TOWN OF GLASTONBURY

INVITATION TO BID

BID #	ITEM	DATE & TIME REQUIRED
GL-2013-23	Main Street Traffic Signal Improvement State Project 53-181	March 27, 2013 at 11:00 A.M.

The Town of Glastonbury will receive Sealed Bids, in duplicate, for the Main Street Traffic Signal Improvement Project, State Project No. 53-181 (Bid #GL-2013-23), reconstruction of six (6) traffic control signals on Main Street. Work will include upgrade and replacement with a Closed Loop Signal System and include the following Main Street intersections:

1. Putnam Boulevard,
2. Glastonbury Boulevard/Griswold Street,
3. Chili's Restaurant/Griswold Mall Shopping Center,
4. Pratt Street and Spring Street,
5. Naubuc Avenue/New London Turnpike, and
6. Welles Street

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 March 27, 2013 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 from the Town's website at www.glastonbury-ct.gov at no cost or at the Office of the Purchasing Agent, Town Hall, 2155 Main Street, Glastonbury, Connecticut 06033, (second level) for a non-refundable fee of $100.

The successful Bidder is required to comply with all provisions of the Civil Rights Act of 1964, the Equal Opportunity Act of 1972, Executive Orders #3, No. 17, 11246, 11375 and 11478. Contractors shall comply with State Statutes concerning Employment and Labor Practices, if applicable, and Section 31-53 of the Connecticut Statutes, as amended (Prevailing Wages), and Federal Davis Bacon Labor standards.

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

This contract is subject to meeting subcontracting Disadvantaged Business Enterprise (DBE) goal conditions. A DBE goal of 10% has been assigned to this contract. Only DBE firms that are certified by the Connecticut Department of Transportation are eligible to perform work that will count toward the assigned goal.

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.

   If the unit price is ambiguous, unintelligible, or uncertain for any cause, then the item total shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price.

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

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 <u>at the job site</u> which would affect their work <u>before submitting a bid</u>. Failure to meet this criteria shall not relieve the Bidder of the responsibility of completing the bid <u>without extra cost</u> 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. <u>Each bid must be accompanied by a bid bond payable to the Town for ten percent (10%) of the total amount of the bid</u>. 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. 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 click on **Bids & RFPs** which will bring you to the links for the **Code of Ethics** and the **Consultant 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:**

The Town is required to report names of non-resident (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. **Upon award, all non-resident contractors must furnish a five percent (5%) sales tax guarantee bond (State Form AU-766) or a cash bond for five percent (5%) of the total contract price (State Form AU-72) to DRS even though this project is exempt from most sales and use taxes.**

See State Notice to Non-Resident Contractors SN 2005 (12). If the above bond is not provided, the Town is required to withhold five percent (5%) from the contractor's payments and forward it to the State DRS.

The contractor must promptly furnish to the Town a copy of the **Certificate of Compliance** issued by the State DRS.

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.

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.

21. **Federal Prevailing Wage Rates: (Davis-Bacon and Related Acts (DBRA)**

Federal Davis Bacon Labor Standards must be complied with under this contract. The execution of the contract by the bidder binds it to all applicable Federal Davis Bacon Labor Laws and Regulations. Federal Prevailing Wage Rates are included in this bid package.

The Davis-Bacon and Related Acts (DBRA) are administered by the US Department of Labor Wage and Hour Division. These Acts apply to contractors and subcontractors performing on federally funded or assisted contracts in excess of $2,000 for the construction, alteration, or repair (including painting and decorating) of public buildings or public works. The Davis-Bacon Act requires that all contractors and subcontractors performing on federal contracts (and contractors or subcontractors performing on federally assisted contracts under the related Acts) in excess of $2,000 pay their laborers and mechanics not less than the prevailing wage rates and fringe benefits listed in the contract's Davis-Bacon wage determination for corresponding classes of laborers and mechanics employed on similar projects in the area. Davis-Bacon labor standards clauses must be included in covered contracts. Additional compliance information may be found at:

http://www.dol.gov/compliance/guide/dbra.htm#Basic
http://www.dol.gov/whd/regs/compliance/whdfs66.pdf

22. Each bid shall also include a description of three (3) projects completed by the bidder with references to demonstrate successful experience with similar projects.

23. Each bid shall include a signed copy of the Non-Collusion Affidavit form which is included with Attachment A.

24. In order to expedite award of this contract, all bidders shall submit the following additional items as part of their bid response. Blank forms related to the items listed below are included as part of Attachment A.

    A. Contractor's Proposed Progress Chart – Highway Construction Bar Chart.

    B. Certificate of Compliance with Connecticut General Statute Section 31-57b.

    C. Disadvantaged Business Enterprise (DBE) Participation Approval Request form

    D. Anticipated Source of Material form (CON-83).

    E. Certificate of Insurance (ACCORD FORM)

    F. Affirmative Action Program Certification

25. This contract is subject to meeting subcontracting Disadvantaged Business Enterprise (DBE) goal conditions. A DBE goal of 10% has been assigned to this contract. Only DBE firms that are certified by the Connecticut Department of Transportation are eligible to perform work that will count toward the assigned goal.

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 Stephen Braun, Assistant Town Engineer, 2155 Main Street, PO Box 6523, Glastonbury, CT 06033; stephen.braun@glastonbury-ct.gov. Telephone (860) 652-7743 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 click on Bids & RFP's).

All requests 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, which shall be governed by the relevant articles of the Form 816.

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 January 2013 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 Superpave Design Level Information: Hot-Mix Asphalt (HMA) constructed according to the Superpave mix-design system is required to attain a Superpave Design Level and is required to use a Performance Graded (PG) binder. Pavement for improvements on Glastonbury Boulevard at Main Street shall be Design Level 2.

01.04 Coordination With State Project 53-185: Work completed under this project must be coordinated with State Project 53-185, which includes the rehabilitation of all pavement along Main Street between the East Hartford town line and Naubuc Avenue / New London Turnpike. The pavement rehabilitation work will proceed once all underground work for the traffic signals to be constructed under State Project 53-181 has been completed.

01.05 Additional Notices to Contractor are included in the Special Provisions.

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 Contractor 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 Contractor and all of its agents, employees and sub-contractors and other providers of services and shall name the **Town, 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 Contractors 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-. 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
- $100,000 each accident/$500,000 disease-policy limit/$100,000 disease each employee

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.

c. Automobile Insurance:

- Including all owned, hired, borrowed, and non-owned vehicles
- Limit of Liability for Bodily Injury and Property Damage Per Accident: $1,000,000

d. 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 State and 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 30 days in advance with written notice of cancellation or non-renewal. The Certificate shall evidence all required coverage on the General Liability and Auto Liability policies including the Additional Insured and Waiver of Subrogation on the General Liability policy. 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. Acceptable materials include brush, stumps, demolition materials, and excess excavated earth materials. Unacceptable materials are 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 is required to 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. These items shall be measured and paid for under the appropriate contract line items.

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 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 There will be no extra payment for submitting plans or details for supporting and protecting all existing utilities during construction.

11.00 TIME FOR COMPLETION/NOTICE TO PROCEED

11.01 The work under this Contract shall commence on the date ordered by the Engineer in the Notice to Proceed. **It is the Town's intent to execute a contract and issue a Notice to Proceed immediately following award of this contract.** After the work has begun, it shall continue in an orderly fashion such that all contract work is completed within two

hundred forty (240) calendar days of the commencement date indicated in the Notice to Proceed. Close coordination is required with State Project 53-185, which includes the rehabilitation of full width pavement along Main Street between the East Hartford town line and Naubuc Avenue / New London Turnpike. This includes compliance with the required schedule for the completion of underground work as noted below.

11.02 **All underground work in this contract, with the exception of that at the intersection of Main Street and Welles Street, shall be completed within 105 calendar days of the commencement date indicated in the Notice to Proceed.** This includes the installation of all foundations and conduits for signal equipment, resetting or replacement of granite curb as necessary for relocated sidewalk ramps, all work related to the Glastonbury Boulevard median island construction, and any other work that disturbs the paved roadway. The contractor should plan to mobilize multiple crews and work extended hours as necessary to achieve this schedule. This schedule is required in order to allow for pavement rehabilitation work for State Project 53-185 to proceed. Liquidated damaged noted in Section 12.00 will be applied for each calendar day that the underground work described above has not been completed to the satisfaction of the Engineer.

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 completion, or completion as modified in writing by both parties, until such work is satisfactorily completed and accepted.

13.00 SCHEDULE OF DRAWINGS

13.01 The Contractor is hereby alerted that the plan set entitled “Main Street Traffic Signal Improvement Project”, including forty-three (43) plan sheets prepared by the Tighe & Bond, Inc. 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 shall be responsible for all construction layout work, which shall be paid for under the “Construction Staking” pay item.

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, 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 for storage. 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 Refer to the Prosecution and Progress section of the Special Provisions for this information.

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 Retainage shall be governed by Article 1.09.06 of the Form 816, except that the retainage amount shall be equal to five (5) percent.

Proposal of _____

(hereinafter called "Bidder"), organized and existing under the laws of the State of _____

_____, doing business as _____

_____.

To the Town of Glastonbury (hereinafter called "Town").

In compliance with your Invitation to Bid, the Bidder hereby proposed to furnish materials and/or services as per Bid Number GL-2013-23 in strict accordance with the Bid Documents, within the time set forth therein, and at the prices stated below.

By submission of this bid, the Bidder certifies, and in the case of a joint bid each party thereto certifies as to their own organization that this bid has been arrived at independently without consultation, communication, or agreement as to any matter relating to this bid with any other Bidder or with any competitor.

The Bidder acknowledges receipt of the following:

Addendum #1_____

Addendum #2_____

Addendum #3_____

It is the responsibility of the Bidder to check the Town's website for any Addendum before submitting the bid.

Line #	Item #	Description	Unit	Quantity	Unit Price	Extension
1	0201001	Clearing and Grubbing	L.S.	L.S.		
2	0202451A	Test Pit Excavation	C.Y.	10		
3	0205002	Rock In Trench Excavation 0-4' Deep	C.Y.	36		
4	0202529	Cut Bituminous Concrete Pavement	L.F.	230		
5	0209001	Formation of Subgrade	S.Y.	81		
6	0219011	Sediment Control System At Catch Basin	EA.	37		
7	0304002	Processed Aggregate Base	C.Y.	23		
8	0406011	Bituminous Concrete, Class 1	TON	14		
9	0406029	Bituminous Concrete, Class 4	TON	28		
10	0813001	5" Granite Stone Curbing	L.F.	28		
11	0813010	Removal of Granite Stone Curbing	L.F.	190		
12	0813011	5" Granite Curved Stone Curbing	L.F.	10		
13	0921001A	Concrete Sidewalk	S.F.	2914		
14	0925101A	Relay Brick Walk	S.F.	122		
15	0952001A	Selective Clearing And Thinning	L.S.	L.S.		
16	0970006A	Trafficperson (Municipal Police Officer)	EST.	EST.	$60,000	$60,000
17	0970007A	Trafficperson (Uniformed Flagger)	HR	350		
18	0971001A	Maintenance And Protection of Traffic	L.S.	L.S.		
19	0975002	Mobilization	L.S.	L.S.		

20	0976002	Barricade Warning Lights - High Intensity	DAY	800		
21	0978002	Traffic Drum	EA.	40		
22	0980001	Construction Staking	L.S.	L.S.		
23	0981100	42" Traffic Cone	EA.	40		
24	1001001	Trenching And Backfilling	L.F.	4468		
25	1002015	Rock In Foundation Excavation	V.F.	45		
26	1002202	Traffic Control Foundation-Mast Arm	EA.	27		
27	1002203	Traffic Control Foundation-Pedestal Type 1	EA.	25		
28	1002208	Traffic Control Foundation - Controller - Type IV	EA.	6		
29	1008115	2" Rigid Metal Conduit-In Trench	L.F.	2047		
30	1008117	3" Rigid Metal Conduit-In Trench	L.F.	1170		
31	1008215	2" Rigid Metal Conduit-Under Roadway	L.F.	1368		
32	1008217	3" Rigid Metal Conduit-Under Roadway	L.F.	2217		
33	1008908A	Clean Existing Conduit	L.F.	100		
34	1010001	Concrete Handhole	EA.	33		
35	1010021	Concrete Handhole -Type II	EA.	15		
36	1010052A	Cast Iron Handhole Cover	EA.	5		
37	1010054A	Cast Iron Handhole Cover - Type II	EA.	2		
38	1010902A	Remove Concrete Handhole	EA.	1		
39	1017032A	Service (Metered)	EA.	6		
40	1102002	8' Aluminum Pedestal	EA.	14		

41	1102008	4'4" Aluminum Pedestal	EA.	9		
42	1102010	12' Aluminum Pedestal	EA.	2		
43	1104022A	15' Steel Mast Arm Assembly	EA.	1		
44	1104023A	20' Steel Mast Arm Assembly	EA.	3		
45	1104026A	25' Steel Mast Arm Assembly	EA.	4		
46	1104028A	30' Steel Mast Arm Assembly	EA.	7		
47	1104031A	35' Steel Mast Arm Assembly	EA.	3		
48	1104033A	40' Steel Mast Arm Assembly	EA.	5		
49	1104037A	45' Steel Mast Arm Assembly	EA.	4		
50	1105101A	1 Way, 1 Section Mast Arm Traffic Signal	EA.	36		
51	1105103A	1 Way 3 Section Mast Arm Traffic Signal	EA.	56		
52	1105303A	1 Way 3 Section Pedestal Mounted Traffic Signal	EA.	2		
53	1106001A	1 Way, Pedestrian Signal, Pole Mounted	EA.	16		
54	1106002A	2 Way, Pedestrian Signal, Pole Mounted	EA.	5		
55	1106003A	1 Way, Pedestrian Signal, Pedestal Mounted	EA	14		
56	1107011A	Accessible Pedestrian Signal And Detector Type A	EA.	40		
57	1108187A	System Integration	L.S.	L.S.		
58	1108578A	Full Actuated Controller 8 Phase (Modified)	EA.	6		
59	1108660A	Ethernet Switch - Field (4 Port, Hardened)	EA.	6		
60	1108661A	Ethernet Switch - TCC (24 Port)	EA.	1		
61	1108722A	Vehicle Emitter	EA.	8		

62	1108724A	Phase Selector	EA.	6		
63	1108726A	Confirmation Light	EA.	1		
64	1108826A	Fiber Optic Patch Cord	EA.	27		
65	1108843A	12 Position Fiber Optic Patch Panel	EA.	6		
66	1111407A	Camera Video Detection System	EA.	6		
67	1112242A	Fiber Optic Splice Enclosure (Signal)	EA.	1		
68	1112410A	Detector (Type A)	EA.	15		
69	1113016	3 Conductor No. 8 AWG Type Se Style THW	L.F	531		
70	1113030A	12 Strand Fiber Optic Drop Cable	L.F	3683		
71	1113101	3 Conductor No. 14 Cable	LF	252		
72	1113102	5 Conductor No. 14 Cable	L.F	8629		
73	1113103	7 Conductor No. 14 Cable	L.F	7831		
74	1113104	9 Conductor No. 14 Cable	LF	3624		
75	1113550A	Detector Cable (Optical)	LF	2816		
76	1118012A	Removal and/or Relocation of Traffic Signal Equipment	L.S.	L.S.		
77	1118051A	Temporary Signalization (Site No. 1)	L.S.	L.S.		
78	1118052A	Temporary Signalization (Site No. 2)	L.S.	L.S.		
79	1118053A	Temporary Signalization (Site No. 3)	L.S.	L.S.		
80	1118054A	Temporary Signalization (Site No. 4)	L.S.	L.S.		
81	1118055A	Temporary Signalization (Site No. 5)	L.S.	L.S.		
82	1118056A	Temporary Signalization (Site No. 6)	L.S.	L.S.		

83	1206023A	Removal And/Or Relocation Of Existing Signs	L.S.	L.S.		
84	1208906	Sign Face Sheet Aluminum Bright Wide Angle Retro-Reflective Sheeting	S.F.	222		
85	1208928A	Sign Face Sheet Aluminum (Type III Reflective Sheeting)	S.F.	199		
86	1210101A	4" White Epoxy Resin Pavement Markings	L.F.	1200		
87	1210102A	4" Yellow Epoxy Resin Pavement Markings	L.F.	1000		
88	1210105A	Epoxy Resin Pavement Markings, Symbols And Legends	S.F.	1500		
89	1211001	Removal of Pavement Markings	S.F	950		
90	1220013A	Construction Signs - Bright Fluorescent Sheeting	S.F.	500		
91	1108722A	Vehicle Emitter	EA.	1		
92	1113812A	Uninterruptible Power Supply	EA.	6		

TOTAL BID AMOUNT: **$**_____

WRITTEN BID AMOUNT: _____

_____

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. Included Non-Collusion Affidavit Form as per Section 23 of the Information for Bidders.

_____5. Included Other Required Forms as per Section 24 of the Information for Bidders.

_____6. Checked Town web site for Addendums and acknowledged Addendums on page BP-1.

_____7. Acknowledged Code of Ethics on page BP-8.

_____8. Clearly marked envelope with Bid Number, Date, and Time of opening.

TOWN OF GLASTONBURY			
BID / PROPOSAL		**GL # or RPGL #**	**2013-23**
DATE ADVERTISED	**03/01/2013**	**DATE / TIME DUE**	**03/27/2013 at 11:00 A.M.**

NAME OF PROJECT **Main Street Traffic Signal Improvement**

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 ADDENDUMS POSTED PRIOR TO BID OPENING.

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

TECHNICAL SPECIFICATIONS
(SPECIAL PROVISIONS)

TECHNICAL SPECIFICATIONS

INDEX

Note: This index has been prepared for the convenience of those using this contract with the sole express purpose of locating quickly the information contained herein; and no claims shall arise due to omissions, additions, deletions, etc., as this index shall not be considered part of the contract.

ITEM

ITEM #1113030A	12 STRAND FIBER OPTIC DROP CABLE
ITEM #1113550A	DETECTOR CABLE (OPTICAL)
ITEM #1113812A	UNINTERRUPTIBLE POWER SUPPLY
ITEM #1118012A	REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT
ITEM #1118051A	TEMPORARY SIGNALIZATION (SITE NO. 1)
ITEM #1118052A	TEMPORARY SIGNALIZATION (SITE NO. 2)
ITEM #1118053A	TEMPORARY SIGNALIZATION (SITE NO. 3)
ITEM #1118054A	TEMPORARY SIGNALIZATION (SITE NO. 4)
ITEM #1118055A	TEMPORARY SIGNALIZATION (SITE NO. 5)
ITEM #1118056A	TEMPORARY SIGNALIZATION (SITE NO. 6)
ITEM #1206023A	REMOVAL AND/OR RELOCATION OF EXISTING SIGNS
ITEM #1208928A	SIGN FACE - SHEET ALUMINUM (TYPE III REFLECTIVE SHEETING)
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
ITEM #1220013A	CONSTRUCTION SIGNS - BRIGHT FLUORESCENT SHEETING

NOTICE TO CONTRACTOR - TRAFFIC SIGNALS

The Contractor is hereby notified that certain conditions pertaining to the installation of new signals and maintenance of traffic signal operations are required 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 countdown pedestrian signals. The countdown display is allowed only during the flashing don't walk time of the pedestrian movement.

The Controller Unit (CU) shall conform to the 2008-2010 Functional Specifications for Traffic Control Equipment. The Functional Specifications require the CU meet NEMA Standard Publication No. TS2-1992 Type 2. The Functional Specifications are available on the Departments' web site, www.ct.gov/dot/.

Under Maintenance and Protection of Traffic (M&PT) and Temporary Signalization the Contractor is required to keep in operation the following: all vehicle and pedestrian signals including necessary support structures; all vehicle and pedestrian detection; the pre-emption system; and coordination to the master, if in a system.

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.

Vehicle detection material such as loop detector sawcut, conduit, and lead-in cables that is damaged during construction shall be repaired or replaced within 24 hours unless the Engineer determines otherwise.

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

The 30 Day Test on traffic control equipment, as specified in Section 10.00, Article 10.00.10 - TESTS, will not begin until the items listed below are delivered to the Town of Glastonbury.

Four (4) sets of cabinet wiring diagrams. Leave one set in the controller cabinet.
All spare load switches and flash relays.

The following notes apply to projects which include Optical Pre-emption:

- Pre-emption is to operate through the internal pre-emption of the signal controller.
- If not present in a controller cabinet the contractor shall install the following items:
    - Pre-emption disconnect switch.
    - Pre-emption termination panel with “D” harness.
    - Pre-emption test pushbuttons.
- Contractor must provide a chart, or print out of the program steps and settings.
- Detector locations are for illustration only. Exact locations shall be determined by the Manufacturer or his designated representative. Detector cables are to be installed continuous between each detector and the auxiliary equipment cabinet.

Mast arm assemblies and foundations have new specifications and are to be designed based on The AASHTO 2009 Standards. Refer to Specifications and Typical Detail Sheets.

All Mast Arm mounted signs are to be fixed mounted. Method of mounting must be submitted to the Division of Traffic for approval prior to installation unless otherwise noted.

Prior to the start of fabrication of steel mast arm assemblies, the contractor shall, in the field, verify the location of the foundations, and establish and verify all elevations, dimensions, and longitudinal grades. The contractor shall submit a cross section for each mast arm assembly in accordance with the special provisions of Article 1.05.02, prior to the submission of the shop drawings.

The contractor is advised that signal appurtenances (mast arms, pedestals and controllers) when in or adjacent to sidewalks, shall be field located to provide a free path of not less than 4 ft.

The Contractor is hereby notified that the intersection base plans were developed from field survey and field observations completed by Tighe & Bond using a compilation of field and existing conditions data. The existing conditions plans are included in the plan set. The Contractor shall field verify existing conditions prior to the start of work.

Agents of various public service agencies, municipal and State departments may be entering on the work site to remove existing facilities, to construct or place new facilities or to make alterations to existing facilities. The Contractor shall perform the work in cooperation with the various agencies in a manner which causes the least interference with the operations of the aforementioned agencies and shall have no claim for delay which may be due, or result, from said work of these agents.

The Contractor, in constructing or installing facilities along side or near sanitary sewers, storm drains, water or gas pipes, electric or telephone conduits, poles, sidewalks, walls, vaults or other structures shall, at his expense, sustain them securely in place, cooperating with the officers and agents of the various utility companies and municipal departments which control them, so that the services of these structures shall be maintained. The Contractor shall also be responsible for the repair or replacement, at his own expense, of any damage to such structures caused by his acts or neglect, and shall leave them in the same condition as they existed prior to commencement of the work. In case of damage to utilities, the Contractor shall promptly notify the utility owner and shall, if requested by the Engineer, furnish labor and equipment to work temporarily under the owner's direction in providing access to the utility. Pipes or other structures damaged by the operation of the Contractor may be repaired by the town or by the utility owner that suffers the loss. The cost of such repairs shall be borne by the Contractor, without further compensation by the owner.

If live service connections are to be interrupted by excavations of any kind, the Contractor shall not break the service until new services are provided. Abandoned services shall be plugged off or otherwise made secure.

The Contractor shall be required without additional compensation to provide safe and convenient access to all abutters during the prosecution of the work. Necessary access for fire apparatus and other emergency vehicles shall be maintained at all times.

Sweeping and cleaning of surfaces beyond the limits of the project caused by vehicular tracking of materials during the various phases of the work shall be considered as incidental to the work being performed under the contract and there will be no additional compensation.

Upon award, the Contractor shall proceed with shop drawings, working drawings, procurement of materials, and all other submittals required to complete the work in accordance with the contract documents.

All existing and other materials not required or needed for use on the project, and not required to be removed and stacked, shall become the property of the Contractor and shall be removed from the site and legally disposed of by the Contractor as directed by the Engineer.

The Contractor is hereby notified that the work on this project to proceed in an accelerated and orderly fashion to minimize disruption to area businesses and commuters as described in the Prosecution and Progress including the completion of all underground foundation and conduit work and sidewalk work prior to the start of the Main Street paving project.

To achieve this goal the Contractor is to schedule the work such that trenches are backfilled immediately and roadway pavement is fully restored within fourteen calendar days; foundations/trenches are to be poured the same day they are excavated (**holes are not to be left overnight**). Prior to any work on the traffic signal control, the Contractor shall notify and coordinate the work with the Town of Glastonbury Department of Physical Services.

The Contractor will be responsible for the removal of pavement markings as called for on the plans or as directed by the Engineer. The Contractor is alerted that conflicting pavement markings, identified by the Engineer for removal, shall be removed as expeditiously as possible. The removal process shall begin on the day indicated by the Engineer, and continue during existing working hours as may be restricted in "Limitations of Operations."

The Contractor may utilize sand blasting, hydro blasting or grinding to remove existing pavement markings. The use of a grinder will be allowed, providing that the grinder does not remove more than 1/32 inch of pavement.

The Contractor may utilize any removal method that does not damage the pavement. Where new pavement markings are to be installed over the eradicated markings, some scaring of the surface of the pavement will be considered acceptable.

The Contractor is responsible for obtaining manufacturer’s warrantees for all equipment used under this contract and submitting them to the Town.

No Contractor will be allowed to work above 10’ on any utility pole without authorization from custodian of pole, in writing.

The Contractor is advised that signal appurtenances (mast arms, pedestals and controllers) when in or adjacent to sidewalks, shall be field located to provide a free path of not less than 4 feet.

The Contractor shall field verify the installed aerial fiber optic trunk cabling by the Town under a separate project including the aerial splice enclosures at the locations shown on the plans. The Contractor shall verify the trunk system and the connections proposed for the system.

The Contractor shall arrange for and provide all the necessary field tests, as directed by the Engineer, to demonstrate that the installation is in proper working order and in accordance with the plans and specifications.

An intersection acceptance test shall be conducted and successfully completed prior to acceptance of entire corridor intersections. The test is designed to demonstrate that the field

equipment installed at each intersection is installed properly and that all functions are in conformance with the plans and specifications. The engineer reserves the right to make adjustments to the timing of the controllers during and after test periods. These timing adjustments shall not relieve the Contractor of any responsibility otherwise set forth in the Contract.

If the new signal is not operating properly, the old controller shall continue to operate the signal and the Contractor, at his own expense, shall make all necessary repairs, adjustments, changes or replacements promptly and to the satisfaction of the Engineer.

When all work is completed and the signal installation is operating properly, the new signal may be left on automatic operation and the existing signal may be taken out of operation and removed.

Upon completion of the installation and testing, the Contractor shall notify the Engineer that the installation is complete and shall arrange a time for the Engineer to conduct the Functional Inspection and complete the Intersection Acceptance Test of the traffic signal. A qualified representative of the traffic controller manufacturer or the distributor and the video detection manufacturer or the distributor must also be present during the Functional Inspection. A punch list of traffic signal items shall be provided to the Contractor as a result of the Functional Inspection.

A 30-day test shall start at the successful completion of the Functional Inspection and system integration, including communication with the traffic management center. All electronic equipment, including but not limited to the controller, video detector, IP camera, conflict monitor, detector amplifiers, load switches and flasher shall be tested for proper operation for 30 consecutive days. During this testing period, all equipment shall operate without failure of any type. A new 30 day test shall begin each time a failure is identified and corrected. The 30-day working test period shall not start until the Engineer has inspected the installation. The Contractor shall be responsible for all equipment installed until the 30-day test is terminated and all punch-list have been addressed and resolved. The 30-day working test period shall not be considered complete until final sets of cabinet wiring diagrams and a CADD/PDF in a CD format have been received by the Engineer. The 30-day working test period will not apply to any equipment furnished by the State and installed by the Contractor.

The Engineer may adjust any timing during this period to fully test the functional operation of the equipment installed. If any failures are identified, the Contractor shall replace or repair the defective equipment within 24 hours of notification by the Engineer.

All necessary corrections and adjustments shall be made promptly by the Contractor so as to make the installation satisfactory to the Engineer and at no additional cost.

When Intersection Acceptance Test is successfully completed and the 30-day test period has passed, the intersection shall be accepted by the Engineer. It may be possible that all of the traffic signal controllers in the system have completed their 30-day functional test period before the traffic signal interconnect system has been completed.

The Engineer shall issue an acceptance letter to the Contractor or permitter if the traffic signal has been installed by permit, stating the 30-day test start and completion dates and relieving the Contractor from maintenance responsibility of the traffic controller. All traffic signal punch list items, identified at the inspection, shall be resolved prior to issuance of the acceptance letter. The party who assumes ownership shall also receive a copy of the acceptance letter. Completion of the 30-day test period relieves the Contractor of normal maintenance responsibility including accidental damage or vandalism. The Contractor shall repair or replace any equipment found to be defective or damaged due to poor workmanship or the Contractor's operations.

All tests and test equipment shall be supplied at the Contractor's expense.

The Contractor is hereby notified of the uninterruptible power system and transfer switches for external power support are part of the contract at the specified controller locations.

The Contractor is hereby notified that the optical detector locations shown on the plans are for illustration only. The exact locations shall be determined for best detection by the manufacturer or his designated representative. Detector cables are to be installed continuous between each optical detector and the controller cabinet.

The Contractor is hereby instructed to contact and coordinate with the optical detector manufacturer for the installation of the detectors.

The Contractor is hereby notified that the video detection zones are shown on the plans. The exact placement of video cameras and detection zones to provide the desired area of detection for all lighting conditions shall be determined by the manufacturer or his/her designated representatives. Camera cables are to be installed continuous between each camera and the controller cabinet.

The Contractor is hereby instructed to contact and coordinate with the video detection equipment manufacturer for the installation of video detection equipment and cameras. This shall include, but not be limited to, a site survey with the manufacturer representative at all project locations.

The Contractor shall obtain all necessary Town permits, including but not limited to sidewalk, curb, street obstruction and street opening.

The Contractor shall obtain all necessary State permits to install any appurtenances on State-owned property.

The Contractor is hereby notified temporary pavement markings may be required during the construction of the underground work while the Main Street repaving project is underway.

The Contractor is hereby notified that in addition to the details shown on the Plans, the Town of Glastonbury standard drawings related to handicapped ramps also apply. The standard Glastonbury drawings are included in the plan set.

NOTICE TO CONTRACTOR – GRANITE CURBING

The Contractor is hereby notified that the existing curbing within the project area is primarily granite stone curbing with the exception of private driveways which are mostly bituminous concrete lip curbing. The Contractor is responsible for verifying the limits of existing granite stone curbing prior to excavation.

The Contractor shall replace in kind all disturbed curbing associated with the construction of signal equipment and removal and construction of concrete sidewalk ramps at no cost.

NOTICE TO CONTRACTOR – CONCRETE SIDEWALK

The Contractor is hereby notified that Class F Concrete shall be used for all sidewalk ramps instead of the Class A Concrete detailed by the Connecticut Department of Transportation Standard Detail entitled Sidewalk Ramps.

The cost associated with the Class F Concrete shall be included and paid for under Item #09210001A “Concrete Sidewalk”.

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 Tighe & Bond, Inc. for approval before fabrication.

Joseph Balskus, P.E., PTOE
Project Manager
Tighe & Bond, Inc.
213 Court Street, Suite 900
Middletown, Ct 06457

and one (1) set to the Town of Glastonbury Public Works Department.

Please forward to:

Daniel A. Pennington, P.E.,
Manager of Physical Services/Town Engineer
Town of Glastonbury
2155 Main Street
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 Connecticut Department of Transportation Traffic Electrical Unit, one 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 traffic signal 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.

Shop drawings for all underground work including foundations, conduit and sidewalk construction shall be submitted at one time and within 15 days of the notice of award, unless otherwise approved by the engineer.

Aluminum Pedestals
Steel Mast Arm Assembly
Traffic Signals
LED Traffic Signal Lamp Unit
Pedestrian Signals
Pedestrian Pushbuttons and Signs
Pre-Emption Button
Accessible Pedestrian Signal
Controller
- Solid State Time Switch
- Solid State Load Switch
- Conflict Monitor
- Solid State Flasher

Uninterruptible Power Supply
- Battery System
- Transfer Switch
- External Power Connection

Pre-Emption Equipment
- Vehicle Emitter
- Phase Selector
- Pre-Emption System Chassis
- Detector Cable (Optical)

- Confirmation Light

Video Detection
- Camera Assembly
- Camera Extension Bracket
- Video Detector Processor
- Camera Cable

Fiber Optic Communication Cable
- Fiber Optic Patch Cords
- Ethernet Switches
- Fiber Optic Patch Panels

Concrete Handholes and Covers
Foundations
- Mast arm
- Pedestal
- Controller
- Light Standard

Sign Face Sheet Aluminum
- Street Name Signs

SECTION 1.06 CONTROL OF MATERIALS

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.

Steel Mast Arm Anchor Bolts
Steel Mast Arm Assembly

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.

Aluminum Pedestals
Steel Mast Arm Assembly
Traffic Signals
LED Traffic Signal Lamp Unit
Pedestrian Signals
Pedestrian Pushbuttons and Signs
Pre-Emption Button
Accessible Pedestrian Signal
Controller
- Solid State Time Switch
- Solid State Load Switch
- Conflict Monitor
- Solid State Flasher

Uninterruptible Power Supply
Pre-Emption Equipment
- Vehicle Emitter
- Phase Selector
- Pre-Emption System Chassis
- Detector Cable (Optical)
- Confirmation Light

Video Detection
- Camera Assembly
- Camera Extension Bracket
- Video Detector Processor
- Camera Cable

Fiber Optic Communication Cable
- Fiber Optic Patch Cords
- Ethernet Switches
- Fiber Optic Patch Panels

Concrete Handholes and Covers
Sign Face Sheet Aluminum

s:\traffic\1406\signal specs\specs\1.06-GENERAL REQUIREMENTS

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 15 days prior to the start of any work on this project involving their utilities:

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

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

AT&T Connecticut (The Southern New England Telephone Company)
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

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

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

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

Metropolitan District Commission
Mr. Richard Norris, P.E.
Project Engineer/Utility Liaison
555 Main Street, P.O. Box 800
Hartford, CT 06142-0800
(860) 278-7850 ext.3450
rnorris@themdc.com

S:/1406\signal specs\specs\1.07-LEGAL RELATIONS & RESPONSIBILITY

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.01 – Transfer of Work or Contract: *Replace 1.08.01 with the following:*

1.08.01 – Transfer of Work or Contract: The Contractor shall perform with its own organization Contract work with a value under the Contract of at least 50% of the original total Contract value. If the Contractor sublets, sells, transfers, or otherwise disposes of any part of the Contract work without the Commissioner's prior written consent, the Contractor will not be relieved of any Contractual or other legal responsibility in connection therewith. Such an unauthorized act by the Contractor shall constitute a material breach of the Contract, and the Commissioner may, in such a case, terminate the Contract without further compensation to the Contractor.

The Contractor shall include the following alternative dispute resolution clause in all of its Project subcontracts:

"For any dispute arising out of the agreement between the Contractor and a subcontractor, including claims of late payment or non-payment, which cannot be settled within 60 days of the subcontractor submitting a written claim to the Contractor, either party may bring the dispute before an alternative dispute resolution entity for resolution. If the parties do not agree upon a particular dispute resolution entity for that purpose, the dispute shall be resolved under the auspices and construction arbitration rules of the American Arbitration Association, or under the rules of any other alternative dispute resolution entity approved by the Department either generally or for the specific dispute. The Department may not be made a party to formal arbitration regarding such a dispute. These rights and restrictions may not be waived, and if these provisions are not included in the Contractor's subcontracts for the Project, these provisions shall nonetheless be read into them."

The Contractor shall not knowingly enter into any lower tier transaction on a Department project with any person or entity which, under any federal or state law or regulation, or by voluntary agreement, is currently debarred or disqualified from bidding for construction contracts or participating in construction projects in any jurisdiction within the United States, unless after disclosure of such ineligibility, such participation is authorized by appropriate federal and State authorities, including the Commissioner.

The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of the work provided for therein, or of its right, title, or interest therein, to any individual or entity without the prior written consent of the Commissioner. No payment will be made for any part of the work sublet, sold, transferred, assigned, or otherwise disposed of by the Contractor, prior to the authorization date given in the written consent of the Commissioner. Such an unauthorized act by the Contractor shall constitute a material breach of the Contract, and the Commissioner may, in such a case, terminate the Contract without further compensation to the Contractor.

The Contractor shall pay the subcontractor for work performed within thirty (30) days after the Contractor receives payment for the work performed by the subcontractor. Withholding retainage by the Contractor, subcontractor or lower tier subcontractors is not allowed.

Payment for work that has been performed by a subcontractor does not eliminate the Contractor's responsibilities for all the work as defined in Article 1.07.12, "Contractor's Responsibility for Work."

Payment for work that has been performed by a subcontractor also does not release the subcontractor from its responsibility for maintenance and other periods of subcontractor responsibility specified for the subcontractor’s items of work. Failure of a subcontractor to meet its maintenance, warranty and/or defective work responsibilities may result in administrative action on future Department contracts.

For any dispute regarding prompt payment, the alternate dispute resolution provisions of this article shall apply.

The above requirements are also applicable to all sub-tier subcontractors and the above provisions shall be made a part of all subcontract agreements.

Failure of the Contractor to comply with the provisions of this section may result in a finding that the Contractor is non-responsible on future projects.

Article 1.08.03 - Prosecution of Work:

Add the following:

The project will be constructed in various phases as described herein with an accelerated underground construction phase.

Phase 1 – Organization Phase - up to 30 Calendar Days from Notice to Proceed.

The first phase is to afford the Contractor time for the administrative/engineering/procurement function required for the project. This would include such items as performing construction staking, digging test pits, submitting catalog cuts or shop drawings and purchasing materials. Actual construction is not permitted during the period. Shop drawings for the underground related work in Phase 2A shall be submitted within 15 days of the notice of award. Shop drawings will be returned within 7 calendar days by the Engineer.

The Contractor is to use this time to fully prepare for the successive phases so that construction can proceed quickly and efficiently. During the phase, after the construction staking is complete and underground utilities are marked out, the Contractor, the designer, and the Engineer will walk the project to determine if test pits are necessary or if there are any apparent conflicts with private property, utilities, or other roadside appurtenances such as obstructions, rocks, large trees, etc. Those conflicts will be resolved prior to ordering equipment for the specific area where the conflict exits.

Phase 2A – Underground Construction Phase – up to 105 Calendar Days from Notice to Proceed.

When all apparent conflicts have been identified and resolved, the Contractor may request that the underground construction phase begin. Once commencement of construction begins, as and when approved by the Engineer, the Contractor will have up to 105 calendar days from the Notice to Proceed to complete the underground work, with the exception of that at the intersection of Main Street and Welles Street. Underground work includes the installation of all foundations and conduits for signal equipment, Glastonbury Boulevard median construction, and resetting or replacement of granite stone curb as necessary for relocated sidewalk ramps. Phase 2A, must be completed within the time established or liquidated damages, as specified elsewhere in the Contract, will be assessed against the Contractor per calendar day from that day until the date on which the work is complete. If unforeseen situations arise, the Contractor may request an extension of time for an individual location and, if justified, the Engineer may grant an extension of time for that location. Granting an extension of time for one location will not entitle the Contractor to extensions of time for other locations in the project.

Phase 2A will not start prior to the conclusion of Phase 1. The Contractor may begin Phase 2A only with prior written permission from the Engineer to do so, unless all the work allotted for this phase can be completed prior to the winter period.

Phase 2B – Construction Phase (All Other Work) – up to 240 Calendar Days from Notice to Proceed.

Once underground construction, with the exception of that at the intersection of Main Street and Welles Street, is complete the remainder of the construction can begin, as and when approved by the Engineer, the Contractor will have up to 240 consecutive calendar days from the Notice to Proceed to complete the remaining work, including cleanup. That work, once started, must be completed within the time established for the original construction phase, and liquidated damages, as specified elsewhere in the Contract, will be assessed against the Contractor per calendar day from that day until the date on which the work is complete. If unforeseen situations arise, the Contractor may request an extension of time for an individual location and, if justified, the Engineer may grant an extension of time for that location. Granting an extension of time for one location will not entitle the Contractor to extensions of time for other locations in the project.

The Contractor may begin Phase 2B only with prior written permission from the Engineer to do so, unless all the work allotted for this phase can be completed prior to the winter period. If the project will not be completed in the one construction season, the Contractor shall complete all work started at or between intersections, including cleanup, prior to the winter shutdown.

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.

Article 1.08.04 - Limitation of Operations - Add the following:

TIME RESTRICTIONS

The Contractor will not be allowed to work on Town streets Saturday and Sunday, or on the following State observed Legal Holidays:

New Year's Day
Martin Luther King Jr. Day
Good Friday, Easter
Memorial Day
Independence Day
Labor Day
Columbus Day
Thanksgiving Day
Christmas Day

Main Street, Griswold Street, Glastonbury Boulevard

The Contractor will not be allowed to close more than one lane of traffic for typical construction operations, except as noted in the Special Provision "Maintenance and Protection of Traffic". When closing the lane, the Contractor must employ the temporary traffic control measures in the Special Provisions.

Halting Traffic
During these times when the Contractor is working over the roadway installing traffic signal equipment, the Contractor may halt traffic for a period, not to exceed ten minutes to adequately secure all materials before allowing traffic to pass with prior approval from the Engineer.

All Other Roadways

The Contractor will be allowed to impact traffic on the side street approaches to the Main Street intersections with alternating one-way traffic patterns or a detour of side street traffic. The detouring of the traffic shall be proposed by the Contractor and approved by the Engineer prior to implementation and only if a suitable detour route is available. When closing the lane, the Contractor must employ the temporary traffic control measures in the Special Provisions.

Halting Traffic
During these times when the Contractor is working over the roadway installing traffic signal equipment, the Contractor may halt traffic for a period, not to exceed ten minutes to adequately secure all materials before allowing traffic to pass with prior approval from the Engineer.

TRAFFIC SIGNALS

Loop detectors disturbed by the Contractor's operations shall be made operational or temporary detection must be provided within 24 hours of the termination of the existing loop detectors.

LANE CLOSURE RESTRICTIONS

It is anticipated that work on adjacent projects may be ongoing simultaneously with this project. The Contractor shall be aware of those projects so that coordination is maintained for proper traffic flow at all times on all project roadways and this coordination is acceptable to the Engineer.

The Contractor will not be allowed to close a lane if a Contractor working on an adjacent project has the opposite lane closed unless there is at least a one block clear area length where the entire roadway is open to traffic, measured from the end of the first work area to the beginning of the signing pattern for the next work area.

Article 1.08.13 – Termination of the Contractor's Responsibility *Replace with the following:*

1.08.13 – Acceptance of Work and Termination of Contractor's Responsibility:
The Contractor's responsibility for non-administrative Project work will be considered terminated when the final inspection has been held, any required additional work and final cleaning-up have been completed, all final operation and maintenance manuals have been submitted, and all of the Contractor's equipment and construction signs have been removed from the Project site. When these requirements have been met to the satisfaction of the Engineer, the Commissioner will accept the work by certifying in writing to the Contractor, that the non-administrative Project work has been satisfactorily completed.

SECTION 1.09 - MEASUREMENT AND PAYMENT

Article 1.09.06 – Partial Payments: *Replace 1.09.06 with the following:*

1.09.06 – Partial Payments:

A. Monthly and Semi-monthly Estimates.

(1) Once each month, the Engineer will make, in writing, current estimates of the value of work performed in accordance with the Contract, calculated at Contract unit prices, including but not limited to the value of materials complete in place and materials not yet incorporated into the Project, but approved by the Engineer for payment (as provided for elsewhere in this article). Retainage will not be held.

Exceptions may be made as follows:
(a) When not in conflict with the interests of the State, the Contractor may request, and the Engineer may make, semi-monthly estimates for payment.
(b) No estimates for payments will be made when, in the judgment of the Engineer, the Project is not proceeding in accordance with the Contract.

(2) The Engineer may also make payment at Contract unit prices for the number of units that represent the value of the Project work performed to date, if said units are essentially, though not totally, complete.

(3) As soon as possible after the final inspection, the apparent final quantities will be sent to the Contractor. The Contractor shall respond in writing within 21 days of receipt by either signing and thus accepting the final quantities or by disagreeing in writing, citing the pay items involved with documentation and justification of such agreement. Failure to respond within the 21 days will be considered as acceptance of the final quantities and the Department may proceed with final payment,

B. Payment for Stored Materials: Non-perishable materials that meet Contract requirements, that have been produced or purchased specifically for incorporation into the Project, and that have been delivered to the Project site or to such location as the Engineer may have approved, but which have not yet been incorporated into the Project, may be included in current estimates at such fraction of the applicable Contract unit price or lump sum price as the Engineer may deem to represent a fair value for the material, if such materials have been paid for by the Contractor as shown by receipted bills or, in lieu of such receipted bill(s), a duly-executed Certification of Title executed by the Contractor and the Vendor in the form approved by the Department. When partial payment is made for stored materials, such materials shall become the property of the State; but such payment shall in no way release the Contractor from its responsibility for the condition, protection and, in case of loss, replacement of such materials, or from any liability resulting in any manner from the presence of such materials wherever they may be stored or kept. All materials shall be stored in accordance with Article 1.06.03 and in accordance with the manufacturer's recommendations. Material test approval by the Department shall be required prior to payment for such materials.

Offsite storage may be approved by the Engineer provided that the materials proposed for payment are segregated from other materials, clearly labeled as being owned by the Department for use on the identified Project, otherwise handled in compliance with Article 1.06.03, and stored in accordance with the manufacturer's recommendations. All such materials must be readily-available for inventory and inspection by the Engineer. Storage outside of the State of Connecticut may be considered only when a representative of the Department is able to verify that the above requirements have been satisfied.

For items requiring extended fabrication, manufacturing or assembly time, the Contractor may propose to the Engineer a schedule of values for the related material costs. If the Engineer approves such a schedule of values, it shall become the Basis of Payment for the stored materials, so long as all other pertinent Contract requirements have been satisfied.

Generic materials having a use on many projects will be considered for payment prior to their incorporation into the Project only if stored in unopened packaging or in large lots. Stock and raw materials will not be considered for such advance payment without the Engineer's prior written consent thereto.

In no case shall material payments exceed the Contract unit price or lump sum price less the actual value of delivery and installation of the materials; if they do exceed such a price, the Engineer reserves the right to reduce any related payment accordingly. Such reductions in payment shall in no way affect the Department's ownership interest in the stored materials.

Article 1.09.07 – Final Payment: *Replace 1.09.07 with the following:*

1.09.07 – Final Payment: When the Commissioner has accepted the Project, the Engineer will prepare a final payment estimate and a list of final item quantities. The list will include the entire amount of each item of Project work performed, the value thereof, and the amount of all payments made on prior estimates, all such estimated payments being merely partial payments and subject to correction in the calculation of the final payment.

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. (cu.m) is encountered, the Engineer will determine if it must be removed and the method. Do not use explosives. See the pertinent construction methods of Section 2.02.03. When concrete must be removed, reinforced or not, it shall be considered, measured, and paid for as rock in 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 (cubic meter) for "Test Pit Excavation", which price shall include excavation, unsuitable material disposal, compacted backfill, bituminous pavement, sawcut, pavement repair, all utility costs, all equipment, tools, labor and work incidental thereto. The volume excludes the volume of material that is measured as Rock In Foundation Excavation.

Pay Item	Pay Unit
Test Pit Excavation	c.y.

ITEM #0921001A – CONCRETE SIDEWALK

Description:

The Contractor shall construct sidewalks and pedestrian ramps 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 and disposal of existing concrete sidewalk and construction of new concrete sidewalk. At street corners where the intersection is rounded with a radius of less than 25 feet to the curb, the sidewalk slabs will be a minimum of five feet in length and constructed of five-inch thick concrete. 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 or at locations directed by the Engineer, and shall be a minimum of five inches thick. This work shall also include the removal and disposal of existing sidewalk and pedestrian sidewalk ramps, furnishing and installing Detectable Warning Strips, and recessing or replacing with new granite stone curbing the curbing along the pedestrian sidewalk ramps in the locations and to the dimensions and details shown on the plans or as ordered by the Engineer. Existing concrete sidewalk shall be removed to the nearest existing expansion joint.

This work shall also include the removal, resetting, relocation of existing granite stone curbing. Where sidewalk ramps are removed/relocated to another intersection corner location, granite stone curbing shall be reset from recessed position or replaced with new granite stone curbing in the existing ramp location.

Materials:

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. 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 4,000 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.

Base: The stone base shall be processed aggregate base conforming to Article M.05.01 of Form 816.

Stone Curbing: The stone curbing shall be granite stone curbing conforming to Article M.12.06 of Form 816.

Detectable Warning Strips: The Detectable Warning Strip shall be a prefabricated detectable warning surface tile as manufactured from Engineered Plastics Inc. 300 International Drive, Suite 100 Williamsville, NY 14221, telephone number (800) 682-2525 or the approved equal

from ADA Fabricators, INC. P.O Box 179 North Billerica, MA 01862 telephone number (978) 262-9900. The tile shall conform to the dimensions shown on the plans and have a brick red homogeneous color throughout in compliance with Federal Standard 595A Color #22144 or approved equal.

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.

Dowels: Smooth metal dowels, 5/8-inch in diameter, measuring 24 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 24-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 24 inches in length. All metal dowels shall conform to the requirements of ASTM A615 Grade 60.

Construction Methods:

Excavation: Excavation, including removal of existing sidewalk and pedestrian sidewalk ramps, shall be made to the required depths below the finished grade, as shown on the plans or as directed. All soft and yielding material shall be removed and replaced with gravel base and compacted in accordance with the specifications. All granite stone curbing to be reused shall be removed and if necessary, stored nearby for future reuse.

When connecting new concrete sidewalk to a section of existing concrete sidewalk, the connection point shall be at the nearest expansion joint in the existing sidewalk.

Base: The gravel base shall be placed in two equal lifts, the full width of the excavation, and shall be compacted to the satisfaction of the Engineer with at least two passes of a motor driven vibratory compactor.

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. 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.

Granite Stone Curbing: The granite stone curbing shall be installed as new or resetting of existing granite stone curbing and in accordance with Article 8.13.03.

Concrete: The concrete shall be proportioned, mixed, placed, etc., in accordance with the provisions of Section 6.01 for Class "F" Concrete, except as modified herein. The concrete shall contain not less than 5% nor more than 7% entrained air at the time the concrete is deposited in the forms. Air-entrainment shall be obtained and the concrete cured in accordance with the provisions of Article

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.

Surface Finish: 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.

Curing: The Contractor shall use a liquid membrane-forming curing compound. The curing compound shall be similar or equal to Demicon “Cure Hard” with fugitive dye and shall meet the latest ASTM Specification C-156. Waterproof paper or plastic membrane are acceptable alternatives.

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.

Dowels: Smooth metal dowels, 5/8-inch in diameter, measuring 24 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 shall be installed according to manufacturer instructions and as directed by the Engineer.

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.

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.

Method of Measurement: This work will be measured for payment as follows:

1. Concrete Sidewalk: This work will be measured by the actual number of square feet of completed and accepted concrete sidewalk and ramps.

2. Removal of Existing Sidewalk: Removal of existing sidewalk and pedestrian ramps will not be measured for payment, but the cost shall be included in the price bid for concrete sidewalk.

3. Excavation: Excavation below the finished grade of the sidewalk, backfilling, and disposal of surplus material will not be measured for payment, but the cost shall be included in the price bid for the sidewalk. Excavation above the finished grade of the sidewalk will be measured and paid for in accordance with Section 2.02

4. Gravel Base: This work will not be measured for payment, but the cost shall be considered as included in the price bid for the sidewalk.

5. Detectible Warning Strips: Will not be measured for payment, but the cost shall be included in the price bid.

6. Granite Stone Curbing: Will not be measured for payment either for removal, resetting or new curbing, but the cost shall be included in the price bid for concrete sidewalk.

Basis of Payment: This work will be paid for at the contract unit price per square foot for "Concrete Sidewalk," complete in place, which price shall include all removal of existing sidewalk and sidewalk ramps, excavation as specified above, removal and disposal of surplus material, backfill, and gravel base, equipment, tools, materials and labor incidental thereto.

Pay Item	Pay Unit
Concrete Sidewalk	s.f.

ITEM #0925101A - RELAY BRICK WALK

Description:

Work under this item shall consist of removing and reconstructing brick walk which has been disturbed by excavation at the locations shown on the plans or as directed by the Engineer in conformance with these specifications.

Materials:

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

Construction Methods:

Existing bricks shall be carefully removed. If any bricks are broken during removal, the Contractor shall be responsible for replacing them. Upon reconstruction of the brick walk, all soft and yielding material and other portions of the subbase which will not readily compact shall be removed and replaced with suitable materials. The surface of the subbase shall be compacted with mechanical equipment capable of delivering a ground pressure of not less than 300 pounds per linear inch (54 kilograms per linear centimeter) of contact width. The amount of compaction shall be as specified by the Engineer but in no case shall that amount be less than four complete passes of the compacting equipment. The dry density after compaction shall conform to Article 2.02.03-6 of the standard specifications, Form 816. After compaction, the subbase shall be trued to the required line and grade. No additional payment will be made for any materials which are required to bring the subbase to the lines, grade and cross-sections of the site. The Contractor shall protect the subbase from damage by exercising such precautions as the Engineer deems necessary. The subbase surface shall be maintained in such condition as to permit proper drainage. It shall be checked and approved prior to placement of the leveling base. The leveling base shall be screeded loose to a thickness of approximately 2" (50mm). The leveling shall be treated with a soil sterilizer, of a type to be approved by the Engineer, prior to the placement of the bricks. The exact thickness of the leveling base is to be determined at the job site.

Care shall be taken by the Contractor to insure the screeded leveling base is loose and undisturbed placement. Bricks are to be installed "Hand-tight" with care being taken not to disturb the leveling bed. Mason string lines shall be used to insure proper lines and grades. Bricks are to be vibrated into the leveling base with a vibratory plate capable of achieving a 3500 to 5000 pounds (1590 to 2268 kilograms) compaction force. Such vibratory compaction shall be accomplished on all bricks prior to the end of operations on each working day. Compaction of the bricks shall continue until finish grade, as directed by the Engineer, is achieved. All joints shall be filled after final compaction with the same material used for the leveling base.

Method of Measurement:

This work will be measured for payment by the actual number of square feet (square meters) of complete and accepted relayed brick walk.

Basis of Payment:

This work will be paid for at the contract unit price per square foot for "Relay Brick Walk" complete and accepted in place which price shall include removing, storing and reconstruction of Brick Walk and all material, labor, equipment and work incidental thereto.

ITEM #0952001A – SELECTIVE CLEARING AND THINNING

Section 9.52 is amended as follows:

Article 9.52.01 – Description is supplemented as follows:

This work shall consist of cutting, trimming and removal of trees, stumps, brush, rubbish and objectionable material as shown on the plans and as directed by the Engineer and Town of Glastonbury to provide required sight lines to proposed traffic control signal equipment.

This work includes excavation of a tree protection trench adjacent to an existing or proposed sidewalk, conduit, traffic signal control equipment, and foundations by means of a chain-driven trenching machine with additional pruning of roots using hand methods as required. This is performed adjacent to the proposed sidewalk, conduit, traffic signal control equipment, and foundation excavation and within the drip line of an existing tree to cleanly sever roots prior to sidewalk excavation.

The services of a licensed arborist will be required to supervise the above referenced work and shall be included in the contract unit price.

Article 9.52.03 – Construction Methods is supplemented as follows:

Where directed by the Engineer, materials to be cut, trimmed or removed shall be those items that restrict visibility to a traffic signal to less than 400 ft. All traffic signal indications will be visible for 400 ft measured from the center of the right-travel lane approaching the intersection, as viewed from a 3.5 ft height above the roadway.

All trees scheduled to be removed shall be visibly marked or flagged by the Contractor at least seven days prior to the cutting of such trees.

The Engineer will inspect the identified trees and verify the limits of clearing and thinning prior to the Contractor proceeding with his cutting operation.

Tree protection trench shall be installed in advance of the intended sidewalk, conduit, traffic signal control equipment or foundation construction during times where damage to trees will be minimized, as directed by the Engineer. The work area shall generally include the length of trench within the drip line of the canopy of the tree of concern. Extreme care shall be taken by the Contractor to identify and protect underground utilities within the work area, and any conflicts shall be immediately brought to the attention of the Engineer.

Where tree protection is called for on the plans, the Contractor shall use a chain-driven trenching apparatus to cleanly sever tree roots adjacent to the proposed sidewalk, conduit, traffic signal control equipment, and foundation excavation as directed by the Engineer. Additional pruning

of roots using hand methods may also be required, as directed by the Engineer or licensed arborist supervising the work.

ITEM #0970006A - TRAFFICPERSON (MUNICIPAL POLICE OFFICER)
ITEM #0970007A - TRAFFICPERSON (UNIFORMED FLAGGER)

9.70.01—Description: Under this item the Contractor shall provide the services of Trafficpersons of the type and number, and for such periods, as the Engineer approves for the control and direction of vehicular traffic and pedestrians. Traffic persons requested solely for the contractor's operational needs will not be approved for payment.

9.70.03—Construction Method: Prior to the start of operations on the project requiring the use of Trafficpersons, a meeting will be held with the Contractor, Trafficperson agency or firm, Engineer, and State Police, if applicable, to review the Trafficperson operations, lines of responsibility, and operating guidelines which will be used on the project. A copy of the municipality's billing rates for Municipal Police Officers and vehicles, if applicable, will be provided to the Engineer prior to start of work.

On a weekly basis, the Contractor shall inform the Engineer of their scheduled operations for the following week and the number of Trafficpersons requested. The Engineer shall review this schedule and approve the type and number of Trafficpersons required. In the event of an unplanned, emergency, or short term operation, the Engineer may approve the temporary use of properly clothed persons for traffic control until such time as an authorized Trafficperson may be obtained. In no case shall this temporary use exceed 8 hours for any particular operation.

If the Contractor changes or cancels any scheduled operations without prior notice of same as required by the agency providing the Trafficpersons, and such that Trafficperson services are no longer required, the Contractor will be responsible for payment at no cost to the Department of any show-up cost for any Trafficperson not used because of the change. Exceptions, as approved by the Engineer, may be granted for adverse weather conditions and unforeseeable causes beyond the control and without the fault or negligence of the Contractor.

Trafficpersons assigned to a work site are to only take direction from the Engineer.

Trafficpersons shall wear a high visibility safety garment that complies with OSHA, MUTCD, ASTM Standards and the safety garment shall have the words "Traffic Control" clearly visible on the front and rear panels (minimum letter size 2 inches (50 millimeters). Worn/faded safety garments that are no longer highly visible shall not be used. The Engineer shall direct the replacement of any worn/faded garment at no cost to the State.

A Trafficperson shall assist in implementing the traffic control specified in the Maintenance and Protection of Traffic contained elsewhere in these specifications or as directed by the Engineer. Any situation requiring a Trafficperson to operate in a manner contrary to the Maintenance and Protection of Traffic specification shall be authorized in writing by the Engineer.

Trafficpersons shall consist of the following types:

1. Uniformed Law Enforcement Personnel: Law enforcement personnel shall wear the high visibility safety garment provided by their law enforcement agency. If no high visibility safety garment is provided, the Contractor shall provide the law enforcement personnel with a garment meeting the requirements stated for the Uniformed Flaggers' garment.

Law Enforcement Personnel may be also be used to conduct motor vehicle enforcement operations in and around work areas as directed and approved by the Engineer.

Municipal Police Officers: Uniformed Municipal Police Officers shall be sworn Municipal Police Officers or Uniformed Constables who perform criminal law enforcement duties from the Municipality in which the project is located. Their services will also include an official Municipal Police vehicle when requested by the Engineer. Uniformed Municipal Police Officers will be used on non-limited access highways. If Uniformed Municipal Police Officers are unavailable, other Trafficpersons may be used when authorized in writing by the Engineer.
Uniformed Municipal Police Officers and requested Municipal Police vehicles will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the construction sites.

2. Uniformed Flagger: Uniformed Flaggers shall be persons who have successfully completed flagger training by the American Traffic Safety Services Association (ATSSA), National Safety Council (NSC) or other programs approved by the Engineer. A copy of the Flagger's training certificate shall be provided to the Engineer before the Flagger performs any work on the project. Uniformed Flaggers shall conform to Chapter 6E, Flagger Control, in the Manual of Uniformed Traffic Control Devices (MUTCD) and shall wear high-visibility safety apparel, use a STOP/SLOW paddle that is at least 18 inches (450 millimeters) in width with letters at least 6 inches (150 millimeters) high. The paddle shall be mounted on a pole of sufficient length to be 6 feet (1.8 meters) above the ground as measured from the bottom of the sign.

Uniformed Flaggers will only be used on non-limited access highways to control traffic operations when authorized in writing by the Engineer.

9.70.04—Method of Measurement: Services of Trafficpersons will be measured for payment by the actual number of hours for each person rendering services approved by the Engineer. These services shall include, however, only such trafficpersons as are employed within the limits of construction, project right of way of the project or along detours authorized by the Engineer to assist the motoring public through the construction work zone. Services for continued use of a detour or bypass beyond the limitations approved by the Engineer, for movement of construction vehicles and equipment, or at locations where traffic is unnecessarily restricted by the Contractor's method of operation, will not be measured for payment.

Trafficpersons shall not work more than twelve hours in any one 24 hour period. In case such services are required for more than twelve hours, additional Trafficpersons shall be furnished and measured for payment. In cases where the Trafficperson is an employee on the Contractor's payroll, payment under the item "Trafficperson (Uniformed Flagger)" will be made only for those hours when the Contractor's employee is performing Trafficperson services.

Travel time will not be measured for payment for services provided by Uniformed Municipal Police Officers or Uniformed Flaggers.

Mileage fees associated with Trafficperson services will not be measured for payment.

Safety garments and STOP/SLOW paddles will not be measured for payment.

9.70.05—Basis of Payment: Trafficpersons will be paid in accordance with the schedule described herein.
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. Uniformed Law Enforcement Personnel: The sum of money shown on the Estimate and in the itemized 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.

The Department will pay the Contractor its actual costs for "Trafficperson (Municipal Police Officer)" plus an additional 5% as reimbursement for the Contractor's administrative expense in connection with the services provided.

The invoice must include a breakdown of each officer's actual hours of work and actual rate applied. Mileage fees associated with Trafficperson services are not reimbursable expenses and are not to be included in the billing invoice. The use of a municipal police vehicle authorized by the Engineer will be paid at the actual rate charged by the municipality. Upon receipt of the invoice from the municipality, the Contractor shall forward a copy to the Engineer. The invoice will be reviewed and approved by the Engineer prior to any payments. *Eighty (80%) of the invoice will be paid upon completion of review and approval. The balance (20%) will be paid upon receipt of cancelled check or receipted invoice, as proof of payment.* The rate charged by the municipality for use of a uniformed municipal police officer and/or a municipal police vehicle shall not be greater than the rate it normally charges others for similar services.

2. Uniformed Flagger: Uniformed flaggers will be paid for at the contract unit price per hour for "Trafficperson (Uniformed Flagger)", which price shall include all compensation, insurance benefits and any other cost or liability incidental to the furnishing of the trafficpersons ordered.

Pay Item	Pay Unit
Trafficperson (Municipal Police Officer)	est.
Trafficperson (Uniformed Flagger)	Hr.

ITEM NO. 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 project entails the construction of new traffic control signal equipment along Town roadways. No State highways are involved with the project however State Right Of Way along the Route 3 corridor traverses the Main Street approach to the Putnam Boulevard intersection.

Main Street

The Contractor shall maintain and protect a minimum of two lanes 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 three travel lanes, on a paved travel path not less than 11 feet in width for each lane.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working on the installation of undergrounds conduits crossing the entire travelway, at which time the Contractor shall maintain and protect one travel lane in each direction, on a paved travel path not less than 11 feet in width for each lane.

Glastonbury Boulevard, Putnam Boulevard and Griswold Street

The Contractor shall maintain and protect a minimum of two lanes of traffic in each direction on Putnam Boulevard and Glastonbury Boulevard, each lane on a paved travel path not less than 11 feet in width, and on Griswold Street, 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 one lane in each direction, on a paved travel path not less than 11 feet in width.

All Other Roadways

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.

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 only 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

Loop detectors disturbed by the Contractor's operations shall be made operational, in accordance with Form 816 and supplemental or temporary detection shall be provided within 24 hours of the termination of the existing loop detectors.

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 Pattern

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.

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 4. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

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

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

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

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

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

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

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

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

5.c) Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the "flashing arrow" mode when taking the lane. The sign truck and workers should be immediately ahead of the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the "caution" mode when traveling in the closed lane.

5.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the "caution" mode when in the closed lane.

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

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

SECTION 6. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

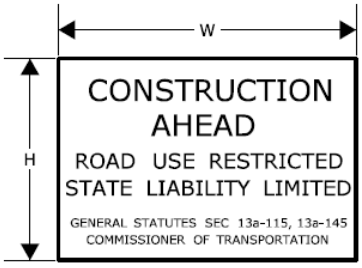
6.a) Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.

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

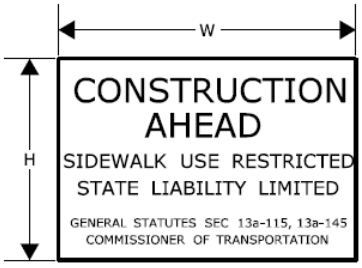
6.c) Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.

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

SERIES 16 SIGNS



		W H
16-E	80-1605	84" x 60"
16-H	80-1608	60" x 42"
16-M	80-1613	30" x 24"



		W H
16-S	80-1619	48" x 30"

THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE. SERIES 16 SIGNS SHALL BE INSTALLED ON ANY MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED-ACCESS HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMPS PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

THE LOCATION OF SERIES 16 SIGNS CAN BE FOUND ELSEWHERE IN THE PLANS OR INSTALLED AS DIRECTED BY THE ENGINEER.

SIGNS 16-E AND 16-H SHALL BE POST-MOUNTED.

SIGN 16-E SHALL BE USED ON ALL EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMPS, OTHER STATE ROADWAYS, AND MAJOR TOWN/CITY ROADWAYS.

SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

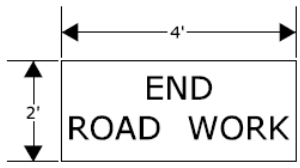
THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY IN CONNECTICUT WHERE THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL NOT BE INSTALLED ON TOWN ROADS.

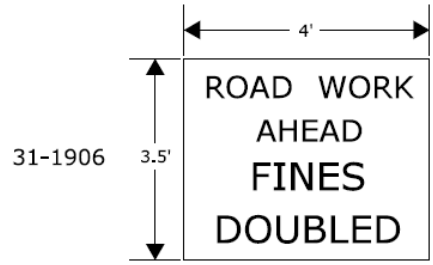
THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL BE PLACED AFTER THE SERIES 16 SIGN AND IN ADVANCE OF THE "ROAD WORK AHEAD" SIGN.

"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN MUST BE THE "END ROAD WORK" SIGN.



80-9612



31-1906

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN
REQUIRED SIGNS

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 11:35:43-04'00'
PRINCIPAL ENGINEER

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

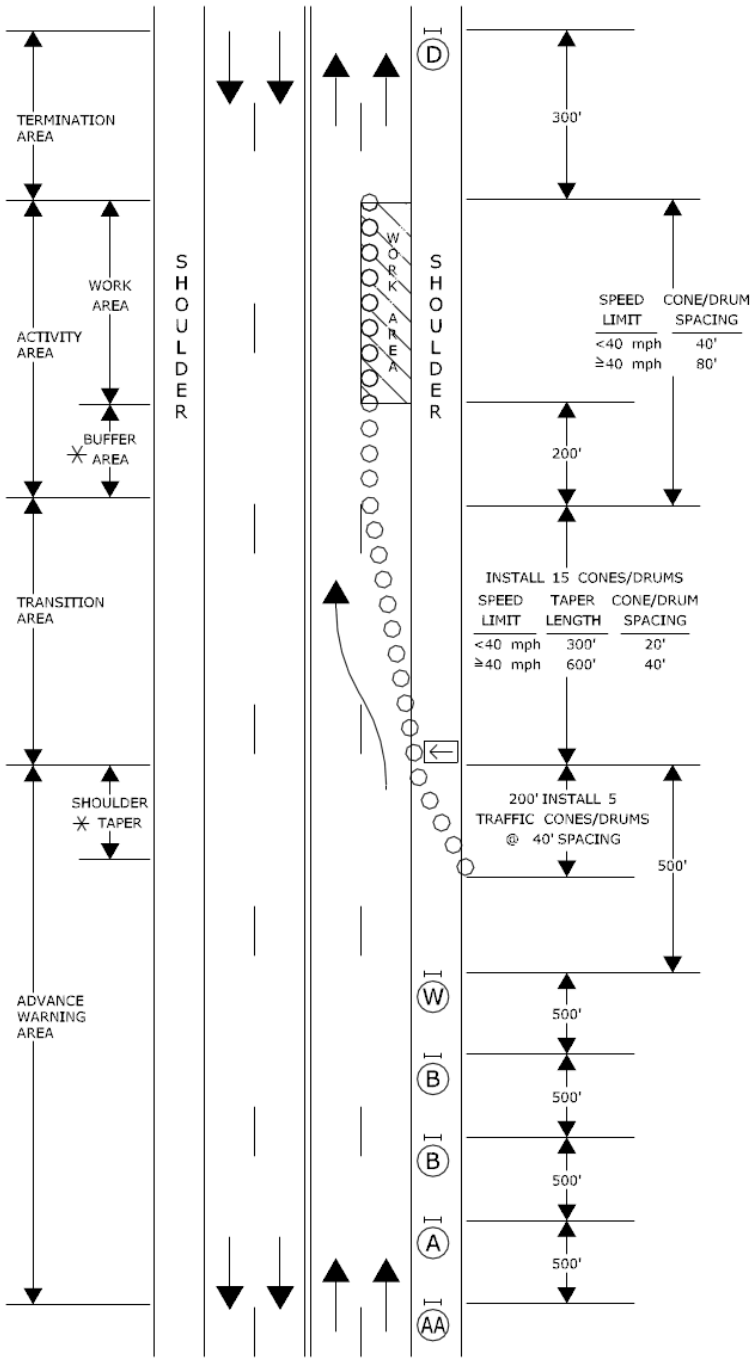
NOTES

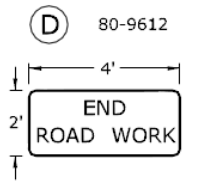
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

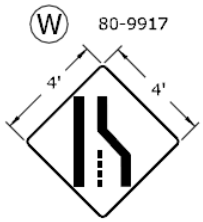
APPROVED Charles S. Harlow 2012.06.05 15:50:35-04'00'
PRINCIPAL ENGINEER

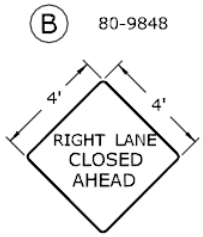
WORK IN RIGHT LANE - 4 LANE UNDIVIDED HIGHWAY

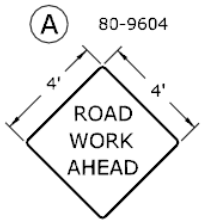
SIGN FACE
86 SQ. FT (MIN.)

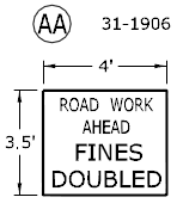












○ TRAFFIC CONE **OR** TRAFFIC DRUM
✳ OPTIONAL ⊗ TRAFFIC DRUM ⊢ PORTABLE SIGN SUPPORT
⇐ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 10

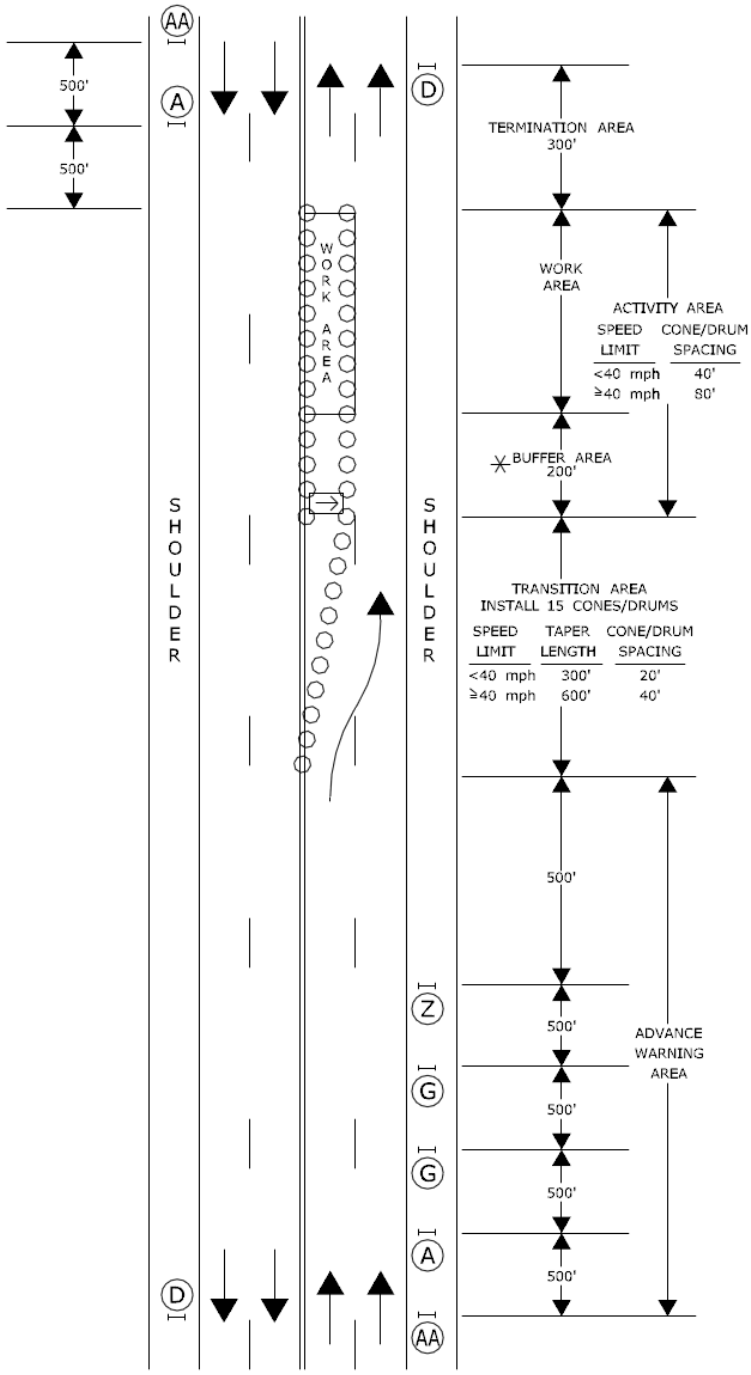
SEE NOTES 1, 2, 3, 4, 5, 6, 7, 8

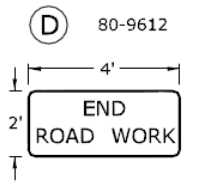
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

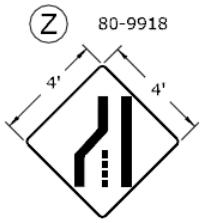
APPROVED Charles S. Harlow 2012.06.05 15:54:15-04'00'
PRINCIPAL ENGINEER

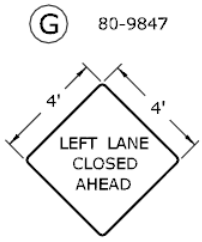
WORK IN LEFT LANE - 4 LANE UNDIVIDED HIGHWAY

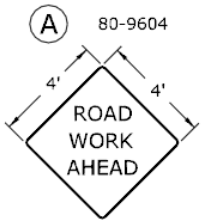
SIGN FACE
124 SQ. FT (MIN.)

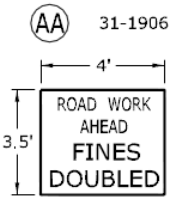












◯ TRAFFIC CONE **OR** TRAFFIC DRUM
✳ OPTIONAL ⊗ TRAFFIC DRUM ⊢⊣ PORTABLE SIGN SUPPORT
⇦ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 11

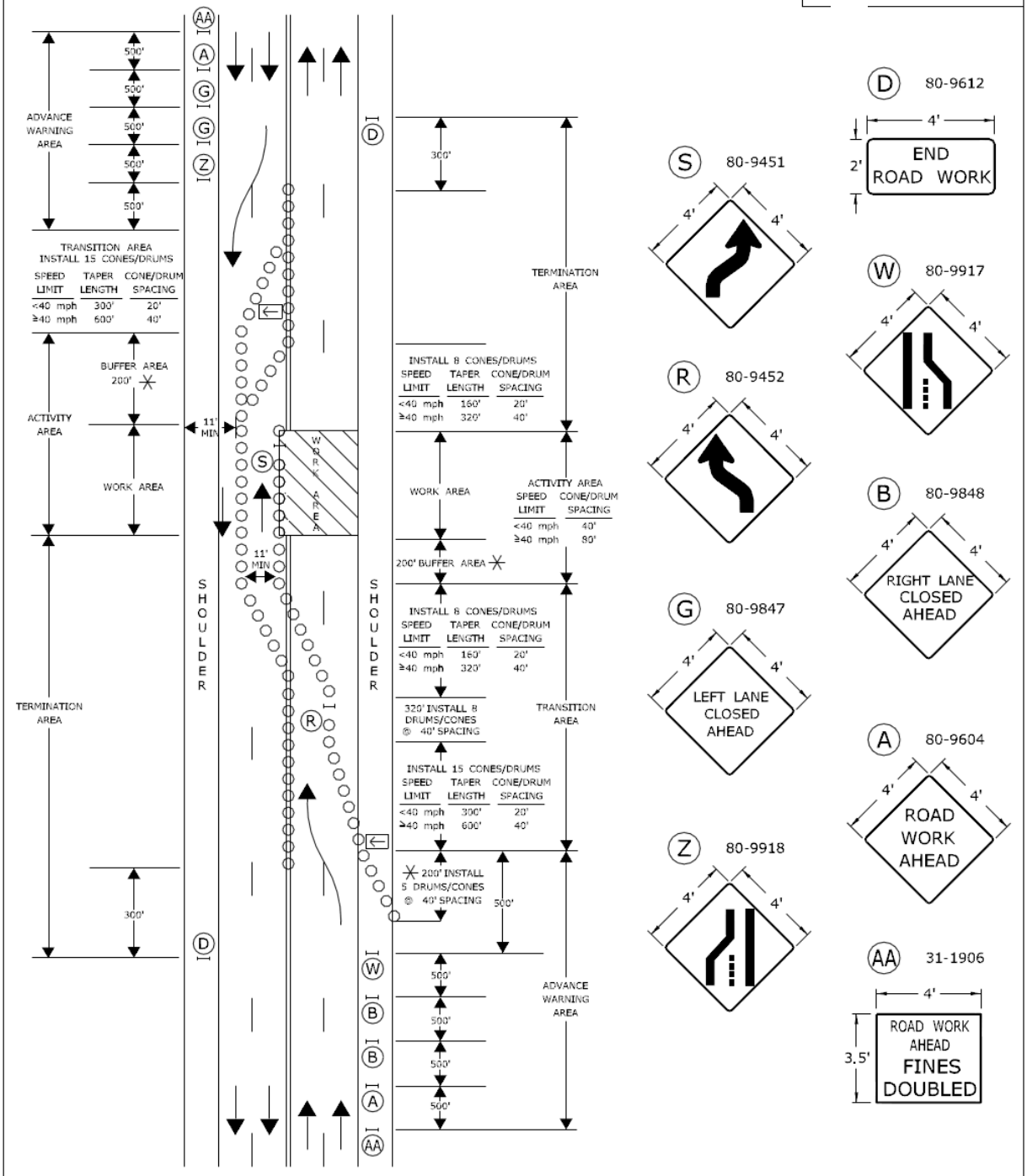
SEE NOTES 1, 2, 3, 4, 5, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:54:36-04'00'
PRINCIPAL ENGINEER

WORK IN BOTH LANES - 4 LANE UNDIVIDED HIGHWAY

SIGN FACE
204 SQ. FT (MIN.)



○ TRAFFIC CONE **OR** TRAFFIC DRUM
✳ OPTIONAL ⊗ TRAFFIC DRUM ⊢ PORTABLE SIGN SUPPORT
⟸ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 12

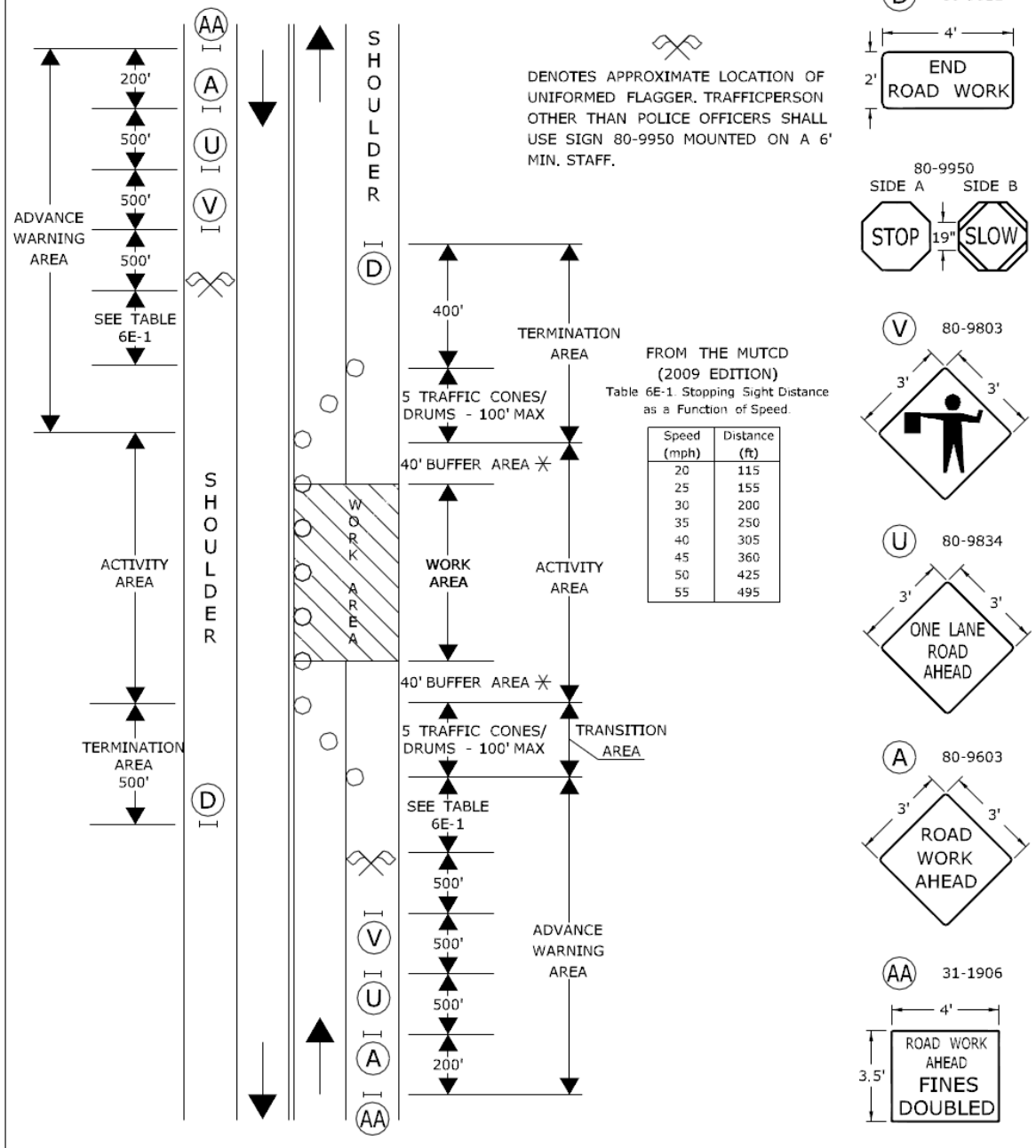
SEE NOTES 1, 2, 3, 4, 5, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:55:01-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)



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
Charles S. Harlow
2012.06.05 15:55:23-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

A. TO STOP TRAFFIC

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

B. TO DIRECT TRAFFIC TO PROCEED

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

C. TO ALERT OR SLOW TRAFFIC

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

◯ TRAFFIC CONE **OR** TRAFFIC DRUM
✳ OPTIONAL ⊗ TRAFFIC DRUM ⊢⊣ PORTABLE SIGN SUPPORT
⟵ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

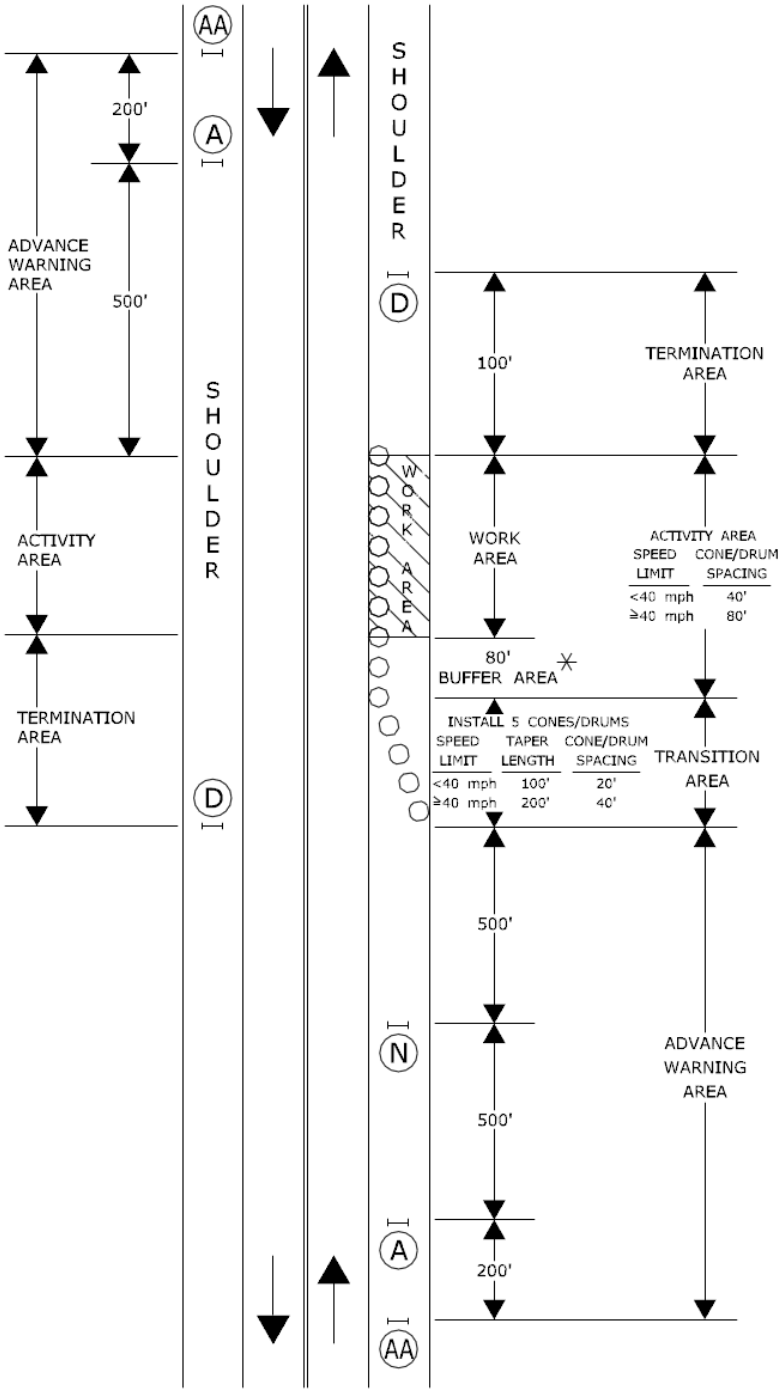
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 2 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

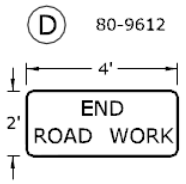
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

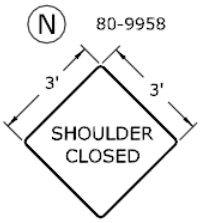
APPROVED Charles S. Harlow 2012.06.05 15:55:45-04'00'
PRINCIPAL ENGINEER

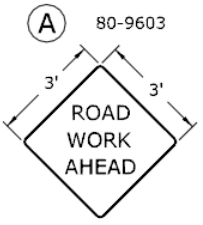
WORK IN SHOULDER - TWO LANE HIGHWAY

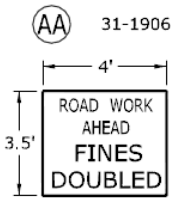
SIGN FACE
71 SQ. FT (MIN.)











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

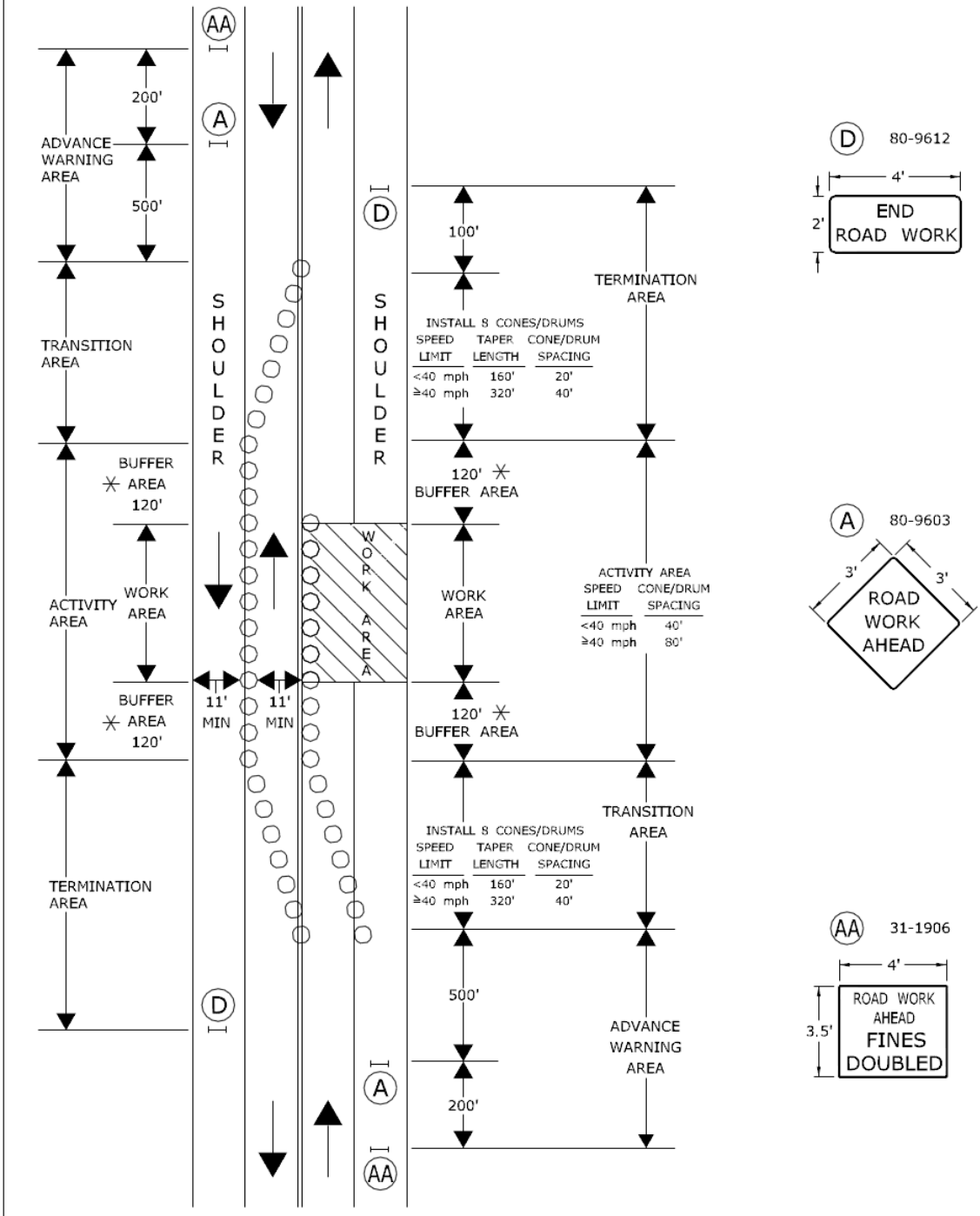
SEE NOTES 1, 2, 4, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:56:09-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY

SIGN FACE
62 SQ. FT (MIN.)



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

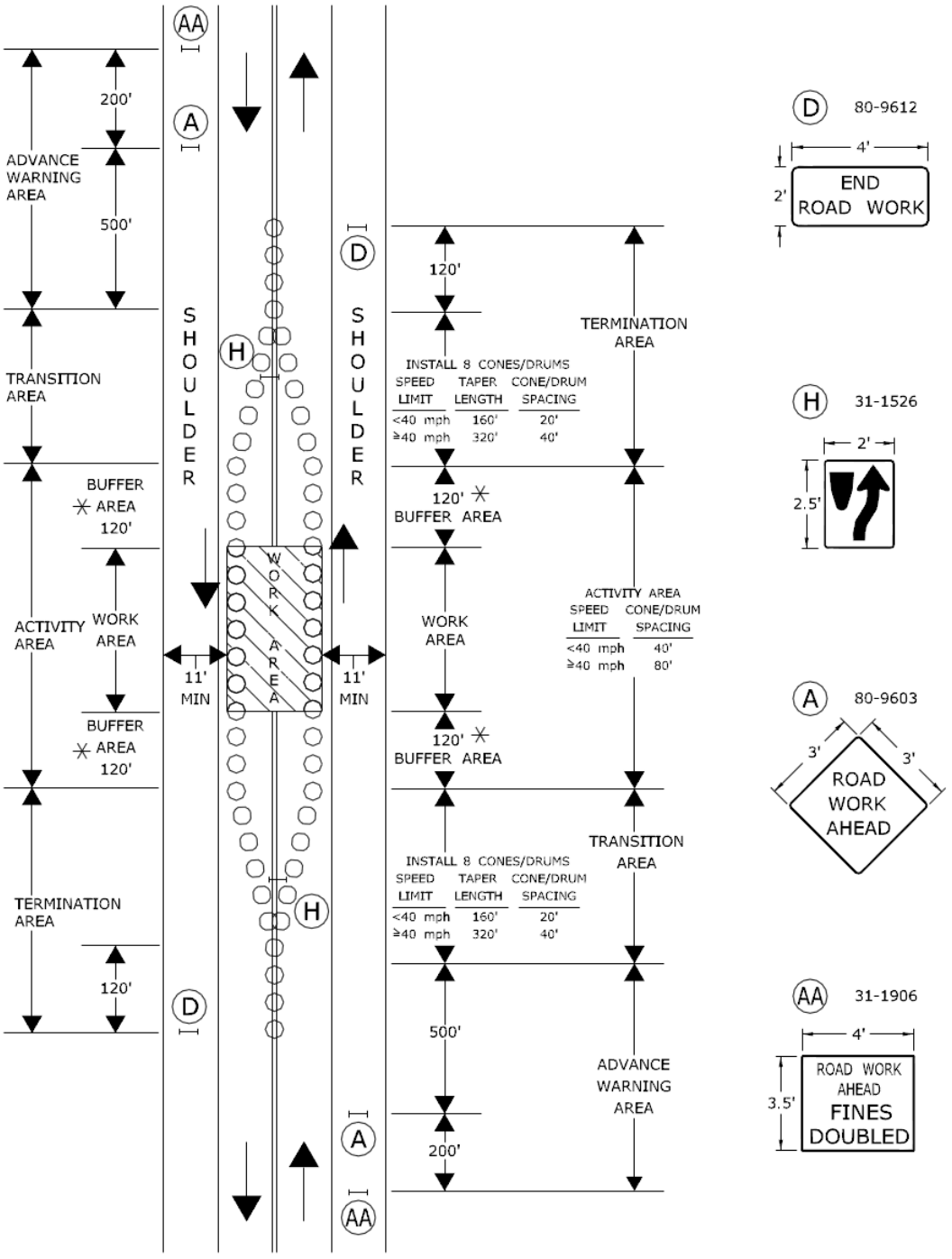
SEE NOTES 1, 2, 4, 6, 7, 8

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.)



◯ 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

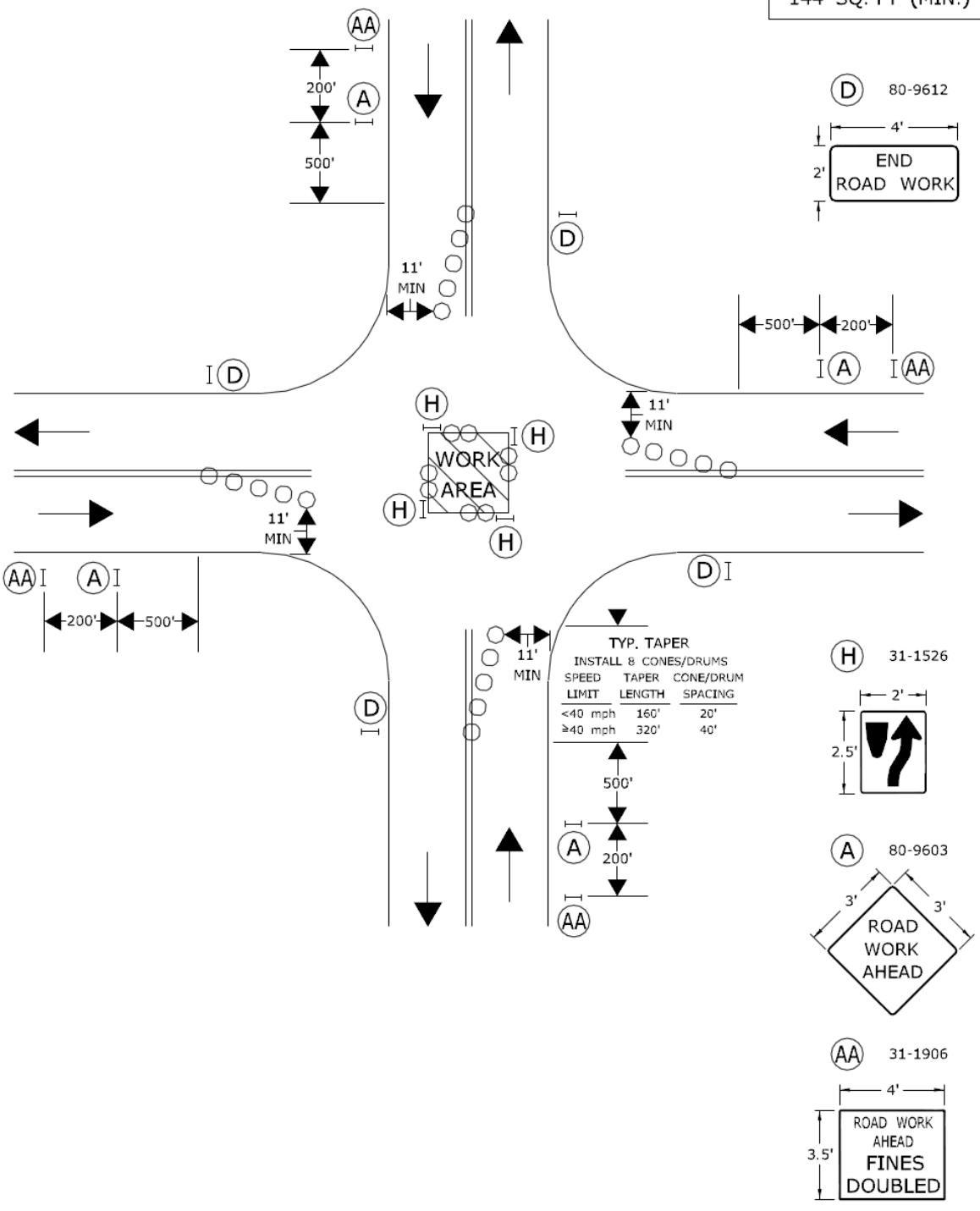
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:56:51-04'00'
PRINCIPAL ENGINEER

WORK IN MIDDLE OF ROADWAY AT INTERSECTION

SIGN FACE
144 SQ. FT (MIN.)



TRAFFIC CONE **OR** TRAFFIC DRUM
OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

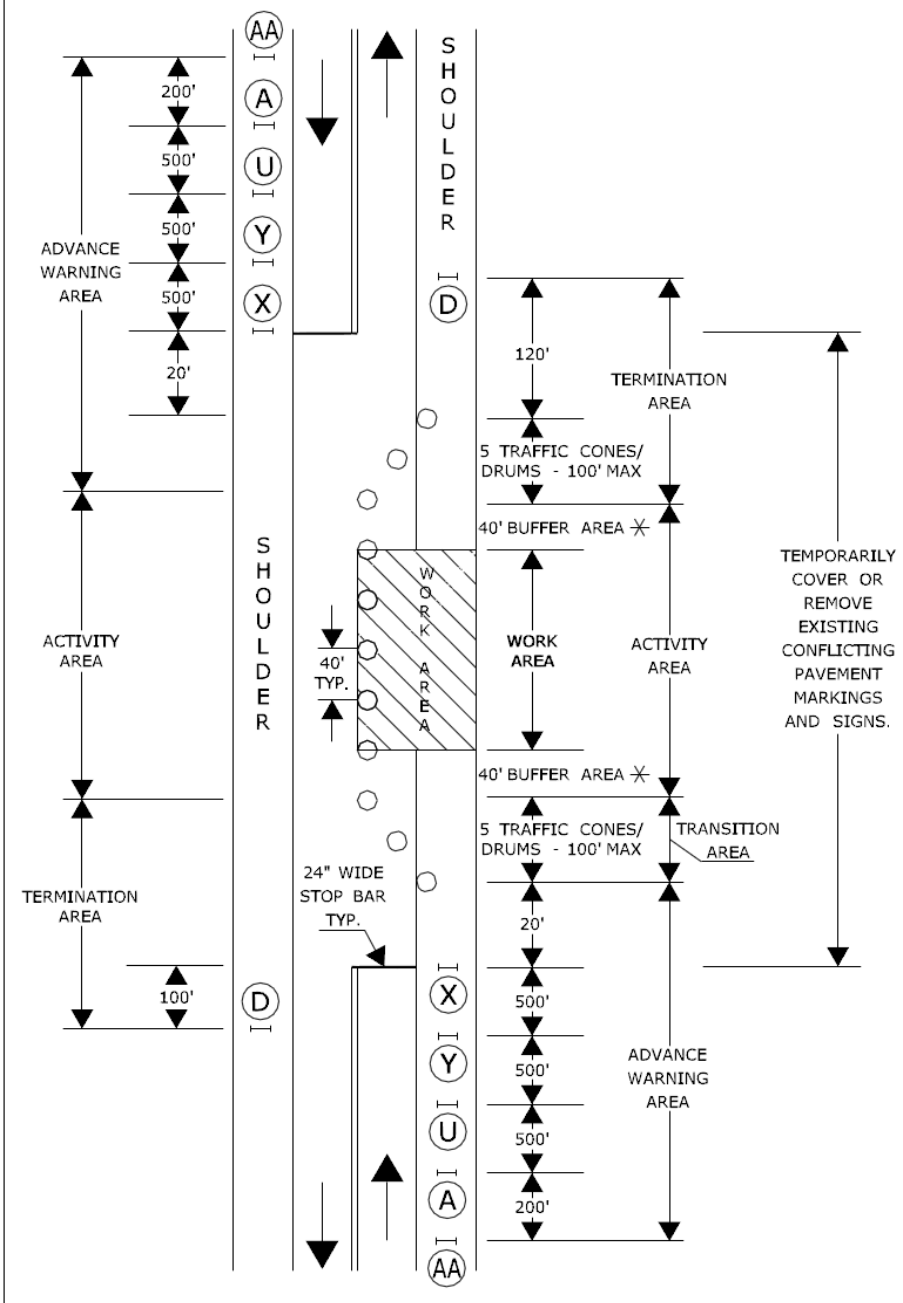
PLAN 17

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

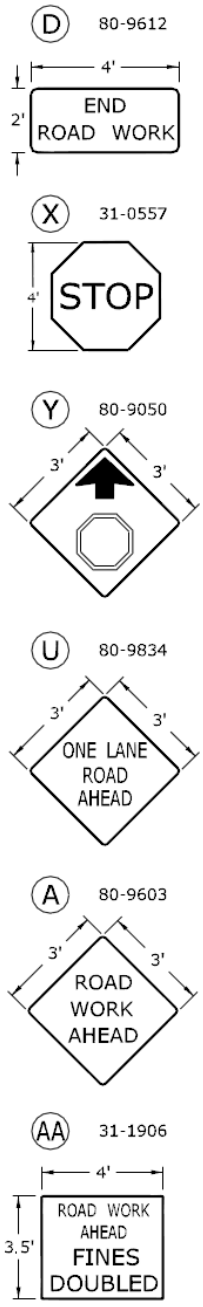
CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:57:16-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS
STOP SIGN CONTROL



SIGN FACE
125 SQ. FT (MIN.)



○ 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 Charles S. Harlow 2012.06.05 15:57:37-04'00'
PRINCIPAL ENGINEER

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.

In accordance with the appropriate section, the Contractor shall install permanent pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the permanent pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed and the permanent 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 permanent 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 City may perform or arrange for others to perform such work. In those instances, the City 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 City's 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.

ITEM# 1008908A - CLEAN EXISTING CONDUIT

Description:

Clean existing conduit as required, as shown on the plans or as directed by the Engineer to remove dirt and debris to facilitate the installation of new cable. Existing conduit to be reused includes the existing interconnect conduit along Main Street between Glastonbury Boulevard and Putnam Boulevard with the majority of the conduit in the grass shoulder along the east side of the roadway, between the sidewalk and the curb. Existing conduit is also to be cleaned under the Main Street roadway at the Glastonbury Boulevard intersection.

Construction Methods:

Where cable is to be installed in existing conduit, the conduit may have to be cleaned prior to the installation. Cleaning will only be necessary if the new cable cannot be easily installed in the existing conduit. By field inspection, and with the concurrence of the Engineer, determine the sections of conduit that require cleaning.

Remove all existing cable from conduit. Install temporary cable elsewhere, as necessary, to maintain normal signalization, complete with vehicle & pedestrian detection, EVPS, and coordination. Clean the conduit by one of the following methods:

1) Rodding.
2) A high pressure jet spray, or air pressure.
3) By pulling a mandrel or ball through the conduit.

Submit in writing the anticipated method of cleaning the conduit to the Engineer for approval prior to cleaning any conduit. If the conduit is found damaged to any extent that the cleaning process will not clear the obstruction, it will be the judgment of the Engineer whether to replace the entire conduit run or excavate and replace only the damaged section.

If the existing conduit is found to be missing hardware such as bonding bushings and bond wire, the missing material shall be provided and installed under this item prior to installation of the cable.

Method of Measurement:

This work shall be measured from termination point to termination point. This work shall be measured for payment on actual number of linear feet.

Basis of Payment:

"Clean Existing Conduit" shall be paid for at the contract unit price per linear foot, which price shall include all material, tools, equipment, labor, and work incidental thereto. Work pertaining to temporary operation shall be paid for under Item 1118051A - Temporary Signalization (Sites 1-6). Replacement of any damaged conduit shall be paid for under the applicable conduit item.

Pay Item	Pay Unit
Clean Existing Conduit	L.F.

ITEM #1010052A – CAST IRON HANDHOLE COVER

ITEM #1010054A – CAST IRON HANDHOLE COVER – TYPE II

Article 10.10.05 - Basis of Payment:

After the words “Cast Iron Handhole Cover, insert the phrase “of the type called for”.

Add to the list of pay items:

Pay Item	Pay Unit
Cast Iron Handhole Cover	EA.
Cast Iron Handhole Cover Type II	EA.

ITEM #1010902A - REMOVE CONCRETE HANDHOLE

DESCRIPTION: Under this item the contractor shall remove an existing concrete handhole where shown on the plans or as directed by the Engineer. The removed concrete handhole with cover shall remain the property of the contractor.

CONSTRUCTION METHODS: The contractor shall remove an existing concrete handhole and cover where indicated on the plans or as directed by the engineer. The removed concrete handhole with cover shall remain the property of the contractor. The resulting excavation shall be backfilled, graded and seeded to match surroundings, unless otherwise noted on the plans.

METHOD OF MEASUREMENT: This work will be measured for payment by the number of concrete handholes removed and disposed of, complete and accepted.

BASES OF PAYMENT: This work will be paid for at the contract unit price each for "Remove Concrete Handhole", which price shall include all materials, equipment and work incidental thereto including removal, excavation, backfilling, grading, seeding, hauling and disposing of the concrete handhole and cover.

ITEM# 1017032A - SERVICE (METERED)

Description:

Furnish and install a metered electric service at the location shown on the plans or as directed by the Engineer.

Materials:

- Meter Socket
  - UL listed
  - Manual lever bypass
  - Locking metal cover for the glass enclosure
  - Contact the serving utility company for a list of approved meter sockets
- Conduit Bond Clamp
  - UL listed
  - Rated for direct burial

Meter socket rated at 200 amps
Enclosure capable of accepting a 3 inch (75 mm) rigid metal conduit (RMC)

Construction Methods:

Comply with the National Electric Code (NEC), the Department of Public Utility Regulatory Authority (PURA), and the serving power company requirements. Install a meter socket with associated equipment on the outside of the controller cabinet, as shown on the plans. Mount the enclosure approximately 54 inches (1.37 meters) above the ground. Install an expansion fitting in the RMC between the ground and the enclosure. Attach a direct-buried bond clamp to the service RMC below ground level, adjacent to the foundation. Bond the service conduit to the controller cabinet ground rod. Install a continuous nylon pull rope of at least 200 lbs (90 Kg) breaking strength in the conduit between the meter socket and the service source. Ensure all circuit breakers are off when service is connected by the utility company. The work must be inspected and approved by the Engineer or his designated representative prior to scheduling a service connection. Record the meter number and the date service is connected for billing purposes.

Service Request

- Traffic Signal on State Road: Contact the CT DOT Traffic Electrical office to complete the necessary service request forms.
- Traffic Signal on Town Road: Complete all necessary request forms and forward to the appropriate power company office.
- Incident Management Site: Complete all necessary request forms and forward to the appropriate power company office.

Contact the power company engineering representative for exact requirements of the service. All riser fees and any other installation charges required of an underground metered service are the responsibility of the Contractor. When the work is complete notify the Engineer to inspect and confirm that the work is according to the National Electric Code. Request that the Engineer contact the power company to schedule the connection.

Method of Measurement:

The installation of the Service (Metered) will be measured for payment by the number of metered electric services of the type specified, completed, with service connected, and accepted in place.

Basis of Payment:

This work will be paid for at the contract unit price each for "Service (Metered)" complete and accepted in place. The price shall include all material above ground such as the meter socket enclosure, surface conduit, expansion fitting, coupling, and load side service conductors. The price shall also include the direct-buried ground clamp, bonding wire, pull rope, all material, equipment, tools, labor and incidentals necessary.

The power company will provide the line-side conductors and the meter.

ITEM # 1104022A – 15’ STEEL MAST ARM ASSEMBLY
ITEM # 1104023A – 20’ STEEL MAST ARM ASSEMBLY
ITEM # 1104026A – 25’ STEEL MAST ARM ASSEMBLY
ITEM # 1104028A – 30’ STEEL MAST ARM ASSEMBLY
ITEM # 1104031A – 35’ STEEL MAST ARM ASSEMBLY
ITEM # 1104033A – 40’ STEEL MAST ARM ASSEMBLY
ITEM #1104037A – 45’ STEEL MAST ARM ASSEMBLY

Description: Work under this item shall consist of designing, fabricating and installing a mast arm assembly to carry traffic appurtenances (such as traffic signals, signs, antenna, etc.) of the type specified, on a prepared foundation, in accordance with the details shown on the plans, in accordance with these specifications and as ordered by the Engineer.

Mast arms for the Welles Street intersection shall be painted black. The color of the finish coat for Mast Arms and anchor bolt covers, handhole covers, post caps, and end caps shall be included under this item. All other locations in the project shall not be painted.

Materials: The structural plate components, such as the baseplate and the plates in the arm to pole ring stiffened, built-up box connection, shall be made of steel that conforms to the requirements, including the supplementary notch toughness requirements, of ASTM A709, Grade 50T2 (ASTM A709M, Grade 345T2) and meet the following Charpy-V Notch toughness requirements:

Minimum test value energy 20 ft.-lbs.
Minimum average energy 25 ft-lbs. at 40º F

The Charpy V-notch sampling and testing shall be in accordance with ASTM A673, "P" piece frequency.

The tubular components, such as the pole, arm and luminaire arm, and the steel for the handhole reinforcement, shall be made of steel with a minimum yield stress of 35,000 psi (241 MPa). The steel shall meet the following notch toughness requirements:

Yield Strength	Thickness in. (mm)	Minimum Test Value Energy ft.-lbs. (J)	Minimum Average Energy, ft.-lbf (J)
$F_y \leq$ 36 ksi (250 MPa)	$\leq$ 4 (100)	20	25 (34) at 40ºF (4ºC)
36 ksi (250 MPa) < $F_y \leq$ 50 ksi (345 MPa)	$\leq$ 2 (50)	20	25 (34) at 40ºF (4ºC)
36 ksi (250 MPa) < $F_y \leq$ 50 ksi (345 MPa)	2 < t $\leq$ 4 (50 < t $\leq$ 100)	24	30 (41) at 40ºF (4ºC)
50 ksi (345 MPa) < $F_y \leq$ 70 ksi (485 MPa)	$\leq$ 4 (100)	28	35 (48) at -10ºF (-23ºC)

Charpy V-notch sampling and testing shall be in accordance with AASHTO T243 (ASTM A673/A673M), "P" piece frequency.

Charpy V-notch sampling and testing shall be in accordance with AASHTO T243 (ASTM A673/A673M), "P" piece frequency.

The non-structural components, such as hand hole covers, caps and anchor bolt covers, shall be made of steel with minimum yield strength of 36,000 psi (250 MPa).

All high strength bolts shall conform to ASTM A325, Type 1 (ASTM A325M, Type 1). Nuts shall conform to ASTM A563, Grade DH (ASTM A563M, Property Class 10S). Circular, flat, hardened steel washers shall conform to ASTM F436 (ASTM F436M). The bolts, nuts and washers shall be galvanized in accordance with ASTM A153 (ASTM A153M) or ASTM B695, Grade 50. The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. The high strength bolts shall conform to the requirements of Subarticle M.06.02-3.

The anchor bolts shall conform to ASTM F1554, Grade 105. The nuts shall conform to ASTM A563, Grade DH (ASTM A563M, Class 10S). The washers shall conform to ASTM F436 (ASTM F436M). The bolts, nuts and washers shall be galvanized in accordance with ASTM A153 (ASTM A153M). The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing.

All steel components, including anchor bolts, shall be completely hot-dip galvanized, after fabrication, in accordance with ASTM A123 (ASTM A123M) or ASTM A153 (ASTM A153M), as applicable. Repairs to damaged areas of the hot-dip galvanized coatings shall conform to the requirements of ASTM A780 amended as follows:

> Paints containing zinc dust, if used for repairs, shall contain either between 65% to 69% metallic zinc by weight or greater than 92% metallic zinc by weight in dry film.

The silicone sealant shall be a 1-component, 100% silicone sealant recommended for use with galvanized steel.

Neoprene gasket material for the access openings shall conform to ASTM D1056, Grade 2A2 or 2A3. Other grades of neoprene approved by the Engineer may be used.

Closed cell elastomer for sealing the space between the foundation and base plate shall conform to ASTM D1056, Grade 2A2 or 2A3 and shall have a pressure-sensitive adhesive backing on one

side for adhesion to steel. Closed cell elastomer contained within the anchor bolt pattern shall not interfere with the anchor bolt leveling nuts and shall not block the opening in the base plate.

Bare copper grounding conductor shall be #8 AWG stranded bare copper wire conforming to M.15.13. The grounding bolt shall be stainless steel with a hex head.

The Contractor shall submit Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for the steel used in the mast arm members and components, high-strength bolts (including nuts and washers) and anchor bolts (including nuts and washers). The Certified Test Reports shall include the following:

a. Mill test reports that indicate the place where the material was melted and manufactured.

b. High-strength bolt test results for proof load tests, wedge tests, and rotational-capacity tests that indicate where the tests were performed, date of tests, location of where the components were manufactured and lot numbers.

c. Galvanized material test results that indicate the thickness of the galvanizing.

Prior to incorporation into the work, the Contractor shall submit samples in conformance with Article 1.06.02 for the steel used in the mast arm members and components, high-strength bolts (including nuts and washers) and anchor bolts (including nuts and washers).

Construction Methods: The design and fabrication of the mast arm assembly, including its anchorage (into the foundation), shall conform to the requirements of the latest edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, including the latest interim specifications, amended as follows:

- The design wind speed shall be 120 mph (193 km/hr). The computation of wind pressures in accordance with Appendix C is not permitted.

- The mast arms shall be designed to support fixed mounted traffic signals and signs. The wind drag coefficient for traffic signals and luminaires shall be 1.2.

- The mast arms shall be designed for fatigue category I. The mast arms shall be designed for the wind load effects due to galloping, natural wind gusts and truck-induced gusts. The luminaire arms shall be designed for the wind load effects due to natural wind gusts. The design pressure for the truck-induced gust shall be based on a truck speed of 65 mph (105 km/hr). The design of the mast arms assuming that vibration mitigation devices will not be installed.

- The vertical deflection of the free end of the arm due to the wind load effects of galloping and truck-induced gusts shall not exceed 8” (200 mm).

- The minimum design life for mast arms shall be 50 years.

- The maximum stress ratio (the ratio of the computed stress to the allowable stress) or combined stress ratio in any mast arm component due to each group load shall not exceed 0.90.

- The maximum arm length arm shall be 45’-0” (13 720 mm), measured from the centerline of the pole to the tip of the arm.

- The maximum luminaire arm length shall be 15’-0” (4500 mm) if called for on the plans.

- The maximum diameter of the pole at its base shall be 18" (457 mm).

- The maximum diameter of the arm at the arm-pole connection shall be 15" (381 mm).

- The minimum wall thickness of the arm at the pole connection and the pole shall be 5/16" (8 mm).

- The arm, luminaire arm and pole shall be fabricated from either round or multisided tubular members. Multisided tubular members with other than 8, 12 or 16 sides are not permitted. Multisided tubular members with fluted sides are not permitted. The arm and luminaire arm shall be fabricated with a taper (change in diameter).

- A maximum of one slip-type field splice is permitted in the arm. Slip-type field splices are not permitted in the pole. The wall thickness of the pole and arm component members shall be uniform throughout their lengths. The use of multiple plies (laminations) to obtain the required arm and pole thickness is not permitted. The use of shop-fabricated stepped members is not permitted.

- The arm, luminaire arm and pole members may be fabricated with no more than 2 longitudinal seam welds.

- The longitudinal seam welds within 6” (152 mm) of the member ends shall be complete joint penetration groove welds. The longitudinal seam welds on the female section of telescopic (slip-type) field splices shall be complete joint penetration groove welds for a length equal to the minimum splice plus 6” (150 mm).

- Partial joint penetration longitudinal seam welds shall be non-destructively tested in accordance with the magnetic particle method. Complete joint penetration longitudinal seam welds in members less than 5/16" (8 mm) thick shall be non-destructively tested in accordance with the magnetic particle method on both the inside and outside surfaces. Complete joint penetration seam welds in members greater than or equal to 5/16" (8 mm) thick shall be non-destructively tested in accordance with the ultrasonic method.

- The arm to transverse plate connection shall be made with a complete joint penetration groove weld with a backing ring attached to the plate with a continuous fillet weld. The pole to transverse base plate connection (at the foundation) shall be made with a complete joint penetration groove weld with a backing ring attached to the plate with a continuous fillet weld. 100% of the complete joint penetration groove welds shall be non-destructively tested by the ultrasonic method. After galvanizing, the joint between the backing ring and tubular member shall be sealed with silicone sealant.

- The strength of a connection made with a complete joint penetration groove weld shall be no greater than the strength of the base metal. In connections joining base metal with different yield strengths, the base metal with the lower yield strength shall govern the design.

- The minimum base plate and flange plate thickness shall be 2” (51 mm). The determination of the plate thickness in the tubular member to transverse plate connections shall consider the potential for the plate to warp due to the heat from welding. Consideration should be given to the use of thicker plates to allow for subsequent machining of warped plates to a flat surface so that removal of material will not compromise the required strength of the plate.

- The flange plate connection in the arm to pole in the ring stiffened, built-up box connection shall be designed as slip critical connections with standard holes. The minimum number of high-strength bolts in a flange splice shall be 8. Consideration should be given to the use of smaller diameter bolts since they require lower specified minimum bolt tensions.

- The minimum thickness of the ring plates and gusset plates in the ring stiffened, built-up box connection shall be ½” (12 mm).

- The size of fillet welds specified in designed connections shall be no less than 5/16”. The use of seal and tack welds is not permitted. No welding shall be performed after galvanizing.

- The use of stiffeners at tubular member to transverse plate connections and at the arm to pole connection is not permitted.

- The pole base plate anchor bolt circle diameter shall be 24" (610 mm).

- The anchor bolt to base plate connection shall be designed as a double-nut connection with shear holes. The anchor bolts shall use embedded anchorage plates to transmit loads from the pole base to the concrete foundation. The use of hooked anchor bolts is not permitted. The minimum number of anchor bolts shall be 8. The minimum anchor bolt diameter shall be 2" (51 mm). The minimum anchor bolt embedment, the distance from the top of the foundation to the top of the embedded anchorage plate, shall be 3'-6" (1067 mm). Each anchor bolt shall be supplied with 4 nuts and 4 washers. Washers shall be placed on the top and bottom surfaces of the pole base plate and anchorage plate. Welding to the anchor bolts is not permitted.

The mast arm shall be designed for the load effects due to the actual traffic appurtenances (signals, signs, luminaires, cameras, etc.). The mast arms shall also be designed for the effects of traffic appurtenances during all stages of construction that may exist during the project under which the mast arms are installed. The mast arms shall be designed to support traffic appurtenances with properties no less than those tabulated on the plans.

The dimensions of the mast arm assemblies are shown on the traffic plans, elevations, cross-sections or in the special provisions. The arm, luminaire arm and pole lengths and the attachment heights shall be verified by the Contractor based on the finished grade at the site, top of foundation elevation, the locations of overhead utility cables and the traffic appurtenance mounting heights. If either the arm or pole length is inadequate, the Contractor shall notify the Engineer.

The minimum vertical clearance from the top of the finished road to the bottom of the traffic signals shall be 16'-0" (4877 mm). The maximum vertical clearance from the top of the finished road to the bottom of the traffic signals shall be 18'-0" (5486 mm). The traffic signals shall be installed so that the bottom of all the signals for each approach is at the same elevation.

The arm to pole connection shall be made with a ring stiffened, built-up box. The luminaire arm to pole connection shall be made with either a built-up box or a ring stiffened built-up box. A minimum of 8 high-strength bolts shall be used to connect the arm flange plate to the built-up box connection plate. A minimum of 4 high-strength bolts shall be used to connect the luminaire arm flange plate to the built-up box connection plate. All fasteners and their components used in the connection shall be visible. The use of tapped holes in the plates of the connection is not permitted. A hole(s) shall be provided in the connection to allow wires to pass from the pole to the arm and luminaire arm. The sides of all other holes in the connection shall be ground smooth and the edges rounded by grinding to prevent the wires from chafing. Holes placed in the connection for galvanizing shall be filled with neoprene plugs.

A J-hook shall be welded to the inside of the pole at the top for wire handling and support.

The mast arm pole shall have a handhole centered 1'-3" (380 mm) from the top of the base plate. The handhole shall be located away from traffic. The handhole shall be reinforced with a frame having a minimum 4" (102 mm) wide by minimum 6" (152 mm) high clear opening. The minimum thickness of the handhole frame shall be no less than the thickness of the pole. The handhole frame shall be connected to the pole with a partial joint penetration groove weld reinforced with a fillet weld. The handhole shall be provided with a cover connected to the frame with stainless steel screws. The cover shall be installed with a neoprene gasket matching the dimensions of the cover. The cover shall also be attached to the frame with a stainless steel chain. The inside bottom of the frame shall have a hole tapped for the stainless steel grounding bolt.

The mast arm shall be supplied with a pole cap plate, arm cap plate, and anchor bolt covers. The cap plates shall be attached with fasteners. The joint between the tubular member and plate shall be sealed with a neoprene gasket matching the dimensions of the plate.

Prior to fabrication, the Contractor shall submit working drawings and design computations for each mast arm assembly to the Engineer for review in accordance with Article 1.05.02. An individual, independently packaged set of working drawings and computations, with all details and documents necessary for fabrication and erection of the structure and its components, including a copy of the certificate of insurance, shall be prepared and submitted for **each** mast arm. **A single set of drawings with tabulated data for multiple mast arm locations is not permitted.** The alpha-numeric mast arm identifier shall be included on these documents. The working drawings and computations shall be prepared in Customary U.S. units.

The packaged set of working drawings and computations for each mast arm assembly shall be submitted either in paper (hard copy) form or in an electronic portable document format (.pdf) with appropriate bookmarks. The packaged set submitted in paper form shall be bound with a staple. The packaged set submitted in an electronic portable document format (.pdf) shall be in an individual file and the file shall be enabled for commenting. The packaged set shall include the following:

- title sheet
- table of contents
- contact information for designer, fabricator and galvanizer – contact information should include name and address of each firm and the name of contact person with phone number and email address
- copy of the certificate of insurance
- copy of fabricator's AISC certification
- copy of the traffic signal control plan detailing mast arm assembly
- mast arm assembly working drawings
- mast arm assembly design computations
- welding procedures
- mast arm installation procedure, including the method to plumb the pole

The working drawings and design computations shall be **signed, dated and sealed** by a Professional Engineer licensed in the State of Connecticut, who shall also be available for consultation in interpreting his computations and drawings, and in the resolution of any problems which may occur during the performance of the work. Each working drawing shall be signed, dated and sealed. The cover/first sheet for the computations shall be signed, dated and sealed.

Working drawings submitted in paper form shall be printed on ANSI B (11" x 17") sheets. Each drawing shall have a border and title block. Located in the lower right hand corner of the drawing adjacent to the title block, each drawing shall have a rectangular box, 2 ¼" wide x 1 ¾" high (57 mm wide x 44 mm high), for the reviewers stamp. On the ANSI B sheets, the minimum text height and width shall be 1/16". All letter characters shall be uppercase. Design computations, procedures and other supporting data shall be submitted on 8 ½" x 11" sheets.

Working drawings submitted in an electronic portable document format (.pdf) shall be created on ANSI D (22" x 34") full scale (1" electronic file = 1" paper) sheets. (The purpose of creating the drawings on ANSI D sheets is so that the sheets may be printed/plotted at that size or smaller without loss of legibility.) Each drawing shall have a border and title block. Located in the lower right hand corner of the drawing adjacent to the title block, each drawing shall have a rectangular box, 2 ¼" wide x 1 ¾" high, for the reviewers stamp. On the ANSI D full scale sheets, the minimum text height and width shall be 1/8". All letter characters shall be uppercase. The electronic files for the design computations, procedures and other supporting data shall be created on ANSI A (8 ½" x 11") letter sheets.

The working drawings shall include complete details of all mast arm components. The drawings shall include, but not be limited to the following:

- the project number, town and mast arm identification number
- reference to the design specifications, including interim specifications
- reference to the design specifications design criteria, such as design wind speed, minimum design life, fatigue category, vehicle speed, etc.
- material specifications for all components
- material designations for the arm and pole, with an explanation of the alpha numeric characters (equivalent thickness, in inches (in millimeters), shall be provided for gage numbers)
- non-destructive weld testing requirements
- details of the location of the longitudinal seam welds in the arm, luminaire arm and pole
- a plan view of the anchor bolt layout relative to the orientation of the arm(s)

- anchor bolt dimensions, including embedment and projection
- permanent camber
- mast arm installation procedure, including the method to plumb the pole

The design computations shall include, but not be limited to the following:

- the project number, town and alpha-numeric mast arm identifier
- computations for projects in Customary U.S. units shall be provided in Customary U.S. units. Computations for projects in metric units shall be provided in both Customary U.S. units and metric units.
- references to design specifications, including interim specifications, and the applicable code section and articles
- description/documentation for all computer programs used in the design
- drawings/models of the structure, components and connections, with dimensions, loads and references to the local and global coordinate systems used (as applicable), to facilitate review of the results
- a tabulation of the section properties of the tubular members at each analyzed section. The tabulated values should include the diameter, D (if round member); effective width, b (if multisided member, AASHTO 5.5.2); equivalent diameter (if multisided member, AASHTO 5.6), wall thickness, t; inside bend radius, r_b (if multisided member, AASHTO 5.5.2), cross-sectional area, A; moment of inertia, I; section modulus, S; radius of gyration, r. AASHTO Table B-1 may be used to determine the section properties. If Table B-1 is used, the radius measured to the mid-thickness of the wall shall also be provided.
- results of all group loads and load combinations
- stress ratios and combined stress ratios for all group loads and load combinations
- maximum vertical deflection due to dead loads
- vertical deflection of the free end of the arm due to the wind load effects of galloping and truck-induced gusts

The Contractor shall submit the packaged set of working drawings and calculations to the "Engineer of Record". The "Engineer of Record" is identified in the signature block on the mast arm assembly contract plans. A copy of the transmittal shall be sent to the District Construction office administering the project.

Tighe & Bond is the "Engineer of Record" and the working drawings and calculations shall be submitted to the following person and address:

Mr. Joseph C. Balskus, P.E., PTOE
Director of Traffic and Parking
Tighe & Bond, Inc.
213 Court Street, Suite 900
Middletown, CT 06457

JCBalskus@tighebond.com

The reviewed and stamped working drawings and calculations shall be sent by the reviewer, along with a recommendation regarding acceptance, to the Town of Glastonbury Department of Physical Services office for review, comment and distribution. After the Town of Glastonbury office has reviewed the working drawings and calculations, ensured all comments have been addressed and have found the submittal to be acceptable, in addition to distributing copies of the working drawings and calculations to the Contractor and Town of Glastonbury, a copy of each packaged set of working drawings and calculations shall be sent to the following Department offices:

Bridge Safety and Evaluation - Robert P. Zaffetti – Sandra A. Dumas
Research and Materials - Ravi V. Chandran - Robert G. Lauzon
Traffic Engineering – Charles Harlow- Tracy L. Fogarty
Traffic Signal Lab
Engineer of Record

The mast arm assemblies shall be fabricated in accordance with the latest edition of the AASHTO LRFD Bridge Construction Specifications, including the latest interim specifications, amended herein.

The steel fabricator shall be AISC certified for the fabrication of Simple Steel Bridges (SBR).

Fabrication of the mast arm may begin only after the working drawings and design computations have been reviewed and the Engineer has authorized fabrication to begin. The Contractor shall submit to the Engineer, no less than 2 weeks prior to the start of fabrication, the name and location of the fabrication shop where the work will be done so that arrangements can be made for an audit of the facility and the assignment of the Quality Assurance (QA) inspector. No fabrication will be accepted unless the QA inspector is present during fabrication. No changes may be made during fabrication without prior written approval by the Engineer of Record.

The Contractor shall furnish facilities for the inspection of material and workmanship in the shop by the Engineer. The Engineer and his representative shall be allowed free access to the necessary parts of the premises.

The Engineer will provide QA inspection at the fabrication shop to assure that all applicable Quality Control plans and inspections are adequately adhered to and maintained by the Contractor during all phases of the fabrication. A thorough inspection of a random selection of elements at the fabrication shop may serve as the basis of this assurance.

Prior to shipment to the project, each individual piece of structural steel shall be marked in a clear and permanent fashion by a representative of the fabricators' Quality Control (QC) Department to indicate complete final inspection by the fabricator and conformance to the project specifications for that piece. The mark must be dated. A Materials Certificate in accordance with Article 1.06.07 may be used in lieu of individual stamps or markings, for all material in a single shipment. The Materials Certificate must list each piece within the shipment and accompany the shipment to the project site.

Following the final inspection by the fabricator's QC personnel, the Engineer may select pieces of structural steel for re-inspection by the Department's QA inspector. Should non-conforming pieces be identified, all similar pieces must be re-inspected by the fabricator and repair procedure(s) submitted to the Engineer for approval. Repairs will be made at the Contractor's expense.

The pieces selected for re-inspection and found to be in conformance, or adequately repaired pieces, may be marked by the QA inspector. Such markings indicate the Engineer takes no exception to the pieces being sent to the project site. Such marking does not indicate acceptance or approval of the material by the Engineer.

Fabrication of the mast arm assemblies shall conform to the requirements of Articles 6.03.04, 6.03.05, 6.03.06 and 6.03.10, 6.03.11, 6.03.12 and 6.03.13.

All welding details, procedures and nondestructive testing shall conform to the requirements of AWS D1.1 Structural Welding Code - Steel.

Personnel performing the nondestructive testing shall be certified as a NDT Level II technician in accordance with the American Society for Non Destructive Testing (ASNT), Recommended Practice SNT-TC-1A and approved by the Engineer.

All nondestructive testing shall be witnessed by Engineer. Certified reports of all tests shall be submitted to the Engineer for examination. Each certified report shall identify the structure, member, and location of weld or welds tested. Each report shall also list the length and location of any defective welds and include information on the corrective action taken and results of all retests of repaired welds.

The Department reserves the right to perform additional testing as determined by the Engineer. Should the Engineer require nondestructive testing on welds not designated in the contract, the cost of such inspection shall be borne by the Contractor if the testing indicates that any weld(s) are defective. If the testing indicates the weld(s) to be satisfactory, the actual cost of such inspection will be paid by the Department.

All members and components shall be hot-dip galvanized in a single dip. Double-dipping shall not be used.

All damaged areas of the hot-dip galvanized surfaces shall be repaired in accordance with the requirements of ASTM A780. If paint containing zinc dust is used for repairs, the dry coating thickness shall be at least 50% greater than the thickness of the adjacent hot-dip galvanized coating, but no greater than 4.0 mils. The paint shall be brush applied. The use of aerosol spray cans shall not be permitted. The color of the finished repair area shall match the color of the adjacent hot-dip galvanized surface at the time of the repair to the satisfaction of the Engineer.

After fabrication, the arm to pole bolted connection shall be assembled in the fabricator's shop, in the presence of the Engineer, to determine the acceptability of the connection. The faying surfaces shall be free of dirt, loose scale, burrs, other foreign material and other defects that would prevent solid seating of the parts. Prior to assembly, the galvanized faying surfaces shall be scored by wire brushing. The faying surfaces of the connection plates shall be checked with a straight edge to ensure that the surfaces are not distorted and the entire faying surface of each plate will be in contact when assembled. The high-strength bolts, including nuts and washes, shall be installed and tensioned in accordance with Subarticle 6.03.03-4(f). A connection may be found acceptable by the Engineer if the faying surfaces of the flange (connection) plates are in firm, continuous contact after properly tensioning the bolts. Only mast arm assemblies with acceptable arm to pole bolted connections shall be shipped. If a bolted connection is found not acceptable, the Contractor shall submit a procedure to repair the connection to the Engineer for review. Galvanized surfaces damaged by the repair procedure shall be hot dip galvanized. Repair of the damaged galvanized surfaces in accordance with the requirements of ASTM A780 or with a galvanizing repair stick is not permitted. Bolts, nuts and washers used for the trial shop fit-up shall not be reused in the final field assembly.

After fabrication and prior to shipping, aluminum identification tags shall be attached to the arm and pole members with self-tapping tamper resistant screws.

The finished members and components shall be protected with sufficient dunnage and padding to protect them from damage and distortion during transportation. Damage to any material during transportation, improper storage, faulty erection, or undocumented fabrication errors may be cause for rejection of said material at the project site. All costs associated with any corrective action will be borne by the Contractor.

Following delivery to the project site, the Engineer will perform a visual inspection of all material to verify shipping documents, fabricator markings, and that there was no damage to the material or coatings during transportation and handling.

The Engineer is not responsible for approving or accepting any fabricated materials prior to final erection and assembly at the project site.

High-strength bolts, nuts and washers shall be stored in accordance with Subarticle 6.03.03-4(f).

The mast arm shall be erected, assembled and installed in accordance with these specifications and the procedures and methods submitted with the working drawings. The Contractor and the mast arm designer are responsible to ensure that the erection and assembly procedures and methods in this specification are acceptable for use with the mast arm assembly. Changes to these method and procedures shall be submitted with the working drawings and computations.

Prior to installation of the mast arm pole, the threads of the embedded anchor bolts shall be cleaned of accumulated dirt and concrete. The anchor bolt nuts shall be re-lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. On each anchor bolt, all the nuts shall be run down by hand on the anchor bolt threads.

The pole shall be erected so that the centerline of the pole will be plumb after the application of all the dead loads. The pole may be initially installed raked in the opposite direction of the overhead member to obtain the plumb condition.

During the erection of the pole, the leveling nuts and washers shall be inspected, and if necessary adjusted, so that they are in full contact with the bottom surface of the baseplate. Subsequently, the top nuts and washers shall be inspected, and if necessary adjusted, so that they are snug tight (in full contact with the baseplate). Snug tight is defined as the condition where the nuts and washers are in full contact with the baseplate and the snug tight condition was the result of the full effort of a person using a 12” wrench.

With the top nuts snug tight, the top nuts shall be tightened one-sixth of a turn beyond snug tight. After the top nuts are tightened, the leveling nuts should be retightened to assure the full contact has been maintained. The top nuts shall have full thread engagement. The distance from the bottom of the leveling nuts to the top of the foundation shall not exceed 1" (25 mm).

High-strength bolts, including nuts and washes, shall be installed and tensioned in accordance with Subarticle 6.03.03-4(f). The arm shall be temporarily and fully supported while all the high-strength bolts are installed and tensioned. The temporary arm support shall not be removed until the Engineer has confirmed that the faying surfaces of the flange (connection) plates are in firm, continuous contact and the high-strength bolts were properly installed and tensioned. All high-strength bolts in the arm to pole bolted connection shall be inspected (in accordance with Subarticle 6.03.03-4(f)) to confirm the high-strength bolts were properly tensioned.

After erecting the mast arm, the mast arm shall be electrically grounded by attaching the bare copper grounding conductor to the inside of the handhole frame with a stainless steel bolt and to the ground rod with a ground clamp. The rigid metal conduit shall be electrically grounded by

attaching the bare copper grounding conductor to the insulated bonding bushing and to the ground rod with a ground clamp.

The traffic appurtenances shall be located and mounted on the arm as shown on the cross-sections. Holes, if required for wires, shall be located adjacent to the appurtenances and shall be drilled in the bottom of the arm. A rubber grommet shall be installed in each hole to protect the wires from chafing.

After installation of the traffic appurtenances, the anchor bolt nuts (leveling and top anchor nut) and washers shall be in full contact with the top and bottom surfaces of the pole base plate and the centerline of the pole shall be plumb.

After installation of the traffic appurtenances, if the structure exhibits excessive vibration, oscillations or deflections as determined by the Engineer, the Contractor shall design and construct devices to mitigate the movements. The Contractor is responsible for immediately stabilizing the structure to the satisfaction of the Engineer. Stabilizing the structure may require the removal of the sign panels or the entire structure. Prior to installation of any mitigation device, the Contractor shall submit drawings, design computations other documentation to the Engineer for review in accordance with Article 1.05.02.

The last character of the mast arm identification number shall be stenciled with black paint, unless otherwise specified, on the pole of each mast arm. The character shall be 3" (76 mm) high and placed approximately 1' (305 mm) above the top of the base plate facing the centerline of the roadway.

For the Welles Street intersection mast arms, all exterior surfaces shall be coated with a Urethane or Triglycidyl Isocyanurate (TGIC) Polyester Powder to a minimum film thickness of 2.0 mils (0.0508mm). The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 177 degrees Celsius (350 degrees Fahrenheit) and a maximum of 204 degrees Celsius (400 degrees Fahrenheit). The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classifications of ASTM D3359.

The color of the finish coat for steel mast arms, anchor bolt covers, handhole covers, post caps, and end caps shall be Black. **The color of the finished coat shall be BLACK,** No. 17038, Federal Standard No. 595.

Method of Measurement: This work will be measured for payment by the number of steel mast arm assemblies of the type specified, completed and accepted in place.

Basis of Payment: This work will be paid for at the contract unit price each for "XX Steel Mast Arm Assembly" of the type specified, complete in place, which price shall include all equipment, materials, tools and labor incidental to the design, fabrication and installation, including mitigation devices if required, of the mast arms at the locations specified on the plans.

ITEM #1105101A - 1 WAY, 1 SECTION MAST ARM TRAFFIC SIGNAL

ITEM #1105103A - 1 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL

ITEM #1105303A - 1 WAY, 3 SECTION PEDESTAL MOUNTED TRAFFIC SIGNAL

Article 11.05.03 – Construction Methods:

Add the following paragraph:

Circular indications that have an identification mark (such as an arrow) on the top of the lens shall be installed with that mark at the 12 o-clock position.

Article M.16.06 - Traffic Signals

Sub Article 3 - Housing:

In the last sentence, between the words “housing” and “shall” add “and all internal hardware”.

Add the following after the last paragraph.

Each section of the housing shall be provided with a removable visor. The visor shall be the cap type, unless otherwise noted on the plan. The visor shall be a minimum .05 inch (.13 mm) thick. The visor shall be the twist on type and secured to the signal by four equidistant flat tabs screwed to the signal head.

Where noted on the drawings, provide backplates for the traffic signal housings.

Where noted on the drawings, provide support brackets for video detection closed circuit television camera mountings.

Delete Sub Article 5 - Optical Unit and **Sub Article 6** – Lamp Socket and replace with the following:

Optical Unit, Light Emitting Diode:

(a) General:

Only Optical Units that meet the requirements contained herein supplied by the below manufacturers that have been tested by the Department's Signal Lab will be accepted. Final approval for model numbers will be done at the time of the catalog cut submittals.

Duralight
Trastar, Inc.
860 N. Dorothy Dr., Suite 600
Richardson, TX 75081

GE Lighting Solutions
Corporate Headquarters
1975 Noble Road Building 338E
East Cleveland, OH 44112-6300

Dialight
1501 Foute 34 South
Farmingdale, NJ 07727

Leotek
726 South Hillview Drive
Milpitas, CA 95035

The materials for Light Emitting Diode (LED), Optical Unit, circular and arrow, shall conform to the following:

- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement for circular indications dated June 27, 2005.
- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement for arrow indications dated July 1, 2007.
- Section 4, Adjustable Traffic Signals and General Housing sections of the **Department of Transportation Functional Specifications for Traffic Control Equipment, dated 2008-2010.** Where the Department of Transportation Functional Specifications conflict with this Special Provision or the 2005/2007 ITE Performance Specifications, this Special Provision and the 2005/2007 ITE Performance Specifications shall govern.

The Optical Unit shall have an Incandescent look and be made up of a smooth surfaced outer shell, multiple LED light sources, a filtered power supply and a back cover, assembled into a sealed unit. The Optical Unit shall be certified as meeting the 2005/2007 ITE Specifications by Intertek Testing Services, Inc. (ITSNA, formerly ETL) or another organization currently recognized by the Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL.) The Optical Unit shall perform to the requirements of the ITE Specification for a minimum of 60 months.

A "Swing Test" will be performed by the Department to ensure no significant dimming or blanking occurs, until the lamp is obscured by the visor. All L.E.D Lamps will be subjected to further field testing for reliable operation.

The Arrow Optical Unit shall be "Omni-Directional" so that it may be oriented in a right, left or straight configuration without degradation of performance.

(b) Electrical Requirement:

Operating voltage:

80 to 135 Volts AC with cutoff voltage (no visible indication) below 35Volts AC.

Power requirements:

Circular Indications: 12", (300 mm) – no more than 16 Watts
Circular Indications: 8", (200mm) - no more than 16 Watts
Arrows Indications: 12", (300mm) - no more than 16 Watts

Power Supply:

Fused and filtered to provide excess current protection and over voltage protection from electrical surges and transient voltages.

(c) Photometric Requirement:

Beam Color:

Meet 2005/2007 ITE Specifications

(d) Mechanical Requirements:

Diameter:

The Circular Optical Unit shall fit into standard 12" (300mm) or 8" (200mm) housing.
The Arrow Optical Unit shall fit 12" (300mm) housings only.

Enclosure:

UV (Ultraviolet) stabilized polycarbonate back cover.
Clear lens cover for all Red, Yellow and Green Circular Optical Units.
For Arrow Optical Units the arrow indication segment of the lens shall be clear.
Enclosure sealed and waterproofed to eliminate dirt contamination and be suitable for installation in all weather conditions.

Clearly mark on the housing the following information:

- Manufacturer & model number
- Date of manufacture (must be within one year of installation)

The model number shall end with the number of LEDs used to comprise the unit as the last digits of the model number. Example, if the unit comprised of 3 LEDs and the model is x12y, then the new model number shall read x12y3.

Operating temperature:
Meet 2005/2007 ITE Specification

Wiring: L.E.D. lamps shall have **color coded 16 AWG wires** for identification of heads as follows:

RED L.E.D. Lamps	RED with WHITE neutral
YELLOW L.E.D. Lamps	YELLOW with WHITE neutral
GREEN L.E.D. Lamps	GREEN or Brown with WHITE neutral
RED L.E.D. ARROWS	RED/WHITE with WHITE neutral
YELLOW L.E.D. ARROWS	YELLOW/WHITE with WHITE neutral
GREEN L.E.D. ARROWS	GREEN/WHITE or BROWN/WHITE with WHITE neutral
GREEN/YELLOW LE.D ARROWS	GREEN/WHITE or BROWN/WHITE, YELLOW/WHITE, with WHITE neutral

Wires shall be terminated with a Bowma-Crimp style forked spade lug, 6-8 stud/ 16-14 wire size.

All Circular Optical Units shall be supplied with a minimum 40” pigtail and all Arrow Optical Units Supplied with a minimum 60” pigtail.

Sub Article 9 - Painting:

Add the following:

All brackets and hardware shall be painted dark green by the manufacturer except at the Welles Street intersection where they shall be painted flat black. The color shall be No. 14056, Federal Standard No. 595 for dark green.

ITEM#1106001A- 1 WAY PEDESTRIAN SIGNAL POLE MOUNTED

ITEM#1106002A- 2 WAY PEDESTRIAN SIGNAL POLE MOUNTED

ITEM#1106003A- 1 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED

Section 11.06.02 Pedestrian Signal, Materials

Section M.16.07 C. Optical Unit

Delete 2. LED: and replace with the following:

General

- Meet requirements of current MUTCD Section 4E.
- Meet current ITE specifications for Pedestrian Traffic Control Signal Indications - (PTCSI) Part 2: Light Emitting Diode (LED).
- Meet CT DOT, 2008 - 2010 Functional Specifications for Traffic Control Equipment; Section 5D, LED Pedestrian Signal with Countdown Timer.
- Meet EPA Energy Star® requirements for LED Pedestrian Signal Modules.

Operational

- Countdown display only during the flashing Pedestrian Clearance (Ped Clr) Interval. Timer goes blank at end of flashing ped clr even if countdown has not reached zero.

Physical

- Sealed optical module to prevent entrance of moisture and dust.
- Self-contained optical module, including necessary power supplies.
- Designed to securely fit into standard housing without the use of special tools or modifications to the housing.
- Identification information on module: manufacturer's name, model number, serial number, and date code.
- Standard paint except at Welles Street intersection, all equipment shall be painted flat black

Optical

- Multiple LED sources; capable of partial loss of LED's without loss of symbol or countdown message.
- Two complete self contained optical systems. One to display the walking person symbol (walk) and the hand symbol (don't walk). One to display the countdown timer digits.
- Visual Image similar to incandescent display; smooth, non-pixilated.
- Symbol and countdown digit size as shown on the plan.
- Solid hand/person symbol; outline display not allowed.
- Overlaid hand/person symbols and countdown digits arranged side by side.
- Countdown digit display color: Portland Orange in accordance with ITE requirements.
- Countdown digits comprised of two seven segments, each in a figure 8 pattern.

- Photometric Requirements: Luminance, Uniformity, and Distribution in accordance with ITE requirements.
- Color Uniformity in accordance with ITE requirements.
- Blank–Out design; symbols and digits illegible even in direct sunlight when not illuminated.

Electrical

- Operating voltage: 89 VAC to 135 VAC.
- Low Voltage Turn-Off: 35 VAC.
- Turn-On and Turn-Off times in accordance with ITE specifications.
- Combined Hand – Countdown Digits wattage: $\geq$ 20 Watts.
- Input impedance at 60 Hertz sufficient to satisfy Malfunction Management Unit (MMU) requirements.
- Two separate power supplies. One to power the walking person symbol. One to power the hand symbol and the countdown digits.
- Meet Federal Communication Commission (FCC) regulations concerning electronic noise.
- Filtered and protected against electrical transients and surges.

Warrantee

- Five years from date ownership is accepted.

ITEM #1107011A - ACCESSIBLE PEDESTRIAN SIGNAL AND DETECTOR (TYPE A)

Description:

Furnish and install an Accessible Pedestrian Signal and Detector (APS&D). The APS&D provides audio and tactile information to augment the visual pedestrian signal.
Type A provides a low frequency percussive tone during the walk interval and is used where there is an exclusive pedestrian phase or ≥ 10 foot separation between APS&Ds.

Material:

A. General:

- Conform to applicable sections of the current MUTCD Chapter 4E, Pedestrian Control Features as specified herein.
- All features fully operational when the traffic signal is in colors mode.
- All features non-operational when the traffic signal is in flash mode.
- Interchangeable with a non-accessible type pedestrian pushbutton with no modifications to the Controller Assembly (CA) or Controller Unit.
- Audible transducer integral with the APS&D housing, adjacent to the pushbutton.
- Operation programming method: Either or combination of:
  - Mechanically by dip switches or circuit board jumpers
  - Infrared remote-control hand-held device

B. Electrical:

- Metallic components either grounded or insulated to preclude an electrical hazard to pedestrians under all weather conditions.
- All features powered by the 110VAC Walk signal and the 110VAC Don't Walk signal so that additional conductors from the CA are not needed.

C. Call Confirmation Light

- LED
- Color: Red
- Visible from the side a minimum 45 degrees from perpendicular to face of sign.
- Operation:
  - Off during walk interval
  - Off all other times until actuation of pushbutton.
  - Actuation of pushbutton latches the light ON until beginning of walk interval.
  - Actuation of pushbutton initiates speech message "Wait".
- Located directly adjacent to the pushbutton.

D. Audible Pushbutton Locator Tone

- Frequency: repeating tone at one (1) second intervals
- Tone duration: ≤ 0.15 seconds
- Volume:
  - Minimum setting of zero
  - Manually adjustable initial setting
  - Automatically adjusted after initial setting. Volume increased in response to a temporary increase in ambient noise and subsequently decreased with a decrease in ambient noise.
  - Maximum volume: 100 dBA which is the approximate sound pressure of a gasoline powered lawn mower nearby.

- Automatic volume adjustment independent of other APS&Ds at the intersection.
- May be disabled without affecting operation of other features.

- Silent only during walk interval. Active all other times.

E. Vibrotactile Arrow Pushbutton

- Pushbutton contained in a circular assembly which fits inside the housing and is attached to the housing with 4 screws.
- ADA compliant: Size: ≥ 2.0" (50) diameter, Actuation force: ≤ 5 ft-lb (22.2 N)
- Shape: Circular, raised slightly above housing so that it may be actuated with the back of a hand
- Tamper-proof, vandal-proof, weatherproof, freeze-proof, impact-resistant design and construction.
- Operation: Vibrates only during the walk interval (when the walk indication is displayed).
- Tactile Arrow:
  - Attached to surface of the button assembly by a tamperproof method.
  - Raised slightly above surface of pushbutton, minimum 0.125" (0.3)
  - Size: Length ≥ 1.5" (38), Height ≥ 1.0" (25)
  - Color: Sharp contrast to background color of pushbutton and housing

F. Audible Walk Interval

1. General:
   - Operation independent of other APS&Ds at intersection.
   - Active only during the walk interval (when the walk indication is displayed).
   - Volume:
     - Minimum setting of zero
     - Manually adjustable initial setting
     - Automatically adjusted after initial setting. Volume increased in response to a temporary increase in ambient noise and subsequently decreased with a decrease in ambient noise.
     - Automatic volume adjustment independent of other APS&Ds at the intersection.
     - Maximum volume: 100 dBA which is the approximate sound pressure of a gasoline powered lawn mower nearby.
   - Duration:
     - Default method: Automatically set by the duration of the visual walk signal display.
     - When selected: Manually set when rest-in-walk is used for a concurrent pedestrian movement.
   - Audible sounds that mimic any bird call are not allowed.

2. Type A, Percussive Tone:
   - Repeating tone at eight (8) to ten (10) ticks per second.
   - Tone frequency: Multiple frequencies with a dominant component at 880 Hz which creates a "tick - tick - tick…" sound.

G. Pushbutton Housing/Sign Frame/Sign

- One piece die cast aluminum meeting requirements of ASTM B85.
- Sign frame designed to accept 9" x 12" (230 x 300) four-hole advisory sign.
- Flat back to facilitate surface mount.
- Available brackets to either pedestal top-mount or pole side-mount on pole diameter range of 3½" (89) to 15" (380).
- Available brackets to allow mounting two (2) APS&Ds to the same 3½" (89) pole, facing ≥ 60 degrees apart, at the same height.
- Wire entrance through the rear.

- Stainless steel mounting hardware.
- Color: Dark Green, Federal No 14056, Federal standard No. 595 except at Welles Street intersection, shall be painted flat black
- Finish: Housing/Frame and all mounting brackets either:
  1. Painted with 3 coats of infrared oven-baked paint before assembly.
     - Primer: Baked iron oxide which meets or exceeds FS TT-P-636.
     - Second coat: Exterior-baking enamel, light gray, which meets or exceeds FS TT-E-527.
     - Third coat: Exterior-baking enamel, which meets or exceeds FS TT-E-489.
  2. Electrostatic powder coated after chemically cleaned.
- Sign: CT DOT Sign No. 31-0845

Construction Methods:

Install the APS&D according to the manufacturer's instructions. Position the ASP&D so the plane of the sign face is parallel to the crossing (sign is facing perpendicular) and the arrow is pointing in the same direction as the crossing, not necessarily at the ramp. Notify the Engineer if there is any discrepancy or ambiguity between the plans and field conditions that prevent placement of the ASP&D as shown on the plan. Set the minimum sound levels of the locator tone and the audible walk indication when there is little or no ambient noise as in night time operation. Set the volume of audible walk indications and pushbutton locator tones to a maximum of 5dBA louder than ambient sound. The locator tone should be audible 6' to 12' (1.8 m to 3.6 m) from the pushbutton or to the building line, whichever is less. Confirm the volume of both audible walk indication and the locator tone increases with an increase in ambient sound and subsequently decreases when the ambient noise decreases.

If programming method is remote, by an infrared hand-held device, provide one device and operation manual for each intersection where APS&D is installed.

Method of Measurement:

This work is measured by the number of Accessible Pedestrian Signal and DetectorS of the type specified, installed, tested, fully operational, and accepted.

Basis of Payment:

Payment for this work is based on the installation, inspection, successful completion of the 30 day test period, and final acceptance of the Accessible Pedestrian Signal and Detector of the type specified. Payment includes the sign, mounting brackets for adjacent buttons on the same structure, all incidental materials, labor, tools, and equipment necessary to complete the installation. Payment also includes the warrantee, installation manual, and operation manual.

If programming method is remote by an infrared hand-held device, the total bid price of all APS&Ds includes one remote programming device and accompanying operation manual for each intersection where APS&D is installed.

Pay Item	Pay Unit
Accessible Pedestrian Signal and Detector (Type A)	Each

ITEM #1108187A - SYSTEM INTEGRATION

DESCRIPTION:

Work under this item shall consist of the successful integration of the Full Actuated Local Traffic Controllers furnished under this contract, with the Town of Glastonbury's proposed closed loop system. This item shall include all required creations, additions and modifications to the graphics subsystem, communications subsystem, data base, system software, and all other hardware and software necessary to the complete the system integration.

The overall architecture of the system shall be a client/server design based on a distributed open architecture concept.

The Town shall provide a Local Area Network (LAN) for the TSCS at the Glastonbury Police Department. The Traffic Signal Control System (TSCS) software shall operate in a Local Area Network (LAN) configuration with a minimum of two server computers and 2 workstations.

In addition, remote access to the TSCS shall be provided at the Glastonbury Town Hall. The Town will provide connectivity between these locations via the Town's Wide Area Network (WAN).
TSCS processing shall be distributed and "open" communications protocols shall be used for all interfaces between controllers and central. The exception is with respect to the support of controller-specific custom MIBS required to support TSP operation, or other functionality available from the controller supplier.

MATERIALS:

Size and Expansion Requirements
At the start-up, the TSCS shall be capable of managing at least 25 field devices (traffic signal controllers), with an ultimate capacity of 50 field devices. The TSCS shall be designed to enable expansion without redesign of any system components. Expansion shall require only the addition of off-the-shelf hardware components, software replication, software reconfiguration, and/or an expanded database.

Graphical User Interface
The TSCS Graphical User Interface (GUI) shall provide the operator with a graphical operating environment commonly found on today's desktop computers. The GUI shall be easy to use while providing a fast and efficient way to control and monitor the TSCS in real time. The GUI shall use Microsoft Windows programming standards to manage the window's workspace environment.

The GUI shall incorporate the following:

- Pop-up multiple display objects and windows;
- Menu icons and controls;
- Dialog boxes;
- Push button and other active commands;
- Visual and audio alarms; and
- Use of object characteristics such as colours, highlighting, and flashing to alert operators of status changes.

A multi-user commercial database software shall be used, to be either Microsoft SQL Server, or Oracle 10g.

The software shall exchange files with common spreadsheet products (Microsoft Excel and Access), Geographic Information Systems (GIS), Computer Aided Design (CAD), and databases. The Town's preference is ESRI for GIS or AutoCADD for CAD.

The software shall also be able to output data to Business Objects Crystal Reports.

CONSTRUCTION METHODS:

The Contractor shall accomplish all described work with the least amount of interruption to the operation of the existing Town of Glastonbury network. Prior to the start of any fiber optic cabling work on the project, the Contractor and his authorized vendor shall meet with the Town IT Director (Bobby Ashton), Town Director of Physical Services (Daniel Pennington), Engineer of Record to discuss the planned integration of the TSCS equipment in the Town facilities. The meeting shall serve to plan the installation of the equipment, system integration, schedule and determine points of access for the Town network.

The Contractor shall keep the Town of Glastonbury's Director of Information Technology apprised of all work scheduled and in progress. The Town Director of Physical Services and the Engineer of Record are to be included and instructed in the system integration process.

Communication Protocol

The traffic controller supplier will provide their traffic signal communications protocol to the TSCS supplier. The traffic signal controller will be NTCIP compliant. The TSCS supplier will work with the traffic signal controller supplier to integrate the protocol to implement a full-functioning system.

A second objective of the Town is to support multiple brand controllers, for competitive procurement. These traffic signal controllers will communicate using NTCIP, NEMA TS2 1202 Level II conformance.

Required Characteristics of the Traffic Signal Control System

The TSCS shall be able to directly communicate with NEMA TS-2 Type 1 controllers and shall support NTCIP standards. The controller shall support 16 phase operation.

The TSCS shall communicate through an Ethernet network and be capable of working on a wide range of communication media, including wireline (copper and fiber optic) and wireless communications.

The system shall also be capable of communicating through various 3rd party telecommunication services such as dial-up and wireless data transport.

Communication System

It is planned that the traffic control communication network will make use of the fiber-optic system being designed for this project.

Responsibilities of the Selected Contractor

The selected Contractor shall provide new controller cabinet assemblies that meet the functionality described herein. For any field installations required, the field work will be performed by the Town or their designated installer. The Contractor shall provide detailed installation requirements, training and support for field installations.

TSCS/Controller Unit Functionality

The following describes the functionality of the TSCS, which is procured through this specification. The controller unit, and communication protocol supplied with the controller unit, must support the TSCS functionality described below.

TSCS Monitoring

The TSCS software shall utilize traffic signal controllers to operate and control signalized intersections on an individual, section, or system-wide basis. The controller unit shall be capable of being monitored on a real time basis by the TSCS software. The TSCS software and controller unit shall be capable of second-by-second monitoring, provided the communications media has sufficient capacity, and configuration. In addition, the system shall be configurable so that communications can occur less frequently, if desired (i.e. if limited by available communications system capacity).

The controller unit shall be monitored by the TSCS system and provide, at an individual signalized intersection, once per second details on the current green phase, detector activity (vehicles, pedestrians, priority, pre-empt etc.), current timing plan, special function, offset or data made available by the controller.

Required Control Modes

The TSCS software shall activate the following control modes available in the controller unit:

Manual Control

The operator shall be able to manually override the plan that the system, section or the individual traffic signal controller is currently in. Manual selection of timing plans has a higher priority than all other modes of plan selection. The manual override shall terminate automatically at the end of the operator specified time, or be capable of being set as manual with no specified termination time (requiring release by an operator). When the manual override is terminated, the controller shall revert to its normally scheduled operation. In addition, control areas can be created, where the operator can implement a plan at all intersections within a group simultaneously.

Time-of-day (TOD)/Day-Of-Week (DOW)

TOD/DOW mode shall be used for controlling traffic conditions that occur regularly, such as peak-period conditions. In this mode, each controller shall automatically select and implement traffic signal timing plans in accordance with the defined schedule, locally stored, on a time-of-day, day-of-week basis. TOD/DOW plans shall be downloadable to the local traffic signal controller from the TSCS software.

Traffic Responsive Control

The TSCS software shall select the timing plan that is best suited to the existing traffic conditions as measured by the field detectors and analyzed by the TSCS software's traffic responsive process. Once the traffic responsive process has selected the appropriate timing plan, the plan number shall be commanded to the intersections on a continuous basis until the traffic-responsive process recognizes a change in the traffic condition.

Flash Control

To initiate flashing operation, the traffic signal controller shall be commanded to flash from the TSCS software.

Free Control

In the free mode, the controller shall run without coordination.

Event Scheduling Control

The TSCS software shall have the capability of scheduling any system command including all different control modes described in this section.

Default Control Mode

At the system start-up, the default control mode shall always be local TOD/DOW. Because the Town has recurring traffic patterns on a daily basis, the controller unit shall typically operate in the TOD/DOW mode. The controller unit shall read the scheduler to determine the appropriate timing plan for the current day of year, day of week, time of day.

System-wide Clock Updates

The TSCS software shall provide for the automatic downloading of clock updates to the field clocks integrated in each controller unit.

Verification of Field Clocks

The TSCS software shall also upload, on a periodic basis selectable by the operator, the date/time from a local controller unit.

System Log

All controller units shall provide system log information to the TSCS confirming that the action has taken place. As a minimum the system shall log:

- Scheduler – Time of day plan changes (date/time stamp timing plan change issued, and date/time stamp timing plan implemented).
- Operator Plan – Time of day plan changes (date/time stamp timing plan change issued, and date/time stamp timing plan implemented).
- Traffic Responsive Plan – Date/time stamp timing plan change was issued by traffic responsive logic.
- Failures – Date/time stamp system failures including communication, detectors, intersection in flash, power out, cabinet door open, etc.
- Pre-empt Activity – Date/time stamp pre-empt start and end.

Timing Plan Compliance Monitoring

The TSCS software shall be capable of remotely monitoring the real-time phase returns from each controller unit to ensure that it is operating within proper constraints of the timing plan that is in effect. The TSCS software shall utilize the TSCS database timing parameters to check against the real-time phase returns. Through compliance monitoring, the error conditions that shall be detected include the following:

- The traffic signal controller is not using the proper signal timing plan;
- The traffic signal controller time clock is out of synchronization;
- The traffic signal controller is not sequencing;
- The phase sequence is improper; and
- Phase time compliance.

Failure Monitoring

Communications and controller hardware monitoring shall cause the system to fail individual components when operator-definable error thresholds are exceeded. These components shall include, at a minimum, intersections, detectors, and communication channels. The system will also have the ability to communicate with the MMU provided with the controller specification.

Database

Database Generation and Maintenance

The TSCS shall be able to modify the data in the controller unit, including: timing plans, TOD/DOW schedules, TSP priority parameters, operator databases, and alarm databases. Traffic system configuration shall include channel assignments, communication parameters, included intersections, etc.

Database generation of traffic control operations shall include safeguards to preclude dangerous or undesirable intersection operation. These safeguards shall, at a minimum, include range-checking, timing plan verification, and conflicting phases.

Detector Data Collection

The controller unit shall provide information from system and local detectors to the TSCS software. The system detectors shall be used for traffic counting, traffic-responsive operation and computation of measures of effectiveness (MOE's). The local detectors are used for local detection and phase extension. The detection technologies include Loop, Radar, Video and Microwave.

Detector Data Types

The required detector data types provided by the controller unit are as follows:

- Volume: The number of vehicles (counted in an interval of time) where raw and smoothed volume shall be displayable in operator-defined intervals.
- Occupancy: The percentage of time the detector loop is occupied.
- Speed: As calculated by the local controller either using a single loop (and an assumed vehicle length), or through a double loop speed trap configuration.

Detector Data Collection and Retrieval

The controller unit shall provide to the TSCS the data in 5-minute blocks that are date/time tagged.

Detector Monitoring

The detector feedback from the controller unit shall be continuously monitored for proper operation. The TSCS classify detectors as acceptable, marginal, disabled, and failed. Detector failures shall be reported to the TSCS system log and operator alarm.

The system software shall have operator-selectable filters that define the thresholds that a detector must exceed to be considered failed. The filter values shall be selectable on a TOD basis. A minimum of three (3) TOD settings shall be available. The following failure types shall be provided at a minimum:

- Maximum Presence – If an active detector exhibits continuous detection for a program entered period (0-255 minutes in one minutes increments);
- No Activity – If an active detector does not exhibit an actuation during a program period (0-255 minutes in one minute increments);
- Erratic Output – If an active detector exhibits excessive actuation (program entered maximum counts per minute 0-255 in increments of one); and
- Failed Communication – Failed detectors shall not be available for traffic control strategies.

The operator selectable filters shall be definable at a detector level. The detector levels shall include thresholds that must be exceeded by a detector for it to be considered failed. The Contractor shall describe this capability.

The system shall have the capability for disabling some detector monitoring features by TOD.

Intersection Measures of Effectiveness (MOE)

General Requirements

The TSCS software shall have the ability to collect and store intersection MOE data. The software shall process and maintain intersection MOE data on a continuous basis to be used for various timing analysis and reporting tasks. The controller unit shall provide feedback to the TSCS, which will be stored on a per phase basis. The intersection MOEs to be stored include but are not limited to the following:

- Seconds of green time used versus split;
- Percent of green time used versus split;
- Percent of detector calls present;
- Number of times maxed out of phase;
- Number of pedestrian calls;
- Number of emergency vehicle requests (high priority); and
- Number of transit priority request (low priority).

System Log

The Town uses their traffic signal system event logs for legal purposes. The TSCS event log must report what actually occurred on-street, not just what the scheduler requested.
The traffic system log shall record all traffic related messages that occur in order of occurrence. As minimum, it shall include the following:

- Operational events such as;
  - Timing plan change;
  - Special function changes;
  - Route/Central pre-empts;
  - Local pre-empts;
  - Status changes.
- Traffic device failures/repairs (i.e. on flash);
- Communication failures/repairs;
- Traffic data transfer messages;
- Manual override changes; and
- Operator log-on and log-off.

TSCS Display Capabilities

System Status

This TSCS display shall be an overview of the present condition of all devices in the traffic system. The system status screen is a secondary menu allowing the operator to proceed directly to more detailed information for a particular condition.

Intersection Operation

This TSCS display shall show the selected signalized intersection operation in detailed real-time mode. The components of information provided by the controller unit, which the display shall include, are as follows:

- Identification, physical location, communication status, mode of operation, plan number, and offset of cycle.

- Interval, timer and phase number of current phase(s).

- A matrix showing the phase service, current split, vehicle detection status, pedestrian call status, next phase, phase omit, and termination for each of the phases present at the intersection.

Real Time Split Monitor Report

This TSCS display shall detail the real time split usage information for an operator-selected intersection for an operator specified period of time. The split monitor report shall consist of an on-line report, updated every cycle, which gives the operator a comparison of actual programmed split times, in seconds, versus the actual split times utilized by each phase, in seconds, during the last cycle.

The controller unit shall provide the detailed information necessary for the split monitor display, which includes, as a minimum, the following:

- Intersection number and location;

- Programmed split times for each phase (seconds);

- Cycle/split/offset in effect; and

- Actual split time used per phase, for each cycle in the reporting period (seconds).

Split monitor reports shall also be capable of being selected on a scheduled basis.

Real-Time Communications Monitor

This TSCS display will show the request and reply to and from an operator-selected intersection. This monitor shall display the command being sent to an intersection along with the feedback data received back from the controller unit. This display shall be continuous until stopped by the operator. The data shall be displayed in an easily understood format.

Detailed Channel Failure Status

This display/report shall display the failure information for all failed channels. This information shall include at a minimum: channel address, associated intersections, reason for failure, and time of failure.

Communication Statistics

This display shall show the communications throughput. This display shall include number of communication attempts, number of successes, number of failures, and percentage of successful

communications per intersection, per channel, per communication type, and across the entire system.

Detailed Detector Failure Status

This display shall display the failure information for all failed detectors. This information shall include at a minimum: detector location, reason for failure, and time of failure.

Pre-emption History

This display shall include the beginning and ending times (or alternately, the beginning time and duration) of all pre-emption events for a selected period. Types of pre-emption (e.g., emergency vehicle, or railroad) shall be differentiated and the emergency vehicle pre-emption shall be reported by intersection approach.

Training

Training shall be provided to Town personnel on the functional application and operation of the controller cabinet assembly. An initial training module should be directed toward Town staff involved in the testing at the onset of testing. An additional training module should be directed toward field staff and office staff during the system integration test. At a minimum, training shall include the following:

- Overview of the controller cabinet assembly, controller software and hardware components (MMU);
- Emergency Vehicle Pre-emption configuration, and operation; and
- Configuration setup.

The training modules shall consist of both formal classroom presentation and hands-on workshops.

All training shall occur at Town facilities as appropriate for the training module. All proposed training material and a course outline shall be delivered to the Town for approval thirty 30 days before the start of training.

METHOD OF MEASUREMENT:

This item shall be measured at the contract "Lump Sum" price for the successful integration of all local intersections into the closed loop traffic control system, to the satisfaction of the City of Stamford Traffic Engineer.

BASIS OF PAYMENT:

This item shall be paid for at the contract Lump Sum price for "System Integration". This price shall include all software, hardware, graphics creations, materials, equipment, tools, labor, and incidentals thereto.

ITEM #1108578A - FULL ACTUATED CONTROLLER 8 PHASE (MODIFIED)

Article 11.08.01 - Description: Delete the second paragraph and replace with the following:

This item shall consist of furnishing and installing an actuated controller, which shall be a completely digital solid state unit, for controlling the operation of the traffic signals.

The controller shall be completely furnished with the number of phases called for in the item. The cabinet to house the controller shall be completely wired and all sub-bases shall be complete with load switches and flash relays as specified in the **Functional Specifications For Traffic Control Equipment**. The cabinet shall also have all necessary auxiliary equipment required to provide the sequence and timing indicated on the plans. A time switch shall be installed in each cabinet. The controller cabinet shall be sufficiently sized to house the specified equipment including UPS and fiber optic splice enclosure (Putnam Boulevard intersection only) as well as emergency vehicle preemption equipment.

This item shall also include provisions for supporting an uninterruptible power supply, transfer switch and external power supply connection for portable generator hookup in extended periods of area-wide loss of power. The UPS is specified under ITEM #1113812 herein.

Article M.16.09 - Controllers: Add the following sub-articles:

2. Actuated Controllers: The purpose of this sub-article is to set forth minimum design and operating requirements for the materials and components for a digitally timed actuated controller.

Controller Unit

This Specification is for establishing the minimum requirements for a TS2 Actuated Traffic Signal Controller. The TS2 Actuated Traffic Signal Controller shall meet all of the applicable portions of the NEMA TS2 Type 1, 2003 Section 3 for Actuated Control, using the Naztec 980 controller or approved equal. “Approved equal” equipment shall be permitted only when written approval is obtained from the Town. If there is a discrepancy between this specification and NEMA requirements, the conditions of this specification shall prevail.

All controller types shall be sixteen (16) phase. A comprehensive technical document including functional description and drawings, both hardcopy and electronic, shall be attached to the Contractor’s Bid. Failure to comply may result in the Bid being rejected.

Controller Unit - General Functional Requirements

The controller unit shall be:

- Fully actuated;
- Solid state microprocessor based;
- Menu driven;
- With capacity to control 16 traffic phases plus pedestrian phases; and
- Capable of Time Base Coordination with a minimum of 200 programmable steps.

All phases shall have the capability to be recalled to minimum green, maximum green, or pedestrian walk.

All timer units, where pedestrian timing is specified, shall rest in WALK display for main street unless otherwise specified.

Phase detection shall be capable of being declared as either locking or non-locking.

Software programming shall permit the controller unit to time concurrent phases, which shall have active detector calls.

The controller shall be programmable to start up in phases 2 and 6 amber and in phases 4 and 8 red intervals.

The controller unit shall have the capability of time based permissive force-offs. The controller unit shall support the ability to provide automatic calculations for computing the permissive period during coordination. This calculation shall not allow phase to be skipped during coordination. It shall not require the user to enter any data other than the split and cycle information. Calculations shall use the controller entries for phase timings to determine the permissive periods. The controller unit shall support the ability to open separate permissive periods for each phase. This shall support the ability to add unused non-coordinated phase time to the end of the coordinated phase.

The controller unit shall have the ability to store and to execute a minimum of:

- 24 timing plans;
- 16 splits;
- 16 phase omits; and
- 16 phase recalls.

The controller unit shall have the ability to create and store in memory:

- An event (including two levels of transit signal priority (TSP) requests (high and low)) and error log; and

- Log containing volume and occupancy values recorded by traffic detectors; it shall be possible to store data integrated over 5 minute periods (programmable) for at least 24 hours.

The controller unit's clock and memory shall be rechargeable and battery backed-up to retain time, date and signal timing data for a period of at least 30 days.

The communication protocol supplied with the controller shall allow the new TSCS to exchange data with the controller to provide the following functions:

- Status:
  - Current failures;
  - Vehicle and pedestrian display (red, amber, green) for all 16 phases;
  - State of actuating detectors;
  - State of pedestrian detectors;
  - Local pre-empts/priority including two levels of TSP (high and low); and
  - Progress of cycle time.
- Error and Event Log:
  - Upload and Clear.
- System Detector data:
  - Upload volume, occupancy and speed; and
  - Set integration period.
- Timing Plans:
  - Download and upload; and
  - Remote manual select.
- Time Base schedule:

    - Download and upload.

- Set date and time

- Phase minimum values (main page timings):

    - Upload.

The controller unit shall have its own address for communication purposes. There shall be a minimum of 40 programmable addresses available.

The controller shall have input/output remapping features and/or logic programming.
The controller unit shall have the ability to detect the occurrence of all-flash conditions and report through the controller timer to the Traffic Signal Control System using the communications protocol provided.

Phasing

The controller shall be capable of 16 phase operation with a minimum of four rings.
Phases 1, 3, 5 and 7 shall be configurable as left turn arrows for 8 phase units and phases 1 and 3 must be configurable as either a left turn arrow and green ball or a flashing green aspect for 4 phase units. Phases 2, 4, 6 and 8 shall be solid displays with actuated parallel pedestrian indications.

For 16 phase units the vehicle phases will be assigned to phases 1 through 8 as described above, and the remaining phases will be used for transit (generally phases 10/12 and 14 and 16 in a dual ring configuration).

Yellow Trap

The controller shall be wired so that it cannot back up to service a left turn demand.

Pedestrian Phases

Pedestrian isolation circuits shall be provided for all pedestrian phases and shall be external logic units.

Malfunction Management Unit

The Malfunction Management Unit (MMU) shall meet all of the applicable portions of the NEMA TS2 2003 Section 4. The MMU shall detect and respond to improper and conflicting signals and improper operating voltages in a controller assembly. The MMU shall detect the presence of voltage on conflicting field connection terminals, the absence of proper voltages on all of the signal field connection terminals of a channel, and shall be capable of monitoring the presence of satisfactory operating voltages within the controller unit and MMU itself.

The MMU, upon sensing any of these conditions, shall cause the transfer of the traffic signals to Flashing Operation, and the controller assembly shall be wired in such a manner as to provide Flash Transfer if the MMU is removed from service.

The MMU shall operate with the Type Select input at Logic Ground potential such that it is a Type 15 with sixteen channels. Each of the sixteen channels consists of three 120 volt AC inputs: Green/Walk, Amber, and Red/Don't Walk.

The Signal Monitor portion of the MMU shall be capable of monitoring for the presence of voltage on conflicting field connection terminals in the controller assembly. For the purpose of conflict determination, a signal on any of the Green, Amber, or Walk inputs associated with a channel shall be considered as that channel being active.

The Signal Monitor portion of the MMU shall also detect the absence of any required signal voltage on each channel at the field connection terminals in the controller assembly. For this purpose a signal on the Green/Walk, Amber, or Red/Don't Walk inputs associated with a channel shall be considered as that channel being active.

The Voltage Monitor portion of the MMU shall be capable of monitoring the Controller Unit Voltage Monitor output which indicates satisfactory operating voltage in the controller unit.

Communication Protocol

It is expected that signalized intersections to be initially connected to the selected TSCS are interconnected over a newly installed fiber communication network. Field communications processing shall be distributed between the central processors, and local field equipment.

The Contractor shall use open, industry standard protocols. At a minimum the TSCS shall have National Transportation Communication for ITS Protocol (NTCIP) 1202 Level 2 as defined by Section 3.3.6 of NEMA TS2-2003. NTCIP v02.06 capabilities shall include for all NTCIP mandatory and optional objects. The Proponent must demonstrate/document how they will guarantee compliance with NTCIP center-to-field communication protocol.

The Contractor shall support multiple traffic signal controller cabinet assemblies using this protocol. The Contractor shall describe what controllers they support in their proposal submission. The proposals will be evaluated as a total cost of ownership.

Communication Ports

The controller unit shall be supplied with one port conforming to EIA-232 specification, and an Ethernet port. All ports and terminals shall be supplied with Keystone "Jack Screws" catalogue number 7230 or approved equal.

Detector Racks

Each controller shall be equipped with specific racks fully wired for operation and complete with power supplies to accommodate detectors. For this application, the following shall be installed using a maximum of two racks:

- 8 position, 16 channel rack with US Traffic (UST) Model 222 rack mounted solid state detectors and RTC Model 380 Card Rack wired dual priority for fire pre-emption, but not including the card(s).

The detector rack(s) shall be compatible with TS2 Type 1 technology.

Bus Interface Unit NEMA TS2 Type 1

The Bus Interface Unit (BIU) shall meet all of the applicable portions of the NEMA TS2-2003 Section 8 for Bus Interface Units for NEMA TS2 Type 1 controller cabinet assemblies. Bus Interface Units are required in the traffic signal controller cabinet assembly, TS2 Type 1, for connection between the controller and the terminal facilities and detector racks.

Traffic Signal Control Cabinet

The Town intends to procure a controller cabinet assembly that can support up to 16 phase operation.

Cabinet Dimensions

The outline dimensions of the cabinets shall be equivalent to a ConnDOT "D" cabinet, base mounted. The controller cabinet shall comply with NEMA standards and shall be made of aluminum, with a minimum thickness of the aluminum of 3.175 mm. All internal and external cut edges shall be ground smooth to prevent injury or damage. The cabinet shall be manufactured so as to prevent the accumulation of water on its top surface.

Door

The cabinet shall have a hinged main door that permits access to all equipment within the cabinet and visual inspection of all indications and controls. The main door shall be not less than 1320 mm high by 845 mm wide. The size of the main door of the cabinet shall be substantially the full area of the front of the cabinet and shall include a 'door-in-door' for access to a police panel.
The main door shall be provided with a door stop which holds the door open at a minimum of two positions (90 degree and 120 degree) open stop, which can be locked in place. The stop and catch mechanism shall be capable of holding the door open at 90 degrees with a load of 15 pounds per square foot applied uniformly over the face of the door. The doorstop shall be durable stainless steel, approximately 10 mm in diameter.

A three-point latch is required for the main door. The latching mechanism shall be constructed of heavy cadmium plated steel bar and nylon rollers on the locking bar, and a handle which will serve to secure the door.

The door handle shall be durable stainless steel, with a durable 12.7 mm shank, and shall be subject to approval by the Town. Provisions for padlocking shall be provided. The handle shall not impede the operation of the lock during opening. The controller cabinet shall come with a Pelco SM1026 door lock and key or approved equal.

Shelves

The cabinet shall have provisions for positioning shelves to within 31 cm of the bottom of the cabinet and to within 20 cm of the top of the cabinet in increments of not more than 5 cm.
The cabinet will be supplied with 3 shelves, with the spacing to be determined by the Town. One of the three shelves shall have a sliding pullout shelf capable of safely supporting a laptop computer. The pullout shelf shall not interfere with the backboard or cabinet accessories and shall be a minimum of 40 cm x 26 cm (length times width).

Finish

The cabinet shall be finished with gray polyester powder coat baked enamel.

Cabinet Ventilation

The cabinet shall have a replaceable filter with the following dimensions: width 41 cm, height 31 cm, thickness 3 cm. The cabinet will have an air vent filter and removable aluminum cover.

Police Panel

The police panel shall come complete with: signal switch, auto/flash switch, auto/manual switch, hand push button and retractable cord, Pelco SM1013 lock with key (or equivalent).

Thermostat

The cabinet shall be equipped with an adjustable thermostatically controlled heater (bar type, minimum 250 W, CSA approved). The cabinet shall be equipped with an adjustable thermostatically controlled fan with manual control, which shall be vented to the outside. Thermostats shall be located so as to be easily accessible. Thermostat terminals shall be insulated to prevent accidental shock or shorting.

Cabinet Mounting

The cabinet shall be base mounted. A Neoprene gasket shall be supplied for the base of the cabinet.

Ancillary Requirements

The cabinet shall come equipped with a clear plastic cover that covers the power supply.

The controller shall be equipped with back panel able to accommodate 12 three-phase output modules.

The controller shall be equipped with all load switches for the indicated 4, 8, or 16 phase operation, indicating lights for vehicles/pedestrian display shall be provided integral with the load switch.

The cabinet shall come equipped with two internal circuit breakers with labels, one for power feed and one for auxiliary equipment.

The cabinet shall come equipped with a radio interference filter.

The cabinet shall include lightning/high voltage surge protector, model HESCO HE1700RS, wired to provide “user defined input” capability.

The cabinet shall be equipped with two (2) - 110 V AC duplex power outlets (UL/CSA approved) equipped with a ground fault protection unit. One unit shall be located near bottom half of the cabinet and, the other located above the top shelf. The exact location is to be determined by the Town after the contract has been awarded and prior to installation.

The cabinet shall be equipped with 3-way switches inside the cabinet to simulate vehicle and pedestrian pulse and locking detector inputs directly to the controller. These switches shall, as a minimum, access the following features: stop timing, manual timing, manual interval advance and flash mode. These switches shall be designated such that up is on, down is momentary on and center is off. The switches shall be located so they cannot be activated by accident.

The cabinet shall be equipped with solid state flasher (minimum 15A, 2 poles).

The cabinet will include two Malfunction Management Unit (MMU) conflict sheets showing all conflicting displays with numbered circuits.

The cabinet shall be equipped with a lamp outlet complete with 60 W lamp and switch.

The cabinet will be supplied with two sets of equipment and electrical drawings, and one set of operations manuals.

The cabinet shall be supplied with a heavy duty Fellcoat Re-env EPPZ-C waterproof plastic pouch (44 cm x 35 cm) or approved equal capable of mounting to the cabinet door for the purposes of storing electrical and equipment drawings and manuals.

The Contractor shall provide a workable solution for all main panel wiring (wire size and colour coding).

The wiring within the controller cabinets shall be neatly arranged and laced, or enclosed in plastic tubing or raceway.

The controller and cabinet shall be configured to ensure that pre-emption related devices are powered from the rack and video processors are powered from the power supply through the provision of one (1) terminal for every two (2) video cameras used at an intersection.

The cabinet shall be set up to accommodate UPS, transfer switches and an external receptacle for portable generator power.

The Connecticut Department of Transportation Functional Specifications for Traffic Control Equipment, current edition governs the material for the Controller Assembly. The Functional Specifications are advertised biennial for vendors to provide equipment to the State on a low bid basis. All underlined text indicates an addition or revision to these specifications from the previous version. The Functional Specifications are available on the Departments website.

The following sections of the **Notice to Bidders**, pages 1 - 10, shall apply to contract supplied traffic controllers: 12, 15, 16, 17, 18, & 19.

Item 1108115A – FULL ACTUATED CONTROLLER 8 PHASE shall conform to the requirements of Section 1, pages 11 – 94. The Controller Unit (CU) shall conform to the requirements of Item 1D1, CONTROLLER (PRE-EMPTION TYPE), pages 29 – 31. All cabinets shall conform to the specifications of the "D" CABINET REQUIREMENTS, pages 78 – 84.

Controllers in a closed loop system shall conform to the requirements of Section 27, INTERNAL CLOSED LOOP SYSTEM FOR EXISTING NAZTEC SYSTEM, pages 160 – 183, in addition to the above requirements.

The solid state time switch shall conform to Section 13. FOUR CIRCUIT SOLID STATE TIME CLOCK WITH TIME BASE COORDINATION OPTION TC/TBC, pages 138 - 141.

Traffic signal equipment which has not been previously approved to meet the requirements of the Functional Specifications for the above items, will not be approved for use on this contract.

Several parts of Item 1 of the Functional Specifications do not apply to contract supplied and developer supplied traffic controllers. The specifications which are to be disregarded are listed below.

Item 1A-1 - Controller, Two Phase Microprocessor Keyboard Entry
- Type 6 Conflict Monitor
Item 1A-2 - Two Phase Type "A" Cabinet

Supplemental specifications listed below, have been added for material and controller operations which the Department of Transportation does not include in the Functional Specifications for Traffic Control Equipment.

U.C.F. Time Switch Flash Command Procedure
Time Clock/Time Base Installation Requirements
24 Volt Relay Type A
110 Volt Relay Type F
Type G
Time Delay Relay

Non-Actuated Advance Green Phase
Actuated Advance Green Phase
Non-Actuated Clearance / Lag Green Phase
Actuated Clearance / Lag Green Phase
Flashing Stop Ahead Sign
Max II Actuation By Pedestrian Call

UNIFORM CODE FLASH COMMAND PROCEDURE

1. Activate the **MINIMUM RECALL** input to the controller to ensure cycling prior to transferring to flashing operation.
2. Omit all non-actuated and actuated artery advance phases.
3. Omit phases 1 & 5 of all quad sequences.
4. Activate the **STOP TIME** input to the controller, upon entering flash, to prevent cycling.
5. Transfer to flash at the end of the last side street all red condition (at the point the artery **ON** output becomes active).
6. Special technical notes on the intersection plan supercede the above requirements.

TC/TBC INSTALLATION REQUIREMENTS

The following requirements are to be observed when engineering the installation of TC/TBC:

1 a. Circuit 1 shall be designated FLASH and be reserved for night flash command.
b. Circuit 2 shall be designated MAX 2 and be reserved for Max 2 command.
c. Circuit 3 shall be designated COORD and shall select coordinated operation of the intersection.
d. Circuit 4 shall be the yield, and force off command to the controller.

2. All clock outputs shall be active to select the function specified. For example; If the TC/TBC were removed for repair, no inputs would be applied to the controller. The intersection will then operate non-coordinated, in Max 1. Programming the TC/TBC without cycle and offset is not an acceptable method to create a non-coordinated operation. Refer to the typical hookup diagram.

3. All TC/TBC clock installations shall be wired as detailed in figure 1. This method is used for both full and semi actuated operation.

4. Midnight resync shall occur at 12:00 AM.

5. A program card shall be completed indicating all input steps and settings. Four copies shall be provided. One copy left in the cabinet. Three delivered to the engineer along with the cabinet wiring diagrams.

TIME CLOCK / TIME BASE COORDINATION

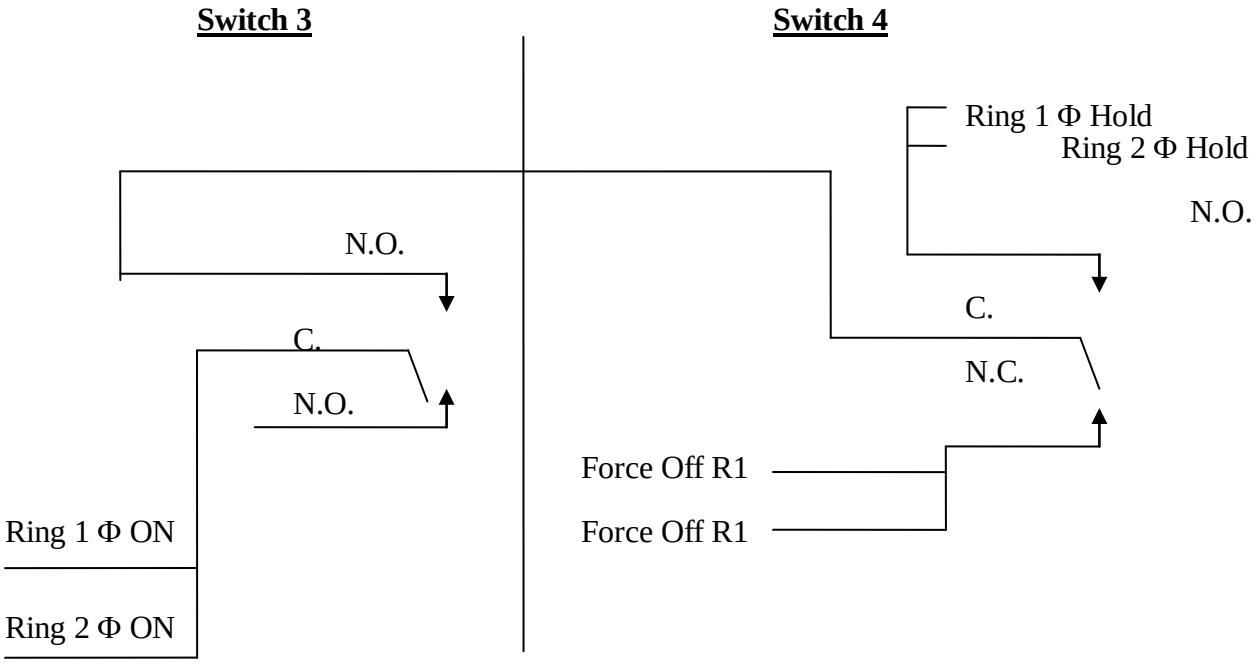


FIG. 1

24 VOLT RELAY

All 24 Volt relays shall meet the requirements of one of the following two types. Diodes shall be installed across the coils of all direct current relays to shunt the reverse voltage generated when the coil de-energizes. All diodes shall be general purpose ECG 125 1000prv @ 25A or equivalent, rated at least .5 amp forward biased. Diodes shall be external to the relay, not enclosed in the dust cover.

TYPE A: Midland Ross, Midtex 155-92 or equivalent.

DESCRIPTION:
This relay shall be enclosed in a clear polycarbonate removable dust cover. It shall have a mechanical life of more than 100,000 operations at rated load.

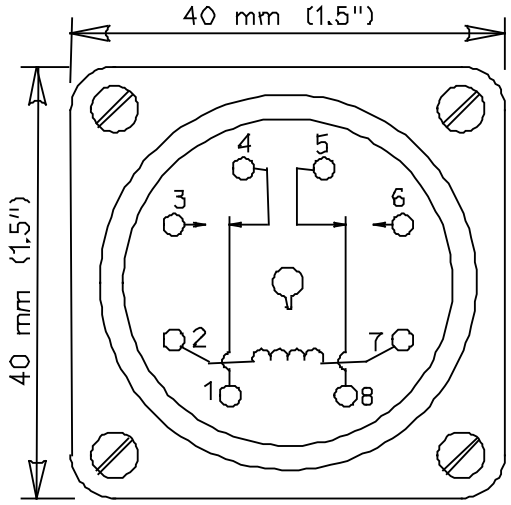
CONTACTS:
The contacts shall be 2 form C (D.P.D.T), U.L. rated at 5 amps 120 volts A.C. The contacts shall be pure fine silver (gold flash). There shall be no tungsten (lamp) load on the contacts of this relay.

COIL: The coil shall operate on 24 V.D.C. and have no less than 450 OHMS impedance.

SIZE: The relay shall be no larger than 65mm(2.5") H x 40mm(1.5") L x 40mm(1.5") W.

BASE: This relay shall have an eight pin octal plug-in base with the pin designation shown below:

1. Common (1)
2. Coil
3. Normally open (1)
4. Normally closed (1)
5. N.C. (2)
6. N.O. (2)
7. Coil (2)
8. Comm.



Bottom View And Wiring Diagram

SOCKET: The socket shall be a closed back, screw terminal type. The front mounted screws shall be 6-32 capable of accepting #14 AWG wire.

110 VOLT RELAY

All 110 volt relays shall meet the requirements of one of the following two types. Across the coil of each relay there shall be a molded suppressor rated at .1uf - 47 ohm @ 600V to suppress electrical noise created by the energization / de-energization of the relay.

TYPE F: Midland Ross, Midtex 136-62T3A1 or equivalent

DESCRIPTION:

Relays of this type shall function as flash transfer, power switching and signal drive. Other uses are acceptable, however, type G relays cannot be used for the above applications.

CONTACTS:

The contacts shall be in the D.P.D.T. form and consist of 10mm(3/8") diameter silver cadmium oxide, rated at 20 Amps @ 117 VAC resistive.

COIL:

The coil shall operate on 110 VAC. No semi-conductors will be allowed in the coil circuit of this relay.

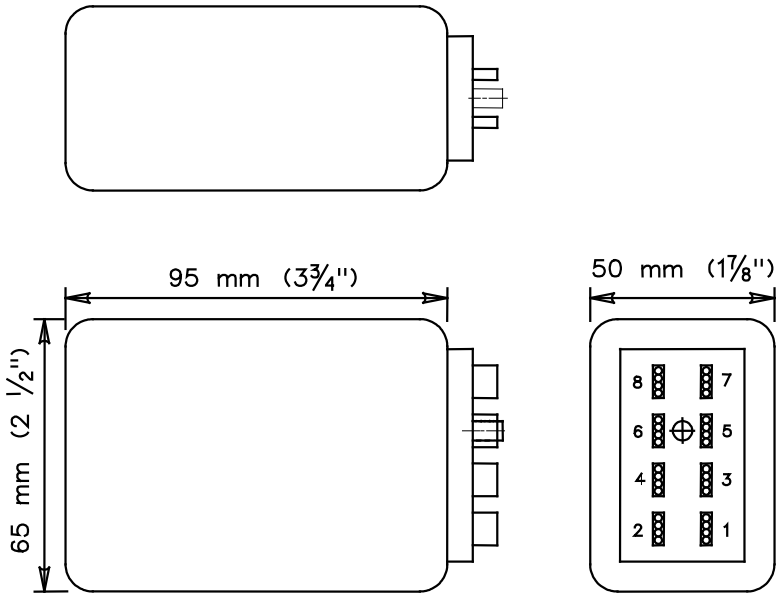
SIZE:

The relay shall be enclosed in a clear plastic dust cover. The overall dimensions shall be no larger than 63mm(2 1/2") x 94mm(3 3/4") x 47mm(1 7/8") as illustrated below.

BASE:

This relay shall have an eight blade plug-in base, Ventron Beau Plug P-5408 or equivalent with the pin designations as shown below:

1. Coil
2. Coil
3. N.C. 1
4. N.C. 2
5. Comm. 1
6. Comm. 2
7. N.O. 1
8. N.O. 2



SOCKET:

The socket shall be Ventron Beau Plug S-5408 or equivalent, contacts rated at 15 Amps @ 1750 VRMS.

TYPE G: Magnecraft, W 88 ACXP-8 or equivalent

DESCRIPTION:

Relays of this type shall function in low current switching applications such as interconnect interface or pre-emption circuits. A clear polycarbonate plastic enclosure shall cover the relay mechanism.

CONTACTS:

The contacts shall be in the D.P.D.T. form and consist of 5mm (3/16") diameter gold flashed, silver alloy, rated at 10 Amps @ 120 VAC resistive.

COIL:

The coil shall operate on 120 Volts AC and require a nominal 3 VA.

SIZE:

Height, length and width dimensions shall be the same as the 24 volt relay Type A: 35mm(1 3/8") x 60mm(2 3/8") x 35mm(1 3/8").

BASE:

The base shall be an octal plug with the pin designations the same as the 24 volt relay Type A.

SOCKET:

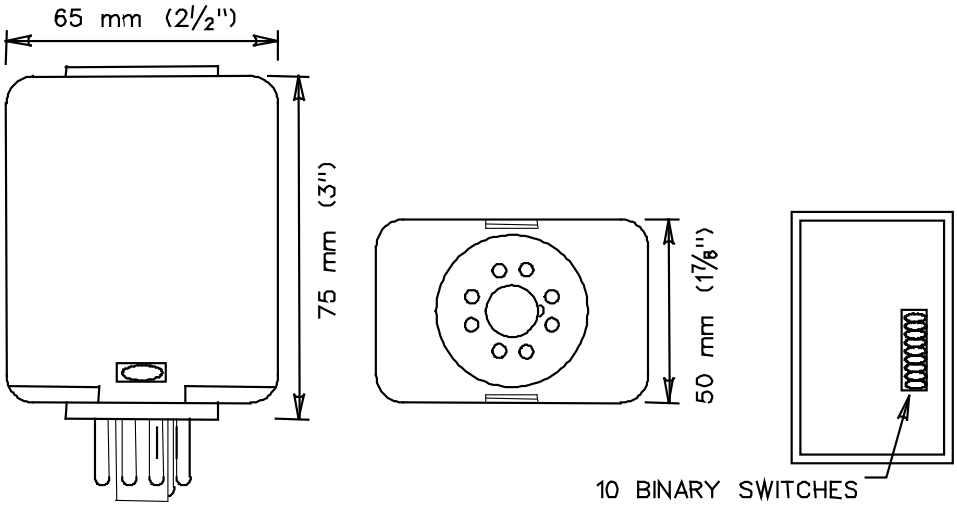
The socket shall be the same as that for the 24 volt relay Type A.

TIME DELAY RELAY

120 VAC SSAC TDM120A or equivalent
24 VDC SSAC TDM24DL or equivalent

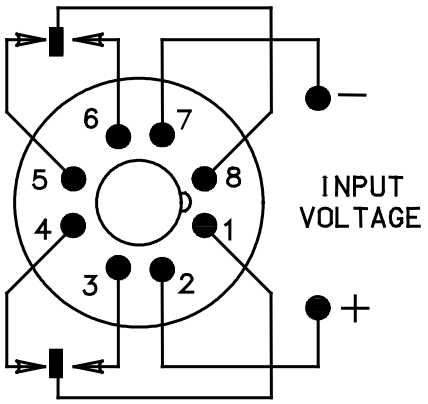
DESCRIPTION:

The time delay relays shall be self enclosed, plug-in, delay on operate type. They shall be digitally timed and adjustable by the use of dip switches located on the top of the case. The timing range shall be 1 to 1023 seconds in 1 second intervals. The time delay relays shall have an internal double pole double throw relay with form "C" contacts rated at 10 amps 120 volts AC. They shall operate accurately in a temperature range of -20 to +65 degrees C. A 120 volt AC input shall initiate timing of the 120 VAC TDR and a 24 VDC input shall initiate timing of the 24 VDC TDR. Removal of the input voltage shall reset the timer. Maximum dimensions of the case shall be as shown below.



SOCKET:

The socket shall be a standard octal base (8 pin) with screw terminal connectors. The pin designation shall be as shown below.



OCTAL (8 PIN) BASE

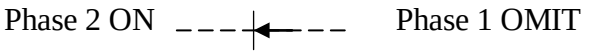
NON-ACTUATED ADVANCE GREEN PHASE

Where the timing and sequence indicates an advance green phase that always precedes the phase in recall (usually phase 2), and that either is fixed timed or is to be extended only, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to the advance phase OMIT input.

2. If the advance phase is to be extendable, it shall be in minimum recall. If the advance phase is fixed timed, it shall be in maximum recall. A different advance time may be selected by switching to maximum 2.

Example: Phase 1 is the advance phase (extendable), in minimum recall.
Phase 2 is the artery, in recall.
Phase 4 is the minor street, in non-lock.



Where the timing and sequence indicates an advance phase that is fixed timed (not extendable), and that always precedes either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

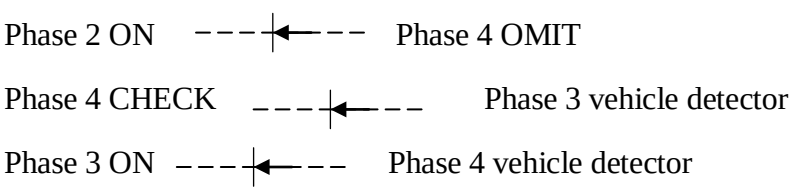
1. The recall phase (usually Phase 2) ON output shall be diode connected to the advance phase's, parent phase OMIT input.

2. The parent phase CHECK output shall be diode connected to the advance phase vehicle detector input.

3. The advance phase ON output shall be diode connected to the following parent phase vehicle detector input. This is to insure a green indication on the parent phase.

4. The advance phase shall be in the non-lock mode. The advance time shall be selected from the maximum interval.

Example: Phase 2 is the artery, in recall.
Phase 3 is the advance for phase 4, in non-lock mode.
Phase 4 (parent phase) is the minor street, in non-lock mode.



ACTUATED ADVANCE GREEN

Where the timing and sequence indicates an advance green phase that is to be extended only, and is to always precede either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The phase ON outputs of all phases that could precede the advance phase, shall be diode connected to the parent phase OMIT input.

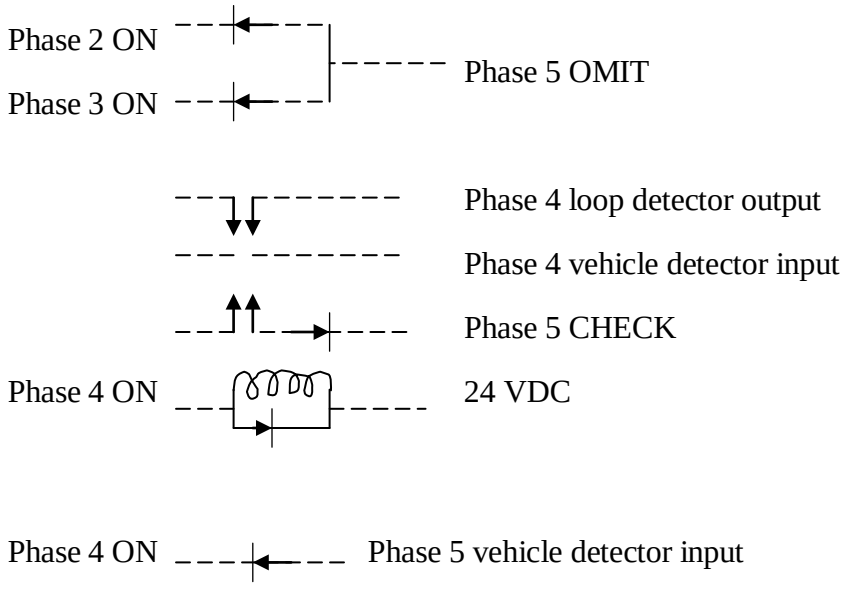
2. The parent phase CHECK output shall be diode connected, through the normally closed contacts of a relay, to the advance phase vehicle detector input. The advance phase loop detector output shall be connected to the normally open contacts.

3. The relay coil shall be energized by the advance phase ON output, which in turn will switch the vehicle detector input from the parent phase CHECK circuit to the loop detector.

4. The advance phase ON output shall be diode connected to the following parent phase vehicle detector input. This is to insure a green indication from the parent phase.

5. The advance phase shall be in the non-lock mode.

Example: Phase 2 is the artery, in recall.
Phase 3 is the pedestrian phase.
Phase 4 is the advance for phase 5, in non-lock.
Phase 5 (parent phase) is the minor street, in non-lock.



The 24 volt relay shall be Type C as previously described in these specifications.

NON-ACTUATED CLEARANCE PHASE

NON-ACTUATED LAG GREEN PHASE

Where the timing and sequence indicates a non-actuated clearance phase or a lagging green phase that always follows the phase in recall, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to all appropriate phase OMIT inputs except the clearance phase.

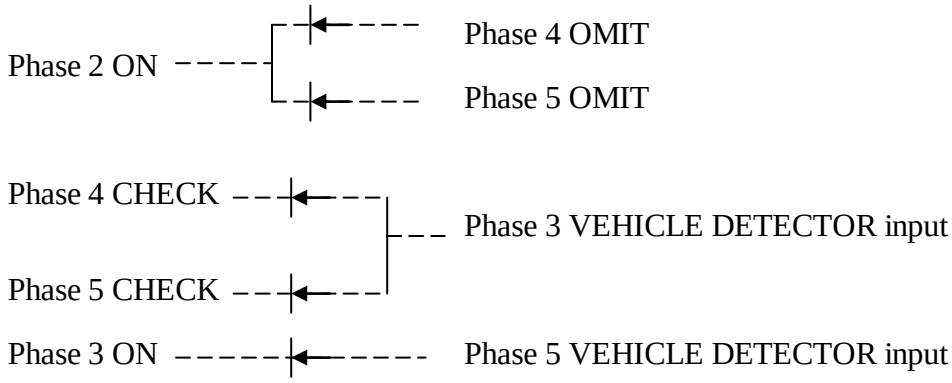
2. The remaining actuated phases shall have their CHECK outputs diode connected to the clearance phase vehicle detector input.

3. The clearance phase ON output shall be diode connected to the following phases vehicle detector input (if the phase is in non-lock mode). This will prevent the controller from returning to the parent phase from the clearance phase without servicing the minor street.

4. The clearance phase shall be in the non-lock mode.

5. The clearance, or lag green time shall be selected from the maximum interval.

Example: Phase 2 is the artery, in recall.
Phase 3 is the clearance phase, in non-lock.
Phase 4 is the pedestrian phase.
Phase 5 is the minor street, in non-lock.



Where the timing and sequence shows a non-actuated clearance phase or lagging green phase following either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to the following clearance phase vehicle detector input. This insures the clearance phase will always follow the parent phase.

2. The clearance phase shall be in the non-lock mode.

3. The clearance, or lag green time shall be selected from the minimum green interval.

ACTUATED CLEARANCE PHASE

ACTUATED LAG GREEN PHASE

Where the timing and sequence indicates an actuated lagging green phase that is to be extended only, and always follows another phase, the following guidelines shall be in effect:

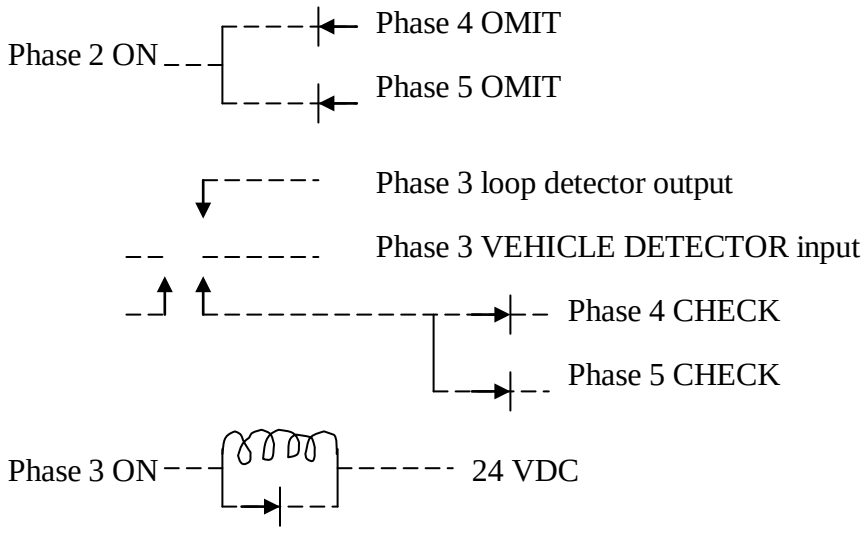
1. The parent phase (usually phase 2) ON output shall be diode connected to the phase OMIT inputs of all phases that could follow the lag phase.

2. The CHECK outputs of all phases that could follow the lag phase shall be diode connected, through the normally closed contacts of a relay, to the lag phase vehicle detector input. The lag phase loop detector output shall be connected to the normally open contacts.

3. The relay coil shall be energized by the lag phase ON output which in turn will switch the phase detector input from the CHECK circuits to the loop detector.

4. The lag phase shall be in the non-lock mode.

Example: Phase 2 (parent phase) is the artery, in recall.
Phase 3 is the lag phase, in non-lock.
Phase 4 is the pedestrian phase.
Phase 5 is the minor street, in non-lock.



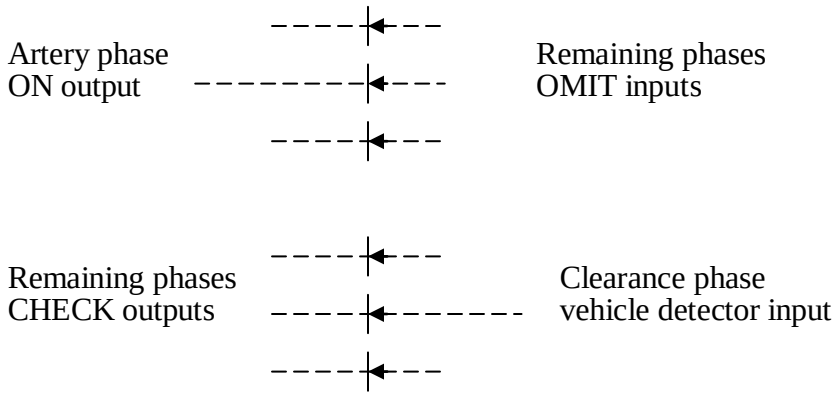
The 24 VDC relay shall be Type C as previously described in these specifications.

FLASHING STOP AHEAD SIGN

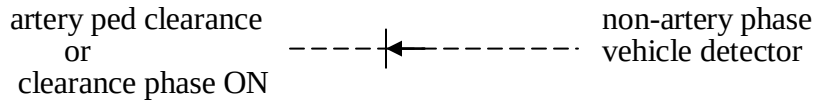
Where the timing and sequence indicates a flashing stop ahead sign, the clearance interval following the phase that the sign is off shall be timed by the following method.

The following phase shall be used for the clearance time. These phases shall be overlapped. The green indication will be maintained by the overlap feature and the following phase green time will be the stop ahead sign clearance.

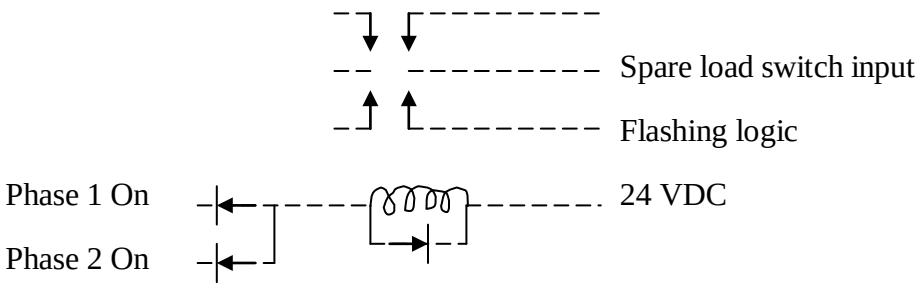
The artery phase ON output shall be diode connected to all other phase OMIT inputs except the clearance phase and the artery phase. The CHECK outputs from the remaining phases (as needed) shall be diode connected to the sign clearance phase vehicle detector input. The clearance phase shall be in the non-lock mode.



If the non-artery phases are in the non-lock mode, a call must be forced to the non-artery phase once the controller leaves the artery Hold interval (either artery walk or artery green). This prevents a false "Stop Ahead" indication if a vehicle turns right on red during the flashing sign clearance interval.



Unless otherwise shown on the plans, the 110 VAC flash power shall be from a spare load switch in the controller cabinet. The load switch input shall be driven with the flashing logic output from the controller. The flashing logic output shall be disconnected from the load switch during the intervals the sign is inactive.



Typical drive circuit for “WHEN FLASHING STOP AHEAD” sign

TIME BASE COORDINATION
MAX II ACTUATION BY PEDESTRIAN CALL

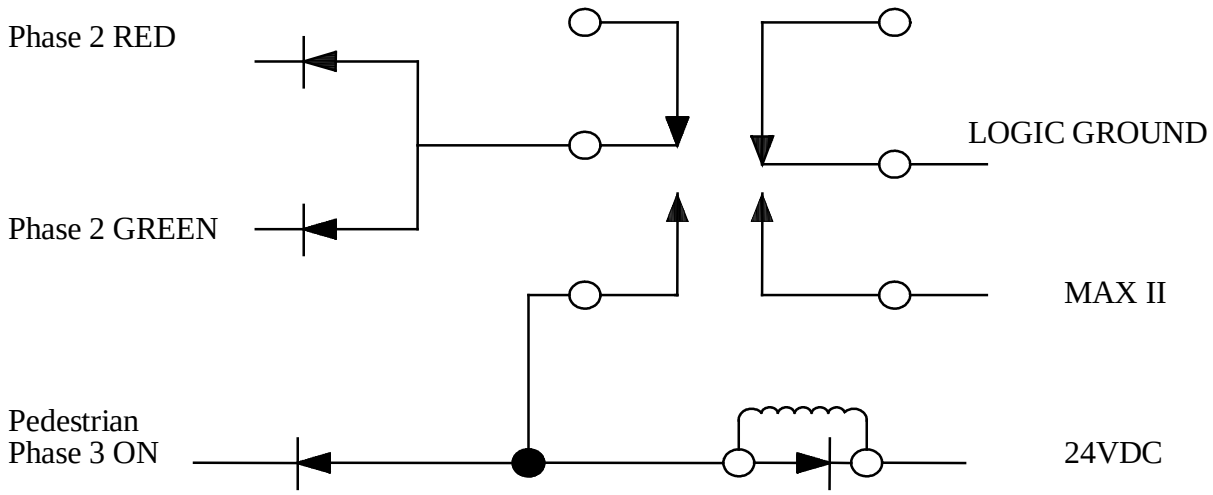
When the sum of the split times, including the walk and don't walk, exceed the background cycle length, the designer may choose to either allow a double cycle of the background timer or reduce the phase timings when the ped phase is called. Reduction of the phase timing by switching to MAX 2 avoids double cycling.

Where indicated on the plans the exclusive pedestrian phase will call MAX II. The minor movement max 2 times are set low so that the total phase times do not exceed the coordination cycle length.

Install a 24 volt relay connected to the inputs and outputs as shown on the following schematic.

Operation: When the controller advances to the exclusive pedestrian phase, the relay is actuated and latched. MAX II timing is selected for one complete cycle, until the relay is unlatched by the artery yellow (absence of red or green).

Example: Phase 2 is the artery. Phase 3 is the exclusive pedestrian phase.



ITEM #1108660A – ETHERNET SWITCH – FIELD (4 PORT, HARDENED)
ITEM #1108661A – ETHERNET SWITCH – TCC (24 PORT)

Description:
The Ethernet network shall be comprised of environmentally hardened Ethernet switching equipment (i.e. Ethernet switches), compliant with IEEE 802.3 (10Mbps), IEEE 802.3u (100Mbps), IEEE 802.3z (1000Mbps) and IEEE 802.3ab (1000Mbps). Field-hardened Ethernet switches with eight ports shall be installed in the field. A 24-port Ethernet switch shall be installed at the Town Police Station.

Materials:
Environmental Requirements
Each switch shall be capable of operating properly over an ambient temperature range of -25°C to +70°C without the use of internal or external cooling fans. Each switch shall be capable of operating properly in relative humidity conditions of 95% non-condensing at 55°C.

Port Requirements
The field-hardened Ethernet switches shall support the following port requirements and options:

8 - 10/100/1000BaseTX ports:
- RJ45 connectors
- Cable type: Category 6, unshielded twisted pair (CAT 6 UTP)
- Segment Length: 100m
- Auto-negotiation support (10/100/1000Mbps)
- Auto MDIX crossover capability
- Full Duplex operation (IEEE 802.3x)

2 - 100BaseFX fiber optical ports:
- Each of the two (2) optical port shall have two (2) fiber optic strands
- Connectors, two (2) total, each supporting two fiber optic strands. Connector types shall be confirmed with City Engineer.
- Optical Characteristics: 1310nm single mode
- Supports Fiber Type: 9/125um single mode fiber.
- Segment Length: 15km with single mode fiber
- Full Duplex operation (IEEE 802.3x)

The Ethernet switch at the Central Site shall support the following port requirements and options:

24 - 10/100/1000BaseTX ports:
- RJ45 connectors
- Cable type: Category 6, unshielded twisted pair (CAT 6 UTP)
- Segment Length: 100m
- Auto-negotiation support (10/100/1000Mbps)
- Auto MDIX crossover capability
- Full Duplex operation (IEEE 802.3x)

2 - 100BaseFX fiber optical ports:

- Each of the two (2) optical port shall have two (2) fiber optic strands
- Connectors, two (2) total, each supporting two fiber optic strands. Connector types shall be confirmed with City Engineer.
- Optical Characteristics: 1310nm single mode
- Supports Fiber Type: 9/125um single mode fiber.
- Segment Length: 15km with single mode fiber
- Full Duplex operation (IEEE 802.3x)

Networking Requirements

Each switch shall support automatic address learning of up to 4096 MAC addresses. Each switch shall support the following advanced layer 2 functions:

- IEEE 802.1Q VLAN, with support for up to 4096 VLANs
- IEEE 802.1p priority queuing
- IEEE 802.1w rapid spanning tree.
- IEEE 802.3x flow control
- IEEE 802.17 resilient packet ring (RPR)

Network Management Functionality Requirements

Each switch shall provide the following network management functions:

- SNMPv2
- RMON
- Port Mirroring
- Spanning Tree
- Rapid Spanning Tree (IEEE 802.1w)

Programmable Critical Failure Relay

Each switch shall provide a programmable critical failure out relay that may be configured to activate upon critical error detection such as loss of link or detection of critical system errors. Thus function shall be user enabled and programmable. The output contacts shall be available in a Form-C configuration and be capable of switching at least 30Vdc @ 2A.

Power Supply Requirements

Each switch shall provide options for operation at the following power supply inputs:

- 85 to 264 Vac (50/60Hz)
- 10 to 30 Vdc

Each switch shall require no more than 15W of power. The Ethernet switches' power supply shall have no exposed power connectors.

Mounting Requirements

Each switch shall provide options for DIN Rail mounting and panel mounting via brackets. Field-hardened Ethernet switches shall be installed in cabinets in the field. The Central Site Ethernet switch shall be installed in a rack in the location specified by the Engineer.

Construction Methods:
The Contractor shall furnish and install all hardware, tools, equipment, materials, supplies, and manufactured articles. The Contractor shall also perform all operations and equipment integration necessary to install fully operational Ethernet switches that meet the required features, functions, and parameters.

Installation
The Contractor shall install Ethernet switches as designated in the plans and specifications. The Contractor shall install new Ethernet switches into the Ethernet network without disabling existing Ethernet services. The Contractor shall confirm compatible interoperability with the existing Ethernet switches. The Contractor shall install and mount the Ethernet switches as per the manufacturer's recommended installation procedure. The Contractor shall be responsible for the proper configuration for the Ethernet switches including assignment of IP addresses, as necessary. The Contractor shall install all interface cable connections between the Ethernet switches and associated equipment. All cables shall be labeled identifying the associated equipment connection. The Contractor shall neatly train and organize all cables. No cables shall be installed with a radius less than the manufacturer's minimum recommended bending radius.

Submittals
In addition to the submittal requirements specified elsewhere, the Contractor shall submit an operating manual, a service manual, and maintenance instructions for each type and model of Ethernet switch.

Testing
In addition to the testing requirements specified elsewhere, the Contractor shall test the Ethernet switches to demonstrate:

- **Resilient Packet Ring Test**: The Contractor shall ensure that network is configured to support the resilient packet ring network. The Contractor shall demonstrate this by disconnecting the field switches at each of the sites from the network and verifying that the data transmission on network is fully operational.

Warranty
Two (2) years, all parts and labor, from date of acceptance.

Delivery, Storage, and Handling
The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance. The Contractor shall be responsible for storage of the materials and equipment prior to delivery and testing in a clean, dry location free from construction dust, precipitation and excess moisture. The Contractor shall be required to replace any damaged materials and equipment at no additional cost.

Method of Measurement:
This item shall be measured for payment for each installed Ethernet switch complete, as specified and shown on the drawings and these specifications.

Basis of Payment:
The unit price bid for each Ethernet Switch shall include the cost of furnishing all labor, materials, tools and equipment necessary to complete the work. Payment for all miscellaneous hardware, cabling, necessary documentation, and testing shall be included under this item.

Pay Item:	**Unit:**
Ethernet Switch - Field	EA
Ethernet Switch – Central Site	EA

ITEM # 1108826A – FIBER OPTIC PATCH CORD

Description:
This work shall include furnishing and installing pre-assembled fiber optic patch cords (hereinafter referred to as patch cords). Patch cords are used for final connection between equipment and the fiber optic cable patch panels.

Materials:
Patch cords shall meet the same material performance specifications as those specified for 12 Fiber Optic Drop Cable.

Pre-assembled patch cords shall be purchased from the manufacturer completely assembled in standard lengths. The fiber patch cords shall be single mode as required to match the trunk cable.

Patch cords shall be a minimum of 6.5 feet in length unless specified otherwise on the plans.

The outside jacket shall be color-coded yellow for single mode fiber.

Pre-assembled fiber optic patch cords shall be labeled at each end, within six (6) inches of the termination. The label shall be identical at each end of the cord. Each cord shall have a unique label. Labels may be field applied.

Unless a different connector is required for compatibility with existing or proposed active components, all fiber optic patch cord connectors shall be ST/ST compatible. Connector types shall be confirmed with the City Engineer. The ST connectors shall be ceramic ferrule, with the fiber permanently secured within the ferrule by epoxy (heat set), chemically cured or a hot-melt adhesive in accordance with the connector and/or the epoxy manufacturer. When patch cords are installed outside of a controlled-environment location, the connector minimum operating temperature range shall be -40° F to +158° F. For those applications within a controlled-environment location, the minimum operating temperature shall be -4° F to +140° F.

For any patch cables that require field termination, the procedure for the termination of the patch cables (installation of connectors) used in this project shall comply with the connector manufacturer's standard field installation recommendations. This procedure shall be submitted to the Engineer for approval. Unless recommended otherwise by the connector manufacturer, each fiber shall be cleaved and cleaned, and shall receive multiple polishing with increasingly fine grit polishing pads.

The average loss for mated pairs of connectors shall not exceed 0.4 dB for single mode fibers.

Construction Methods:

Installation
The Contractor shall connect patch cords to system equipment as indicated in contract documents and as directed by Engineer.

At no time shall the bending radius of a cord be less than the manufacturer's recommendation. For all cords the minimum bending radius shall be 20 times the cable diameter during installation. After installation, the minimum bending radius shall be 10 times the cable diameter.

At no time shall the pulling (tensile) strength of the patch cord be exceeded during installation. The Contractor must take appropriate precautions to assure that the installation does not damage the cables.

Testing:
All testing and test equipment shall be in conformance with the following standards:

- TIA/EIA-455-B Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and other Fiber Optic Components.
- TIA/EIA-526 Standard Test Procedures for Fiber Optic Systems.

All patch cords longer than 100 feet shall be tested using an Optical Time Domain Reflectometer (OTDR). OTDR testing shall occur after completion of the installation, splice, or termination.

OTDR measurements shall be made once in each direction on each fiber after final assembly. OTDR graphs shall be submitted to the Engineer.

Fiber optic patch cords shorter than 100 feet shall be tested using an optical power meter and calibrated optical source. The optical attenuation shall be measured from end-connector to end-connector and the results recorded and submitted to the Engineer.

Acceptable loss per each fiber, per direction, shall be the sum of the cable length times the specified loss as indicated above. An allowance of 0.5 dB per connector (1.0 dB per connector pair) and 0.1 dB per fusion splice shall be permitted. Any cable, termination, or splice, installed under this contract, with losses in excess of the acceptable limit shall be repaired, or replaced by the Contractor at the Contractor's sole expense.

Where test results indicate excessive loss, or other problems, in the existing fibers, terminations, or splices, the Contractor shall submit those findings to the Engineer as soon as possible.

Method of Measurement:
This item shall be measured for payment for each Fiber Optic Patch Cord installed by length and number of fibers, tested, and complete, as specified in contract documents.

Basis of Payment:
The unit price bid for each Fiber Optic Patch Cord shall include the cost of furnishing all labor, materials, tools and equipment necessary to complete the work. Typical items would be "EACH OF 6.5 FEET FIBER OPTIC PATCH CORD."

Pay Item:	**Unit:**
Fiber Optic Patch Cord	EA

ITEM # 1108843A – 12-POSITION FIBER OPTIC PATCH PANEL

Description:
The 12-Position Fiber Optic Patch Panel shall be used for the termination of fiber optic cables within field cabinets. The Patch Panels shall consist of the following main components:

- Patch Panel Housing
- Connector Modules

Materials:

Patch Panel Housing
The patch panel housings shall be rack or shelf mountable and shall provide for the cross-connecting or inter-connecting of fibers. The patch panel housing shall allow for the mounting of multiple connector modules. The units shall provide for direct connectorization and pigtail splicing.

Rack-mountable housings shall be mountable in an EIA-310 compatible 465 or 592 mm (19" or 24") rack. The unit shall be modular with separate splicing, connector, jumper management and combination connector /splicing housings available. The unit shall be mounted with a 120 mm (4.75") frontal projection, with the option to flush mount. The unit shall not exceed a depth requirement of 305 mm (12").

The unit shall meet the design requirements of ANSI/TIA/EIA-568 and the plastics flammability requirements of UL 94 V-0.

Housings shall be manufactured using 16 gauge aluminum or equivalent for structural integrity and shall be finished with a wrinkled black powder coat for durability. Installation fasteners shall be included and shall be black in color.

The unit shall have patch cord routing guides that allow a transition and segregation point for jumpers exiting the sides of the housing.

The unit shall accommodate a 12-Position port count.

The unit shall include a clamshell-type cable clamping mechanism to provide cable strain relief. The cable clamp shall accept one cable from 0.735 TO 1.125 inches (9.5 to 28.6 mm) in diameter. The cable clamp mechanism shall also handle multiple smaller fiber count cables when used with the multiple cable insert. The total cable capacity per clamp shall be five cables ($\leq$ 0.4 in/10.2mm OD) when used with the multiple cable insert. Housing cable clamp capacity shall be two clamps for the 12-position fiber optic patch panel housings. Additional cable clamps shall be available as an accessory kit.

The 12-position fiber optic patch panel housings shall utilize a slide-out tray for connector access. These connector housings shall have metal front and rear doors and jumpers shall route out the sides of the housing. Front and rear doors shall utilize a set of swell latches to provide ready

access and closing. The front and rear doors shall be lockable when used with an optional key lock kit.

The connector housings shall have a labeling scheme that complies with ANSI/TIA/EIA-606.

Provisions for the mounting of fiber optic fan-out kits shall be incorporated into the housing.

Connector Modules

A connector module is defined as a modular removable case containing optical fiber connector adapters and provisions for strain-relief, slack storage, and the furcation of fiber optic cables. The connector module shall have the following characteristics:

The connector panel shall utilize a single mounting footprint and shall be available with three, four, six, eight or twelve connector adapters in each panel. The panel shall be attached with two push-pull latches to allow quick installation and removal.

Blank connector panels shall be available to fill unused space within the housings. The blank connector panel shall be attached with at least two push-pull latches to allow quick installation and removal. Housings shall be supplied with blank connector panels for all available positions unless the housing is ordered with optical fiber adapters or copper jacks pre-installed. The blank panels shall be manufactured from injection molded polycarbonate and shall be finished with a wrinkled black texture to match the housing.

Connector modules shall be manufactured from 16 gauge cold rolled steel or injection molded polycarbonate for structural integrity.

Connector modules shall be finished with a wrinkled black texture to match other hardware.

The connector module shall consist of a panel incorporated into a protective case with a removable cover for access to the interior connectors and fibers.

The 12-Position Fiber Optic Patch Panel shall include a total of two connector modules with six Type SC single mode connectors on each. Connectors shall be field mountable and shall not exceed 0.15 dB loss rating.

Pigtails

The 12-Position Fiber Optic Patch Panel shall include and be capable of terminating up to 12 connectorized pigtails. The pigtails shall be factory made. The Patch Panels shall use connectorized pigtails to connect the 12 strand fiber optic cable entering the field cabinet to the patch panel connectors. The Contractor shall furnish pigtails and splice them to the fiber optic cables. The fiber optic strand of the connectorized pigtail shall have matching optical properties as the fiber optic strand used on the fiber optic cable.

All splices shall be fusion type. All strands of all fiber optic cables shall be spliced to pigtails and terminated on the patch panel. The Contractor shall provide all equipment and consumable supplies necessary for performing the splices. Prior to the start of each shift, fusion splicing

equipment shall be cleaned, calibrated and specifically adjusted to the present fiber and environmental conditions. Splice enclosures, tools and procedures, shall be approved by the cable manufacturer as being compatible with the cable type being delivered.

Each spliced fiber shall be packaged in a protective waterproof sleeving. Bare fibers shall be completely re-coated with a protective room temperature vulcanizing (RTV) coating gel or similar approved substance, prior to application of the sleeve, so as to protect the fiber from scoring, dirt or microbending.

Average splice loss shall not exceed a mean of 0.1 dB. If a splice is measured to exceed 0.15 dB during the splicing process, it shall be remade until its loss falls below 0.15 dB. Each attempt shall be recorded for purposes of acceptance.

All splice losses shall be recorded in tabular form and submitted to the Engineer for approval. An optical time domain reflectometer (OTDR) shall be used to record splice loss, and chart recordings of the "signature" and shall be submitted with the splice data with a record of all OTDR settings and the OTDR locations written on the trace.

The Contractor shall supply and install a shelf or rack mounted splice tray housing as directed by the Engineer and two splice trays. The Patch Panel shall include a restraining system to hold the splice trays securely in place.

The splice trays shall each accommodate twelve single mode fusion splices. All of the splice trays shall be used to connect all strands of the 12 strand fiber optic cable entering the field cabinet to the patch panel connectors. The splice trays meeting the following requirements:

The splice trays shall incorporate a system to retain and provide strain relief to the fiber optic buffers tubes and connector pigtails. The splice trays shall incorporate grooves where the fiber optic splice can be held in place. Each splice tray shall incorporate a snap on lid.

The 12-Position Fiber Optic Patch Panel shall incorporate cable guides that maintain fiber strands and fiber buffer tubes bending radius greater than the minimum allowed by the manufacturer.

The 12-Position Fiber Optic Patch Panel shall incorporate a restraining mechanism to hold the fiber optic cable central member and outside jacket.

Environmental Requirements:

All equipment shall be certified to operate over a temperature range of -20° C to +60° C with a relative humidity of 10% to 95%, non-condensing.

Construction Methods:

Installation

The installation of the 12-Position Fiber Optic Patch Panels shall conform to all the manufacturer's recommended installation procedures and as described in this specification. The manufacturer's installation procedures shall supersede in the case of conflicting details.

The Contractor shall install the 12-Position Fiber Optic Patch Panels in the field cabinets as directed by the Engineer. The Contractor shall provide and install all interconnection fiber optic patch cords between the optical equipment in the cabinet, as shown on contract documents. Sufficient lengths of cable between the patch panel and the optical equipment installed in the rack shall be coiled in the equipment cabinet to allow the splice closures to be removed from the cabinet for splicing.

Submittals

In addition to the submittal requirements specified elsewhere, the Contractor shall submit the following:

- Product data, installation manuals, materials, system configuration options and features, and accessories for the 12-Position Fiber Optic Patch Panels.
- Shop Drawings shall be completely dimensioned and shall indicate the intended installation method and details for the 12-Position Fiber Optic Patch Panels.
- "As-built" installation prints and equipment manuals for the 12-Position Fiber Optic Patch Panels.

Delivery, Storage, and Handling

The Contractor shall deliver, store, handle and install all materials and equipment in such a manner as not to degrade quality, serviceability or appearance. The Contractor shall be responsible for storage of the materials and equipment prior to installation in a clean, dry location free from construction dust, precipitation and excess moisture. The Contractor shall replace any damaged materials and equipment, at no additional cost.

Manufacturer's Requirements

A minimum of ten (10) year's experience in the design, manufacture, and testing of the 12-Position Fiber Optic Patch Panels is required. The equipment shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

Method of Measurement:

This item shall be measured for payment for each installed 12-Position Fiber Optic Patch Panel complete, as specified and shown on the drawings and these specifications

Basis of Payment:

The unit price bid for each 12-Position Fiber Optic Patch Panel shall include the cost of furnishing all labor, materials, tools and equipment necessary to complete the work. Payment for all miscellaneous hardware, cabling, necessary documentation, and testing shall be included under this item.

Pay Item:	**Unit:**
12-Position Fiber Optic Patch Panel	EA

ITEM # 1111407A – CAMERA VIDEO DETECTION SYSTEM

Description:
These items shall consist of furnishing and installing vehicle Video Detection System equipment at each of the project intersections as called for on the plans. This item shall also consist of furnishing and installing all vehicle video detection equipment to support the Town of Glastonbury Naztec signal system data collection management software.

This specification sets the minimum requirements for a wide-area vehicle detection system thatprocesses video images for vehicle presence, count, speed, and other typical traffic parameters. The detection of vehicles passing through the field of view of an image sensor shall be available to a large variety of end user applications as simple contact closure outputs, data for a traffic controller, and other traffic data. This reflects the current real time detector or alarm states (on/off) or as summary traffic statistics that are reported locally or remotely. The contact closure outputs shall be provided to a traffic signal controller and comply to the NEMA (National Electrical Manufacturers Association) TS2 input file rack standards. The system architecture shall fully support networking of system components through a variety of industry standard and commercially available infrastructure that are used in the traffic industry. The serial data communications shall support direct connect, modem, and multi-drop interconnects.

The system shall be integrated through a client-server relationship. A communications server application shall provide the data communications interface between as few as one to as many as hundreds of machine vision processor (MVP) sensors using the industry standard TCP/IP network protocol. Communications protocol for the proposed machine vision system must be compatible with the existing machine vision system infrastructure to support current data collection processes.

Materials:
All materials furnished, assembled, fabricated, or installed shall be new, corrosion resistant, and in strict accordance with the details shown in the plans and in the Special Provisions. All equipment furnished under this item shall be current production equipment, identical models of which are field operational.

The video detection system shall consist of the following components:
- Camera Risers, installation and removal tools
- Machine Vision Processor (MVP) including camera and enclosure
- Communication Interface Panel (CIP)
- Cabinet Interface Module
- Video Detection System Software
- Traffic Data Collection
- Camera Cable

All MVP Processors and components shall be of the same type and from the same manufacturer. The MVP image sensor shall communicate with the cabinet interface module via the communications interface panel. The MVP shall be connected from the field to the communications interface panel using the twisted pair camera cable as specified herein. The

MVP image sensor shall communicate to the communications interface panel, cabinet interface module and various PC applications using the industry-standard TCP/IP network protocol. Additionally, one or more PCs shall be capable of communicating directly or remotely to a MVP sensor network where each MVP sensor has a unique Internet Protocol (IP) address. The MVP sensor network shall support communications over a mix of media, including PSTN, CDPD, CDMA, dedicated twisted-pair, fiber, and wireless.

The communications interface panel shall support one to eight MVPs. The communication interface panel in the cabinet shall provide electrical termination for the MVP sensor. The communication interface panel shall provide transient protection to electrically protect equipment in the cabinet. The communications interface panel will provide for supervisory connectivity via a RJ-45 Ethernet Port. The use of Serial to Ethernet converters will not be acceptable. The communications interface panel consists of a predefined wire termination blocks for MVP Broadband Over Power (BOP) communications, electrical surge protectors to isolate the modular cabinet interface unit and MVP, and an interface connector to cable directly to the modular cabinet interface unit. The connection from the MVP(s) to the communications interface panel shall be via the manufacturers supplied three wire cable with Easy-Lock connector to sensor. Splices between the MVP and the communications interface panel shall not be allowed. The interface panel shall provide power for one to eight MVP(s), taking local line voltage and coupling it with Ethernet protocol communications for the Broadband Over Power termination at about 15 watts.

The cabinet interface module shall communicate directly with up to eight (8) MVP sensors and shall comply with the form factor and electrical characteristics of a NEMA TS2 detector rack. For a contact closure interface to a traffic controller or other device, this interface shall accept sixteen (16) contact closure inputs (usually red and green control signals), and provide twenty-four (24) contact closure outputs to a traffic signal controller. For a SDLC interface to a NEMA TS2 traffic controller, this interface shall provide thirty-two (32) TS2 inputs for phase/load switch status, sixty-four (64) TS2 detector outputs and emulate up to four (4) bus interface units (BIU).

Camera Riser:
As called for on the plans, these camera risers to be mounted behind signal heads as shown on the plans and illustrated in the figure attached after this section. These camera risers shall be paid each under this Item # 1111407. The camera riser shall match the external finish of the traffic signal pole.

Machine Vision Processor including camera and enclosure
The MVP image sensor shall be an integrated imaging color CCD array with optics, high-speed, image processing hardware and a general purpose dual-core CPU bundled into a sealed enclosure. The CCD array shall be directly controlled by the CPU, thus providing high video quality for detection that has virtually no noise to degrade detection performance. It shall be possible for the user to zoom the lens, as required for operation. The MVP shall be able to transmit MPEG-4 video streams to remote locations. This requirement is described further in the video outputs section. It shall provide a video compression co-processor so as not to interfere with detection performance while streaming video. The MVP shall provide direct real-time iris

and shutter speed control. The MVP image sensor shall be equipped with an integrated auto zoom/auto focus lens that can be changed using computer software.

The MVP sensor shall output MPEG-4 streaming video utilizing Broadband Over Power via a single RJ-45 Ethernet Port on the communications interface panel.

Real-time detector performance shall be observed by viewing the video output from the sensor with overlaid flashing detectors to indicate the current detection state (on/off). Real-time speeds and classifications shall also be visible through streaming video via the video player.

Video Outputs
The MVP shall provide MPEG-4 color video output from the interface panel for real-time display on a PC using an Ethernet cable from the communications interface panel or to a monitor over standard coax cable from the cabinet interface module. The software shall also display streaming video as part of the user software based on MPEG 4 video compression. The MPEG-4 video compression shall be accomplished internally through software. No external video encoders are required. The MPEG 4 video compression shall be able to be viewed for individual cameras simultaneously on a PC. The streaming video shall be recordable as a data file on the PC for later playback and editing. The Machine Vision Processor (MVP) including camera and enclosure shall meet the following requirements:

Lens
- 22X continuous-focus zoom
- Horizontal: 5 to 74 degrees
- Vertical: 4 to 59 degrees

Imaging Device
- 1/4” color CCD

Video Formats Supported
- RS170, NTSC, CCIR and PAL

Video Compression
- MPEG-4 color video compression (software)

Resolution
- 470 TVL Horizontal

Effective Pixels
- NTSC :768(H) x 494(V) [380k]
- PAL: 752(H) x 582(V) [440k]

Synchronization
- Crystal lock

Sensitivity—at Lens
- Full video, AGC off, 2 lux
- Signal to Noise Ratio 50 dB

Communications
- Connector: EasyLock (IDC rapid termination industrial connector)
- Internet Protocol (IP) address
- RJ-45 Ethernet communications

Housing & Sunshield

Image sensor and MVP shall be sealed in a waterproof and dust-tight NEMA4 (IP66) enclosure. The housing shall include a thermostatically controlled ITO faceplate heater, Hydrophilic faceplate coating, weather proof connector and an adjustable weather and sun-shield with drip guard.

Power

- 110/220 VAC 50/60Hz
- 15 watts with heater on

Dimensions

- Mounting: Standard camera bracket tilt top
- Housing Enclosure: 3.5" diameter, 15.5" long
- Weather sunshield: 21.3" long

Weight

- 6.6 lbs.

Ambient Temperature Limits

- -34°C to +60°C / -29°F to +140°F

Humidity Limits

- Up to 100% relative humidity per MIL-E-5400T Paragraph 4.3.24.4

Camera Cable

The Color Camera / Integrated Machine Vision Processor cable shall use 3-Conductor, 18AWG Polyethelene Jacketed conduit rated power cable. The cable shall supply 110VAC power to the camera and bi-directional data communications and video between the MVP and CIP. Coaxial cable will not be allowed from MVP to traffic control cabinet. This camera cable shall be installed from the video detection camera/integrated Machine Vision Processor back to the communications interface panel

The cable outside jacket material shall be black UV resistant Santoprene 121-87, with a nominal wall thickness of 0.05" and a 600v (RMS) rating. The cable identification shall be marked with the manufacturer's part number at regular intervals along the cable.

Communications Interface Panel (CIP)

The communications interface panel shall provide power, high-voltage transient protection, mechanical strain relief and electrical connections to the Color Camera / Integrated Machine Vision Processor for communications and video. The communications interface panel shall also act as a terminal for Ethernet network communications. The communications interface panel shall contain an industry standard RJ-45 type connector for CAT-6 cable interface. A single communications interface panel shall provide for a termination of one to eight MVPs and a single 10/100 Base-T Ethernet network cable. The communications panel shall pass the detection information to the cabinet interface module. The communications interface panel consists of a predefined wire termination block for MVP power, data and video connections, electrical surge protectors to isolate the modular cabinet interface unit and MVP, and an interface connector to cable directly to the modular cabinet interface unit. In addition to the RJ-45 Ethernet port, the communications interface panel shall have at a minimum, a detector communications port, four sets of 3 compression terminals to support up to eight MVPs, and a compression block for power connection.

The Communications Interface Panel (CIP) shall meet the following requirements:

General

- Auto-Sensing 10/100Base-T network interface with on-board RJ-45 connector
- Robust on-board IP Stack: TCP, UDP, DHCP, SNMP, SSL/TLS, HTTP, SMTP, ICMP, IGMP and ARP
- Secure web-based configuration (HTTP/HTTPS)
- Universal IP address assignment
- Configuration and management through SNMP (read/write)

Connectors

- Ethernet Connectivity Upstream:
  - RJ-45 Connector
- Local and Remote Supervisor Capability
  - Network Browser via Ethernet RJ-45
- Detector Communications Port
  - Single FireWire Female Connector
- MVP Terminations
  - Four sets of 3 compression terminals
- Line Power
  - 3 Position Compression Block

Environmental

- -34°C to +74°C / -29°F to +165°F
- Up to 100% relative humidity per MIL-E-5400T per Paragraph 4.3.24.4

Cabinet Interface Module

The cabinet interface module shall provide the interface between the MVPs and the traffic signal controller. The cabinet interface module shall also be referred to as the "Access Point" or the detector port master. The cabinet interface module shall be capable of supporting up to eight MVPs in a single cabinet. The cabinet interface module shall be a single card rack device that can slide easily into a detector rack or be connected as a stand-alone device using a housing with power connector. The cabinet interface module shall provide real-time detection information from the MVP to the traffic signal controller.

The cabinet interface module shall communicate directly with up to eight (8) MVP sensors and shall comply with the form factor and electrical characteristics of a NEMA type C or D detector rack. The cabinet interface module shall be capable of emulating the functions of up to four Bus Interface Units (BIUs).

The cabinet interface module shall be capable of simultaneously providing NEMA TS 1 / 170/2070, and NEMA TS2 outputs to the traffic control cabinet.

The cabinet interface module shall meet the following requirements:

Environmental

- -34°C to +74°C / -29°F to +165°F
- 0 to 95% relative humidity

Outputs

- 24 optically-isolated NEMA TS1/TS2 outputs

Inputs

- 16 optically-isolated inputs to monitor signal controller phases or other conditions

Connectors

- Female I/O connector 44-socket metal shell D subminiature connector
- Female 15-pin metal shell D subminiature connector
- Cinch Jones 50-44A-30M edge connector
- BNC
- Two (2) USB for USB Mouse

Power

- 20 to 28 VDC, 100 milliamps, not exceeding 5 watts (Operates at 24 VDC as allowed in section 5.3.4.5 of the TS2 standard

TS2 Capability

- Fully comply with NEMA Publication Standard TS2-1998

Power

- 12 to 24 VDC, 100 not exceeding 11 watts .(Operates at 24VDC or at 12VDC as in section 5.3.4.5 of the TS2 standard)

Video Detection System Software

The MVP sensor's embedded firmware shall automatically perform a variety of diagnostic, installation, fault tolerant, and vehicle detection operations. Vehicle detection shall be reliable, consistent, and perform under all weather, lighting and traffic congestion conditions.

A software suite of client applications shall reside on the host client / server PC. The software suite shall support Microsoft Windows XP, NT, 2000 and later operating systems. Client applications shall include:

Network Browser:

Learn a network of connected modular cabinet interface units and MVPs then show the topology in a logical hierarchical relationship.

Detector Editor:

Create and modify detector configurations to be executed on the MVP sensor.

Operation Log:

Extract the MVP run-time operation log of special events that have occurred.

Software Installer:

Reconfigure one or more MVP sensors with a newer release of embedded system software.

Video Player:

Play streaming color video from any or all sensors connected to network. Video player shall also have the ability to go in to a video wall option which will divide the PC screen in as many sensors that are opened giving the user optimal viewing. The video player shall also be able to record and play back any or all sensors being viewed.

Video Controller:

Control the zoom, pan & tilt (optional) of the sensor it is controlling. Multiple sensors shall be able to be viewed or controlled at the same time. If multiple sensors are being viewed simultaneously, the video controller application shall allow the user to enlarge the screen in to a video wall option, which will split up the whole screen with the number of sensors being viewed.

Detection Types:

The MVP shall be able to be programmed with a variety of detector types that perform specific functions. The general functions performed by the detectors shall:

- Include presence/passage detection of moving and stopped vehicles.
- Enable detection based on the direction of travel or based on when a moving vehicle stops.
- Measuring vehicle speed and length and provide five (5) classes of vehicles based on length.
- Determine counts, either lane-by-lane or cumulative.
- Speed alarm detectors:
    - Output alarm on each fast vehicle, ignoring vehicles of length of less than the user defines.
    - Output alarm based on the average number of vehicles the user enters and the upper and lower speed thresholds that the user defines.
    - Output alarm based on the average speed over a user defined time frame.
    - Output alarm based on user-defined percent increase or decrease over a speed limit.

Detection Zone Programming

Placement of detection zones shall be by means of a supervisor computer (PC) operating in the Windows 2000 or Windows NT graphical environments, a keyboard, and a mouse. The VGA monitor shall be able to show the detection zones superimposed on images of traffic scenes.

The detection zones shall be created and/or edited by using a mouse to draw detection zones on the supervisor computer's VGA monitor. Using a mouse and the keyboard it shall be possible to place, size, and orient detection zones to provide optimal road coverage for vehicle detection. It shall be possible to download detector configurations from the supervisor computer to the MVP, to retrieve the detector configuration that is currently running in the MVP, and to back up detector configurations by saving them to the supervisor computer’s removable or fixed disks.

Traffic Data Collection

The MVP sensor shall optionally store cumulative traffic statistics, internally in non-volatile memory, for later retrieval and analysis. MVP sensor shall have at least 5 megabytes of memory for data storage. The following data types are available to be stored in time increments from a cycle to one-hour increments:

- Average Flow Rate

- Total Volume Count
- Arithmetic Mean Speed
- Vehicle Class Count
- Average Time Headway
- Average Time Occupancy
- Level of Service
- Space Mean Speed
- Space Density
- Density

The above data types shall also be available to be viewed real-time through a standard web browser compatible with the existing Town of Glastonbury data collection and management service (DCMS.) The manufacturer shall modify the existing Town of Glastonbury web page interface/GIS map to include all video detection sensors as part of this project.

This DCMS shall have the capability of polling an unlimited number of video detector sensors via the fiber optic Ethernet based communication interface. The DCMS shall then display the data real-time on the Town of Glastonbury custom website. It shall be the responsibility of the manufacturer to make all necessary modifications to this website. The manufacturer shall also supply all necessary cables and hardware at the Town of Glastonbury Traffic Operations Center to provide for a fully operational website displaying real-time data. In addition to displaying real-time data and color snapshots of the image sensor, the manufacturer shall archive all data for the agency to create custom data reports in Excel or HTML by simply accessing the website and filtering the dates and reporting parameters.

System Installation

The supplier of the video detection system shall supervise the installation and testing of the video detection system and computer equipment. A factory certified representative from the supplier shall be on-site during installation.

Warranty, Service and Support

The Video Detection manufacturer shall, for a minimum of five (5) years, warrant the video detection system including all software upgrades free of charge for duration of warranty period.

Method of Measurement:

The MVP Color Camera / Integrated Machine Vision processor system or approved equal will be measured for payment as the number units furnished, installed, made fully operational and tested. MVP Color Camera / Integrated Machine Vision processor Cable will not be measured for payment but included in the cost as furnished, installed made fully operational and tested.

Basis of Payment:

The unit price bid for each MVP Color Camera / Integrated Machine Vision processor or approved equal System item shall include the cost of furnishing four (4) MVP Unit(s), one (1) CIP-8 (per 8 MVP Units), camera cable and one (1) cabinet interface module (detector port master) and all associated enclosures and equipment and all labor, training, materials, cables, tools and equipment necessary to complete the work. Payment for the MVP Comm. server

configuration software, all miscellaneous hardware, cabling, connectors, documentation, test equipment, and testing shall be included under these items. The unit price bid shall also include the cost of furnishing all labor, materials and tools and equipment necessary to complete the work and to make the system fully operational**.**

Pay Item	**Unit**
Camera Video Detection System	EA

1112242A FIBER OPTIC SPLICE ENCLOSURE (SIGNAL).
1113030A 12 STRAND FIBER OPTIC DROP CABLE

Description:
The Contractor shall furnish and install the required fiber optic cables and splice enclosures in accordance with these requirements and as directed by the Engineer. The Town of Glastonbury has recently installed a 48 pair single mode fiber optic trunk cable along Main Street with overhead splice enclosures as shown on the plans.

The Contractor shall furnish and install the fiber optic interconnects, and all necessary components required to form a complete cable interconnect system and shall conduct acceptance tests for this interconnect as specified.

The passive components that shall be provided under this specification include the following:

- All Fiber Optic Cable Connectors and Splices
- Fiber Optic Splice Trays
- Fiber Optic Splice Enclosures

Other passive components that are required to form a complete communication system include (1) terminations and (2) moisture and water sealants and cable caps for below-grade applications. The components supplied shall be commercially available components whose specifications indicate state-of-the-art capability for the application.

The Contractor shall furnish, install, splice, and test all of the fiber optic cables as part of the installation of the fiber optic cable splice enclosure and as shown on the Drawings. All equipment for installation, splicing, and testing shall be provided by the Contractor. All fibers in the fiber optic cable shall be spliced and/or terminated in designated equipment as specified or as directed by the Engineer.

Materials:

Fiber Optic Drop Cable
The single mode fiber optic drop cable to be provided shall be a loose, flexible buffer tube cable design as specified herein. The fiber optic drop cable shall contain twelve (12) fibers, as shown in the Drawings. The fiber optic cable shall be suitable for outside duct, aerial, and direct buried installations, and for indoor use when installed in accordance with NEC Article 770 and local building code requirements. All cables shall consist of the number of fibers as specified on the plans.

The single mode fiber optic drop cable shall be unterminated One end shall be fusion spliced in the splice enclosure to the designated trunk fiber strand as shown in the Drawings. The other end of the fiber optic drop cable shall be spliced to fiber optic pigtails in the fiber optic patch panel (specified elsewhere). The contractor shall test the fiber optic cable splices using approved materials, methods and fiber optic test equipment.

The drop cable shall be sufficient length to be installed as shown on the Drawings, with a minimum of 10 meters of slack provided in the handhole or as shown on the Drawings.

The Contractor shall follow the drop cable manufacturer's recommendation in the installation of the drop cables, including the individual breakout fibers.

Fiber optic drop cables shall be installed on aerial messenger cable or in conduit, connected to the fiber optic backbone cable and equipment cabinet fiber optic patch panels as shown on the Drawings. The fiber optic drop cables shall be spliced to the designated fiber strands within approved spliced closures installed on the messenger wire, on the utility pole or in handholes as shown on the Drawings or as directed by the Engineer.

The cable shall meet the requirements of REA 7 CFR 1755.900 at a minimum, and shall be new, unused and of current design and manufacture.

The cable shall meet all requirements stated in this specification. The cable shall be an accepted Product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1992.

Optical Requirements:

- Nominal Attenuation: < 0.4 dB/km 1310 nm, < 0.3 dB/km at 1550 nm
- Attenuation Uniformity: No point discontinuity greater than 0.10 dB at either 1310 nm or 1550 nm.
- Maximum Attenuation: Each individual fiber shall not be greater than 0.15 dB/km at 1550 nm.
- Attenuation at the Water Peak: The attenuation at 1383 ± 3 nm shall not exceed 2.1 dB/km.
- Cutoff Wavelength: The cabled fiber cutoff wavelength (λ_{ccf}) shall be < 1250 nm.
- Mode-Field Diameter: 9.30 ± 0.50 μm at 1310 nm, 10.50 ± 1.00 μm at 1550 nm.
- Zero Dispersion Wavelength (λo): 1301.5 nm ≤ λo ≤ 1321.5 nm.
- Zero Dispersion Slope (So): ≤ 0.092 ps/(nm²•km).
- Fiber Polarization Mode Dispersion (PMD): ≤ 0.5 $ps/\sqrt{km}$.
- Chromatic Dispersion: The maximum dispersion shall be ≤ 3.2 ps/(nm•km) from 1285 nm to 1330 nm and shall be < 18 ps/(nm•km) at 1550 nm as measured in accordance with TIA/EIA Standard FOTP-169.

Mechanical Requirements: All fibers in the cable must be usable fibers. All fibers within a given cable shall be from the same manufacturer, shall contain no factory splices, and conform to the following minimum requirements:

- Typical Core Diameter: 8.3 μm.
- Cladding Diameter: 125.0 ± 1.0 μm.
- Core-to-Cladding Offset: ≤ 0.6 μm.
- Cladding Non-Circularity: ≤ 1.0%.

- Fiber Curl: ≥ 4.0 m radius of curvature

Color Coating: Each fiber shall have a color coating applied to it by the manufacturer. The coating shall not affect the optical characteristics of the fiber. Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding." The fibers shall be colored with ultraviolet (UV) curable inks. The nominal diameter of the colored fiber shall be 250 μm.

Primary Coating: The coating shall be a dual layered, UV-cured acrylate applied by the fiber manufacturer. The coating shall be mechanically strippable without damaging the fiber. The coating diameter shall be 245 ± 10 μm.

The force required to mechanically remove at least 30 mm of unaged coating shall not exceed 10 N as measured in accordance with TIA/EIA Standard FOTP-178.

Central Strength Member: The central anti-buckling member shall consist of a dielectric, glass reinforced plastic (GRP) rod. The purpose of the central member is to prevent buckling of the cable. The GRP rod shall be over-coated with a black colored thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

Buffering: All fibers shall be placed inside a non-conductive loose buffer tube. Each buffer tube shall contain up to twelve (12) fibers. The Contractor shall submit the fiber count per buffer tube and the buffer tube count configuration to the Engineer for approval. The fiber shall not adhere to the inside of the buffer tube. Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and not subject to fading or smearing onto each other or into the gel filling material. Coloring medium shall not cause fibers to stick together.

Buffer tubes shall be of dual layer construction, standard colors are used for tubes 1 through 12 and stripes are used to denote tubes 13 through 24. The color sequence applies to tubes containing fibers only, and shall begin with the first tube. If fillers are required, they shall be placed in the inner layer of the cable. The tube color sequence shall start from the inside layer and progress outward.

Each buffer tube shall be filled with a non-hygroscopic, non-nutritive to fungus, electrically non-conductive, homogeneous gel to prevent water and moisture penetration. The gel shall contain anti-oxidant additives, and the gel shall be readily removable with conventional solvents. The gel shall be non-toxic and safe to exposed skin. It shall be chemically and mechanically compatible with all cable components.

The nominal outer diameter of the buffer tube shall be 3.0 mm. The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrink back requirements of 7 CFR 1755.900. Buffer tube colored stripes shall be inlaid in the tube by means of co-extrusion when required. The nominal stripe width shall be 1 mm.

Filler Rods: Filler rods shall be used to fill all unused buffer tubes, or shall be used instead of unused buffer tubes in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 3.0 mm in outer diameter.

Stranding: Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process. Water blocking yarn(s) shall be applied longitudinally along the central member during stranding. Two polyester yarn binders shall be applied in contra helix form with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes. The binders shall be non- hygroscopic, non-wicking, and dielectric with low shrinkage.

Core and Cable Flooding: For single layer cables, a water blocking tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The tape shall be held in place by a single polyester binder yarn. The water blocking tape shall be non-nutritive to fungus, electrically non-conductive and homogenous. It shall also be free from dirt and foreign matter.

For dual layer cables, a second (outer) layer of buffer tubes shall be stranded over the original core to form a two-layer core. A water blocking tape shall be applied longitudinally over both the inner and outer layer with each being held in place with a single polyester binder yarn. The water blocking tape shall be non-nutritive to fungus, electrically non-conductive and homogenous. It shall also be free from dirt and foreign matter.

Tensile Strength Provisions: Tensile strength shall be provided by dielectric yarns. The high tensile strength dielectric yarns shall be helical stranded evenly around the cable core. The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

Inner Jacket: The cable shall have an inner jacket of medium density polyethylene (MPDE) with a minimum nominal jacket thickness of 1.0 mm. The inner jacket shall be applied directly over the tensile strength members and the water blocking tape.

Outer Jacket: The outer jacket shall be medium density polyethylene (MPDE) with a minimum nominal jacket thickness of 1.4 mm. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus. The cable jacket shall contain no metal elements and shall be of a consistent thickness. The jacket shall be free of holes, splits, and blisters.

The MPDE jacket material shall be as defined by ASTM D1248, Type II, Class C and Grades J4, E7 and E8.

The jacket shall be marked in contrasting color at one (1) meter intervals with the following information and in accordance with Section 350G of the National Electrical Safety Code (NESC).

- FIBER OPTIC CABLE - XXX - MM/YY
- XXX = Number of optical fibers in the cable
- MM/YY = Month and Year that the cable was manufactured

In addition, the outer jacket shall have sequential meter markings as approved by the Engineer. The actual length of the cable shall be within 1% of the length markings.

Ripcords: The cable shall contain two (2) ripcords under the sheath for easy sheath removal of all-dielectric cable. The cable shall contain one ripcord under the inner sheath and one under the steel armor for armored cable. The ripcord color shall be orange for non-armored sheaths and yellow for armored sheaths

Bend Radius: The cable shall be capable of withstanding a minimum bending radius of 10 times its outer diameter during operation and 15 times its outer diameter during installation without changing the characteristics of the optical fibers.

Diameter: The nominal outer diameter of the various cable sizes shall be the following:

- 12 Fiber - 11.5 mm (0.46 in)
- 72 Fiber - 12.5 mm (0.50 in)

Manufacturer's Certification

The following tests shall be performed and the test results documented for the type of cable supplied. The cable manufacturer shall certify that each reel of cable furnished meet or exceeds the following specifications:

Attenuation Change: When tested in accordance with TIA/EIA Standard FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures (-40°C and +70°C) shall not exceed 0.05 dB/km at 1550 nm.

Water Penetration: When tested in accordance with TIA/EIA Standard FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable." a one meter length of unaged cable shall withstand a one meter static head or equivalent continuous pressure of water for 24 hours, without leakage through the open cable end. If the first sample fails, subsequent test shall be done in accordance with either Bellcore TR-TSY-000020 or REA PE-90.

Filling Compound Flow: When tested in accordance with TIA/EIA Standard FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable", the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 80°C. If material flow is detected, the weight of any compound that drips from the sample shall be less than 0.05 grams.

Comprehensive Strength: When tested in accordance with TIA/EIA Standard FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 440 N/cm (250 lbf/in) uniformly over the length of the sample. The load shall be applied at the rate of 3 mm to 20 mm per minute and maintained for ten minutes. The

magnitude of the fibers shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation greater than 0.1 dB. The repeatability of the measurement system is typically ± 0.05 dB or less. No fibers shall exhibit a measurable change in attenuation after load removal.

Impact Resistance: When tested in accordance with TIA/EIA Standard FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," the cable shall withstand 25 impact cycles. The magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.1dB at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Cable Flex: When tested in accordance with TIA/EIA Standard FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles at a rate of 30 ± cycles per minute with a sheave diameter not greater than 20 times the cable diameter. The magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.1dB at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Cable Freezing: When tested in accordance with TIA/EIA Standard FOTP-98, the cable shall be immersed in water. Upon freezing, the magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.1dB at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Jacket Shrinkage: When tested in accordance with TIA/EIA Standard FOTP-86, the maximum outer cable jacket shrinkage shall be less than 5%.

Outer Jacket Adhesion: When tested in accordance with Bellcore TR-TSY-000020, the force required to initiate slippage between the cable outer jacket and the steel armor shall be a minimum of 14.0 N/mm of a cable circumference.

Lightning Protection: When tested in accordance with TIA/EIA Standard FOTP-181, "Lightning Damage Susceptibility Test for Optic Cables with Metallic Components," the cable shall withstand a simulated lightning strike with a peak value of the current pulse equal to 105 kA without loss of fiber continuity. A damped oscillatory test current shall be used with a maximum time-to-peak value of 15 μs (which corresponds to a minimum frequency of 16.7 kHz) and a maximum frequency of 30 kHz. The time to half-value of the wave form envelope shall be from 40 - 70 μs. In addition to the analysis criterion set forth in FOTP-181, the integrity of the buffer tubes (or analogous loose tube and strength members) must be intact after removal of the cable specimens from the test box.

Cable Twist: When tested in accordance with TIA/EIA Standard FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 4 meters shall withstand 10 cycles of mechanical twisting. The magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.1dB at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Tensile Strength: When tested in accordance with TIA/EIA Standard FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a tensile load of 2700 N (608 lbf). The magnitude of the attenuation change shall be within the repeatability measurement system for 90% of the test fibers. The remaining 10% of the fibers shall not experience an attenuation change greater than 0.2dB during loading and 0.1 dB after loading at 1550 nm. The repeatability of the measurement system shall be ± 0.05 dB or less. The cable jacket shall exhibit no cracking or splitting when observed under 5X magnification.

Cable Bend: When tested in accordance with TIA/EIA Standard FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable", the cable shall withstand four full turns around a mandrel of ≤ 10 times the cable diameter for non-armored cables and ≤ 20 times the cable diameter for armored cables after conditioning for four hours at test temperatures of -30°C and +60°C. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears or other openings. Optical continuity shall be maintained throughout the test.

Fiber Optic Splices

All fiber optic splices shall be fusion splices. A factory fabricated fusion splice kit containing materials necessary for quality fusion splicing shall be provided for each fiber splice. All fusion splice kits shall have a specified maximum loss of 0.1 dB at 1310 nm.

Fiber Optic Splice Enlosures

The Contractor shall furnish and install one fiber optic splice enclosure at the Putnam Boulevard location and in the traffic signal controller cabinet as shown on the Drawings and as directed by the Engineer. The fiber optic splice enclosure shall be capable of accepting the specified fiber optic cable used.. The fiber optic splice enclosure shall meet all requirements stated in the following specification:

- The splice enclosure housing shall be non-metallic. It shall be resistant to solvents, stress cracking, and creep. The housing materials shall also be compatible with chemicals and other materials to which they might be exposed in normal applications.

- The fiber optic closure shall be available in distinct sizes to accommodate a variety of cable entries. A small fiber optic closure shall be capable of accommodating up to five cables in a butt or branch configuration. A medium sized fiber optic closure shall accommodate six cables in a butt configuration or twelve cables in a through configuration. A large fiber optic closure shall accommodate eight or sixteen cables in

a butt or through configuration, respectively. A mid-span (express) configuration shall be achievable using two cable entry ports located at the seam of the end cap halves.

- The closure shall be capable of accepting additional cables without removal of the sheath retention or strength member clamping hardware on previously installed cables or disturbing existing splices. The fiber optic splice closure shall provide a robust clamping mechanism to prevent pistoning of the central member or strength members and to prevent cable sheath slip or pullout.

- The splice closure shall have available appropriate hardware and installation procedures to facilitate the bonding and grounding of metal components in the closure and the cable armored sheath. The cable bonding hardware shall be able to accommodate a copper conductor equal to or larger than a #6 AWG.

- Aerial splice closures shall have available the necessary hardware to attach and secure the closure to an aerial strand.

- The splice organizer used in the closure shall accommodate splice trays suitable for single fiber splices.

- The splice closure shall accommodate a minimum of 12 single fiber splices.

- Spliced fibers shall not be subjected to a bend radius smaller than 30 mm (1.2 inches). Buffer tubes shall not be subjected to a bend radius smaller than 38 mm (1.5 inches).

- The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by construction crews.

- The splice closure shall incorporate a mechanical compression and/or mastic tape sealing system to maintain a barrier against water penetration.

A bond clamp shall remain firmly attached to the cable armor sheath while under a tensile load of 9 kg (20 lbf). Following removal of the load, there shall be no evidence of clamp loosening or damage to the cable sheath, armor, or clamp that would reduce its current carrying capacity as required by the AC fault test.

- The electrically conductive path used for continuity and grounding of the splice closure metallic components shall be capable of withstanding an AC current of 1000 Amperes for 20 seconds.

- The cable clamping and sealing hardware used to terminate fiber optic cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at 1550 nm ± 20 nm.

- An axial load of 100 lbf, individually applied to each cable, shall not cause mechanical damage to the cable or clamping hardware. The load to the fiber optic

cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at 1550 nm ± 20 nm.

- Subjecting the closure/cable interface to 90° flexing for 8 cycles at ambient temperatures of -18°C ± 2°C (0°F ± 3.6°F) and 40°C ± 2°C (104°F ± 3.6°F) shall not cause any mechanical damage to the cable or clamping hardware. In addition, flexing of the fiber optic cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at 1550 nm ± 20 nm.

- Subjecting the closure/cable interface to 10 cycles of torsional loading at ambient temperatures of -18°C ± 2°C (0°F ± 3.6°F) and 40°C ± 2°C (104°F ± 3.6°F) shall not cause any mechanical damage to the cable or clamping hardware. In addition, torsional loading of the fiber optic cable shall not exceed allowable attenuation changes.

- The diameter of the fiber optic splice closure shall not permanently deform more than 10 %, nor temporarily deform more than 20%, when it is compressed by a uniformly distributed load of 300 lbf. Additionally, the compressive load shall cause no mechanical damage to the closure or its contents.

- A closure shall not exhibit any mechanical damage after being subjected to mechanical impact of 85 lbf (115 Nm) at temperatures of -18°C ± 2°C (0°F ± 3.6°F) and 40°C ± 2°C (104°F ± 3.6°F).

- The closure central member clamp shall prevent movement (e.g. bowing, pistoning, or breaking) of the cable central member (CM) when the CM exerts a force of 100 lbf on the clamp.

- Sealing components (gaskets, grommets, O-rings) used in a closure, shall not permit the entry of water into the closure after thermal aging at 90°C ± 1°C (194°F ± 1.8°F) for 720 hours (30 days).

- The closure shall be capable of being safely and properly assembled at temperatures of 0°C ± 2°C (32°F ± 3.6°F) and 40°C ± 2°C (104°F ± 3.6°F) using materials and procedures specified by the manufacturer.

- The splice closure shall show no evidence of water penetration following exposure to a 20-foot water-head for a period of 7 days.

- A closure shall show no evidence of corrosion following exposure to salt-fog for a period of 90 days.

- Samples of polymeric closure materials shall not support fungus growth when tested per ASTM G 21. A rating of 0 is required.

Splice Trays

The Contractor shall furnish and install fiber optic splice trays to organize and store splices within splice closures. The trays shall be compatible with the fiber optic splices and splice closures specified herein and shall meet the following minimum requirements:

- The tray shall have the capacity of up to 12 splices. It shall be compatible with the fusion splices specified herein and provide optimum physical protection.

- The trays shall be engineered for use with loose tube optical cable designs. They shall not induce attenuation due to fiber bending. No cable ties are to be used. The loose tube buffers shall be secured with a tube guide or channel snap.

- Slack fiber within the tray shall be placed in an oval shape along an inside wall of the tray.

Quality Assurance

All optical fibers shall be proof tested by the fiber manufacturer to a minimum load of 0.7 GN/m^2 (100 kpsi). All optical fibers shall be attenuation tested. The attenuation of each fiber shall be provided for each reel of cable furnished. The cable manufacturer shall be ISO 9001 registered.

Environmental Requirements

The cable shall function within the specifications over the following temperature ranges:

- Shipping/Storage: -50°C to 70°C
- Installation: -30°C to 70°C
- Operation: -40°C to 70°C

Construction Methods

Prior to the installation of the fiber optic cable, the Contractor shall submit his proposed cable plant design to the Engineer for approval. The cable plant design shall include the following at a minimum:

- Catalog cuts and shop drawings for all cable, connectors, splice equipment, splice enclosures, splice trays and cable installation and test equipment.
- Locations of all proposed splices.

Fiber Optic Drop Cable

The fiber optic cable installation techniques and procedures shall be specified by the cable manufacturer and shall be such that the optical and mechanical characteristics of the cables are not degraded at the time of installation.

Experience Requirements

Personnel involved in the installation, splicing and testing of the fiber optic cable shall meet the following requirements:

- A minimum of seven (7) years experience in the installation of fiber optic cables, including fusion splicing, terminating, and testing single mode fibers.

- Shall have installed at least five (5) communication systems where fiber optic cables in aerial/outdoor conduits and the systems are in continuous satisfactory operation for at least two (2) years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the fiber optic systems.

- Personnel performing Splicing shall have been trained and certified by the manufacturer of the fiber splice equipment and material to be used, in fiber optic splicing procedures. Proof of this training must be submitted to the Engineer for approval.

- Installers shall have been trained and certified by the manufacturer of the fiber optic cable to be used, in fiber optic cable installation and handling procedures. Proof of this training must be submitted to the Engineer for approval.

- Personnel involved in testing shall have been trained and certified by the manufacturer of the fiber optic cable test equipment to be used, in fiber optic cable testing procedures. Proof of this training must be submitted to the Engineer for approval.

Installation

All fiber optic cables to be installed in a new or existing conduit, duct facility or overhead shall be pulled as a unit. The Contractor shall ensure the cable is not damaged during storage, delivery and installation. The cable shall not be pulled along the ground or over or around obstructions. The cable shall not be stepped on by workmen, nor run over by vehicles or equipment. All cable shall be inspected and approved by the Engineer prior to installation. All cables shall be pulled in conduit and along a cable messenger with a cable grip designed to provide a firm hold on the exterior covering of the cable. Heat shrinkable end caps shall be placed on the cable ends. Conduit ends shall be sealed with a urethane compound after the cable installation.

When installing cable in existing conduits which already have cables within them, the Contractor shall not damage existing cables. Should the Contractor cause damage to the fiber optic cable, or any existing cables, he shall immediately notify the Engineer and the affected owner. Corrective action will be made by the cable owner. The cost to repair damages caused by the Contractor's actions shall be deducted from the payment due to the Contractor and paid to the cable owner for cable repair purposes.

The cable pulling operation shall be performed such that a minimum bending of the cable shall occur in the unreeling and pulling operations. Entry guide chutes shall be used to guide the cable into the pull-box conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the array is specifically approved by the cable manufacturer. The pulling tension shall be continuously measured and it shall not be allowed to exceed the maximum tension specified by the

manufacturer of the cable; breakaway swivels must be used to insure cable tensile strength is not exceeded. The pulling system shall have an audible alarm that shall sound whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the Engineer upon request.

The central strength member and aramid yarn shall be attached directly to the pulling eye during cable pulling. “Basket grip” or “Chinese finger” type attachments to the cable outer jacket will not be permitted. A breakaway swivel with a cable manufacturer approved tensile rating shall be used on all pulls.

Cable slack of 10 meters shall be provided in pull boxes.

Splicing Requirements

All optical fibers shall be spliced to provide continuous runs. Splices shall be allowed in locations shown on the Drawings.

All splices shall use the fusion technique. Fusion splicing equipment shall be provided by the Contractor and shall be clean, calibrated and specifically adjusted to the fiber and environmental conditions at the start of each shift. Splice enclosures, tools and procedures, shall be approved by the cable manufacturer as being compatible with the cable type being delivered.

Each spliced fiber shall be packaged in a protective sleeving or housing. Bare fibers shall be completely recoated with a protective RTV, gel or similar substance, prior to application of the sleeve or housing, so as to protect the fiber from scoring, dirt or microbending.

Splice losses shall not exceed an average of 0.10 dB. If a splice is measured to exceed 0.15 dB during the splicing process, it shall be remade until its loss falls below 0.15 dB @ 1310 nm. Each attempt shall be recorded for purposes of acceptance.

All splice losses shall be recorded in tabular form and submitted to the Engineer for approval. An optical time domain reflectometer (OTDR) shall be used to record splice loss, and chart recordings of the “signature” and shall be submitted with the splice data with a record of all OTDR settings and the OTDR locations written on the trace.

Unused optical fibers shall be properly protected with sealed end caps.

Documentation Requirements:

Four (4) complete sets of operation and maintenance manuals shall be provided. The manuals shall, as a minimum, include the following:

- Complete and accurate as-built schematic diagrams showing the fiber optic cable and locations of all splices.
- Complete performance data of the cable showing the losses at each splice joint and each terminal connector.
- Installation, splicing, terminating and testing procedures.

- Complete parts list including names of vendors.
- Complete maintenance and trouble-shooting procedures.

One (1) month prior to installation, four (4) copies of the Contractor's Installation Practices shall be submitted for approval. This shall include installation methods, list of installation equipment, and splicing and test equipment. Field quality control procedures shall be detailed as well as procedures for corrective action.

Testing Requirements

The following tests shall be conducted. All tests shall be conducted in accordance with the approved test procedures. The Contractor shall submit test procedures and forms for approval to the Engineer.

Pre-Installation Tests: The fiber optic cable shall be tested at the storage site prior to installation. Each optical fiber in the cable shall be tested from one end with an OTDR with wavelength (1310 and 1550 nm) and fiber type. Testing shall check for continuity, length, anomalies, and attenuation. Each measurement shall be recorded with color, location, and type of fiber measure. In the event that a meaningful measurement cannot be made from one end, it shall be performed from the opposite end of that fiber.

Post-Installation Tests: After installation, each optical fiber in the cable shall be tested again for loss characteristics. Both directions of operation of the fiber shall be tested with an OTDR with wavelengths 1310 and 1550 nm.

After each fiber splice and connector installation, the cable shall be tested with an OTDR and the data shall be submitted to the Engineer as a basis for acceptance.

Subsystem Tests: The Contractor shall conduct approved fiber optic network subsystem tests after the integration of the fiber optic terminal equipment to the fiber optic network. The tests, as a minimum, shall demonstrate the capability of the fiber optic cable to transmit the specified signals. The tests shall run continuously for a minimum of twenty four (24) hours without any network outage. Approved data forms shall be completed and turned over to the Engineer for review as the basis for acceptance/rejection.

If a subsystem fails because of any components in the subsystem, the particular components shall be corrected or replaced with other components and the tests shall be repeated.

If a component has been modified as a result of the subsystem test failure, a report shall be prepared and delivered to the Engineer prior to testing.

Method of Measurement:

The quantity of single mode fiber optic drop cable to be paid will be measured for payment as the number of linear feet actually furnished and installed.

The quantity of fiber optic cable splice enclosures to be paid will be measured as the number of splice enclosures actually furnished and installed.

Basis of Payment:

The unit price paid per linear foot for Fiber Optic Drop Cable shall include the cost of furnishing, installing, grounding and bonding, connecting and testing the fiber optic cable of the type specified. The price shall also include furnishing all labor, tools, materials, documentation, equipment, storage, transportation, and other incidentals necessary to complete the work.

The unit price paid for Fiber Optic Cable Splice Enclosure shall include the cost of furnishing, installing, connecting and testing of the splice enclosure. The price shall also include furnishing all labor, tools, materials, documentation, equipment, storage, transportation, and other incidentals necessary to complete the work.

Pay Item:	**Unit:**
Fiber Optic Cable Splice Enclosure	EA
Fiber Optic Drop Cable	LF

ITEM #1113812A – UNINTERRUPTIBLE POWER SUPPLY

DEFINITIONS

UPS: means Uninterruptible Power Supply.

AGM VRLA Battery: means sealed battery using Absorbed Glass Mat & Valve Regulated Lead Acid technology

Gel Cell Battery: means sealed battery contains acid in a gel form so it does not leak.

The contractor shall provide a complete UPS system for all intersection locations within the proposed traffic controller cabinets. For the Glastonbury Boulevard intersection, the UPS shall include provisions for external generator hookup for extended periods of non-power situations.

MATERIALS

1.1 General

The UPS system shall provide uninterruptible power and conditioning of the utility power required for the operation of all electronic equipment used to operate the traffic control signals in the event of main utility power supply failure or voltage or frequency fluctuations.

The UPS system shall be supplied complete with UPS automatic switch.

The UPS control unit shall be a line interactive or double conversion type with automatic voltage regulation for 120V, 60Hz, single phase.

The UPS system shall include all wiring necessary to interconnect the UPS control unit to the power source and to the traffic signal control components.

The UPS control unit must latch from line to battery and from battery to line (transfer time) in less than 60 milliseconds.

When installed at a traffic signal using LED signal lamps, the UPS system shall be capable of maintaining full signal display operation for a minimum of 4 hours after which it shall be capable of maintaining a flashing signal display for a further 6 hours minimum.

Switching from full operation to a flashing operation may be determined by a timer circuit or based on battery capacity.

If the UPS control unit or the batteries fail, the system shall automatically switch back to utility line power.

The UPS cabinet shall be supplied complete within the traffic signal controller based mounted cabinet as indicated in the Contract Documents.

The battery installation and wiring to the batteries shall be according to National Electric Code requirements as applicable.

The UPS system components shall operate properly for the time periods specified above under the following conditions:

- Ambient temperature –37 ^{o}C to +74 ^{o}C
- Humidity: 5 percent to 95 percent
- The UPS system components shall withstand shock and vibration according to NEMA TS 2-2003

The system shall have provisions for external generator back up at the Glastonbury Boulevard intersection.

5.3 Batteries:

Batteries shall be AGM VRLA or Gel Cell technology.

Battery leads to UPS control unit shall be of suitable length and not less than 2.5 metres.

Each battery shall be placed on its own heater mat with all heater mats being supplied with AC power by the UPS control unit.

Battery mats shall become inoperable with loss of line voltage.

The batteries shall be protected by a circuit breaker or a fuse.

Each battery shall be labelled with the date of manufacture. The label shall be at a visible location on the top of the battery.

In addition to any other warranty, the Contractor shall provide a 3 year warranty on the batteries. The warranty period for each battery shall be 3 years, commencing from the date of "switch on" for operation of the UPS system in which the batteries are used. Any defective battery shall be replaced within 30 days. The warranty shall include all labor, equipment, and materials required to replace the batteries, including traffic control and all removal and disposal work. The Contractor shall be responsible for the removal and disposal of any defective batteries replaced under warranty. The Owner shall be the sole judge in determining if a battery is defective.

1.4 UPS Control Unit

The UPS control unit shall be rack mountable with the following maximum dimensions: Width of 483 mm (19-inch), depth of 254 mm (10 inches), and height of 153 mm (6 inches).

The front face of the control unit shall have indicators capable of displaying the following:

- Number of times the system was on battery supply
- Total time on battery supply
- Battery charge status to indicate the battery capacity

Each of the battery supply indicators listed above shall have a manual reset switch.

The UPS control unit shall have a minimum of one standard 120V grounded socket located on either the back or the front panel.

The UPS control unit shall contain over-current protection located on the front panel to switch power On/Off from the batteries and to switch AC input and output power On/Off.

The UPS control unit shall have a self-test feature to test the UPS Automatic Switch and the control circuitry.

The UPS control unit shall have an open collector output or an AC or DC contact closure to indicate when the traffic signal is operating on battery supply.

The UPS control unit shall have an open collector output or an AC or DC contact closure to indicate low battery alarm.

The UPS control unit shall have a minimum of 1 switched AC output that will switch on when the traffic signal has been on battery supply continuously for 4 hours.

A 9 pin male serial port shall be located on the front panel to allow for communication to a laptop computer for changing software settings.

A set of battery voltage test points, or a readout indicating battery voltage condition shall be located on the front panel.

1.5 UPS Automatic Switch

The UPS automatic switch shall allow the UPS control unit to be removed for replacement or maintenance without turning off the traffic signal system.

The utility line power shall be connected to the input of the automatic switch. Under normal operating conditions the automatic switch shall connect the utility line power to the UPS control unit. In the event that the UPS control unit is not present or does not function, the automatic

switch shall automatically connect the utility line power directly to the traffic signal system, bypassing the UPS control unit.

The switch shall also allow for transferring power to an external receptacle for portable generator powering of the traffic controller during extended periods of power loss.

1.6 Power Conditioning and the Use of Batteries by the UPS

Under normal operating conditions the utility line power shall flow through the UPS control unit to the traffic signal system and any other connected loads.

When the utility line power is within the operating parameters specified by the UPS manufacturer and the Contract Documents the UPS control unit shall condition and deliver the power to the loads without drawing power from the batteries.

When the utility line power is not within the operating parameters specified by the UPS manufacturer and the Contract Documents the UPS control unit shall condition and deliver the power to the loads by drawing power from the batteries as required.

5.7 Electrical

The UPS system shall accept an AC voltage input range of 85 to 135 VAC, single phase, 2 wire plus ground without drawing on battery power.

The UPS system shall provide voltage regulation at 120 VAC ± 3 percent under any line, load or battery conditions other than “low battery”, and a frequency regulation of 60 Hz ± 3 Hz synchronized to the utility line power.

Power rating shall be a minimum of 1000 VA (700W). The UPS system shall provide pure sine wave output, computer grade power compatible with all equipment loads, with power factor correction.

The UPS system shall include full time protection from sudden voltage increase with inrush protection and AC line filtering.

The UPS system shall provide complete isolation from the line operating as a separately derived power source in accordance with NEC requirements.

Duct seal compound is to be used to adequately seal all duct ends inside the cabinet.

All cables entering into the UPS shall be labeled using a permanent marking system to the satisfaction of the Town.

The Contractor shall coordinate turn-on with the Town.

1.7 PRODUCTION

All wires and leads shall be tied and secured within the UPS cabinet prior to delivery.

1.8 BASIS OF PAYMENT

The unit price identified in the schedule of unit prices shall be full compensation to Supply and Install a Battery Backup System or UPS for the traffic signal system. The unit price bid shall also include but not limited to Alpha Novus FXM with 1100 W/VA output, Alpha Outdoor Enclosure Side Mount 6, Universal Automatic Transfer Switch, AlphaGuard Battery Balancer, Battery heater mats, Surge Suppression device, Generator support, locking generator access door and L5-30 F1 plug, Universal Generator Transfer switch, On Battery indicator light, door activated interior light, tilt switch, Tamper switch, ground mount kit, and 4 – GXL 210 AlphaCell Batteries or approved equivalent. UPS equipment shall be installed in accordance with manufacturer's specifications.

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 State owned salvage material to the Department of Transportation Stores warehouse listed below. 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.

DOT Salvage Store #134
660 Brook Street
Rocky Hill, CT

Contact Materials Management Salvage Coordinator, at (860) 258-1980, 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.

Pay Item	Pay Unit
Removal and/or Relocation of Traffic Signal Equipment	L.S. (L.S.)

s:\\traffic1406\signal specs\specs\1118012A-REMO & RELO T S EQUIP-Projects

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 Facility on New London Turnpike. 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 Town.

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.

Pay Item	Pay Unit
Removal and/or Relocation of Traffic Signal Equipment	L.S.

s:\\traffic1406\signal specs\specs\1118012A-REMO & RELO T S EQUIP-Projects

ITEM #1118051A – TEMPORARY SIGNALIZATION (SITE NO. 1)

ITEM #1118052A – TEMPORARY SIGNALIZATION (SITE NO. 2)

ITEM #1118053A – TEMPORARY SIGNALIZATION (SITE NO. 3)

ITEM #1118054A – TEMPORARY SIGNALIZATION (SITE NO. 4)

ITEM #1118055A – TEMPORARY SIGNALIZATION (SITE NO. 5)

ITEM #1118056A – TEMPORARY SIGNALIZATION (SITE NO. 6)

Description:

The work under this item will require coordination with the Main Street paving contractor to ensure all traffic signals remain operational while the work is underway for both underground and paving work as well as the installation of pedestrian ramps at new locations.

The Contractor shall keep each traffic signal in the project limits operational at all times during construction through the use of the existing signal, the temporary signal, the revised signal or any combination thereof. The Contractor shall furnish, install, maintain, relocate, and remove existing, temporary, and proposed traffic signal equipment and all necessary hardware as needed throughout the duration of construction and in conformance with the applicable specifications and with Town of Glastonbury standards.

The Contractor shall relocate the existing and temporary traffic signal heads and appurtenances (span poles, mast arms, span wire, pedestrian push buttons, pedestrian walk signals, etc.) and revise the signal phasing and timing as many times as deemed necessary during construction to maintain and protect traffic and pedestrian movements where shown on the plans or as proposed by the Contractor and approved by the Engineer.

The Contractor shall make modifications to the controller as necessary to maintain temporary signalization during each phase/stage of construction.

Throughout the duration of construction, the Contractor shall provide detection on the existing, temporary, and/or new roadway alignment for all intersection approaches that have existing detection. The Contractor shall furnish, install, maintain, relocate and revise the necessary equipment (loop detectors, preformed loop detectors, microwave detectors, cable, conduit, amplifiers, pushbuttons, handholes, etc.) to provide proper vehicle detection and pedestrian detection during each phase of construction. During construction, if a detector becomes non-operational, the associated phase shall be put on max recall and the Contractor shall provide detection within 24 hours.

Throughout the duration of construction, the Contractor shall furnish, install, maintain, relocate, and remove the equipment necessary to maintain existing emergency vehicle pre-emption and the equipment necessary to maintain existing interconnect to adjacent signals.

The Contractor shall furnish, install, maintain, relocate, and remove signal-related signing (lane-use, signal ahead, NTOR, etc.) and pavement markings as needed throughout the duration of construction.

Materials:

All materials used for Temporary Signalization shall conform to the pertinent articles of the Standard Specifications, the Supplemental Specifications, and the Special Provisions contained in this contract, or as approved by the Engineer.

Construction Methods:

In the presence of the Engineer and a representative from the DOT Electrical Maintenance Office, the Electrical Contractor shall inspect the existing controller and verify its working condition prior to Temporary Signalization.

The Contractor shall submit a traffic signal plan to the Engineer for approval showing the signal phasing, timing, and the location of the signal supports, signal heads, detectors, pedestrian push buttons, pedestrian signals, and pavement markings at least 30 days prior to each phase/stage change.

Temporary Signalization will begin when the Contractor revises or relocates the existing signal or installs temporary traffic signal equipment. The Contractor shall be responsible for maintenance of all equipment during Temporary Signalization. The Engineer shall record the date Temporary Signalization begins for each site and shall notify the DOT Electrical Maintenance Office and the Local Police Department that maintenance responsibility has been transferred to the Contractor.

The Contractor shall provide to the Engineer a list of telephone numbers of personnel who will be responsible for the maintenance of the traffic signals during Temporary Signalization. The Contractor shall respond to traffic signal malfunctions by having a representative at the site within three hours and the Contractor shall have the traffic signal back in operation within 24 hours.

If the Engineer determines that the nature of a malfunction requires immediate attention and the Contractor does not respond within three hours following the initial contact, then DOT personnel will be called to repair the signal. The State will deduct all expenses incurred by the State, with a minimum deduction of $1,000. for each service call, from money due or to due to the contractor.

For intersections with a State furnished controller, Temporary Signalization shall terminate when the signal inspection is complete and is accepted by the Engineer. For intersections with a Contractor furnished controller, Temporary Signalization shall terminate at the beginning of the 30 day test period. For locations that will not be permanently signalized,

Temporary Signalization shall terminate when construction is complete and the temporary signal equipment is removed from the project as approved by the Engineer.

All equipment shall be relocated and/or removed in such a manner as to cause no hazard to pedestrians, traffic or property. When the Contractor is performing signal work, the Contractor shall maintain traffic as specified in the Special Provisions "Prosecution and Progress" and "Maintenance and Protection of Traffic."

During Temporary Signalization, all existing equipment shall remain the property of the owner. Temporary equipment supplied by the Contractor for Temporary Signalization will remain the Contractor's property unless noted otherwise. All existing equipment that is removed and designated as salvage shall be returned to the owner.

The Contractor shall be responsible for obtaining secondary service required for continuous operation of the traffic signals during Temporary Signalization. The party previously responsible for payment of electricity shall continue to be responsible during Temporary Signalization.

The Contractor shall be responsible for the cost of electricity at unsignalized intersections that require Temporary Signalization due to construction activities. Locations where the temporary signal equipment will be removed when no longer needed shall have a metered service.

Method of Measurement:

Temporary Signalization shall be paid for only once per site on a percentage of the contract Lump Sum price. Fifty percent (50%) shall be paid when Temporary Signalization begins and fifty percent (50%) shall be paid when Temporary Signalization terminates.

Basis of Payment:

This work shall be paid at the contract Lump Sum price for "Temporary Signalization (Site No.)" for each site. This item shall consist of furnishing, installing, maintaining, relocating, revising, and removing existing, temporary, and proposed traffic signal equipment (except for the items identified below), signing and all necessary hardware, materials, labor and work incidental thereto. This price shall also include any modifications to the controller including timing and phasing changes. 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 will not be paid for under this item. The following established contract items, if used for Temporary Signalization, will be paid for at the contract unit price: Loop Detector Amplifiers, Trenching and Backfilling, Handholes, Rigid Metal Conduit (Type), Loop Detector Sawcut, Cable, Removal of Pavement Markings, and temporary pavement marking items.

Pay Item	Pay Unit
Temporary Signalization (Site No. X)	L.S.

ITEM #1108722A - VEHICLE EMITTER
ITEM #1108724A - PHASE SELECTOR
ITEM #1112410A - DETECTOR (TYPE A)
ITEM #1112470A - PRE-EMPTION SYSTEM CHASSIS
ITEM #1113550A - DETECTOR CABLE (OPTICAL)
ITEM #1108726A – CONFIRMATION LIGHT

SYSTEM DESCRIPTION:

The emergency vehicle traffic signal priority control system shall enable designated vehicles to remotely cause the traffic signal controller to advance to and/or hold a desired traffic signal display by using existing controller functions. The control shall be activated at a minimum distance of 548.6M (1,800 feet) along an unobstructed "line of sight" path. The control shall not terminate until the vehicle is within 12.2M (40 feet) of the detector or at the intersection.

The system shall consist of the following components:

A. Vehicle Emitter which shall be mounted on the emergency vehicle and shall transmit optical energy signals only in the forward direction. If the municipality presently uses optical pre-emption, the emitters shall be of the same manufacture currently used by the Town.

B. Phase Selector (minimum 2 channel) which shall cause the signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle. A pre-emption system chassis shall house two phase selectors.

C. Optical Detector which shall be mounted on or near a traffic signal and shall receive the optical energy signals generated by the Vehicle Emitter.

    1. Detector (Type A), 1 Direction, 1 Channel

D. Detector Cable (Optical).

E. Confirmation light (where noted on the drawings).

System Operation:

A. The operating sequence shall be initiated when the optical detector receives the required optical energy signal from the Emitter.

B. The phase selector shall cause the traffic signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle.

C. The phase selector shall cause the controller to advance to and/or hold the desired traffic signal display even if the optical energy signals cease before the desired display is obtained.

D. The phase selector shall allow the traffic signal controller to resume normal operation within ten seconds after optical energy signals cease if the optical energy signals cease after the desired traffic signal display is obtained.

E. The phase selector shall not respond to optical energy signals from an emergency vehicle if it is already processing optical energy signals from another emergency vehicle.

F. For the fire station at Pratt Street, the pre-emption buttons in the fire station garage shall be wired directly to the controller, with each of three buttons in the station allowed to extend the pre-empt green time for exiting apparatus.

G. When apparatus is leaving the station, the subsequent northbound downstream traffic signal shall also be pre-empted, directly from the station.

System Components:

A. Vehicle Emitter:

The emitter assembly consists of an emitter and power supply and an emitter control switch assembly. The emitter assembly is mounted on a vehicle and produces a flashing optical signal when in operation.

1. Shall operate on ten to fifteen volts DC input voltage, but shall not be damaged by input voltage surges up to twenty-five volts DC.

2. Shall be controlled by a single on/off switch that requires no other adjustments by the operator. The on/off condition shall be indicated by a light located adjacent to the switch.

3. Shall be automatically disabled or de-activated by one or a combination of the following: seat switch, emergency brake switch, door switch, transmission safety switch.

4. Shall operate over an ambient temperature range of minus 34^{O} C to plus 60^{O} C. (minus 30^{O} F. to plus 140^{O} F.)

5. Shall operate in 0 to 95 % humidity.

6. Shall be a pulsed optical energy source with a controlled repetition rate.

7. Shall not generate voltage transients on the battery input line which exceed battery voltage by more than four volts.

8. Shall produce optical energy in a cone of not more than 90 degrees horizontal and not more than 30 degrees vertical. The detectors and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

B. Optical Detector:

The optical detector receives the high intensity optical pulses produced by the emitter. These optical energy pulses are transformed by the detector into appropriate electrical signals which are transmitted to the phase selector. The optical detector is mounted at or near the intersection in a location which permits an unobstructed line of sight to vehicular approaches. The units may be mounted on signal span wires, mast arms or other appropriate structures.

1. Shall be of solid state construction.

2. Shall operate over an ambient temperature range of minus 34^{O} C to plus 60^{O} C. (minus 30^{O} F. to plus 140^{O} F.)

3. Shall have internal circuitry potted in a semi-flexible compound to ensure moisture resistance.

4. Shall operate in 0 to 95 % humidity.

5. Shall have a cone of detection of not more than 13 degrees. The detector and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

C. Phase Selector:

The phase selector supplies power to and receives electrical signals from the optical detector. When detector signals are recognized as a valid call, the phase selector causes the signal controller to advance to and/or hold the desired traffic signal display. This is accomplished by activating the pre-empt input to the controller.

The phase selector is capable of assigning priority traffic movement to one of two channels on a first-come, first-serve basis. Each channel is connected to select a particular traffic movement from those normally available within the controller. Once a call is recognized, "commit to green" circuitry in the phase selector functions so that the desired green indication will be obtained even if optical communication is lost. After serving a priority traffic demand, the phase selector will release the controller to follow normal sequence operation.

1. Shall include an internal power supply to supply power to the optical detectors.

2. Shall have minimum two-channel operation with the capability of interfacing with an additional phase selector for expansion of channels of operation.

3. Shall have adjustable detector range controls for each channel of operation, from 12M (40 feet) to 548M (1800 feet).

4. Shall have solid state indicator lights for power on and channel called.

5. Shall operate over an ambient temperature range of minus 34^{O} C to plus 60^{O} C (minus 30^{O} F. to plus 140^{O} F.)

6. Shall operate in 0 to 95 % humidity.

D. Detector Cable (Optical):

1. 3-Conductor cable with shield and ground wire.
2. AWG #20 (7x28) stranded.
3. Individually tinned copper strands.
4. Conductor insulation: 600 volt , 75 deg. C (167^{O} F.).
5. 1 Conductor-yellow; 1 Conductor-blue; 1 Conductor-orange.
6. Aluminized mylar shield tape or equivalent.
7. AWG #20 (7x28) stranded uninsulated drain wire
8. DC resistance not to exceed 11.0 ohms per 305M(1000 feet).
9. Capacitance from one conductor to other two conductors and shield not to exceed 157pf/M (48 pf./ft.).
10. Jacket: 600 volts, 80 deg. C (176^{O} F.), minimum average wall thickness - 1.14mm (.045").
11. Finished O.D.: 7.62mm (0.3") max.

E. Confirmation Lights

When indicated on the plan a Confirmation Light (CL) with drive card shall be installed. The CL shall provide visual indication to the emergency vehicle operator that the emitting optical signal has been detected and that the pre-emption call has been sent to the traffic signal controller. The confirmation light shall only be installed at the Pratt Street intersection adjacent to the fire station.

The CL unit:

1) Shall be a 110 VAC white incandescent lamp designed for outdoor application.
2) Mounting hardware shall be corrosion resistant, designed for outdoor installation.
3) Shall be capable of displaying a flashing or solid output during pre-emption call.
4) The driver card shall be programmable with dipswitches.

System Interface:

System shall be capable of operating in a computerized traffic management system when appropriate interfacing is provided by the computer supplier.

General:

The Contractor shall furnish the manufacturer the phasing diagrams indicating controller sequence and timing.

The Contractor shall secure from the manufacturer a guarantee for the equipment for a period of sixty (60) months, which time shall commence from the date of delivery. Manufacturer shall certify upon request that all materials furnished will conform to this specification. The manufacturer or his designated representative shall be responsible for determining and setting all required range and emitter intensity for the emergency vehicle operation.

Construction Methods:

All equipment except the vehicle emitter assembly shall be installed and wired in a neat and orderly manner in conformance with the manufacturers' instructions. The vehicle

emitter assembly shall be delivered to a designated town representative. Installation of the vehicle emitter assembly shall be the responsibility of the town.

Traffic signals owned and maintained by the State that have optical pre-emption equipment owned and maintained by the town shall have an Auxiliary Equipment Cabinet (AEC) attached to the controller cabinet. The optical pre-emption equipment shall be housed in the AEC. Traffic signals owned and maintained by the town do not require an AEC to house the pre-emption equipment.

Detector cables shall be continuous with no splices between the optical detector and the AEC.

Detector locations shown on the plan are for illustration purposes only. Exact location shall be determined by the contractor or the designated representative for the best possible line of sight.

If not present in an existing traffic controller cabinet, the following items shall be installed and connected, in conformance with the current Functional Specifications for Traffic Control Equipment, "D" Cabinet Requirements (Pre-emption Type):

- Controller "D" harness and adapter.
- Pre-emption termination panel with terminal block and relay bases.
- Pre-emption disconnect switch, mounted on the emergency switch panel (on inside of cabinet door).
- Pre-emption test buttons, mounted on the pre-emption termination panel.

All connections from the phase selector to the "D" harness and to the cabinet wiring shall be made at the termination panel. The termination panel shall have AC+ Lights, AC-, and a switched logic ground. The switched logic ground feeds all the pre-empt inputs to the phase selector. When switched off by the pre-emption disconnect switch, the traffic controller shall not be affected by pre-empt calls from the optical pre-emption system. A minimum of two test buttons shall be provided. If there are more than two pre-empt runs, a button for each shall be installed. A chart or print out indicating the program steps and settings shall be provided along with the revised cabinet wiring diagrams.

Test the Pre-emption System According to the following Guidelines:

1. Notify the system owner/user, such as the municipal fire chief or public works director, of the scheduled inspection

2. Request a fire department representative and an emergency vehicle, which has an emitter to conduct the test. If not available, the contractor shall provide an emitter.

3. In the presence of the Engineer and the municipal representative, test each pre-empted approach with the emergency vehicle. Test the following items of the system:

   * Confirm that the emitter activates the phase selector and the phase selector activates the correct pre-emption input to the controller.

   * Confirm adequate range. The traffic signal must be pre-empted to green sufficiently in advance of the emergency vehicle arrival. The vehicle emitter shall initiate pre-emption at a minimum distance of 548.6M (1800 feet).

* Confirm there are no false calls. Keep the emitter active as the emergency vehicle passes through the intersection. No other optical detectors shall sense the strobe.

4. Document the test. Provide the Engineer and, upon request, the municipality copies of the test results.

   If a malfunction is found or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test. Repeat the above steps for all approaches that did not pass.

   All adjustments such as emitter intensity, phase selector range, sensitivity, detector placement, shall be made at the intersection by the contractor so that the optical pre-emption operates correctly with other major manufacturers' equipment currently owned by the town.

Method of Measurement:

Optical Detectors, Phase Selectors, System Chassis will be measured for payment by the number of each supplied, installed and accepted. Detector Cable (Optical) will be measured by the number of meters (linear feet) supplied, installed and accepted. Vehicle Emitters will be measured by the number of each supplied to the Town and accepted. Confirmation lights will be measured by the number of each supplied to the Town and accepted.

Basis of Payment:

Payment for Optical Detectors, Phase Selector, System Chassis and Detector Cable (Optical) will include the item unit cost, including all manufacturer's required mounting hardware and the cost of installation and supervision by the manufacturer or his designated representative, including travel and subsistence, and all materials, equipment and labor incidental thereto. Payment for termination panel, “D” harness, test buttons, program chart (or print out) and revised cabinet wiring diagrams shall be included in the item PRE-EMPTION SYSTEM CHASSIS. Payment for Vehicle Emitters will include the item unit cost only.

Pay Items	Pay Units
Vehicle Emitter	Ea.
Detector (TYPE)	Ea.
Phase Selector	Ea.
Detector Cable (Optical)	L.F.
Pre-Emption System Chassis	Ea.
Confirmation Light	Ea.

ITEM NO. 1206023A - REMOVAL AND RELOCATION OF EXISTING SIGNS

Section 12.06 is supplemented as follows:

Article 12.06.01 – Description is supplemented with the following:
Work under this item shall consist of the removal and/or relocation of designated side-mounted 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.

Pay Item	Pay Unit
Removal and Relocation of Existing Signs	L.S.

ITEM #1208928A – SIGN FACE – SHEET ALUMINUM (TYPE III REFLECTIVE SHEETING)

12.08.01—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.

This item shall also include the installation of Town of Glastonbury Street Name signs on the mast arms as shown on the plans.

12.08.02—Materials: Reflective sheeting shall conform to the requirements of Article M.18.09.01, Type III.

Sheet aluminum sign blanks shall conform to the requirements of Article M.18.13.

Silk screening of Type III reflective sheeting shall conform to the requirements specified by the reflective sheeting manufacturer.

Metal sign posts sign supports shall 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.

12.08.03—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 III 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 III 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 designated 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-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.

12.08.04—Method of Measurement: This work will be measured for payment by the number of square feet (square meters) of sign face-sheet aluminum of the type specified, installed and accepted.

12.08.05—Basis of Payment: This work will be paid for at the Contract unit price per square foot (square meter) 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.

Pay Item Pay Unit

Sign Face—Sheet Aluminum (Type) s.f.

ITEM # 1210101A – 4” (100mm) WHITE EPOXY RESIN PAVEMENT MARKINGS

ITEM # 1210102A – 4” (100mm) YELLOW EPOXY RESIN PAVEMENT MARKINGS

ITEM # 1210103A – 6” (150mm) WHITE EPOXY RESIN PAVEMENT MARKINGS

ITEM # 1210104A – 8” (200mm) WHITE EPOXY RESIN PAVEMENT MARKINGS

ITEM # 1210105A – EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS

SECTION 12.10 – EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS is amended as follows:

*Delete “**SYMBOLS AND LEGENDS**” from the title of the special provision.*

SECTION 12.10.03 – Construction Methods 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.

ITEM #1220013A – CONSTRUCTION SIGNS - BRIGHT FLUORESCENT SHEETING

Article 12.20.01 – Description: 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.

Article 12.20.02 – 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 R_A

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 B_1) 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.

Article 12.20.03 – 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.

Article 12.20.04 – 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.

Article 12.20.05 – 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. 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.

Pay Item	Pay Unit
Construction Signs – Bright Fluorescent Sheeting	S.F.

ATTACHMENT A:
REQUIRED FORMS

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____)
) ss.
County of _____)

_____, being first duly sworn, deposes and says that:

(1) He is (owner, partner, officer, representative or agent) of _____ _____, the Bidder that has submitted the attached bid;

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from Bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Owner or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(Signed) _____

_____
(Title)

Subscribed and sworn to before me
this _____ day of _____ 20 ___

_____

_____
(Title)

My Commission expires _____ , 20 ___.

CONTRACTOR'S PROPOSED PROGRESS CHART – HIGHWAY CONSTRUCTION BAR CHART

Project Number(s): _____ Town(s) of: _____

Date Submitted: _____ Description: _____

Operation	Quantity	Duration
Organization		
Clearing & Grubbing		
Earth Excavation		
Rock Excavation		
Channel Excavation		
Borrow		
Drainage (Trench, Pipe)		
Pile Driving		
Footing		
Abutments & Wings		
Steel Erection		
Floor Slabs		
Concrete Pavement		
Bit. Conc. Pavement		
Bridge Railing		
Curbing		
Sidewalk		
Fencing		
Electrical Work		
Traffic Items		
Misc. & Clean up		

Calendar Days

Equipment to expect to use:

_____

_____

_____

_____

Total Calendar Days: _____

Signed By: _____

1/95

CONNECTICUT DEPARTMENT OF TRANSPORTATION (CTDOT)

Rev 02/2012

PRE-AWARD DBE COMMITMENT APPROVAL REQUEST

TO BE SUBMITTED WITHIN THE TIME FRAME INDICATED IN THE BID DOCUMENTS

Sheet ☐ of ☐

CDOT Project Number (s): _____

Town(s) of: _____

Submitted By: _____

Original Bid ($): _____

Dollar amount subcontracted to this DBE firm ($): _____

Dollar amount requested for CREDIT for this DBE Firm ($): _____ **

** Please be advised that by submitting this form you (the prime) agree that the Credited amount will be the amount of commitment to the project by you

DBE Subcontractor: _____ FEIN Number: _____

Address: _____

Is this DBE firm a 1st or 2nd tier subcontractor? ☐ 1st ☐ 2nd*

* The CDOT prefers 1st tier subcontractors; however, credit for 2nd tier DBE firms will be approved provided this page is signed by both the prime and the DBE firm, the 1st tier subcontractor is identified, the extent of the 2nd tier work is clearly identified, and the prime makes the assertion that regardless of its arrangement with the 1st tier subcontractor, this DBE firm will be used and its replacement is subject to the conditions of the DBE specification and contract requirements.

Item Number & Description	Is This item Partial Yes	Is This item Partial No	Firm Type Code ***	Quantity and Unit of item as bid	Contract Unit Price	Quantity and Unit for item Subcontracted	Subcontract Unit Price	Total Item price subcontracted	Total item prices credited to the subcontractor ****
	☐	☐							
	☐	☐							
	☐	☐							
	☐	☐							
	☐	☐							
	☐	☐							
	☐	☐							

If any of the items above are checked **Yes** as to **Partial**, please use the space provided or use an attachment to offer an explanation of the work involved. Also please identify who is responsible for the remainder of the partial items.

*** Firm Type Code: **S** (subcontractor), **M** (manufacturer), **P** (supplier), **T** (trucking), **V** (services)

Any DBE Trucking firm (**T**) nominated on this form must self preform not less than 30% of their contract value.

**** The credited amount includes adjustments for supply items (60%) or items further subcontracted to NON-DBE firms.

Only certified DBE firms and only for work which they have been certified for will be approved by CDOT toward the goal. Department's DBE directory is available on CTDOT's website or by calling 860-594-2171

_____ _____ _____ _____

Signature of Prime Contractor, Title | Date | Signature of Subcontractor, Title | Date

After this submittal is approved by the Department, any proposed changes to it must be submitted to the Deaprtment for approval.

ANTICIPATED SOURCE OF MATERIAL

REV. 8/98
PRINTED ON RECYCLED PAPER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
P.O. BOX 317546
NEWINGTON, CT 06111-7546

PROJECT NUMBER	
TOWN	

MATERIALS	SOURCE OF SUPPLY AND MAILING ADDRESS PG. 1 of 2
AGGREGATES:	
Coarse	
Fine	
BITUMINOUS CONCRETE	
BITUMEN:	
Asphalt Cement	
Asphalt Cutbacks	
Emulsion	
Tar	
BRICK	
CEMENT - PORTLAND	
Type I	
Type II	
Type 1A	
Type IIA	
TYPE OF DELIVERY:	
Truck	
R.R. Car	
CONCRETE BLOCKS	
CONCRETE, PORTLAND CEMENT	
CURING MATERIAL:	
Mats	
Paper	
Compound	
Other	
DAMPPROOFING and/or WATERPROOFING:	
Primer	
Seal	
Fabric	
FENCE:	
Property or Wire	
Posts: Steel	
Wood	
Chain Link	
Fittings for Chain Link	
GRAVEL	
GUIDE RAIL:	
Wire Rope	
Fittings	
Posts:	
Metal	
Wood	
JOINT FILLER	
JOINT SEALER	
LOAD TRANSFER UNIT	
METAL FLASHING	
METAL BEAM TYPE RAIL (BRIDGE)	
METAL BEAM TYPE RAIL	
METAL BRIDGE RAIL	
OVERHEAD SIGN SUPPORTS	
PAINT:	
2nd Prime Coat (Field)	
1st Field Coat	

MATERIALS	SOURCE OF SUPPLY AND MAILING ADDRESS PG. 2 of 2
PILING:	
Sheets	
Bearing	
Pipe	
Wood (Pressure Treated)	
Precast, Prestressed	
PIPE:	
C.C.M.	
Cast Iron	
Reinf. Concrete	
Vitrified Clay	
PRECAST, PRESTRESSED UNITS	
STEEL:	
Bar Mat Fabric and/or Wire Mesh	
Metal Cribbing	
Reinforcement	
Scuppers	
SHEAR CONNECTORS:	
Spiral	
Welded	
STRUCTURAL (BRIDGES)	
STRUCTURAL (Side mounted sign supports)	
	CONTRACTOR
	SIGNED BY
	DATE

NOTE: Items not listed above shall be listed below.

STATE OF CONNECTICUT

Certificate of Compliance with Connecticut General Statute Section 31 - 57b

I hereby certify that all of the statements herein contained below have been examined by me, and to the best of my knowledge and belief are true and correct.

The _____ **HAS / HAS NOT**
Company Name (Cross out Non-applicable)

been cited for three (3) or more willful or serious or serious violations of any Occupational Safety and Health Act (OSHA) or of any standard, order or regulation promulgated pursuant to such act, during the three year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Aet of 1970, and not abated within the time fixed by the citation and such citation has not been set aside following appeal to the appropriate agency of court having jurisdiction or **HAS / HAS NOT** (Cross out Non-applicable) received one or more criminal convictions related to the injury or death of any employee in the three-year period preceding the bid.

The list of violations (if applicable) is attached.

_____
(Name of Firm, Organization or Corporation)

Signed: _____
Written Signature:

_____
Name Typed: *(Corporation Seal)*

Title: _____
(Title of Above Person, typed)

Dated: _____

State of)

County of) ***ss:*** ***A.D., 20_____***

)

Sworn to and personally appeared before me for the above, _____,
(Name of Firm, Organization, Corporation)

Signer and Sealer of the foregoing instrument of and acknowledged the same to be the free act and deed of

_____, and his/her free act and deed as
(Name of Person appearing in front of Notary or Clerk)

_____.
(Title of Person appearing in front of Notary or Clerk)

My Commission Expires: _____
(Notary Public) *(Seal)*

AFFIRMATIVE ACTION PROGRAM CERTIFICATION

City/Town of _____

_____

Firm Name: _____

_____

Address: _____

_____

Project Description: _____

_____

_____

Bid Amount: _____

Date: _____

I _____ **of** _____
(Name of Person) (Name of Firm)

intend to honor our Affirmative Action Program on file with the Connecticut Department of Transportation, Office of Contract Compliance. I further certify that our Affirmative Action Program is current and that the last approval was on (Date) _____**, 20**___ **and it expires on (Date)** _____**, 20**___**.**

Signed By: _____

Title: _____

EEO Officer: _____

ATTACHMENT B:
REQUIRED STATE CONTRACT PROVISIONS
STATE AND FEDERAL PREVAILING WAGES

Construction Contracts - Required Contract Provisions
(FHWA Funded Contracts)

Index

Index of Exhibits

1. Federal Highway Administration (FHWA) Form 1273

The Contractor shall comply with the Federal Highway Administration (FHWA), Form 1273 attached at Exhibit A, as revised, which is hereby made part of this contract. The Contractor shall also require its subcontractors to comply with the FHWA – Form 1273 and include the FHWA – Form 1273 as an attachment to all subcontracts and purchase orders.

2. Title VI of the Civil Rights Act of 1964 / Nondiscrimination Requirements

The Contractor shall comply with Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. 2000 et seq.), all requirements imposed by the regulations of the United States Department of Transportation (49 CFR Part 21) issued in implementation thereof, and the Title VI Contractor Assurances attached hereto at Exhibit B, all of which are hereby made a part of this Contract.

3. Contractor Work Force Utilization (Federal Executive Order 11246) / Equal Employment Opportunity

(a) The Contractor shall comply with the Contractor Work Force Utilization (Federal Executive Order 11246) / Equal Employment Opportunity requirements attached at Exhibit C and hereby made part of this Contract, whenever a contractor or subcontractor at any tier performs construction work in excess of $10,000. These goals shall be included in each contract and subcontract. Goal achievement is calculated for each trade using the hours worked under each trade.

(b) Companies with contracts, agreements or purchase orders valued at $10,000 or more will develop and implement an Affirmative Action Plan utilizing the ConnDOT Affirmative Action Plan Guideline. This Plan shall be designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex or national origin, and to promote the full realization of equal employment opportunity through a positive continuation program. Plans shall be updated as required by ConnDOT.

4. Requirements of Title 49, Code of Federal Regulations (CFR), Part 26

Pursuant to 49 CFR 26.13, the following paragraph is part of this Contract and shall be included in each subcontract the Contractor enters into with a subcontractor:

"The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of U.S. DOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this contract or such other remedy as ConnDOT (recipient) deems appropriate."

5. Contract Wage Rates

The Contractor shall comply with:

The Federal and State wage rate requirements indicated in Exhibits F and G hereof are hereby made part of this Contract. If a conflict exists between the Federal and State wage rates, the higher rate shall govern.

Prevailing Wages for Work on State Highways; Annual Adjustments. With respect to contracts for work on state highways and bridges on state highways, the Contractor shall comply with the provisions of Section 31-54 and 31-55a of the Connecticut General Statutes, as revised.

As required by section 1.05.12 (Payrolls) of the State of Connecticut, Department of Transportation's Standard Specification for Roads, Bridges and Incidental Construction (FORM 816), as may be revised, every Contractor or subcontractor performing project work on a federal aid project is required to post the relevant prevailing wage rates as determined by the United States Secretary of Labor. The wage rate determinations shall be posted in prominent and easily accessible places at the work site.

6. Americans with Disabilities Act of 1990

This provision applies to those Contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990, (42 U.S.C. 12101 et seq.), (Act), during the term of the Contract. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the Contractor to satisfy this standard as the same applies to performance under this Contract, either now or during the term of the Contract as it may be amended, will render the Contract voidable at the option of the State upon notice to the contractor. The Contractor warrants that it will hold the State harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the Contractor to be in compliance with this Act, as the same applies to performance under this Contract.

7. Connecticut Statutory Labor Requirements

(a) Construction, Alteration or Repair of Public Works Projects; Wage Rates. The Contractor shall comply with Section 31-53 of the Connecticut General Statutes, as revised. The wages paid on an hourly basis to any person performing the work of any mechanic, laborer or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (i) of section 31-53 of the Connecticut General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each pay day.

(b) Debarment List. Limitation on Awarding Contracts. The Contractor shall comply with Section 3l-53a of the Connecticut General Statutes, as revised.

(c) Construction Safety and Health Course. The Contractor shall comply with section 31-53b of the Connecticut General Statutes, as revised. The contractor shall furnish proof to the Labor Commissioner with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 of the Connecticut General Statutes, as revised, on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of

telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

Any employee required to complete a construction safety and health course as required that has not completed the course, shall have a maximum of fourteen (14) days to complete the course. If the employee has not been brought into compliance, they shall be removed from the project until such time as they have completed the required training.

Any costs associated with this notice shall be included in the general cost of the contract. In addition, there shall be no time granted to the contractor for compliance with this notice. The contractor's compliance with this notice and any associated regulations shall not be grounds for claims as outlined in Section 1.11 – "Claims".

(d) Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited. The Contract is subject to Section 31-57b of the Connecticut General Statutes, as revised.

(e) Residents Preference in Work on Other Public Facilities. NOT APPLICABLE TO FEDERAL AID CONTRACTS. Pursuant to Section 31-52a of the Connecticut General Statutes, as revised, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the state who are, and continuously for at least six months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states

8. Tax Liability - Contractor's Exempt Purchase Certificate (CERT – 141)

The Contractor shall comply with Chapter 219 of the Connecticut General Statutes pertaining to tangible personal property or services rendered that is/are subject to sales tax. The Contractor is responsible for determining its tax liability. If the Contractor purchases materials or supplies pursuant to the Connecticut Department of Revenue Services' "Contractor's Exempt Purchase Certificate (CERT-141)," as may be revised, the Contractor acknowledges and agrees that title to such materials and supplies installed or placed in the project will vest in the State simultaneously with passage of title from the retailers or vendors thereof, and the Contractor will have no property rights in the materials and supplies purchased.

Forms and instructions are available anytime by:

Internet: Visit the DRS website at www.ct.gov/DRS to download and print Connecticut tax forms; or Telephone: Call 1-800-382-9463 (Connecticut calls outside the Greater Hartford calling area only) and select Option 2 or call 860-297-4753 (from anywhere).

9. Executive Orders

This Contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the Contract as if they had been fully set forth in it. The Contract may also be subject to the applicable parts of Executive Order No. 7C of Governor M. Jodi Rell, promulgated July 13, 2006, concerning contracting reforms and Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services, in accordance with their

respective terms and conditions. If Executive Orders 7C and 14 are applicable, they are deemed to be incorporated into and are made a part of the Contract as if they had been fully set forth in it. At the Contractor's request, the Department shall provide a copy of these orders to the Contractor.

10. Non Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised): References to "minority business enterprises" in this Section are not applicable to Federal-aid projects/contracts. Federal-aid projects/contracts are instead subject to the Federal Disadvantaged Business Enterprise Program.

(a) For purposes of this Section, the following terms are defined as follows:

i. "Commission" means the Commission on Human Rights and Opportunities;
ii. "Contract" and "contract" include any extension or modification of the Contract or contract;
iii. "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
iv. "gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.
v. "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;
vi. "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
vii. "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;
viii. "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
ix. "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the 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 Connecticut General Statutes § 32-9n; and
x. "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and “contract” do not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

(b) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers’ representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.

(c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

(e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by

regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

(f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.

(g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.

(h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter."

The Nondiscrimination Certifications can be found at the Office of Policy and Management website.

http://www.ct.gov/opm/cwp/view.asp?a=2982&Q=390928

11. Whistleblower Provision

The following clause is applicable if the Contract has a value of Five Million Dollars ($5,000,000) or more.

Whistleblowing. This Contract may be subject to the provisions of Section 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The State may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

12. Connecticut Freedom of Information Act

(a) Disclosure of Records. This Contract may be subject to the provisions of section 1-218 of the Connecticut General Statutes. In accordance with this statute, each contract in excess of two million five hundred thousand dollars between a public agency and a person for the performance of a governmental function shall (a) provide that the public agency is entitled to receive a copy of records and files related to the performance of the governmental function, and (b) indicate that such records and files are subject to FOIA and may be disclosed by the public agency pursuant to FOIA. No request to inspect or copy such records or files shall be valid unless the request is made to the public agency in accordance with FOIA. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of sections 1-205 and 1-206 of the Connecticut General Statutes.

(b) Confidential Information. The State will afford due regard to the Contractor's request for the protection of proprietary or confidential information which the State receives from the Contractor. However, all materials associated with the Contract are subject to the terms of the FOIA and all corresponding rules, regulations and interpretations. In making such a request, the Contractor may not merely state generally that the materials are proprietary or confidential in nature and not, therefore, subject to release to third parties. Those particular sentences, paragraphs, pages or sections that the Contractor believes are exempt from disclosure under the FOIA must be specifically identified as such. Convincing explanation and rationale sufficient to justify each exemption consistent with the FOIA must accompany the request. The rationale and explanation must be stated in terms of the prospective harm to the competitive position of the Contractor that would result if the identified material were to be released and the reasons why the materials are legally exempt from release pursuant to the FOIA. To the extent that any other provision or part of the Contract conflicts or is in any way inconsistent with this section, this section controls and shall apply and the conflicting provision or part shall not be given effect. If the Contractor indicates that certain documentation is submitted in confidence, by specifically and clearly marking the documentation as "CONFIDENTIAL," DOT will first review the Contractor's claim for consistency with the FOIA (that is, review that the documentation is actually a trade secret or commercial or financial information and not required by statute), and if determined to be consistent, will endeavor to keep such information confidential to the extent permitted by law. See, *e.g.*, Conn. Gen. Stat. §1-210(b)(5)(A-B). The State, however, has no obligation to initiate, prosecute or defend any legal proceeding or to seek a protective order or other similar relief to prevent disclosure of any information that is sought pursuant to a FOIA request. Should the State withhold such documentation from a

Freedom of Information requester and a complaint be brought to the Freedom of Information Commission, the Contractor shall have the burden of cooperating with DOT in defense of that action and in terms of establishing the availability of any FOIA exemption in any proceeding where it is an issue. In no event shall the State have any liability for the disclosure of any documents or information in its possession which the State believes are required to be disclosed pursuant to the FOIA or other law.

13. Service of Process

The Contractor, if not a resident of the State of Connecticut, or, in the case of a partnership, the partners, if not residents, hereby appoints the Secretary of State of the State of Connecticut, and his successors in office, as agent for service of process for any action arising out of or as a result of this Contract; such appointment to be in effect throughout the life of this Contract and six (6) years thereafter.

14. Substitution of Securities for Retainages on State Contracts and Subcontracts

This Contract is subject to the provisions of Section 3-ll2a of the General Statutes of the State of Connecticut, as revised.

15. Health Insurance Portability and Accountability Act of 1996 (HIPAA)

The Contractor shall comply, if applicable, with the Health Insurance Portability and Accountability Act of 1996 and, pursuant thereto, the provisions attached at Exhibit D, and hereby made part of this Contract.

16. Forum and Choice of Law

Forum and Choice of Law. The parties deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Contractor waives any objection which it may now have or will have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

17. Summary of State Ethics Laws

Pursuant to the requirements of section 1-101qq of the Connecticut General Statutes, the summary of State ethics laws developed by the State Ethics Commission pursuant to section 1-81b of the Connecticut General Statutes is incorporated by reference into and made a part of the Contract as if the summary had been fully set forth in the Contract.

18. Audit and Inspection of Plants, Places of Business and Records

(a) The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor

Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract. For the purposes of this Section, "Contractor Parties" means the Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to Perform under the Contract in any capacity.

(b) The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.

(c) The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.

(d) The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.

(e) The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.

(f) The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

19.Campaign Contribution Restriction

For all State contracts, defined in Conn. Gen. Stat. §9-612(g)(1) as having a value in a calendar year of $50,000 or more, or a combination or series of such agreements or contracts having a value of $100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations," attached as Exhibit E.

20. Tangible Personal Property

(a) The Contractor on its behalf and on behalf of its Affiliates, as defined below, shall comply with the provisions of Conn. Gen. Stat. §12-411b, as follows:

(1) For the term of the Contract, the Contractor and its Affiliates shall collect and remit to the State of Connecticut, Department of Revenue Services, any Connecticut use tax due under the provisions of Chapter 219 of the Connecticut General Statutes for items of tangible personal property sold by the Contractor or by any of its Affiliates in the same manner as if the Contractor and such Affiliates were engaged in the business of selling tangible personal property for use in Connecticut and had sufficient nexus under the provisions of Chapter 219 to be required to collect Connecticut use tax;

(2) A customer's payment of a use tax to the Contractor or its Affiliates relieves the customer of liability for the use tax;

(3) The Contractor and its Affiliates shall remit all use taxes they collect from customers on or before the due date specified in the Contract, which may not be later than the last day of the month next succeeding the end of a calendar quarter or other tax collection period during which the tax was collected;

(4) The Contractor and its Affiliates are not liable for use tax billed by them but not paid to them by a customer; and

(5) Any Contractor or Affiliate who fails to remit use taxes collected on behalf of its customers by the due date specified in the Contract shall be subject to the interest and penalties provided for persons required to collect sales tax under chapter 219 of the general statutes.

(b) For purposes of this section of the Contract, the word "Affiliate" means any person, as defined in section 12-1 of the general statutes, that controls, is controlled by, or is under common control with another person. A person controls another person if the person owns, directly or indirectly, more than ten per cent of the voting securities of the other person. The word "voting security" means a security that confers upon the holder the right to vote for the election of members of the board of directors or similar governing body of the business, or that is convertible into, or entitles the holder to receive, upon its exercise, a security that confers such a right to vote. "Voting security" includes a general partnership interest.

(c) The Contractor represents and warrants that each of its Affiliates has vested in the Contractor plenary authority to so bind the Affiliates in any agreement with the State of Connecticut. The Contractor on its own behalf and on behalf of its Affiliates shall also provide, no later than 30 days after receiving a request by the State's contracting authority, such information as the State may require to ensure, in the State's sole determination, compliance with the provisions of Chapter 219 of the Connecticut General Statutes, including, but not limited to, §12-411b.

21. Bid Rigging and/or Fraud – Notice to Contractor

The Connecticut Department of Transportation is cooperating with the U.S. Department of Transportation and the Justice Department in their investigation into highway construction contract bid rigging and/or fraud.

A toll-free "HOT LINE" telephone number 800-424-9071 has been established to receive information from contractors, subcontractors, manufacturers, suppliers or anyone with knowledge of bid rigging and/or fraud, either past or current. The "HOT LINE" telephone number will be available during normal working hours (8:00 am – 5:00 pm EST). Information will be treated confidentially and anonymity respected.

22. Consulting Agreement Affidavit

The Contractor shall comply with Connecticut General Statutes Section 4a-81(a) and 4a-81(b), as revised. Pursuant to Public Act 11-229, after the initial submission of the form, if there is a change in the information contained in the form, a contractor shall submit the updated form, as applicable, either (i) not later than thirty (30) days after the effective date of such change or (ii) prior to execution of any new contract, whichever is earlier.

The Affidavit/Form may be submitted in written format or electronic format through the Department of Administrative Services (DAS) website.

EXHIBIT A

FHWA-1273 -- Revised May 1, 2012

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential

minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating

areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or

any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is

registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit

any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under

construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered

transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with

obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency,

a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

EXHIBIT B

TITLE VI CONTRACTOR ASSURANCES

During the performance of this Contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

1. **Compliance with Regulations:** The Contractor shall comply with the regulations relative to nondiscrimination in federally assisted programs of the United States Department of Transportation (hereinafter, "USDOT"), Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the "Regulations"), which are herein incorporated by reference and made a part of this contract.

2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the Contract, shall not discriminate on the grounds of race, color, national origin, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by Subsection 5 of the Regulations, including employment practices when the Contract covers a program set forth in Appendix B of the Regulations.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:**
In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, national origin, sex, age, or disability.

4. **Information and Reports:** The Contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Connecticut Department of Transportation (ConnDOT) or the Funding Agency (FHWA, FTA and FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to ConnDOT or the Funding Agency, as appropriate, and shall set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the ConnDOT shall impose such sanctions as it or the Funding Agency may determine to be appropriate, including, but not limited to:

A. Withholding contract payments until the Contractor is in-compliance; and/or
B. Cancellation, termination, or suspension of the Contract, in whole or in part.

6. **Incorporation of Provisions:** The Contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The Contractor shall take such action with respect to any subcontract or procurement as the ConnDOT or the Funding Agency may -direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request the ConnDOT to enter into such litigation to protect the interests of the Funding Agency, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States

EXHIBIT C

CONTRACTOR WORKFORCE UTILIZATION (FEDERAL EXECUTIVE ORDER 11246) / EQUAL EMPLOYMENT OPPORTUNITY (Federal - FHWA)

1. **Project Workforce Utilization Goals:**
   These goals are applicable to all the Contractor's construction work (whether or not it is Federal or Federally assisted or funded) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where the work is actually performed.

   Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications which contain the applicable goals for minority and female participation.

   The goals for minority and female utilization are expressed in percentage terms for the contractor's aggregate work-force in each trade on all construction work in the covered area, are referenced in the attached Appendix A.

2. **Executive Order 11246**
   The Contractor's compliance with Executive Order 11246 and 41-CFR Part 60-4 shall be based on its implementation of the specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(A) and its efforts to meet the goals established for the geographical area where the contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hour performed.

   If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Pan does not excuse any covered Contractor's of subcontractor's failure to take good faith efforts to achieve the plan goals and timetables.

   The Contractor shall implement the specific affirmative action standards provided in a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in

which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs (OFCCP) Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractors obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant hereto.

In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites; and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off the street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason thereafter; along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the Union or Unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or women sent by the Contractor, or when the Contractor has other

information that the Union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO Policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company EEO Policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment, decisions including specific Foreman, etc. prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO Policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work-force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and

employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review at least annually of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (a through p). The efforts of a contractor association, joint contractor union, contractor community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under a through p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work-force participation, makes a good faith effort to meet with individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of Executive Order 11246 if a particular group is employed in a substantially disparate manner, (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under utilized).

The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in these

specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4 8.

The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status, (e.g. mechanic, apprentice, trainee, helper, or laborer) dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

Nothing herein provided shall be construed as a limitation upon the application of their laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

The Director of the Office of Federal Contract Compliance Programs, from time to time, shall issue goals and timetables for minority and female utilization which shall be based on appropriate work-force, demographic or other relevant data and which shall cover construction projects or construction contracts performed in specific geographical areas. The goals, which shall be applicable to each construction trade in a covered contractor's or timetables, shall be published as notices in the Federal Register, and shall be inserted by the Contracting officers and applicants, as applicable, in the Notice required by 41 CFR 60-4.2.

FEDERALLY FUNDED OR ASSISTED PROJECTS
APPENDIX A
(Labor Market Goals)

Standard Metropolitan Statistical Area (SMSA)

Female			**Minority**
Bridgeport – Stamford – Norwalk – Danbury			**10.2%**
6.9%			
Bethel	Bridgeport	Brookfield	Danbury
Darien	Derby	Easton	Fairfield
Greenwich	Milford	Monroe	New Canaan
New Fairfield	Newton	Norwalk	Redding
Shelton	Stamford	Stratford	Trumbull
Weston	Westport	Wilton	
Hartford – Bristol – New Britain			**6.9%**
6.9%			
Andover	Avon	Berlin	Bloomfield
Bolton	Bristol	Burlington	Canton
Colchester	Columbia	Coventry	Cromwell
East Granby	East Hampton	East Hartford	East Windsor
Ellington	Enfield	Farmington	Glastonbury
Granby	Hartford	Hebron	Manchester
Marlborough	New Britain	New Hartford	Newington
Plainville	Plymouth	Portland	Rocky Hill
Simsbury	South Windsor	Southington	Stafford
Suffield	Tolland	Vernon	West Hartford
Wethersfield	Willington	Windsor	Windsor Locks
New Haven – Waterbury – Meriden			**9.0%**
6.9%			
Beacon Falls	Bethany	Branford	Cheshire
Clinton	East Haven	Guilford	Hamden
Madison	Meriden	Middlebury	Naugatuck
New Haven	North Branford	North Haven	Orange
Prospect	Southbury	Thomaston	Wallingford
Waterbury	Watertown	West Haven	Wolcott
Woodbridge	Woodbury		
New London – Norwich			**4.5%**
6.9%			
Bozrah	East Lyme	Griswold	Groton
Ledyard	Lisbon	Montville	New London
Norwich	Old Lyme	Old Saybrook	Preston
Sprague	Stonington	Waterford	

Non SMSA

Female			**Minority**
Litchfield – Windham			**5.9%**
6.9%			
Abington	Ashford	Ballouville	Bantam
Barkhamsted	Bethlehem	Bridgewater	Brooklyn
Canaan	Canterbury	Central Village	Cahplin
Colebrook	Cornwall	Cornwall Bridge	Danielson
Dayville	East Canaan	East Killingly	East Woodstock
Eastford	Falls Village	Gaylordsville	Goshen
Grosvenor Dale	Hampton	Harwinton	Kent
Killignly	Lakeside	Litchfield	Moosup
Morris	New Milford	New Preston	New Preston Marble Dale
Norfolk	North Canaan	No. Grosvenordale	North Windham
Oneco	Pequabuck	Pine Meadow	Plainfield
Pleasant Valley	Pomfret	Pomfret Center	Putnam
Quinebaug	Riverton	Rogers	Roxbury
Salisbury	Scotland	Sharon	South Kent
South Woodstock	Sterling	Taconic	Terryville
Thompson	Torrington	Warren	Warrenville
Washington	Washington Depot	Wauregan	West Cornwall
Willimantic	Winchester	Winchester Center	Windham
Winsted	Woodstock	Woodstock Valley	

EXHIBIT D

Health Insurance Portability and Accountability Act of 1996 ("HIPAA").

(a) If the Contactor is a Business Associate under the requirements of the Health Insurance Portability and Accountability Act of 1996 ("HIPAA"), the Contractor must comply with all terms and conditions of this Section of the Contract. If the Contractor is not a Business Associate under HIPAA, this Section of the Contract does not apply to the Contractor for this Contract.

(b) The Contractor is required to safeguard the use, publication and disclosure of information on all applicants for, and all clients who receive, services under the Contract in accordance with all applicable federal and state law regarding confidentiality, which includes but is not limited to HIPAA, more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E; and

(c) The State of Connecticut Agency named on page 1 of this Contract (hereinafter the "Department") is a "covered entity" as that term is defined in 45 C.F.R. § 160.103; and

(d) The Contractor, on behalf of the Department, performs functions that involve the use or disclosure of "individually identifiable health information," as that term is defined in 45 C.F.R. § 160.103; and

(e) The Contractor is a "business associate" of the Department, as that term is defined in 45 C.F.R. § 160.103; and

(f) The Contractor and the Department agree to the following in order to secure compliance with the HIPAA, the requirements of Subtitle D of the Health Information Technology for Economic and Clinical Health Act (hereinafter the HITECH Act), (Pub. L. 111-5, sections 13400 to 13423), and more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E.

(g) Definitions

(1) "Breach shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(1))

(2) "Business Associate" shall mean the Contractor.

(3) "Covered Entity" shall mean the Department of the State of Connecticut named on page 1 of this Contract.

(4) "Designated Record Set" shall have the same meaning as the term "designated record set" in 45 C.F.R. § 164.501.

(5) "Electronic Health Record" shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(5))

(6) "Individual" shall have the same meaning as the term "individual"' in 45 C.F.R. § 160.103 and shall include a person who qualifies as a personal representative as defined in 45 C.F.R. § 164.502(g).

(7) "Privacy Rule" shall mean the Standards for Privacy of Individually Identifiable Health Information at 45 C.F.R. part 160 and parts 164, subparts A and E.

(8) "Protected Health Information" or "PHI" shall have the same meaning as the term "protected health information" in 45 C.F.R. § 160.103, limited to information created or received by the Business Associate from or on behalf of the Covered Entity.

(9) "Required by Law"' shall have the same meaning as the term "required by law" in 45 C.F.R. § 164.103.

(10) "Secretary" shall mean the Secretary of the Department of Health and Human Services or his designee.

(11) "More stringent" shall have the same meaning as the term "more stringent" in 45 C.F.R. § 160.202.

(12) "This Section of the Contract" refers to the HIPAA Provisions stated herein, in their entirety.

(13) "Security Incident" shall have the same meaning as the term "security incident" in 45 C.F.R.§ 164.304.

(14) "Security Rule" shall mean the Security Standards for the Protection of Electronic Protected Health Information at 45 C.F.R. part 160 and parts 164, subpart A and C.

(15) "Unsecured protected health information" shall have the same meaning as the term as defined in section 13402(h)(1)(A) of HITECH. Act. (42 U.S.C. §17932(h)(1)(A)).

(h) Obligations and Activities of Business Associates.

(1) Business Associate agrees not to use or disclose PHI other than as permitted or required by this Section of the Contract or as Required by Law.

(2) Business Associate agrees to use appropriate safeguards to prevent use or disclosure of PHI other than as provided for in this Section of the Contract.

(3) Business Associate agrees to use administrative, physical and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of electronic protected health information that it creates, receives, maintains, or transmits on behalf of the Covered Entity.

(4) Business Associate agrees to mitigate, to the extent practicable, any harmful effect that is known to the Business Associate of a use or disclosure of PHI by Business Associate in violation of this Section of the Contract.

(5) Business Associate agrees to report to Covered Entity any use or disclosure of PHI not provided for by this Section of the Contract or any security incident of which it becomes aware.

(6) Business Associate agrees to insure that any agent, including a subcontractor, to whom it provides PHI received from, or created or received by Business Associate, on behalf of the Covered Entity, agrees to the same restrictions and conditions that apply through this Section of the Contract to Business Associate with respect to such information.

(7) Business Associate agrees to provide access, at the request of the Covered Entity, and in the time and manner agreed to by the parties, to PHI in a Designated Record Set, to Covered Entity or, as directed by Covered Entity, to an Individual in order to meet the requirements under 45 C.F.R. § 164.524.

(8) Business Associate agrees to make any amendments to PHI in a Designated Record Set that the Covered Entity directs or agrees to pursuant to 45 C.F.R. § 164.526 at the request of the Covered Entity, and in the time and manner agreed to by the parties.

(9) Business Associate agrees to make internal practices, books, and records, including policies and procedures and PHI, relating to the use and disclosure of PHI received from, or created or received by, Business Associate on behalf of Covered Entity, available to Covered Entity or to the Secretary in a time and manner agreed to by the parties or designated by the Secretary, for purposes of the Secretary determining Covered Entity's compliance with the Privacy Rule.

(10) Business Associate agrees to document such disclosures of PHI and information related to such disclosures as would be required for Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.

(11) Business Associate agrees to provide to Covered Entity, in a time and manner agreed to by the parties, information collected in accordance with clause h. (10) of this Section of the Contract, to permit Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder. Business Associate agrees at the Covered Entity's direction to provide an accounting of disclosures of PHI directly to an individual in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.

(12) Business Associate agrees to comply with any state or federal law that is more stringent than the Privacy Rule.

(13) Business Associate agrees to comply with the requirements of the HITECH Act relating to privacy and security that are applicable to the Covered Entity and with the requirements of 45 C.F.R. sections 164.504(e), 164.308, 164.310, 164.312, and 164.316.

(14) In the event that an individual requests that the Business Associate (a) restrict disclosures of PHI; (b) provide an accounting of disclosures of the individual's PHI; or (c) provide a copy of the individual's PHI in an electronic health record, the Business Associate agrees to notify the covered entity, in writing, within two business days of the request.

(15) Business Associate agrees that it shall not, directly or indirectly, receive any remuneration in exchange for PHI of an individual without (1) the written approval of the covered entity, unless receipt of remuneration in exchange for PHI is expressly authorized by this Contract and (2) the valid authorization of the individual, except for the purposes provided under section 13405(d)(2) of the HITECH Act,(42 U.S.C. § 17935(d)(2)) and in any accompanying regulations

(16) Obligations in the Event of a Breach

A. The Business Associate agrees that, following the discovery of a breach of unsecured protected health information, it shall notify the Covered Entity of such breach in accordance with the requirements of section 13402 of HITECH (42 U.S.C. 17932(b) and the provisions of this Section of the Contract.
B. Such notification shall be provided by the Business Associate to the Covered Entity without unreasonable delay, and in no case later than 30 days after the breach is discovered by the Business Associate, except as otherwise instructed in writing by a law enforcement official pursuant to section 13402 (g) of HITECH (42 U.S.C. 17932(g)) . A breach is considered discovered as of the first day on which it is, or reasonably should have been, known to the Business Associate. The notification shall include the identification and last known address, phone number and email address of each individual (or the next of kin of the individual if the individual is deceased) whose unsecured protected health information has been, or is reasonably believed by the Business Associate to have been, accessed, acquired, or disclosed during such breach.
C. The Business Associate agrees to include in the notification to the Covered Entity at least the following information:
    1. A brief description of what happened, including the date of the breach and the date of the discovery of the breach, if known.

    2. A description of the types of unsecured protected health information that were involved in the breach (such as full name, Social Security number, date of birth, home address, account number, or disability code).

    3. The steps the Business Associate recommends that individuals take to protect themselves from potential harm resulting from the breach.

    4. A detailed description of what the Business Associate is doing to investigate the breach, to mitigate losses, and to protect against any further breaches.

    5. Whether a law enforcement official has advised either verbally or in writing the Business Associate that he or she has determined that notification or notice to

individuals or the posting required under section 13402 of the HITECH Act would impede a criminal investigation or cause damage to national security and; if so, include contact information for said official.

D. Business Associate agrees to provide appropriate staffing and have established procedures to ensure that individuals informed by the Covered Entity of a breach by the Business Associate have the opportunity to ask questions and contact the Business Associate for additional information regarding the breach. Such procedures shall include a toll-free telephone number, an e-mail address, a posting on its Web site and a postal address. Business Associate agrees to include in the notification of a breach by the Business Associate to the Covered Entity, a written description of the procedures that have been established to meet these requirements. Costs of such contact procedures will be borne by the Contractor.

E. Business Associate agrees that, in the event of a breach, it has the burden to demonstrate that it has complied with all notifications requirements set forth above, including evidence demonstrating the necessity of a delay in notification to the Covered Entity.

(i) Permitted Uses and Disclosure by Business Associate.

(1) General Use and Disclosure Provisions Except as otherwise limited in this Section of the Contract, Business Associate may use or disclose PHI to perform functions, activities, or services for, or on behalf of, Covered Entity as specified in this Contract, provided that such use or disclosure would not violate the Privacy Rule if done by Covered Entity or the minimum necessary policies and procedures of the Covered Entity.

(2) Specific Use and Disclosure Provisions

(A) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI for the proper management and administration of Business Associate or to carry out the legal responsibilities of Business Associate.

(B) Except as otherwise limited in this Section of the Contract, Business Associate may disclose PHI for the proper management and administration of Business Associate, provided that disclosures are Required by Law, or Business Associate obtains reasonable assurances from the person to whom the information is disclosed that it will remain confidential and used or further disclosed only as Required by Law or for the purpose for which it was disclosed to the person, and the person notifies Business Associate of any instances of which it is aware in which the confidentiality of the information has been breached.

(C) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI to provide Data Aggregation services to Covered Entity as permitted by 45 C.F.R. § 164.504(e)(2)(i)(B).

(j) Obligations of Covered Entity.

(1) Covered Entity shall notify Business Associate of any limitations in its notice of privacy practices of Covered Entity, in accordance with 45 C.F.R. § 164.520, or to the extent that such limitation may affect Business Associate's use or disclosure of PHI.

(2) Covered Entity shall notify Business Associate of any changes in, or revocation of, permission by Individual to use or disclose PHI, to the extent that such changes may affect Business Associate's use or disclosure of PHI.

(3) Covered Entity shall notify Business Associate of any restriction to the use or disclosure of PHI that Covered Entity has agreed to in accordance with 45 C.F.R. § 164.522, to the extent that such restriction may affect Business Associate's use or disclosure of PHI.

(k) Permissible Requests by Covered Entity. Covered Entity shall not request Business Associate to use or disclose PHI in any manner that would not be permissible under the Privacy Rule if done by the Covered Entity, except that Business Associate may use and disclose PHI for data aggregation, and management and administrative activities of Business Associate, as permitted under this Section of the Contract.

(l) Term and Termination.

(1) Term. The Term of this Section of the Contract shall be effective as of the date the Contract is effective and shall terminate when the information collected in accordance with clause h. (10) of this Section of the Contract is provided to the Covered Entity and all of the PHI provided by Covered Entity to Business Associate, or created or received by Business Associate on behalf of Covered Entity, is destroyed or returned to Covered Entity, or, if it is infeasible to return or destroy PHI, protections are extended to such information, in accordance with the termination provisions in this Section.

(2) Termination for Cause Upon Covered Entity's knowledge of a material breach by Business Associate, Covered Entity shall either:

(A) Provide an opportunity for Business Associate to cure the breach or end the violation and terminate the Contract if Business Associate does not cure the breach or end the violation within the time specified by the Covered Entity; or

(B) Immediately terminate the Contract if Business Associate has breached a material term of this Section of the Contract and cure is not possible; or

(C) If neither termination nor cure is feasible, Covered Entity shall report the violation to the Secretary.

(3) Effect of Termination

(A) Except as provided in (l)(2) of this Section of the Contract, upon termination of this Contract, for any reason, Business Associate shall return or destroy all PHI received from Covered Entity, or created or received by Business Associate on behalf of Covered Entity. Business Associate shall also provide the information collected in accordance with clause h. (10) of this Section of the Contract to the Covered Entity

within ten business days of the notice of termination. This provision shall apply to PHI that is in the possession of subcontractors or agents of Business Associate. Business Associate shall retain no copies of the PHI.

(B) In the event that Business Associate determines that returning or destroying the PHI is infeasible, Business Associate shall provide to Covered Entity notification of the conditions that make return or destruction infeasible. Upon documentation by Business Associate that return or destruction of PHI is infeasible, Business Associate shall extend the protections of this Section of the Contract to such PHI and limit further uses and disclosures of PHI to those purposes that make return or destruction infeasible, for as long as Business Associate maintains such PHI. Infeasibility of the return or destruction of PHI includes, but is not limited to, requirements under state or federal law that the Business Associate maintains or preserves the PHI or copies thereof.

(m) Miscellaneous Provisions.

(1) Regulatory References. A reference in this Section of the Contract to a section in the Privacy Rule means the section as in effect or as amended.

(2) Amendment. The Parties agree to take such action as in necessary to amend this Section of the Contract from time to time as is necessary for Covered Entity to comply with requirements of the Privacy Rule and the Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.

(3) Survival. The respective rights and obligations of Business Associate shall survive the termination of this Contract.

(4) Effect on Contract. Except as specifically required to implement the purposes of this Section of the Contract, all other terms of the Contract shall remain in force and effect.

(5) Construction. This Section of the Contract shall be construed as broadly as necessary to implement and comply with the Privacy Standard. Any ambiguity in this Section of the Contract shall be resolved in favor of a meaning that complies, and is consistent with, the Privacy Standard.

(6) Disclaimer. Covered Entity makes no warranty or representation that compliance with this Section of the Contract will be adequate or satisfactory for Business Associate's own purposes. Covered Entity shall not be liable to Business Associate for any claim, civil or criminal penalty, loss or damage related to or arising from the unauthorized use or disclosure of PHI by Business Associate or any of its officers, directors, employees, contractors or agents, or any third party to whom Business Associate has disclosed PHI contrary to the provisions of this Contract or applicable law. Business Associate is solely responsible for all decisions made, and actions taken, by Business Associate regarding the safeguarding, use and disclosure of PHI within its possession, custody or control.

(7) Indemnification. The Business Associate shall indemnify and hold the Covered Entity harmless from and against any and all claims, liabilities, judgments, fines, assessments, penalties, awards and any statutory damages that may be imposed or assessed pursuant to HIPAA, as amended or the

HITECH Act, including, without limitation, attorney's fees, expert witness fees, costs of investigation, litigation or dispute resolution, and costs awarded thereunder, relating to or arising out of any violation by the Business Associate and its agents, including subcontractors, of any obligation of Business Associate and its agents, including subcontractors, under this section of the contract, under HIPAA, the HITECH Act, the Privacy Rule and the Security Rule.

CONNECTICUT STATE ELECTIONS ENFORCEMENT COMMISSION **EXHIBIT E**

Rev. 1/11
Page 1 of 2

Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations

This notice is provided under the authority of Connecticut General Statutes §9-612(g)(2), as amended by P.A. 10-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined on the reverse side of this page).

CAMPAIGN CONTRIBUTION AND SOLICITATION LIMITATIONS

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor*, with regard to a *state contract* or *state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee (which includes town committees).

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

On and after January 1, 2011, no state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall **knowingly** *solicit* contributions from the state contractor's or prospective state contractor's employees or from a *subcontractor* or *principals of the subcontractor* on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

DUTY TO INFORM

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

PENALTIES FOR VIOLATIONS

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties—Up to $2,000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of up to $2,000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or not more than $5,000 in fines, or both.

CONTRACT CONSEQUENCES

In the case of a state contractor, contributions made or solicited in violation of the above prohibitions may resulting the contract being voided.

In the case of a prospective state contractor, contributions made or solicited in violation of the above prohibitions shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State shall not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.
Additional information may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to “Lobbyist/Contractor Limitations.”

DEFINITIONS

"State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Prospective state contractor" means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. "Prospective state contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a state contractor or prospective state contractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization**,** (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

"State contract" means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. "State contract" does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan, a loan to an individual for other than commercial purposes or any agreement or contract between the state or any state agency and the United States Department of the Navy or the United States Department of Defense.

"State contract solicitation" means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

"Managerial or discretionary responsibilities with respect to a state contract" means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

"Dependent child" means a child residing in an individual's household who may legally be claimed as a dependent on the federal income tax of such individual.

"Solicit" means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

"Subcontractor" means any person, business entity or nonprofit organization that contracts to perform part or all of the obligations of a state contractor's state contract. Such person, business entity or nonprofit organization shall be deemed to be a subcontractor until December thirty first of the year in which the subcontract terminates. "Subcontractor" does not include (i) a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or (ii) an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a subcontractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a subcontractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a subcontractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a subcontractor, which is not a business entity, or if a subcontractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any subcontractor who has managerial or discretionary responsibilities with respect to a subcontract with a state contractor, (v) the spouse or a dependent child who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the subcontractor.

EXHIBIT F

(federal wage rate package will be inserted here)

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General Decision Number: CT130014 01/04/2013 CT14

Superseded General Decision Number: CT20120014

State: Connecticut

Construction Type: Heavy

County: Hartford County in Connecticut.

HEAVY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	01/04/2013

BRCT0001-012 03/31/2012

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 32.50	24.55

CARP0024-014 05/07/2012

Berlin, Bristol, Burlington, Canton, Marlborough, New Britain, Newington, Plainville and Southington

	Rates	Fringes
CARPENTER, Includes Form Work	$ 29.65	21.00

CARP0043-005 05/07/2012

Avon, Bloomfield, East Branby, East Hartfod, East Windsor, Enfield, Farmington, Glastonbury, Granby, Hartford, Hartland, Manchester, Rocky Hill, Simsbury, South Windsor, Suffield, West Hartford, Wethersfield, Windsor, Windsor Locks

	Rates	Fringes
CARPENTER, Includes Form Work	$ 29.65	21.00

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* ELEC0035-006 06/01/2012

Entire County excluding Berlin, Bristol, Hartland, New Britain, Newington, Plainville and Southington Townships

	Rates	Fringes
ELECTRICIAN	$ 37.10	22.12

ELEC0090-005 06/01/2012

Berlin, Bristol, New Britain, Newington, Plainville, Southington Townships

	Rates	Fringes
ELECTRICIAN	$ 35.70	22.49

ELEC0488-005 06/01/2011

Hartland Township

	Rates	Fringes
ELECTRICIAN	$ 35.10	22.26

ENGI0478-010 04/01/2012

	Rates	Fringes
POWER EQUIPMENT OPERATOR:		
Asphalt Paver	$ 33.46	20.50+a
Asphalt Roller	$ 32.81	20.50+a
Asphalt Spreader	$ 33.46	20.50+a
Bulldozer (Rough Grade Dozer)	$ 33.15	20.50+a
Bulldozer Fine Grade(includes slopes, shaping, laser or gps)	$ 34.44	20.50+a
Crane handling or erecting structural steel or stone	$ 35.50	20.50+a
Cranes (100 ton capacity & over)	$ 35.18	20.50+a
Cranes (under 100 ton rated capacity)	$ 34.44	20.50+a
Drills with self contained power units; Directional driller	$ 33.46	20.50+a
Earth Roller	$ 29.94	20.50+a
Excavator/Backhoe 2 cubic yards and over	$ 35.18	20.50+a
Excavator/Backhoe under 2 cubic yards	$ 34.44	20.50+a
Forklift	$ 31.98	20.50+a
Front End Loader (3 cubic yards up to 7 cubic yards)	$ 33.15	20.50+a
Front End Loader (7 cubic yards or over)	$ 35.50	20.50+a
Front End Loader (under 3 cubic yards)	$ 31.98	20.50+a
Grader/Blade	$ 34.44	20.50+a
Maintenance Engineer/Oiler	$ 27.10	20.50+a
Mechanic	$ 32.41	20.50+a

a. PAID HOLIDAYS: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday.

b. Crane with boom, including jib, 150 feet - $1.50 extra .

Crane with boom, including jib, 200 feet- $2.50 extra.
Crane with boom, including jib, 250 feet - $5.00 extra.
Crane with boom, including jib, 300 feet - $7.00 extra.
Crane with boom, including jib, 400 feet - $10.00 extra.

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* IRON0015-007 07/02/2012

	Rates	Fringes
IRONWORKER, STRUCTURAL	$ 33.50	27.98+a

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-006 04/01/2012

	Rates	Fringes
LABORERS		
GROUP 1	$ 25.80	16.45
GROUP 2	$ 26.05	16.45
GROUP 3	$ 26.30	16.45
GROUP 4	$ 26.80	16.45
GROUP 5	$ 27.55	16.45
GROUP 6	$ 27.80	16.45
GROUP 7	$ 16.00	16.45

LABORERS CLASSIFICATIONS

GROUP 1: Laborers (Unskilled), acetylene burner, concrete specialist

GROUP 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators and powdermen.

GROUP 3: Pipelayers, Jackhammer/Pavement breaker (handheld), mason tenders/catch basin builders, asphalt rakers, air track operators, block paver and curb setter

GROUP 4: Asbestos/lead removal

GROUP 5: Blasters

GROUP 6: Toxic waste remover

GROUP 7: Traffic control signalman

PAIN0011-013 06/01/2010

	Rates	Fringes
PAINTER		
Brush and Roller	$ 28.47	15.40
Spray Only	$ 31.47	15.40
Steel Only	$ 30.47	15.40

SUCT2002-009 12/16/2008

	Rates	Fringes

IRONWORKER, REINFORCING.....$ 27.13 13.57

LABORER: Common or General.....$ 21.03 5.30

OPERATOR: Excavator.....$ 27.77 7.60

TRUCK DRIVER: 3 Axle & Semi
- Truck.....$ 19.93 7.39

TEAM0064-006 04/01/2012

	Rates	Fringes
TRUCK DRIVER: 4 Axle Truck.....	$ 28.08	17.22+a

Hazardous waste removal work receives additional $1.25 per hour.

a. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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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 clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination.

The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.

Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

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General Decision Number: CT130003 01/04/2013 CT3

Superseded General Decision Number: CT20120003

State: Connecticut

Construction Type: Highway

County: Hartford County in Connecticut.

HIGHWAY CONSTRUCTION PROJECTS

Modification Number Publication Date
0 01/04/2013

BRCT0001-003 03/31/2012

	Rates	Fringes
BRICKLAYER		
BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, PLASTERERS, STONE MASONS	$ 32.50	24.55

CARP0024-005 05/07/2012

	Rates	Fringes
Carpenters: (Berlin, Bristol, Burlington,Canton, Marlborough, New Britain, Newington, Plainville, Southington)		
CARPENTERS; PILEDRIVERS	$ 29.65	21.00
DIVER TENDERS	$ 29.65	21.00
DIVERS	$ 38.11	21.00

CARP0043-003 05/07/2012

	Rates	Fringes
Carpenters: (Avon, Bloomfied, East Granby, East Hartford, East Windsor, Enfield, Farmington, Glastonbury, Granby, Hartford, hartland, Manchester, Rocky Hill, Simsbury, South Windsor, Suffield, West Hartford, Wethersfield, Windsor, Windsor Locks)		
CARPENTERS; PILEDRIVERS	$ 29.65	21.00
DIVER TENDERS	$ 29.65	21.00
DIVERS	$ 38.11	21.00

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* ELEC0035-002 06/01/2012

	Rates	Fringes
Electricians:		
Entire County, excluding Berlin, Bristol, Hartland, New Britain, Newington, Plainville and Southington..	$ 37.10	22.12

ELEC0090-001 06/01/2010

	Rates	Fringes
Electricians:		
Berlin, Bristol, New Britain, Newington, Plainville, Southington.....	$ 35.20	20.51

ELEC0488-004 06/01/2011

	Rates	Fringes
Electricians:.....	$ 35.10	22.26

ENGI0478-002 04/01/2012

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	$ 35.50	20.50+a
GROUP 2.....	$ 35.18	20.50+a
GROUP 3.....	$ 34.44	20.50+a
GROUP 4.....	$ 34.05	20.50+a
GROUP 5.....	$ 33.46	20.50+a
GROUP 6.....	$ 33.15	20.50+a
GROUP 7.....	$ 32.81	20.50+a
GROUP 8.....	$ 32.41	20.50+a
GROUP 9.....	$ 31.98	20.50+a
GROUP 10.....	$ 29.94	20.50+a
GROUP 11.....	$ 29.94	20.50+a
GROUP 12.....	$ 29.88	20.50+a
GROUP 13.....	$ 31.41	20.50+a
GROUP 14.....	$ 29.30	20.50+a
GROUP 15.....	$ 28.99	20.50+a
GROUP 16.....	$ 28.16	20.50+a
GROUP 17.....	$ 27.75	20.50+a
GROUP 18.....	$ 27.10	20.50+a

Hazardous waste premium $3.00 per hour over classified rate.

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.

a. PAID HOLIDAYS: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the

holiday.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Crane Handling or Erecting Structural Steel or tone; Hoisting Engineer (2 drums or over); Front End Loader (7 cubic yards or over) Work Boat 26 ft. & over.

GROUP 2: Cranes (100 ton rated capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer).

GROUP 3: Excavator; 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.)

GROUP 4: Trenching machines; Lighter Derrick; Concrete Finishing Machine, cmi Machine or Similar; Koehring Loader Skooper).

GROUP 5: Specialty Railroad Equipment; Asphalt Spreader; Asphalt Reclaiming achine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell); Side Boom; Combination Hoe and Loader; Directional Driller.

GROUP 6: Front End Loader (3 cu. yds. up to 7 cubic yards); Bulldozer (Rough grade dozer).

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).

GROUP 8: Mechanic; Grease Truck Operator; Hydroblaster; Barrier Mover; Power Stone Spreader; Welder; Work Boat Under 26 ft.; Transfer Machine.

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).

GROUP 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.

GROUP 11: Conveyor; Earth Roller; Power Pavement Breaker (Whiphammer); Robot Demolition Equipment.

GROUP 12: Wellpoint Operator.

GROUP 13: Portable Asphalt Plant Operator; Portable Concrete Plant Operator; Portable Crusher Plant Operator.

GROUP 14: Compressor Battery Operator.

GROUP 15: Power Safety Boat; Vacuum Truck; Zim Mixer;

Sweeper; (Minimum for any job requiring a CDL License)

GROUP 16: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).

GROUP 17: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater operator.

GROUP 18: Maintenance Engineer.

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* IRON0015-002 07/02/2012

	Rates	Fringes
Ironworkers: (Reinforcing, Structural and Precast Concrete Erection)	$ 33.50	27.98+a

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LABO0056-003 04/01/2012

	Rates	Fringes
Laborers:		
GROUP 1	$ 25.80	16.45
GROUP 2	$ 26.05	16.45
GROUP 3	$ 26.30	16.45
GROUP 4	$ 26.80	16.45
GROUP 5	$ 27.55	16.45
GROUP 6	$ 27.80	16.45
GROUP 7	$ 16.00	16.45

LABORERS CLASSIFICATIONS

GROUP 1: Laborers (Unskilled), acetylene burner, concrete specialist

GROUP 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators and powdermen.

GROUP 3: Pipelayers, Jackhammer/Pavement breaker (handheld), mason tenders/catch basin builders, asphalt rakers, air track operators, block paver and curb setter

GROUP 4: Asbestos/lead removal

GROUP 5: Blasters

GROUP 6: Toxic waste remover

GROUP 7: Traffic control signalman

PAIN0011-003 06/01/2012

	Rates	Fringes
Painters: (BRIDGE		

CONSTRUCTION)
Brush, Roller, Blasting
(Sand, Water, etc.) Spray...$ 42.75 16.90

PAIN0011-004 06/01/2012

	Rates	Fringes
Painters:		
Blast and Spray	$ 33.22	16.90
Brush and Roll	$ 30.22	16.90
Tanks, Towers, Swing	$ 32.22	16.90

TEAM0064-005 04/01/2012

	Rates	Fringes
Truck drivers:		
2 Axle Ready Mix	$ 27.98	17.22+a
2 Axle	$ 27.88	17.22+a
3 Axle Ready Mix	$ 28.03	17.22+a
3 Axle	$ 27.98	17.22+a
4 Axle Ready Mix	$ 28.13	17.22+a
4 Axle	$ 28.08	17.22+a
Heavy Duty Trailer 40 tons and over	$ 28.33	17.22+a
Heavy Duty Trailer up to 40 tons	$ 28.08	17.22+a
Specialized (Earth moving equipment other than conventional type on-the-road trucks and semi-trailers, including Euclids)	$ 28.13	17.22+a

Hazardous waste removal work receives additional $1.25 per hour.

a. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

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Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

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a wage determination matter
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Washington, DC 20210

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U.S. Department of Labor
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Washington, DC 20210

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END OF GENERAL DECISION

EXHIBIT G

(state wages will be inserted here)

Project: Main Street Traffic Signal Improvements

Minimum Rates and Classifications
for Heavy/Highway Construction

Connecticut Department of Labor
Wage and Workplace Standards Division

ID#: **H** 17457

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: GL-2013-23
FAP Number:
Project: Main Street Traffic Signal Improvements

Project Town Glastonbury
State Number: 53-181

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	32.50	24.55
2) Carpenters, Piledrivermen	29.65	21.00

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

2a) Diver Tenders	29.65	21.00
3) Divers	38.11	21.00
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	42.75	16.90
4a) Painters: Brush and Roller	30.22	16.90
4b) Painters: Spray Only	33.22	16.90
4c) Painters: Steel Only	30.47	15.40
4d) Painters: Blast and Spray	33.22	16.90

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

4e) Painters: Tanks, Tower and Swing	32.22	16.90
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)	37.10	22.12
6) Ironworkers: (Ornamental, Reinforcing, Structural, and Precast Concrete Erection)	33.50	27.98 + 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)	38.67	25.56

----LABORERS---- - Last updated 4/11/12

8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	25.80	16.45
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator	26.05	16.45

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

10) Group 3: Pipelayers	26.30	16.45
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters	26.30	16.45
12) Group 5: Toxic waste removal (non-mechanical systems)	27.80	16.45
13) Group 6: Blasters	27.55	16.45
Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe)	26.80	16.45
Group 8: Traffic control signalmen	16.00	16.45

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.---- Last updated 4/11/12----

As of: Thursday, February 21, 2013

13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	31.28	16.45 + a
13b) Brakemen, Trackmen	30.37	16.45 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----Last updated 4/11/12----		
14) Concrete Workers, Form Movers, and Strippers	30.37	16.45 + a
15) Form Erectors	30.68	16.45 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----Last updated 4/11/12----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	30.37	16.45 + a

17) Laborers Topside, Cage Tenders, Bellman	30.26	16.45 + a
18) Miners	31.28	16.45 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----Last updated 4/11/12----		
18a) Blaster	37.41	16.45 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	37.22	16.45 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	35.35	16.45 + a
21) Mucking Machine Operator	37.97	16.45 + a

Project: Main Street Traffic Signal Improvements

----TRUCK DRIVERS----(*see note below)

Two axle trucks	27.88	17.22 + a
Three axle trucks; two axle ready mix	27.98	17.22 + a
Three axle ready mix	28.03	17.22 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.08	17.22 + a
Four axle ready-mix	28.13	17.22 + a
Heavy duty trailer (40 tons and over)	28.33	17.22 + a

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.13	17.22 + 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. (Trade License Required)	35.50	20.50 + a
Group 2: Cranes (100 ton rate capacity and over); Backhoe/Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer). (Trade License Required)	35.18	20.50 + 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)	34.44	20.50 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	34.05	20.50 + 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)	33.46	20.50 + a

Project: Main Street Traffic Signal Improvements

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	33.46	20.50 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	33.15	20.50 + 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).	32.81	20.50 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	32.41	20.50 + 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).	31.98	20.50 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	29.94	20.50 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	29.94	20.50 + a

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

Group 12: Wellpoint Operator.	29.88	20.50 + a
Group 13: Compressor Battery Operator.	29.30	20.50 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	28.16	20.50 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	27.75	20.50 + a
Group 16: Maintenance Engineer/Oiler	27.10	20.50 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	31.41	20.50 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	28.99	20.50 + a

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----Last updated 9/3/2010----

20) Lineman, Cable Splicer, Dynamite Man	44.36	3% + 13.70
21) Heavy Equipment Operator	39.92	3% + 13.70
22) Equipment Operator, Tractor Trailer Driver, Material Men	37.71	3% + 13.70
23) Driver Groundmen	33.27	3% + 13.70

----LINE CONSTRUCTION----Last updated 4/17/09----

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

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
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

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*

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.

As of: Thursday, February 21, 2013

Project: Main Street Traffic Signal Improvements

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.

As of: Thursday, February 21, 2013

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

Please Note: If the "Benefits" listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the "Benefits" section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.

b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

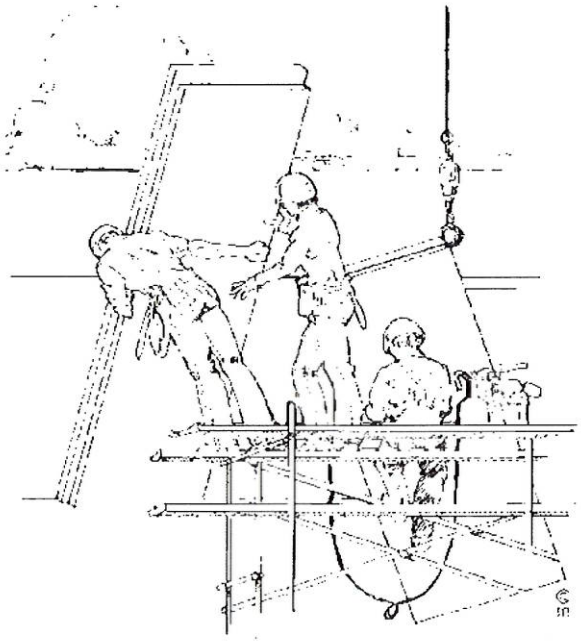
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached "Contracting Agency Certification Form" to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

✎ Inquiries can be directed to (860)263-6543.



CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative title

for _____, located at _____,
contracting agency address

do hereby certify that the total dollar amount of work to be done in connection with

_____, located at _____,
project name and number address

shall be $_____, which includes all work, regardless of whether such project

consists of one or more contracts.

CONTRACTOR INFORMATION

Name:_____

Address:_____
Authorized Representative:_____
Approximate Starting Date: _____

Approximate Completion Date:_____

_____ _____
Signature Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

Statute 31-55a

Last Updated: April 22, 2010

- Special Notice -

To All State and Political Subdivisions,Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement 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 Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- 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.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

◂-- Workplace Laws

Published by the Connecticut Department of Labor, Project Management Office

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

I,_____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

_____
Street

_____
City

and all of its subcontractors will pay all workers on the

_____
Project Name and Number

_____
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

_____
Signed

Subscribed and sworn to before me this _____ day of _____,_____.

_____
Notary Public

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007,* where the total cost of all work to be performed is at least $100,000)

(1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);

(2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;

(3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least $100,000;

(4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;

(5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;

(6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;

(7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;

(8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;

(9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

(10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;

(11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;

(12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;

(13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;

(14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and

(15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.

(16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTMATELY ARISE CONCERNIG THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine

Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.

- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Information Bulletin
Occupational Classifications

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53.

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification.

Below are additional clarifications of specific job duties performed for certain classifications:

Asbestos Insulator

- Handle, install, apply, fabricate, distribute, prepare, alter, repair, or dismantle heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

Carpenter

- Assembly and installation of modular fumiture/fumiture systems.
  [New] a. Free-standing furniture is not covered. This includes: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two- position information access station, file cabinets, storage cabinets, tables, etc.
- Applies fire stopping materials on fire resistive joint systems only.
- Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings.
- Installation of curtain/window walls only where attached to wood or metal studs.

Cleaning Laborer

- The clean up of any construction debris and the general cleaning, including sweeping, wash down, mopping, wiping of the construction facility, washing, polishing, dusting, etc., prior to the issuance of a certificate of occupancy falls under the *Labor classification.*

Delivery Personnel (Revised)

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.
- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer/tradesman and not a delivery personnel.

Electrician

- Installation or maintenance of telecommunication, LAN wiring or computer equipment.
- Low voltage wiring.

Fork Lift Operator

- Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.
- Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

Glaziers

- Installs light metal sash, head sills, and 2-story aluminum storefronts.
- Installation of aluminum window walls and curtain walls is the 'Soidtwork of the Glaziers and Ironworkers classification which requires either a blended rate or equal composite workforce.

Ironworkers

- Handling, sorting, and installation of reinforcing steel (rebar).
- Installation of aluminum window walls and curtain walls is the "joint work" of the Glaziers and Ironworkers classification which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.
- Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation.

Insulator

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings. Past practice using the applicable licensed trades, Plumber, Sheet Metal, Sprinkler Fitter, and Electrician, is not inconsistent with the Insulator classification and would be permitted.

Lead Paint Removal

- Painter Rate
    1. Removal of lead paint from bridges.
    2. Removal of lead paint as preparation of any surface to be repainted.
    3. Where removal is on a Demolition project prior to reconstruction.
- Laborer Rate
    1. Removal of lead paint from any surface NOT to be repainted.
    2. Where removal is on a *TOTAL* Demolition project only.

Roofers

- Preparation of surface, tear-off and/or removal of any type of roofing, and/or clean-up of any areas where a roof is to be relaid.

Sheet Metal Worker

- Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, facia, louvers, partitions, wall panel siding, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Insulated metal and insulated composite panels are still installed by the Iron Worker. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers.

Truck Drivers

- Truck Drivers delivering asphalt are covered under prevailing wage while on the site and directly involved in the paving operation.
- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as hs is part of the construction process.


Any questions regarding the proper classification should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd, Wethersfield, CT 06 109 at (860) 263-6543.

ATTACHMENT C:
DISADVANTAGED BUSINESS ENTERPRISES
SPECIAL PROVISIONS

SPECIAL PROVISION
DISADVANTAGED BUSINESS ENTERPRISES
AS SUBCONTRACTORS AND MATERIAL SUPPLIERS OR MANUFACTURERS
FOR FEDERALLY FUNDED PROJECTS

January 2013

I. ABBREVIATIONS AND DEFINITIONS AS USED IN THIS SPECIAL PROVISION

A. *CTDOT* means the Connecticut Department of Transportation.

B. *USDOT* means the U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration ("FHWA"), the Federal Transit Administration ("FTA"), and the Federal Aviation Administration ("FAA").

C. *Broker* means a party acting as an agent for others in negotiating Contracts, Agreements, purchases, sales, etc., in return for a fee or commission.

D. *Contract, Agreement or Subcontract* means a legally binding relationship obligating a seller to furnish supplies or services (including but not limited to, construction and professional services) and the buyer to pay for them. For the purposes of this provision, a lease for equipment or products is also considered to be a Contract.

E. *Contractor* means a consultant, second party or any other entity under Contract to do business with CTDOT or, as the context may require, with another Contractor.

F. *Disadvantaged Business Enterprise ("DBE")* means a for profit small business concern:

1. That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and

2. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and

3. Certified by CTDOT under Title 49 of the Code of Federal Regulations, Part 26, (Title 49 CFR Part 23 of the Code of Federal Regulations for Participation of Disadvantaged Business Enterprise in Airport Concessions)

G. *USDOT-assisted Contract* means any Contract between CTDOT and a Contractor (at any tier) funded in whole or in part with USDOT financial assistance.

H. *Good Faith Efforts ("GFE")* means all necessary and reasonable steps to achieve a DBE goal or other requirement which by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

I. *Small Business Concern* means, with respect to firms seeking to participate as DBEs in USDOT-assisted Contracts, a small business concern as defined pursuant to Section 3 of the Small Business Act and Small Business Administration ("SBA") regulations implementing it (13 CFR Part 121) that also does not exceed the cap on average annual gross receipts in 49 CFR Part 26, Section 26.65(b).

J. *Socially and Economically Disadvantaged Individual* means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:

1. Any individual who CTDOT finds, on a case-by-case basis, to be a socially and economically disadvantaged individual.

2. Any individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:

    - "Black Americans", which includes persons having origins in any of the Black racial groups of Africa;
    - "Hispanic Americans", which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
    - "Native Americans", which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians.
    - "Asian-Pacific Americans", which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, or Federated States of Micronesia;
    - "Subcontinent Asian Americans", which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
    - Women;
    - Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

K. *Commercially Useful Function ("CUF")* means the DBE is responsible for the execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved with its own forces and equipment. The DBE must be responsible for procuring, determining quantity, negotiating price, determining quality and paying for all materials (where applicable) associated with their work. The DBE must also perform at least 30% of the total cost of its contract with its own workforce.

II. ADMINISTRATIVE REQUIREMENTS

A. General Requirements

A DBE goal percentage equaling 10 percent (%) of the Contract value has been established for this Contract. This DBE goal percentage will be applied to the final Contract value to ultimately determine the required DBE goal. If additional work is required, DBE firms should be provided the appropriate opportunities to achieve the required DBE goal.

In order to receive credit toward the Contract DBE goal, the firms utilized as DBE subcontractors or suppliers must be certified as DBEs in the type of work to be counted for credit by CTDOT's Office of Contract Compliance prior to the date of the execution of the subcontract. Neither CTDOT nor the State of Connecticut's Unified Certification Program (UCP) makes any representation as to any DBE's technical or financial ability to perform the work. Prime contractors are solely responsible for performing due diligence in hiring DBE subcontractors.

All DBEs shall perform a CUF for the work that is assigned to them. The Contractor shall monitor and ensure that the DBE is in compliance with this requirement. The Connecticut DBE UPC Directory of certified firms can be found on the CTDOT website http://www.ct.gov/dot. The directory lists certified DBE firms with a description of services that they are certified to perform. Only work identified in this listing may be counted towards the project's DBE goal. A DBE firm may request to have services added at any time by contacting CTDOT's Office of Contract Compliance. No credit shall be counted for any DBE firm found not to be performing a CUF.

Once a Contract is awarded, all DBEs that were listed on the pre-award DBE commitment document must be utilized. The Contractor is obligated to provide the value and items of the work originally established in the pre-award documentation to the DBE firms listed in the pre-award documentation. Any modifications to the pre-award commitment must follow the procedure established in Section II-C.

The Contractor shall designate a liaison officer who will administer the Contractor's DBE program. Upon execution of this Contract, the name of the liaison officer shall be furnished in writing to CTDOT's unit administering the Contract, CTDOT's Office of Contract Compliance and CTDOT's Office of Construction ("OOC"). Contact information for the designated liaison officer shall be furnished no later than the scheduled date for the pre-construction meeting.

The Contractor shall submit a bi-monthly report to the appropriate CTDOT unit administering the Contract. This report shall indicate what work has been performed to date, with the dollars paid and percentage of DBE goal completed.

Verified payments made to DBEs shall be included in this bi-monthly report. A sample form is included on the CTDOT website.

In addition, the report shall include:

1. A projected time frame of when the remaining work is to be completed for each DBE.

2. A statement by the Contractor either confirming that the approved DBEs are on schedule to meet the Contract goal, or that the Contractor is actively pursuing a GFE.

3. If retainage is specified in the Contract specifications, then a statement of certification that the subcontractors' retainage is being released in accordance with 1.08.01 (Revised or supplemented).

Failure by the Contractor to provide the required reports may result in CTDOT withholding an amount equal to one percent (1%) of the monthly estimate until the required documentation is received.

The Contractor shall receive DBE credit when a DBE, or any combination of DBEs, perform work under the Contract in accordance with this specification.

Only work actually performed by and/or services provided by DBEs which are certified for such work and/or services, as verified by CTDOT, can be counted toward the DBE goal. Supplies and equipment a DBE purchases or leases from the Contractor or its affiliate cannot be counted toward the goal.

Monitoring of the CUF will occur by CTDOT throughout the life of the project. If it is unclear that the DBE is performing the work specified in its subcontract with the prime Contractor, further review may be required. If it is determined that the DBE is not performing a CUF, then the work performed by that DBE will not be counted towards the DBE goal percentage.

B. Subcontract Requirements

The Contractor shall submit to CTDOT's OOC all requests for subcontractor approvals on the standard CLA-12 forms provided by CTDOT. The dollar amount and items of work identified on the CLA-12 form must, at minimum, equal the dollar value submitted in the pre-award commitment. CLA-12 forms can be found at http://www.ct.gov/dot/construction under the "Subcontractor Approval" section. All DBE subcontractors must be identified on the CLA-12 form, regardless of whether they are being utilized to meet a Contract goal percentage. A copy of the legal Contract between the Contractor and the DBE subcontractor/supplier, a copy of the Title VI Contractor Assurances and a copy of the Required Contract Provision for Federal Aid Construction Contracts (Form FHWA-1273) (Federal Highway Administration projects only) must be submitted along with a request for subcontractor approval. These attachments cannot be substituted by reference.

If retainage is specified in the Contract specifications, then the subcontract agreement must contain a prompt payment mechanism that acts in accordance with Article 1.08.01 (Revised or supplemented).

If the Contract specifications do not contain a retainage clause, the Contractor shall not include a retainage clause in any subcontract agreement, and in this case, if a Contractor does include a retainage clause, it shall be deemed unenforceable.

In addition, the following documents are to be included with the CLA-12, if applicable:

- An explanation indicating who will purchase material.
- A statement explaining any method or arrangement for utilization of the Contractor's equipment.

The subcontract must show items of work to be performed, unit prices and, if a partial item, the work involved by all parties. If the subcontract items of work or unit prices are modified, the procedure established in Section II-C must be followed.

Should a DBE subcontractor further sublet items of work assigned to it, only lower tier subcontractors who are certified as a DBE firm will be counted toward the DBE goal. If the lower tier subcontractor is a non-DBE firm, the value of the work performed by that firm will not be counted as credit toward the DBE goal.

The use of joint checks between a DBE firm and the Contractor is acceptable, provided that written approval is received from the OOC prior to the issuance of any joint check. Should it

become necessary to issue a joint check between the DBE firm and the Contractor to purchase materials, the DBE firm must be responsible for negotiating the cost, determining the quality and quantity, ordering the material and installing (where applicable), and administering the payment to the supplier. The Contractor should not make payment directly to suppliers.

Each subcontract the Contractor signs with a subcontractor must contain the following assurance:

"The subcontractor/supplier/manufacturer shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor/subcontractor/supplier/manufacturer to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate."

C. Modification to Pre-Award Commitment

Contractors may not terminate for convenience any DBE subcontractor or supplier that was listed on the pre-award DBE commitment without prior written approval of the OOC. This includes, but is not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Prior to approval, the Contractor must demonstrate to the satisfaction of the OOC, that it has good cause, as found in 49CFR Part 26.53 (f)(3), for termination of the DBE firm.

Before transmitting its request for approval to terminate pre-award DBE firms to the OOC, the Contractor must give written notice to the DBE subcontractor and include a copy to the OOC of its notice to terminate and/or substitute, and the reason for the notice.

The Contractor must provide five (5) days for the affected DBE firm to respond. This affords the DBE firm the opportunity to advise the OOC and the Contractor of any reasons why it objects to the termination of its subcontract and why the OOC should not approve the Contractor's action.

Once the Contract is awarded, should there be any amendments or modifications of the approved pre-award DBE submission other than termination of a DBE firm, the Contractor shall follow the procedure below that best meets the criteria associated with the reason for modification:

1. If the change is due to a scope of work revision or non-routine quantity revision by CTDOT, the Contractor must notify CTDOT's OOC in writing or via electronic mail that their DBE participation on the project may be impacted as soon as they are aware of the change. In this case, a release of work from the DBE firm may not be required; however the Contractor must concurrently notify the DBE firm in writing, and copy the OOC for inclusion in the project DBE file. This does not relieve the Contractor of its obligation to meet the Contract specified DBE goal, or of any other responsibility found in this specification.

2. If the change is due to a factor other than a CTDOT directive, a request for approval in writing or via electronic mail of the modification from the OOC must be submitted, along with an explanation of the change(s), prior to the commencement of work. The Contractor must also obtain a letter of release from the originally named DBE indicating their concurrence with the change, and the reason(s) for their inability to perform the work. In the event a release cannot be obtained, the Contractor must document all efforts made to obtain it.

3. In the event a DBE firm that was listed in the pre-award documents is **unable** or **unwilling** to perform the work assigned, the Contractor shall:

    - Notify the OOC Division Chief immediately and make efforts to obtain a release of work from the firm.

    - Submit documentation that will provide a basis for the change to the OOC for review and approval prior to the implementation of the change.

    - Use the DBE Directory to identify and contact firms certified to perform the type of work that was assigned to the unable or unwilling DBE firm. The Contractor should also contact CTDOT's Office of Contract Compliance for assistance in locating additional DBE firms to the extent needed to meet the contract goal.

Should a DBE subcontractor be terminated or fail to complete work on the Contract for any reason, the Contractor must make a GFE to find another DBE subcontractor to substitute for the original DBE. The DBE replacement shall be given every opportunity to perform at least the same amount of work under the Contract as the original DBE subcontractor.

If the Contractor is unable to find a DBE replacement:

- The Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE. (Refer to GFE in Section III.)

- The Contractor must demonstrate that the originally named DBE, who is unable or unwilling to perform the work assigned, is in default of its subcontract, or identify other issues that affected the DBE firm's ability to perform the assigned work. **The Contractor's ability to negotiate a more advantageous agreement with another subcontractor is not a valid basis for change.**

III. GOOD FAITH EFFORTS

The DBE goal is **NOT** reduced or waived for projects where the Contractor receives a Pre-Award GFE determination from the Office of Contract Compliance prior to the award of the Contract. It remains the responsibility of the Contractor to make a continuing GFE to achieve the specified Contract DBE goal. The Contractor shall pursue every available opportunity to obtain additional DBE firms and document all efforts made in such attempts.

At the completion of all Contract work, the Contractor shall submit a final report to CTDOT's unit administering the Contract indicating the work done by and the dollars paid to DBEs. Only verified payments made to DBEs performing a CUF will be counted towards the Contract goal.

Goal attainment is based on the total Contract value, which includes all construction orders created during the Contract. If the Contractor does not achieve the specified Contract goal for DBE participation or has not provided the value of work to the DBE firms originally committed to in the pre-award submission, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

A GFE should consist of the following, where applicable (CTDOT reserves the right to request additional information):

1. A detailed statement of the efforts made to replace an unable or unwilling DBE firm, and a description of any additional subcontracting opportunities that were identified and offered to DBE firms in order to increase the likelihood of achieving the stated goal.

2. A detailed statement, including documentation of the efforts made to contact and solicit bids from certified DBEs, including the names, addresses, and telephone numbers of each DBE firm contacted; the date of contact and a description of the information provided to each DBE regarding the scope of services and anticipated time schedule of work items proposed to be subcontracted and the response from firms contacted.

3. Provide a detailed explanation for each DBE that submitted a subcontract proposal which the Contractor considered to be unacceptable stating the reason(s) for this conclusion.

4. Provide documentation, if any, to support contacts made with CTDOT requesting assistance in satisfying the specified Contract goal.

5. Provide documentation of all other efforts undertaken by the Contractor to meet the defined goal. Additional documentation of efforts made to obtain DBE firms may include but will not be limited to:
   - Negotiations held in good faith with interested DBE firms, not rejecting them without sound reasons.
   - Written notice provided to a reasonable number of specific DBE firms in sufficient time to allow effective participation.
   - Those portions of work that could be performed by readily available DBE firms.

In instances where the Contractor can adequately document or substantiate its GFE and compliance with other DBE Program requirements, the Contractor will have satisfied the DBE requirement and no administrative remedies will be imposed.

IV. PROJECT COMPLETION

At the completion of all Contract work, the Contractor shall:

1. Submit a final report to CTDOT's unit administering the Contract indicating the work done by, and the dollars paid to DBEs.

2. Submit verified payments made to all DBE subcontractors for the work that was completed.

3. Submit documentation detailing any changes to the DBE pre-award subcontractors that have not met the original DBE pre-award commitment, including copies of the Department's approvals of those changes.

4. Retain all records for a period of three (3) years following acceptance by CTDOT of the Contract and those records shall be available at reasonable times and places for inspection by authorized representatives of CTDOT and Federal agencies. If any litigation, claim, or audit is started before the expiration of the three (3) year period, the records shall be retained until all litigation, claims, or audit findings involving the records are resolved.

If the Contractor does not achieve the specified Contract goal for DBE participation in addition to meeting the dollar value committed to the DBE subcontractors identified in the pre-award commitment, the Contractor shall submit documentation to CTDOT's unit administering the Contract detailing the GFE made during the performance of the Contract to satisfy the goal.

V. SHORTFALLS

A. Failure to meet DBE goals

As specified in (II-A) above, attainment of the Contract DBE goal is based on the final Contract value. The Contractor is expected to achieve the amount of DBE participation originally committed to at the time of award; however, additional efforts must be made to provide opportunities to DBE firms in the event a Contract's original value is increased during the life of the Contract.

The Contractor is expected to utilize the DBE subcontractors originally committed in the DBE pre-award documentation for the work and dollar value that was originally assigned.

If a DBE is terminated or is unable or unwilling to complete its work on a Contract, the Contractor shall make a GFE to replace that DBE with another certified DBE to meet the Contract goal.

The Contractor shall immediately notify the OOC of the DBE's inability or unwillingness to perform, and provide reasonable documentation and make efforts to obtain a release of work from the firm.

If the Contractor is unable to find a DBE replacement, then the Contractor should identify other contracting opportunities and solicit DBE firms in an effort to meet the Contract DBE goal requirement, if necessary, and provide documentation to support a GFE.

When a DBE is unable or unwilling to perform, or is terminated for just cause, the Contractor shall make a GFE to find other DBE opportunities to increase DBE participation to the extent necessary to at least satisfy the Contract goal.

For any DBE pre-award subcontractor that has been released appropriately from the project, no remedy will be assessed, provided that the Contractor has met the criteria described in Section II-C.

B. Administrative Remedies for Non-Compliance:

In cases where the Contractor has failed to meet the Contract specified DBE goal or the DBE pre-award commitment, and where no GFE has been demonstrated, then one or more of the following administrative remedies will be applied:

1. A reduction in Contract payments to the Contractor as determined by CTDOT, not to exceed the shortfall amount of the **DBE goal**. The maximum shortfall will be calculated by multiplying the Contract DBE goal (adjusted by any applicable GFE) by the final Contract value, and subtracting any verified final payments made to DBE firms by the Contractor.

2. A reduction in Contract payments to the Contractor determined by CTDOT, not to exceed the shortfall amount of the **pre-award commitment**. The maximum shortfall will be calculated by subtracting any verified final payments made by the Contractor to each DBE subcontractor from the amount originally committed to that subcontractor in the pre-award commitment.

3. A reduction in Contract payments to the Contractor determined by CTDOT for any pre-award DBE subcontractor who has not obtained the dollar value of work identified in the DBE pre-award commitment and has not followed the requirements of Section II-C or for any DBE firm submitted for DBE credit that has not performed a CUF.

4. The Contractor being required to submit a written DBE Program Corrective Action Plan to CTDOT for review and approval, which is aimed at ensuring compliance on future projects.

5. The Contractor being required to attend a Non-Responsibility Meeting on the next contract where it is the apparent low bidder.

6. The Contractor being suspended from bidding on contracts for a period not to exceed six (6) months.

VI. CLASSIFICATIONS OTHER THAN SUBCONTRACTORS

A. Material Manufacturers

Credit for DBE manufacturers is 100% of the value of the manufactured product. A manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.

If the Contractor elects to utilize a DBE manufacturer to satisfy a portion of, or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

B. Material Suppliers (Dealers)

Credit for DBE dealers/suppliers is limited to 60% of the value of the material to be supplied, provided such material is obtained from an approved DBE dealer/supplier.

In order for a firm to be considered a regular dealer, the firm must own, operate, or maintain a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. At least one of the following criteria must apply:

- To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
- A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating or maintaining a place of business if the person both owns and operates distribution equipment for the products. Any supplementing of the regular dealers' own distribution equipment shall be by long term lease agreement, and not on an ad hoc or contract to contract basis.
- Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this paragraph.

If the Contractor elects to utilize a DBE supplier to satisfy a portion or the entire specified DBE goal, the Contractor must provide the OOC with:

- Subcontractor Approval Form (CLA-12) indicating the firm designation,
- An executed "Affidavit for the Utilization of Material Suppliers or Manufacturers" (sample attached), and
- Substantiation of payments made to the supplier or manufacturer for materials used on the project.

C. Brokering

- Brokering of work for DBE firms who have been listed by the Department as certified brokers is allowed. Credit for those firms shall be applied following the procedures in Section VI-D.

- Brokering of work by DBEs who have been approved to perform subcontract work with their own workforce and equipment is not allowed, and is a Contract violation.

- Firms involved in the brokering of work, whether they are DBEs and/or majority firms who engage in willful falsification, distortion or misrepresentation with respect to any facts related to the project shall be referred to the U.S. DOT, Office of the Inspector General for prosecution under Title 18, U.S. Code, Part I, Chapter 47, Section 1020.

D. Non-Manufacturing or Non-Supplier DBE Credit

Contractors may count towards their DBE goals the following expenditures with DBEs that are not manufacturers or suppliers:

- Reasonable fees or commissions charged for providing a bona fide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment materials or supplies necessary for the

performance of the Contract, provided that the fee or commission is determined by the OOC to be reasonable and consistent with fees customarily allowed for similar services.

- The fees charged only for delivery of materials and supplies required on a job site when the hauler, trucker, or delivery service is a DBE, and not the manufacturer, or regular dealer of the materials and supplies, and provided that the fees are determined by the OOC to be reasonable and not excessive as compared with fees customarily allowed for similar services.

- The fees or commissions charged for providing bonds or insurance specifically required for the performance of the Contract, provided that the fees or commissions are determined by CTDOT to be reasonable and not excessive as compared with fees customarily allowed for similar services.

E. Trucking

While technically still considered a subcontractor, the rules for counting credit for DBE trucking firms are as follows:

- The DBE must own and operate at least one fully licensed, insured, and operational truck used on the Contract.
- The DBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures and operates using drivers it employs.
- The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract.
- The DBE may lease trucks from a non-DBE firm; however the DBE may only receive credit for any fees or commissions received for arranging transportation services provided by the non-DBE firms. Additionally, the DBE firm must demonstrate that they are in full control of the trucking operation for which they are seeking credit.

VII. Suspected DBE Fraud

In appropriate cases, CTDOT will bring to the attention of the USDOT any appearance of false, fraudulent, or dishonest conduct in connection with the DBE program, so that USDOT can take the steps, e.g. referral to the Department of Justice for criminal prosecution, referral to USDOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules provided in 49 CFR Part 31.

CONNECTICUT DEPARTMENT OF TRANSPORTATION
(OFFICE OF CONSTRUCTION)
BUREAU OF ENGINEERING AND CONSTRUCTION

This affidavit must be completed by the State Contractor's DBE notarized and attached to the contractor's request to utilize a DBE supplier or manufacturer as a credit towards its DBE contract requirements; failure to do so will result in not receiving credit towards the contract DBE requirement.

State Contract No.

Federal Aid Project No.

Description of Project

I, _____, acting in behalf of _____,
(Name of person signing Affidavit) (DBE person, firm, association or corporation)
of which I am the _____ certify and affirm that _____
(Title of Person) (DBE person, firm, association or corporation)
is a certified Connecticut Department of Transportation DBE. I further certify and affirm that I have read and understand 49 CFR, Sec. 26.55(e)(2), as the same may be revised.

I further certify and affirm that _____ will assume the actual and
(DBE person, firm, association or Corporation)
for the provision of the materials and/or supplies sought by _____.

If a manufacturer, I operate or maintain a factory or establishment that produces, on the premises, the materials, supplies, articles or equipment required under the contract an of the general character described by the specifications.

If a supplier, I perform a commercially useful function in the supply process. As a regular dealer, I, at a minimum, own and operate the distribution equipment for bulk items. Any supplementing of my distribution equipment shall be by long-term lease agreement, and not on an ad hoc or contract-by-contract basis.

I understand that false statements made herein are punishable by Law (Sec. 53a-157), CGS, as revised).

(Name of Corporation or Firm)

(Signature & Title of Official making the Affidavit)

Subscribed and sworn to before me, this _____ day of _____ 20 _____.

Notary Public (Commissioner of the Superior Court)

My Commission Expires_____

CERTIFICATE OF CORPORATION

I, _____, certify that I am the _____
(Official) (President)
of the Corporation named in the foregoing instrument; that I have been duly authorized to affix the seal of the Corporation to such papers as require the seal; that _____, who signed said instrument on behalf of the Corporation, was then of said corporation; that said instrument was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporation powers.

_____ _____
(Signature of Person Certifying) (Date)

ATTACHMENT D:
CONSTRUCTION PLANS