLANDER		AMERICAN INDIAN or ALASKAN NATIVE	
		Male	Female	Male	Female	Male	Female	Male	Female	male	female
Management											
Business & Financial Ops											
Marketing & Sales											
Legal Occupations											
Computer Specialists											
Architecture/Engineering											
Office & Admin Support											
Bldg/ Grounds Cleaning/Maintenance											
Construction & Extraction											
Installation , Maintenance & Repair											
Material Moving Workers											
Production Occupations											
TOTALS ABOVE											
Total One Year Ago											
FORMAL ON THE JOB TRAINEES (ENTER FIGURES FOR THE SAME CATEGORIES AS ARE SHOWN ABOVE)											
Apprentices											
Trainees											

*NOTE: JOB CATEGORIES CAN BE CHANGED OR ADDED TO (EX. SALES CAN BE ADDED OR REPLACE A CATEGORY NOT USED IN YOUR COMPANY)

1. Which of the following recruitment sources are used by you? (Check yes or no, and report percent used)				2. Check (X) any of the below listed requirements that you use as a hiring qualification		3. Describe below any other practices or actions that you take which show that you hire, train, and promote employees without discrimination
SOURCE	YES	NO	% of applicants provided by source	(X)		
State Employment Service					Work Experience	
Private Employment Agencies					Ability to Speak or Write English	
Schools and Colleges					Written Tests	
Newspaper Advertisement					High School Diploma	
Walk Ins					College Degree	
Present Employees					Union Membership	
Labor Organizations					Personal Recommendation	
Minority/Community Organizations					Height or Weight	
Others (please identify)					Car Ownership	
					Arrest Record	
					Wage Garnishments	

Certification (Read this form and check your statements on it CAREFULLY before signing). I certify that the statements made by me on this BIDDER CONTRACT COMPLIANCE MONITORING REPORT are complete and true to the best of my knowledge and belief, and are made in good faith. I understand that if I knowingly make any misstatements of facts, I am subject to be declared in non-compliance with Section 4a-60, 4a-60a, and related sections of the CONN. GEN. STAT.

(Signature)	(Title)	(Date Signed)	(Telephone)