



Strobel Road Reconstruction Project

GENERAL SPECIFICATIONS

TOWN OF TRUMBULL, CONNECTICUT
GENERAL SPECIFICATIONS
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TOWN OF TRUMBULL, CONNECTICUT

GENERAL SPECIFICATIONS

1. BIDS:

Bids, as stated in the "Bid Sheet", will be compared on the basis of the sum of the quantities multiplied by respective unit prices, added to lump-sum prices.

In the event that there is a discrepancy in the bid sheet between the lump-sum or unit prices written in words and figures, the prices written in words shall govern.

The Town agrees to examine and consider each bid submitted in consideration of the Bidder's Agreements, as hereinabove set forth in the Bid Sheet.

NOTE: Any/all reference to "he/him" shall be taken to mean "his/her/its".

2. OBLIGATION OF BIDDERS:

At the time of opening of bids, each bidder shall be presumed to have inspected the sites, and to have read and made himself thoroughly familiar with the Plans and Contract Documents including all addenda. The failure or omission of any bidder to receive or examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect to his bid.

Each bidder must fully inform himself of the construction and labor conditions relating to the work which is now or will be performed. Failure to do so will not relieve the successful bidder of his obligation to furnish all labor and materials necessary to carry out the provisions of the contract documents and to complete the contemplated work. Inasmuch as possible, the contractor must, in carrying out his work, employ such methods or means as will not cause any interruptions or interference with the work of any other contractor.

The successful bidder must furnish a field and office organization chart and equipment list to be used on the job to demonstrate that he has the capability to perform the work prescribed for this project and shall furnish the Town all other information and data requested on the form provided for this purpose; such submission to be made prior to construction startup.

The Contractor shall supply a foreman full time on the job. Such foreman must be satisfactory to the Town of Trumbull. Failure to comply shall be cause for breach of contract.

The Contractor's normal sequence of operation in performing the work under the terms of this contract shall be varied at the direction of the Town of Trumbull, so that priorities can be given in critical areas such as schedule, right-of-way, clearance and other Town commitments, either present or future.

The Contractor shall file an appeal to the Public Works Director if the sequence of operation in performing the work is varied by the Town in a manner that is unacceptable to him.

The Contractor shall have no claim against the Town for damages or extra compensation on account of delays in execution of the work or delays in making the construction site available to the Contractor.

3. CONTRACT DOCUMENTS:

Whenever the term "Contract Documents" is used herein, it shall include the Agreement, Information to Bidders, General Specifications, Bid Documents, Technical Specifications, Special Notes, Addenda, and Project Plans, including all modifications thereof incorporated in the documents before their execution.

4. DIRECTOR OF PUBLIC WORKS:

The Director Public Works, of the Town of Trumbull, Connecticut, under whose authority all public works are performed. Hereinafter when the word "Engineer" is used, it is hereby interpreted to include the authority of the Director of Public Works, as well as the Town Engineer.

5. TOWN ENGINEER:

The Town Engineer will represent the Town of Trumbull, Connecticut, and shall have complete charge of all work involved. Hereinafter where the word "Engineer" appears it shall mean the Town Engineer or his duly authorized representatives performing their usual duties, i.e. clerk of the works, etc.

6. CONTRACTOR:

Party of the second part to the contract, acting directly or through his agent or employees.

7. SUB-CONTRACTOR:

Any individual, firm, partnership or corporation to whom the Contractor sub-lets or assigns any part or parts of this project covered by this contract.

8. NOTICE:

The term "notice" as used herein shall mean and include written notices.

Written notice shall be deemed to have been served, when deposited in a United States Mail Box to or at last known business address of the person, firm or corporation for whom intended, or to his or their or its duly authorized agent, representative or office,

or enclosed in a postage prepaid wrapper or envelope addressed to such person or firm or corporation at his or their or its last known business address.

9. TIME IS OF THE ESSENCE:

Time is of the essence for this contract and as execution of the work may inconvenience property owners, vehicular traffic, pedestrians and adversely affect business in the area, it is essential that the work be pressed vigorously to completion. Also the cost of Town administration and supervision of construction, will be increased as the time occupied in the work is lengthened, and the deprivation to the residents of the Town of the needed improvement on herein contract may cause damages to the Town.

In the event the Contractor fails to perform the work in a timely manner due to the Contractor's poor planning, financial status, errors in construction or any other reason directly attributed to the Contractor's circumstances, the Town may institute default proceedings against the Contractor to recover damages and losses. Any payments due the Contractor may be withheld pending final determinations, and the bonding company for the performance of the work on this contract may be notified of impending actions that may be warranted.

If any delay is imposed on the Contractor by specific orders of the Engineer, ie; to stop the work (for reasons other than failure on the part of the Contractor to comply with the requirements of the Contract Documents), material or labor strikes, acts of God, etc., such delay will entitle the Contractor to an equivalent extension of time.

When extra or additional work is ordered by the Engineer, the Contractor will be allowed an extension of time expressed in days as determined by the Town Engineer. The Contractor shall submit a written request for an extension of time, along with reasons for the request. A written response will be transmitted to the Contractor with a determination by the Town as to whether or not an extension of time will be granted.

10. COMMENCEMENT OF WORK:

The Contractor shall commence work on the day specified in the order by the Engineer, as the date of such commencement; and shall fully complete the work within the number of consecutive calendar days from said date as hereinafter specified as the period for completion of his contract, unless such period shall be extended as hereinafter provided by the Town.

11. BLANK FORM FOR BID:

All bids must be written or typed upon the blank form for "Bid Sheet," and must state the proposed price of each item of the work, both in words and in figures, and must be signed by the bidder with his business address.

BIDDERS SHALL NOT REMOVE AND SUBMIT THE BID PAGES SEPARATE FROM THE VOLUME OF CONTRACT DOCUMENTS, BUT SHALL SUBMIT THEIR BIDS BOUND WITH THE COMPLETE VOLUME OF ATTACHED DOCUMENTS, INCLUDING ALL PAGES CORRECTLY ASSEMBLED.

The undersigned understands that information relative to subsurface and other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) has been furnished only for his information and convenience without any warranty of guarantee, express or implied, that the subsurface and/or other structures

(surface and/or subsurface) actually encountered will be the same as these shown on the drawings or in any of the other contract documents and he agrees that he shall not use or be entitled to use any such information made available to him through the contract documents or otherwise or obtained by him in his own examination of the site, as a basis of or ground for any claim against the Town, arising from or by reason of any variance which may exist between the aforesaid information made available to or acquired by him and the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered during the construction work, and he has made due allowance therefore in this bid.

12. WORKING HOURS AND HOLIDAYS:

The Contractor shall perform no work during the Town of Trumbull's employees' holidays nor before or after the Town's normal working hours, without specific approval of the Director.

The normal working hours of the Town are Monday through Friday, 7:00 a.m. to 4:00 p.m.

THE OFFICIAL TOWN OF TRUMBULL HOLIDAYS ARE:

New Year's Day
Martin Luther King Day
Presidents' Day
Good Friday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veteran's Day
Thanksgiving Day
Day Following Thanksgiving Day
Christmas Day
Day After Christmas Day

13. PERFORMANCE & GUARANTEE MAINTENANCE BOND:

The Contractor shall secure a maintenance bond with a company which shall have been approved by the Attorney of the Town of Trumbull, guaranteeing his work in all phases of construction for a period of two (2) years from the date of acceptance by the Town which shall also cover all damages due to trench settlement.

The face value of the maintenance bond shall be as follows:20% of the base bid of contracts up to and including \$50,000.00 and in no way less than \$5,000.00.

Contracts in amount above \$50,000.00, the face value of the maintenance bond shall be on the basis of 10% of the base bid submitted. He shall leave the work in perfect order at completion, and neither the final certificate of payment nor any other provision of the contract shall relieve the Contractor of the responsibility for negligence, for faulty materials or workmanship within the extent and period as herein provided. Upon written notice he shall remedy all defects due thereto and pay all expenses for any damage to other work resulting there from.

14. ADDITIONAL OR SUBSTITUTE BOND:

If at any time the Town becomes dissatisfied with the performance bond as issued by the present surety or sureties, or if for any other reason such bond shall cease to be adequate surety to the Town, the Contractor shall within five (5) days after notice from the Town to do so, substitute an acceptable bond in such form and sum and signed by such other sureties as may be satisfactory to the Town.

The premium on such bonds shall be paid by the Contractor. No further payment shall be deemed due nor shall be made until new sureties shall have qualified.

15. POWER OF ATTORNEY:

Attorneys-in-fact who sign contract bonds must file with each bond a certified copy of their power of attorney to sign said bond.

16. QUALIFICATIONS FOR EMPLOYMENT:

No person under the age of sixteen (16) years and no person currently serving sentences in a penal or Correctional institution shall be employed to perform any work on the project under this contract.

No person whose age or physical condition is such as to make his employment dangerous to his health or safety or to the health and safety of others shall be employed to perform any work on the project under this contract.

Provided that this sentence shall not operate against the employment of physically handicapped persons otherwise employed where such persons may be safely assigned to work, which they can ably perform.

There shall be no discrimination because of race, creed, color or political affiliation in employment of persons for work on the project under this contract.

17. PAYMENT OF EMPLOYEES:

The Contractor and each of his subcontractors shall pay each of his employees engaged in the work on the project under this contract in full (less deductions made mandatory by law) in a timely and routine manner.

18. DELETE

19. ACCIDENT PREVENTION:

Precaution shall be exercised at all times for the protection of all persons (including employees) and property.

The safety provisions of applicable laws, building and construction codes shall be observed.

Reference is hereby made to Occupational Safety and Health Administration standards as described in OSHA 2206, 1983 or latest edition or revision thereof

Machinery, equipment and all hazards shall be guarded or eliminated in accordance with the safety provisions of the manual of "Accident Prevention in Construction", published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable laws.

20. INSPECTION:

The Engineer or his authorized representative shall be permitted to inspect the work, materials, payrolls, and records of personnel, invoices of material and other relevant data and records of this contract.

21. PAYMENTS:

The Town's terms of payment are Net 30 Days after approval of invoice. No invoice will be paid until acceptance of goods ordered. By the fifth (5th) day of each month application for payment must be submitted by the Contractor to the Town's designated field representative, for verification and approval of quantities and costs incurred during said pay period. Only upon approval by designated representative will payment be forwarded for processing.

The Town shall retain five per centum (5%) of each estimate until final completion and acceptance of all work covered by this contract.

22. GENERAL SPECIFICATIONS "(OR EQUAL CLASSES)":

Whenever in this contract or specifications, a particular brand or make of material, device or equipment is shown or specified, such brand, make of material, device or equipment should be regarded merely as a standard unless otherwise specified.

If three or more brands, makes of material, devices or equipment are shown or specified, each should be regarded as the equal of the others.

When in the opinion of the Engineer, or his authorized agent, any other brand, make of material, device or equipment is recognized as equal to that specified, considering quality, workmanship and economy of operation, and suitable for the purpose intended, it will be accepted.

In the opinion of the Engineer and the Town's duly authorized agents, all material and workmanship shall in every respect be in accordance with what is in conformity with approved modern practice.

Whenever the plans, drawings, specifications, other contract documents, or the quality of the work, admit of doubt as to what is permissible, the interpretation will be made by the Engineer, as to which is in accordance with approved modern practice, in order to meet the particular requirements of the contract.

In all cases, new material shall be used unless this provision is waived with a special written notice by the Engineer.

23. INSPECTION AND TESTS:

All material and workmanship (if not otherwise designated) shall be subject to inspection, examination and tests, by the Engineer, or his duly authorized representatives, at any and at all times during the manufacture and/or construction, and at any and all places where such manufacture or construction is carried on.

Without additional charge, the Contractor shall furnish promptly all reasonable facilities, labor and material necessary to make tests so required, safe and convenient.

Special full size and performance tests shall be conducted as described in the specifications.

If at any time before final acceptance of the entire work, the Engineer considers necessary or advisable any examination of any portion of the work already completed, by removing or tearing out the same, the Contractor shall upon request, furnish promptly all necessary facilities, labor and materials.

If such work is found to be defective in any material respect, due to material or faulty construction by the Contractor, or any subcontractor, or if any work shall be covered over without approval of the engineer (whether or not the same shall be defective) the Contractor shall be liable for the expense of such examination and of satisfactory reconstruction.

If, however, such approval and consent shall have been given and if such work is found to meet the requirements of this contract, the Contractor shall be recompensed for the extent of such examination and reconstruction in the manner herein provided for the payment of the cost of "EXTRA WORK."

24. COSTS AND TESTS:

The selection of Bureau Laboratories, and/or agencies for the inspection and tests of supplies, materials or equipment shall be subject to the direction of the Engineer.

If inspection, tests, analysis of the materials or equipment, should disclose that said material or equipment requires rejection, then the cost of said inspection, test analysis shall be borne by the Contractor and said cost shall be deducted from the Contractor's current estimate by the Engineer. If supplies, material or equipment shall be found acceptable, the cost of said inspection, tests or analysis shall be borne by the Town.

25. PROTECTION OF WORK AND PROPERTY:

The Contractor shall at all times safely guard the Town's property from injury or loss, in connection with this contract. He shall at all times safely guard and protect his own work and that of adjacent property from damage. The Contractor shall replace and make good any such damage, loss or injury. All passageways, guard fences, lights and other facilities required for protection by local conditions must be provided and maintained.

26. POWER OF CONTRACTOR TO ACT IN AN EMERGENCY:

In case of an emergency, which threatens loss or injury of property and/or safety of life, the Contractor shall be allowed to act without previous instructions from the Engineer, as he sees fit. He shall notify the Engineer immediately thereafter of any compensation claimed by the Contractor due to such extra work, and shall submit same to the Engineer for approval. When the Contractor has not taken action, but has notified the Engineer of an emergency threatening injury to persons or damage to the work, or any adjoining property, the Contractor shall act as instructed or authorized by the Engineer to prevent such threatened injury or damage.

27. CERTIFICATE OF COMPLETION:

Upon completion of all work whatsoever required, the Engineer shall file a written certificate with the Director of Finance and the Contractor, for the entire amount of work performed and compensation earned by the Contractor, including extra work and compensation thereof.

28. FINAL PAYMENT:

Within thirty days of filing a certificate of completion, the Town shall pay to the Contractor the amount therein stated, less all prior payments and advances whatsoever to or for the account of the Contractor. All prior estimates and payments, including those relating to extra work, shall be subject to correction by this present payment, which throughout this contract is called the FINAL PAYMENT.

29. ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE:

The acceptance by the Contractor of the final payment, shall be and shall operate as a release to the Town of all claims and of all liability to the contract or for all things done or furnished in connection with this work, and for every act and neglect of the Town and others relating to or arising out of this work, accepting the Contractor's claim for interest upon the final payment, if the payment is improperly delayed. No payment, however, final or otherwise, shall release the Contractor or his sureties from any obligation under this contract or of the performance bond.

30. SUB-SURFACE STRUCTURES:

All sub-surface structures and public utility lines have been located as far as possible, as indicated on the plans and information obtained from the respective utilities. The Town does not assume the responsibility for the accuracy of this information.

31. SUB-SURFACE CONDITIONS:

Bidders are notified that it is obligatory for them to obtain all the information they require as to the existing physical conditions relative to the work and in particular to sub-surface conditions---NOR SHALL THE TOWN BE HELD LIABLE FOR ANY ADDITIONAL COST TO THE CONSTRUCTION WHICH MAY RESULT DUE TO THESE CONDITIONS, and each bidder in bidding must rely exclusively upon his own investigation and that he makes this bid with the full knowledge of the kind, quality and quantity of work required.

The undersigned understands that information relative to subsurface and other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) has been furnished only for his information and convenience without any warranty of guarantee, express or implied, that the subsurface and/or other structures (surface and/or subsurface) actually encountered will be the same as these shown on the drawings or in any of the other contract documents and he agrees that he shall not use or be entitled to use any such information made available to him through the contract documents or otherwise or obtained by him in his own examination of the site, as a basis of or ground for any claim against the Town, arising from or by reason of any variance which may exist between the aforesaid information made available to or acquired by him and the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered during the construction work, and he has made due allowance therefore in this bid.

32. CONTRACTOR'S TITLE TO MATERIALS:

No materials or supplies for the work shall be purchased by the Contractor or sub-contractor, subject to any chattel mortgage or under any conditional sale or other agreement for which interest is retained by the seller.

33. SUPERINTENDENCE BY CONTRACTOR:

The Contractor shall employ a project Super-intendant who shall be present full time at the site of the work and who shall have full authority to act for the Contractor. The Contractor shall employ a project foreman who shall be in attendance at the work site during working hours.

It is understood that such representative shall be acceptable to the Town and shall be one whose experience and length of service in this particular kind of work warrants his ability to perform the duties entailed to the satisfaction of the Engineer, and who can continue in that capacity for the particular job involved unless he ceases to be on the Contractor's payroll.

The Engineer reserves the right of investigation to satisfy the Town that the appointed superintendent is properly qualified to carry out the obligations entailed to perform the work herein contemplated in the plans and specifications and directions.

34. REPRESENTATIONS OF CONTRACTORS:

The Contractor represents and warrants:

- a). That he is financially solvent and that he is experienced in and competent to perform the type of work, or to furnish plant and equipment materials and supplies.
- b). That he is familiar with all Federal, State and Municipal laws, ordinances and regulations, which in any way may affect the work of those employed therein.
- c). That he has carefully examined the plans and specifications and the site of the work, and that from his own investigation he has satisfied himself about the nature and location of the work, character, quality and quantity of the surface and sub-surface materials likely to be encountered, as well as the character of equipment and other facilities needed for the performance of the work, the general local conditions and all other conditions which may in any way affect the work.

35. PATENT RIGHT:

As part of his obligation hereunder and without any additional compensation, the Contractor will pay for all patent fees or royalties required in respect to the work or any part thereof, and will fully indemnify the Town for any loss on account of infringement of any patent rights.

36. PERMITS AND REGULATIONS:

The Contractor shall procure and pay for all permits and licenses necessary for the execution of his work. Town permit fees will be waived.

The Contractor shall comply with all laws, ordinances, rules and regulations relating to the performance of the work.

37. CORRECTION OF WORK:

All work, all material, whether incorporated in the work or not, all processes of manufacture and all methods of construction, shall be at all time and places subject to the inspection of the Engineer, who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture and methods of construction for the purpose for which they are used.

Should they fail to meet the approval of the Engineer they shall be forthwith reconstructed, made good, replaced and corrected, as the case may be, by the Contractor, at his own expense.

Rejected material shall immediately be removed from the site.

Acceptance of material and workmanship by the Inspectors shall not relieve the Contractor from his obligation to supply other materials and workmanship when so ordered by the Engineer.

If, in the opinion of the Engineer, it is undesirable to replace any defective or damaged material, or to reconstruct or correct any portion of the work injured or not performed in accordance with the contract, the compensation to be paid to the Contractor hereunder, shall be reduced by such amount which the Engineer deems equitable.

The Contractor expressly warrants that his work shall be free from any defects in material or workmanship, and agrees to correct any such defects which may appear within the maintenance period, following final completion of work.

Neither acceptance of the completed work, nor payment thereof, shall operate to release the Contractor or his sureties from any obligation under or upon this contract or the performance bond.

38. STATEMENT SHOWING AMOUNT DUE FOR WAGES, MATERIAL AND SUPPLIES:

With each application for payment under this contract, the Contractor and every subcontractor shall deliver to the Town a written verified statement in a form satisfactory to the Town, showing in detail the amounts then due and unpaid by such Contractor or subcontractor, to all laborers for daily or weekly wages, men employed by him under the contract for performance of work at the site thereof, or to other persons for material and equipment delivered at the site of the work.

The term "laborers" as used herein, shall include workmen and mechanics.

39. TOWN RIGHT TO WITHHOLD PAYMENTS:

The Town may withhold from the Contractor as much of any approved payment due him, as the Town deems necessary.

1st. To assure the payment of just claims due and unpaid of any person supplying labor or materials for the work.

2nd. To protect the Town from loss due to defective work not remedied.

or

3rd. To protect the Town from loss due to injury to persons or damage to work or property of other Contractors, subcontractors, or others caused by the act or neglect of the Contractor or any of his subcontractors.

The Town shall have the right, as agent for the Contractor, to apply any such amounts so withheld in such manner as the Town may deem proper, to satisfy such claims or to secure such protection.

Distribution of such money shall be considered as payments for the amount of the Contractor.

40. TOWN RIGHT TO STOP WORK OR TERMINATE CONTRACT:

If the Contractor shall be adjudged bankrupt, an assignment shall be made for the benefit of creditors. A receiver or liquidator shall be appointed for the Contractor and for any of his property. The Contractor shall be dismissed within twenty (20) days after such appointment. The proceedings in connection therewith shall not be stayed within the said twenty (20) days. If the Contractor shall refuse or fail after notice or warning from the

Engineer, to supply enough properly skilled workmen or proper materials, or if the Contractor shall fail to prosecute the work or any part thereof with such diligence as will insure its completion within the period herein specified (or duly authorized extension thereof) or shall fail to complete the work within said period, or if the Contractor shall fail to make prompt payment to persons supplying labor or materials for the work, or if the Contractor shall fail or refuse to regard laws, ordinances or the instructions of the Engineer or otherwise be guilty of a substantial violation of any provision of this contract, then in any such event, the Town without prejudice to any other right or remedy, may give seven (7) days notice to the Contractor, to terminate the employment of the Contractor. The Contractor shall lose the right to proceed either for the entire work or (at the option of the Town) for any portion thereof on which delays shall have occurred. The Town may as it deems expedient take possession of the work and complete it by contract or otherwise.

In such cases, the Contractor shall not be entitled to receive any further payment until the work is finished.

If the unpaid balance of the compensation to be paid the Contractor hereunder, shall exceed the expense of so completing the work (including compensation for additional managerial administrative and inspection services and any damages for delay), such excess shall be paid to the Contractor.

If such expense shall exceed such unpaid balance, the Contractor and his sureties shall be liable to the Town for such excess.

If the right of the Contractor to proceed with the work is so terminated, the Town may take possession of and utilize in completing the work, such materials, appliances, supplies, plant and equipment as may be on the site of the work, and necessary therefore.

If the work shall be stopped by order of the Court or any other public authority, for a period of three (3) months, without act or fault of the Contractor or any of his agents, servants, employees, or subcontractors, the Contractor may upon ten (10) days' notice to the Town of Trumbull, discontinue his performance of the work and/or terminate the contract.

TERMINATION:

- A. TERMINATION FOR CAUSE, If through any case, the Contractor shall fail to fulfill in a timely manner, its obligations under this Agreement, or if the contractor shall violate any of the covenants, agreements, or stipulations of this Agreement, the Town shall thereupon have the right to terminate this Agreement for cause by giving written notice to the Contractor of such termination and specifying the effective date thereof, at least five (5) days before the effective date of such termination. In the event, all finished or unfinished reports, documents, data, studies, surveys, drawings, maps, models, photographs, and reports or other material prepared by the contractor shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials to the effective date of termination.

The term "cause" includes, without limitation the following;

- 1) If the Contractor furnished any statement, representation, warranty or certification in connection with this Agreement, which is materially false, deceptive, incorrect, or incomplete.
- 2) If the Contractor fails to perform to the Town's satisfaction any material requirement of the Agreement, or is in violation of any specific provision thereof.
- 3) If the Town reasonably determines satisfactory performance of the Agreement is substantially endangered or can reasonably anticipate such an occurrence or default.

Notwithstanding the above, the Contractor shall not be relieved of liability to the Town for any damages sustained by the Town by virtue of any breach of the Agreement by the Contractor, and the Town may withhold any payment to the Contractor for the purpose of setoff until such time as the exact amount of damages due the Town from the Contractor is determined.

- B. TERMINATION FOR CONVENIENCE: The Town may terminate this Agreement at any time the Town determines that the purposes of the distribution of monies under the agreement would no longer be served by completion of the Work/Project. The Town shall effect such termination by giving written notice of termination to the Contractor and specifying the effective date thereof, at least twenty (20) days before the effective date of such termination. In the event, all finished or unfinished documents and other materials as described in Subsection A shall, at the option of the Town, become its property. If the Agreement is terminated by the Town as provided herein, the Contractor shall be paid an amount which bears the same ratio to the total compensation as the services actually and satisfactorily performed to the effective date of termination bear to the total services of the Contractor pursuant to the terms of this Agreement, less payments of compensation previously made, and subject to the Town's right of set off for any damages pursuant to the terms of the Agreement.

41. USES OF PREMISES AND REMOVAL OF DEBRIS:

The Contractor undertakes at his own expense:

- a). To take every precaution against injuries to persons or damage to property.
- b). To store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work.
- c). To place upon the work area or any part thereof, only such loads as are consistent with the safety of that portion of the work.
- d). To frequently clean up all refuse, rubbish, scrap material and debris caused by his operations, so that the site of the work shall at all times present a neat, orderly and workmanlike appearance. Failure to comply with this article within 24 hours of notification

may result in the Owner having the work performed by outside sources at the Contractor's expense. These expenses will be deducted from the regular monthly periodic estimate.

e). To remove before final payment all surplus materials, false work, temporary structures, (including foundations thereof), plant of any description and debris of every nature resulting from his operation, and to put the site in a neat and orderly condition.

f). To effect all cutting, fitting or patching of his work required to make the same conform to the plans and specifications, and with the consent of the Engineer, to cut or otherwise alter the work of any other Contractor.

42. ALL WORK SUBJECT TO CONTROL OF THE ENGINEER:

In the performance of the work, the Contractor shall abide by all orders, directions and requirements of the Engineer and shall perform all duties to the satisfaction of the Engineer, and at such time and places, by such methods and in such manner and sequence as the Engineer may require.

The Engineer shall determine the amount, quantity, acceptability and fitness of all parts of the work, shall interpret the plans, specifications, contract and any extra work orders, and shall decide all other questions in connection with the work.

The Contractor shall employ no plant, equipment, materials, methods or men to which the Engineer objects, and shall remove no plant materials, equipment or other facilities from the site of the work, without the Engineer's permission. Upon request, the Engineer shall confirm in writing any oral order, direction requirement or determination.

43. TOWN ENGINEER, CONTROL NOT LIMITED:

The enumeration herein or elsewhere in the contract of particular instances in which the opinion, judgment, discretion or determination of the Engineer, shall control or in which work shall be performed to his or their satisfaction as subject to his or their approval or inspection, shall not imply that only matters similar to those enumerated shall be governed and performed, but without exception all the work shall be governed and so performed.

44. PROVISIONS REQUIRED BY LAW DEEMED INSERTED:

Each and every provision of law and clause required by law to be inserted in this contract, shall be deemed to be inserted herein, and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not correctly inserted, then upon the application of either party, the contract shall forthwith be physically amended to make such insertion.

45. SUBLETTING, SUCCESSOR AND ASSIGNS:

The Contractor shall not sublet any part of the work under this contract, nor assign any moneys due him hereunder without first obtaining the written consent of the Town.

46. DEFINITIONS:

Wherever the words defined in this section or pronouns used in their stead occur in the specifications, they shall have the meanings herein given.

AS DIRECTED, AS REQUIRED, ETC.

Wherever in the specifications, or on the drawings the words "As Directed", "As Ordered", "As Requested", "As Required", "As Permitted", or words of like import are used, it shall be understood that the Direction, Order, Request, Requirement, or Permission of the Engineer is intended. Similarly, the words "Approved", "Accepted", "Satisfactory", and words of like import shall mean Approved by, Acceptable to, or Satisfactory to the Engineer.

ELEVATION

The figures given on the drawings or in the other contract documents after the word "Elevation" or abbreviation of it shall mean the Distance in Feet Above the Datum Adopted by the Engineer.

NOTE: Unless otherwise stated elsewhere in the contract documents and/or on the contract drawings, vertical elevation datum for this project is based upon NEW City Datum, NGVD (ele. 0.00 = mean water).

ROCK

The word "Rock" wherever used as the name of any excavated material or material to be excavated, shall mean only boulders or solid ledge rock which, in the opinion of the Engineer, requires, for its removal, drilling and blasting, wedging, sledging, barring or breaking up with a power operated tool. No soft or disintegrated rock which can be removed with a hand pick or power-operated excavator or shovel, no loose, shaken or previously blasted rock or broken stone in rock fillings or elsewhere, and no rock exterior to the maximum limits of measurement allowed, which may fall into the excavation, will be measured or allowed as "Rocks".

EARTH

The word "Earth", wherever used as the name of an excavated material or material to be excavated, shall mean all kinds of material other than rock as above defined.

47. ABBREVIATIONS:

Where any of the following abbreviations are used in the Specifications, they shall have the meaning set forth opposite each.

AASHO American Association of State Highway
 Officials

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ASA	American Standard Association
ASCE	American Society of Civil Engineers
ASTM	American Society For Testing and Materials
NEC	National Electrical Code, Latest Edition

48. HANDLING AND DISTRIBUTION:

The Contractor shall handle, haul and distribute all materials and all surplus materials on the different portions of the work, as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the work, and shall be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the work.

Storage and Demurrage charges by Transportation Companies and Vendors shall be borne by the Contractor.

49. MATERIALS:

Samples - Inspection - Approval, unless otherwise expressly provided on the Drawings or in any of the other contract documents, only new material and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor to be incorporated in the work shall be subject to the inspection and approval of the Engineer. No material shall be processed or fabricated for the work or delivered to the work site without prior approval of the Engineer.

As soon as possible after execution of the Agreement, the Contractor shall submit to the Engineer the names and addresses of the manufacturers and suppliers of all materials and equipment he proposes to incorporate into the work. When shop and working drawings are required as specified below, the Contractor shall submit prior to the submission of such drawings, data in sufficient detail to enable the Engineer to determine whether the manufacturer and/or supplier have the ability to furnish a product meeting the specifications. As requested, the Contractor shall also submit data relating to the materials and equipment he proposes to incorporate into the work in sufficient detail to enable the Engineer to identify and evaluate the particular product and to determine whether it conforms to the Contract Requirements. Such data shall be submitted in a manner similar to that specified for submission of shop and working drawings.

Facilities and labor for the storage, handling and inspection of all materials and equipment shall be furnished by the Contractor. Defective materials and equipment shall be removed immediately from the site of the work.

If the Engineer so requires, either prior to or after commencement of the work, the Contractor shall submit additional samples of materials for such special tests as the Engineer deems necessary to demonstrate that they conform to the specifications. Such samples, including concrete test cylinders, shall be furnished, taken, stored, placed and shopped by the approved molds for making concrete test cylinders. Except as otherwise expressly specified, with technical specifications, the Town shall make arrangements and pay for the tests.

All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented. The name of the building or work and location for which the material is intended and the name of the contractor submitting the sample. To ensure consideration of samples, the Contractor shall notify the Engineer by

letter that the samples have been shipped and shall properly describe the samples in the letter. The letter of notification shall be sent separate from and should not be enclosed with the samples.

The Contractor shall submit data and samples, or place his orders, sufficiently early to permit consideration, inspection, testing and approval before the materials and equipment are needed for incorporation in the work. The consequence of his failure to do so shall be the Contractor's sole responsibility.

When required, the Contractor shall furnish to the Engineer triplicate sworn copies of manufacturer's shop or mill tests (or reports from independent test laboratories) relative to materials, equipment, performance rating and concrete data.

50. WATCHMAN:

If it becomes necessary to supply watchmen during non-regular working hours, they shall be employed until (in the opinion of the Engineer) their services are no longer required. The Contractor shall employ and pay a satisfactory, sober, able-bodied watchman who shall be in attendance upon the work at all times, (regardless of the hour) whenever work by the regular employees stops.

51. MAINTENANCE OF TRAFFIC:

The Contractor shall conduct his operations in such a manner so that he does not impose unnecessary hardship upon the residents along the route of the work.

Streets may be closed to traffic only upon written order of the Traffic Engineer. Traffic shall be maintained within the project area except where it is found impracticable, or seriously interferes with the Contractor's operations. If permanent repairs are not completed immediately, the pavement surface along the line of work shall be maintained in a condition comparable to the adjacent road surface.

People living or having business within the barricaded zone shall be permitted to use the highway for auto traffic if possible.

The Contractor shall protect all phases of the work from damage due to traffic, etc., and provide necessary watchmen, signalmen and (if so ordered by the Engineer) police officers.

No direct payment for maintenance of traffic will be made, but shall be considered as included in the base bid submitted.

52. DRIVEWAYS AND PROPERTY ENTRANCES:

Excavated materials and equipment shall be placed in such position as not to unnecessarily impede travel on the streets, or access to driveways. A sufficiently clear space for pedestrian travel shall be maintained on the sidewalks, and all property entrances and driveways shall be kept clear, where possible.

Where necessary, bridges shall be constructed and maintained for residents. Before closing any driveway or entrance, the Contractor shall give the owner or resident of the property involved, due notice of such temporary closing. When this is not practicable and an emergency arises, the Contractor shall, on the order of the Engineer, provide a satisfactory place to house temporarily, any motor vehicle, which may be prevented from being housed at night.

No direct payment will be allowed for this work or condition, but shall be considered as included in the base bid submitted.

53. DUST:

The Contractor shall at all times during the execution of this contract, control the nuisance of flying dust, by water sprinkling or by application of Calcium Chloride, or a method satisfactory to the Engineer.

54. PRESERVATION OF TREES:

Trees and shrubs on the site of the work shall be protected during the entire period of the contract, and if injured by the Contractor or his employees, shall be replaced, unless it is covered by the bid items, at his expense before the completion of the contract.

55. INSPECTION OF WORK AWAY FROM THE SITE:

If work to be done away from the construction site is to be inspected on behalf of the Town during its fabrication, manufacture, or testing, or before shipment, the Contractor shall give notice to the Engineer of the place and time where such fabrication, manufacture, testing or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

56. CONTRACTOR'S SHOP AND WORKING DRAWINGS:

The Contractor shall submit for approval (in reproducible form unless otherwise specified) shop and working drawings of concrete reinforcement, structural details, piping layout, wiring, materials fabricated for the contract and materials and equipment for which such drawings are specifically requested.

Such drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing, when it is customary to do so.

When the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the contract.

When so specified or if considered by the Engineer to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc., may be submitted for approval in place of shop and working drawings. In such case, requirements shall be as specified for shop and working drawings, insofar as applicable, except that the submission shall be in quadruplicate.

The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

No material or equipment shall be purchased or fabricated for the contract until the required shop and working drawings have been submitted as herein above provided and approved as conforming to the contract requirements. All such materials and equipment and the work involved in their installation or incorporated into the work shall then be as shown in and represented by said drawings.

Until the necessary approval has been given, the Contractor shall not proceed with any portion of the work such as the construction of foundations, the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which approval is required.

All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning approved drawings to them. Unless otherwise approved, all shop and working drawings shall be prepared on standard size, 24 inch by 36 inch sheets, except those which are made by changing existing standard shop or working drawings. All drawings shall be clearly marked with the names of the Town, Contractor, and building, equipment or structure to which the drawing applies, and shall be accompanied by a letter of transmittal giving a list of the drawing number and the names mentioned above.

Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the drawings and specifications in all respects. All drawings which are correct shall be marked with the date, checker's name and indication of the Contractor's approval, and then shall be submitted to the Engineer. Other drawings shall be returned for correction.

The approval of shop and working drawings, etc., will be general only and shall not relieve or in any respect diminish the responsibility of the Contractor for details of design, dimensions, etc., necessary for proper fitting and construction of the work as required in the contract and for achieving the result and performance specified hereunder.

Should the Contractor submit for approval, equipment that requires modifications to the structures, piping, layout, etc., detailed on the drawings, he shall also submit for approval, details of the proposed modifications. If such equipment and modifications are approved, the Contractor, at no additional cost to the Town, shall do all work necessary to make such modifications.

The marked-up reproducible of the shop and working drawings or one mark-up copy of catalog cuts will be returned to the Contractor. The Contractor shall furnish additional copies of such drawings or catalog cuts when so requested.

57. OCCUPYING PRIVATE LAND:

The Contractor shall not (except after written consent from the proper parties) enter or occupy with men, tools, materials, or equipment, any land outside the right-of-way or property of the Town. A copy of the written consent shall be given to the Engineer.

58. INTERFERENCE WITH AND PROTECTION OF STREETS:

The Contractor shall not close or obstruct any portion of a street, road or private way without obtaining permits therefore from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the Engineer and to the proper authorities.

Streets, roads, private ways and walks not closed shall be maintained passable and safe by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefore.

The Contractor shall, at least 24 hours in advance, notify the Police and Fire Departments in writing, with a copy to the Engineer, if the closure of a street or road is necessary. He shall cooperate with the Police Department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well-lighted, in order to minimize confusion.

59. STORAGE OF MATERIALS AND EQUIPMENT:

All excavated materials, construction equipment and materials and equipment to be incorporated in the work shall be placed so as not to injure any part of the work or existing facilities and so that free access can be had at all times to all parts of the work and to all Public Utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

60. INSUFFICIENCY OF SAFETY PRECAUTIONS:

If at any time, in the sole judgment of the Engineer, the work is not properly lighted, barricaded, or in any other respect safe in regard to public travel, persons on or about the work, or public or private property, the Engineer shall have the right to order such safeguards to be erected and such precautions to be taken as he deems advisable and the Contractor shall comply promptly with such orders. If, under such circumstances, the Contractor does not or cannot immediately put the work and the safeguards into proper and approved condition, or if the Contractor or his representative is not upon the site so that he can be notified immediately of the insufficiency of safety precautions, the Engineer may put the work into such a condition that it shall be, in his opinion, in all respects safe. The Contractor shall pay all costs and expenses incurred by the Engineer or Town in so doing. Such action of the Engineer, or his failure to take such action, shall in no way relieve or diminish the responsibility of the Contractor for any and all costs, expenses, losses, liability, claims, suits, proceedings, judgments, awards or damages resulting from, by reason of or in connection with any failure to take safety precautions or the insufficiency of the safety precautions taken by him or by the Engineer acting under

authority of this article or for failure to comply with the provisions of any State or Federal Occupational Safety and Health Laws, Rules or Regulations.

61. SANITARY REGULATIONS:

When deemed necessary by the Engineer, the suitable Contractor shall provide sanitary facilities for the use of those employed on the work. Such facilities shall be made available when the first employees arrive on the site of the work, shall be properly secluded from public observation and shall be constructed and maintained during the progress of the work in suitable numbers and at such points and in such manner as may be required or approved.

The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of the work, on the lands of the Town, or on adjacent property.

The Town and the Engineer shall have the right to inspect such facilities at all times to determine whether or not they are being properly and adequately maintained.

62. DELETE

63. DIMENSIONS OF EXISTING STRUCTURES:

Where the dimensions and locations of existing structures are of importance in the installation or connection of any part of the work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

64. WORK TO CONFORM:

During its progress, and on its completion, the work shall conform truly to the lines, levels and grades indicated on the drawings or given by the Engineer and shall be built in a thoroughly substantial and workmanlike manner, in strict accordance with the drawings, specifications and other contract documents and the directions given from time to time by the Engineer.

65. COMPUTATION OF QUANTITIES:

For estimating quantities in which the computation of areas by Geometric methods would be comparatively laborious, it is agreed that the Planimeter shall be considered an instrument adapted to the measurement of such areas. It is further agreed that the computation of the Volume Prismoids shall be by the method of average end areas.

66. PLANNING AND PROGRESS SCHEDULES:

Before starting the work and from time to time during its progress, as the Engineer may request, the Contractor shall submit to the Engineer a written description of the methods he plans to use in doing the work and the various steps he intends to take.

Within two (2) days after the date of starting work, the Contractor shall prepare and submit to the Engineer a written schedule fixing the respective dates for the start and completion of various parts of the work. The Contractor shall update the schedule on a monthly basis and submit each schedule to the Engineer for review, approval and change where necessary during the progress of the work.

67. PRECAUTIONS DURING ADVERSE WEATHER:

During adverse weather and against the possibility thereof, the Contractor shall take all necessary precautions so that the work may be properly done and satisfactory in all respects. When required, protection shall be provided by the use of plastic sheets, tarpaulins, wood and building-paper shelters or other approved means.

The Engineer may suspend construction operations at any time when, in his sole judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather may be.

68. AS-BUILT DRAWINGS:

The Contractor shall be responsible for maintaining a set of as-built drawings during the course of the work for examination by the Engineer.

69. SCOPE OF WORK:

The intent of the contract is to complete the work or improvements in full compliance with the plans, specifications, technical specifications, special notes, etc.

A. Quantities

The unit bid prices shall be applied to the applicable quantities actually used and accepted in the performance of this project. Quantities have been established using the best information available for accuracy. In some instances, however, quantities may have been provided for some items in order to establish a unit price in the eventuality that the item of work may occur during the construction of the project.

Should the actual quantities constructed vary from those estimated, whether higher or lower, the Contractor is made aware that the applicable item will be paid for based upon his unit bid price bid for that item. Exceptions to this article are noted below in section C, Change in Project Scope.

B. Cost Plus Items:

If the Town orders the performance of any work not covered by the drawings or specifications, and for which no unit price or lump sum basis can be agreed upon, then such extra work shall be done on a Cost-Plus percentage basis of payment as follows:

1.0 Direct Labor And Foreman Costs - For all labor including equipment operators, and foremen in direct charge of the specific operation, the Contractor shall receive the rate of

wage actually paid as shown by his certified payroll, which shall be at least the current local minimum prevailing wage rate, per hour, per position, in accordance with the current State of Connecticut, Labor Department Minimum Rates & Classifications for Heavy Construction. Compensation shall be for each hour that said labor and foreman are actually engaged in such work, including such overtime as provided by existing laws and regulations. In addition the contractor shall receive for each hour worked, the actual costs paid to, or in behalf of workmen, by reason of allowances, health and welfare benefits, pension fund benefits or other benefits, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work. All personnel above the grade of foreman are excluded from receiving compensation under this section.

An amount equal to 20 percent of the total sums as specified above (1.0) will also be paid the contractor.

1.1 Other Labor Costs - The Contractor shall also be allowed to add to such direct labor and foremen costs, the following items:

Social Security Tax at the percentage legally required; Unemployment Ins., at the percentage legally required; Workmen's Compensation insurance at policy percentage rate; Property/liability damage insurance premiums;

An amount equal to 6 percent of the total sums as specified above (1.1) will also be paid the contractor.

1.2 Materials - For all materials used, the Contractor shall receive the actual cost of such materials, including freight and delivery charges, as shown by original receipted bills to which shall be added a sum equal to fifteen (15) percent.

1.3 Equipment Rental - For machinery, trucks, or equipment, exclusive of operator's hire, and except small tools and equipment for which no rental is allowed, which it may be deemed necessary to use, the Town will allow the Contractor the cost of renting such machinery, trucks, or equipment, which shall include fuel and lubricants, as are actually used in the performance of the work, but to which no percentage shall be added. Equipment rental costs will be based upon the "Rental Rate Blue Book" including Rate Adjustment Tables and amendments as published by Dataquest, Inc., San Jose, California or a lower rate if so submitted by the Contractor, and must be approved by the Town prior to any work being performed.

1.4 Sub-Contracts - Cost-Plus work may be performed by a subcontractor only when (a) the Contractor has obtained approval of the subcontractor by the Town and (b) the work has been performed by the subcontractor in strict compliance with the terms of the contract. In such event, the Contractor shall receive the cost of any such sub-contract to which shall be added a sum equal to ten (10) percent.

1.5 Superintendence - The foregoing payments shall be received by the Contractor as payment in full for all work done on a Cost Plus basis, and shall be accepted to cover all general superintendence, use of small tools and equipment for which no rental is allowed, job and general overhead, bonding, expenses, and anticipated profit.

2.0 The cost of the work done each day shall be submitted to the Engineer in a satisfactory form, on the succeeding day and shall be approved by him or adjusted accordingly.

3.0 Monthly payments of all charges for extra work, whether priced on the Cost Plus basis or an agreed-upon basis, shall upon completion, and approval, be requested with the subsequent monthly progress billing.

C. Change of Project Scope

In the event that the overall scope of the project is increased or decreased by 25% or more, either party to the contract may request a revised contract consideration to the stipulated bid unit prices that may be affected by the change. After agreement is reached by the Town and contractor on revised unit prices, a change order will be issued reflecting these changes. The re-negotiated unit prices will be based on the original contract unit prices with additions or subtractions indicated so as to justify the new unit price to the satisfaction of the Town. The revised unit prices will be applied only to that portion of the project in which the scope has been changed, in accordance with this article, and shall not be applied to any of the quantities of the original bid. An example of such a change may be the addition to or deletion of the originally stated project areas.

70. FIELD OFFICE:

See Special Provision 0969060A for Construction Field Office. The Town of Trumbull will provide location for field office.

71. COORDINATION OF PLANS/SPECIFICATIONS:

Any requirement on the plans or in these Specifications, Special Notes/Provisions shall be equally binding on the Contractor.

In case of conflict, the plans shall take precedence over the Specifications. Special Notes/Provisions shall take precedence over plans and Specifications.

72. NO PAYMENT:

Unless otherwise provided for by a specific Contract Item, no separate payment shall be made for any of the requirements as described in the above General Specifications, but shall be deemed included in the total bid price for all the work in this Contract.

73. NOISE:

The Contractor will be required to limit noise operations pursuant to Town of Trumbull Charter Chapter 164 -1 to and including Chapter 164 -13

**Construction Contracts - Required Contract Provisions
(State Funded Only Contracts)**

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4. Americans with Disabilities Act of 1990, as Amended
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 - a. Construction, Alteration or Repair of Public Works Projects; Wage Rates
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- EXHIBIT B – Contractor Work Force Utilization / Equal Employment Opportunity (page 14)
- EXHIBIT C – Health Insurance Portability and Accountability Act of 1996 (HIPAA) (page 17)
- EXHIBIT D - Campaign Contribution Restriction (page 25)
- EXHIBIT E - State Wage Rates (Attached at the end)

1. 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 A, all of which are hereby made a part of this Contract.

2. Contractor Work Force Utilization / Equal Employment Opportunity

- (a) The Contractor shall comply with the Contractor Work Force Utilization / Equal Employment Opportunity requirements attached at Exhibit B 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.

3. Contract Wage Rates

The Contractor shall comply with:

The State wage rate requirements indicated in Exhibit E hereof are hereby made part of this Contract.

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.

4. Americans with Disabilities Act of 1990, as Amended

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, as amended (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.

5. 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 31-53a 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

6. 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).

7. 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 Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services and to Executive Order No. 49 of Governor Dannel P. Malloy, promulgated May 22, 2015, mandating disclosure of certain gifts to public employees and contributions to certain candidates for office. If Executive Order No. 14 and/or Executive Order No. 49 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.

8. 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, intellectual disability, 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, intellectual disability, 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>

9. 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.

10. 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.

11. 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.

12. Substitution of Securities for Retainages on State Contracts and Subcontracts

This Contract is subject to the provisions of Section 3-112a of the General Statutes of the State of Connecticut, as revised.

13. 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 C, and hereby made part of this Contract.

14. 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.

15. 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.

16. 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.

17. Campaign Contribution Restriction

For all State contracts, defined in Conn. Gen. Stat. §9-612(f)(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 contract 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," a copy of which is attached hereto and hereby made a part of this contract, attached as Exhibit D.

18. 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.

19. 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.

20. 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

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 B

CONTRACTOR WORKFORCE UTILIZATION / EQUAL EMPLOYMENT OPPORTUNITY

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 Appendix A below.

STATE FUNDED PROJECTS (only)

APPENDIX A

(Labor Market Goals)

LABOR MARKET AREA GOAL
Female

Minority

Bridgeport				14%
6.9%				
Ansonia	Beacon Falls	Bridgeport	Derby	
Easton	Fairfield	Milford	Monroe	
Oxford	Seymour	Shelton	Stratford	
Trumbull				
Danbury				4%
6.9%				
Bethel	Bridgewater	Brookfield	Danbury	
Kent	New Fairfield	New Milford	Newtown	
Redding	Ridgefield	Roxbury	Sherman	
Washington				
Danielson				2%
6.9%				
Brooklyn	Eastford	Hampton	Killingly	
Pomfret	Putnam	Scotland	Sterling	
Thompson	Voluntown	Union	Woodstock	
Hartford				15%
6.9%				

Andover	Ashford	Avon	Barkhamsted
Belin	Bloomfield	Bolton	Bristol
Burlington	Canton	Chaplin	Colchester
Columbia	Coventry	Cromwell	Durham
East Granby	East Haddam	East Hampton	East Hartford
East Windsor	Ellington	Enfield	Farmington
Glastonbury	Granby	Haddam	Hartford
Harwinton	Hebron	Lebanon	Manchester
Mansfield	Marlborough	Middlefield	Middletown
Newington	Plainville	Plymouth	Portland
Rocky Hill	Simsbury	Somers	South Windsor
Southington	Stafford	Suffield	Tolland
Vernon	West Hartford	Wethersfield	Willington
Winchester	Windham	Windsor	Windsor Locks

Lower River 6.9%			2%
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Chester	Deep River	Essex	Old Lyme
Westbrook			

New Haven 6.9%			14%
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Bethany	Branford	Cheshire	Clinton
East Haven	Guilford	Hamden	Killingworth
Madison	Meriden	New Haven	North Branford
North Haven	Orange	Wallingford	West Haven
Woodbridge			

New London 6.9%			8%
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Bozrah	Canterbury	East Lyme	Franklin
Griswold	Groton	Ledyard	Lisbon
Montville	New London	North Stonington	Norwich
Old Lyme	Old Saybrook	Plainfield	Preston
Salem	Sprague	Stonington	Waterford
Hopkinton	RI – Westerly Rhode Island		

Stamford 6.9%			17%
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Darien	Greenwich	New Canaan	Norwalk
Stamford	Weston	Westport	Wilton

Torrington 6.9%			2%
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Canaan	Colebrook	Cornwall	Goshen
Hartland	Kent	Litchfield	Morris
Norfolk	North Canaan	Salisbury	Sharon
Torrington	Warren		

Waterbury 6.9%				10%
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Bethlehem
Southbury
Wolcott

Middlebury
Thomaston
Woodbury

Naugatuck
Waterbury

Prospect
Watertown

EXHIBIT C

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 is 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

August 2015

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.

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 result in 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 E

(state wages will be inserted here)

PERMITS AND/OR REQUIRED PROVISIONS

The following Permits and/or Required Provisions follow this page and are hereby made part of this Contract.

CT DEEP Water Diversion

Submitted: June 15, 2018

DEEP License # 201808141

Approved November 7, 2018

USACE CT GP _ Pre-Construction Notification Approval

USACE Connecticut General Permit PCN Application and CT Addendum

NAE-2018-01428

Submitted: 2/16/2018

Approved November 13, 2018

Trumbull Inland Wetlands

Submitted: 3/28/2016

Approved: 4/5/2016, Application 15-37

OSTA

Traffic Signal Review Daniels Farm Road

Submitted: 2/22/2018

Approved 7/18

OSTA No.: 144-1705-02

Temporary Traffic Signal Review – Strobel Road

Submitted: 5/3/2018

Approved 7/18

OSTA No.: 144-1705-01



Date November 7, 2018

Diane M. Ray
Regulatory and Enforcement Branch B
U.S. Army Corps of Engineers
New England District
CENAE-RDB
696 Virginia Road
Concord, MA 01742-2751

Town of Trumbull
Frank Smeriglio
5866 Main Street
Trumbull CT 06611

SUBJECT: DEEP License #: 201808141
Strobel Road, Trumbull

Dear Mr. Smeriglio:

Please find attached a copy of your subject license and relevant enclosures which are being issued pursuant to your application of June 15, 2018. Your attention is directed to the conditions of the license. All work must conform to that which is specifically authorized.

Any work in regulated areas of the State which has not been authorized by a valid license is a violation of state law and subject to enforcement action by the Department of Energy & Environmental Protection and the Office of the Attorney General.

Your initiation of authorized activities will be relied upon as your agreement to comply with the terms and conditions of the license.

If you have not already done so, you should contact your local Planning and Zoning Office and the U. S. Army Corps of Engineers to determine local and federal permit requirements on your project, if any. Write the Corps' New England District, Regulatory Branch, 696 Virginia Road, Concord, MA 01742-2751; <http://www.nae.usace.army.mil/> or call 1-800-343-4789.

If you should have any questions or concerns, please contact me at 860 424-3698, or Danielle.missell@ct.gov.

Sincerely,

Danielle Missell

Danielle Missell, Environmental Analyst
Land & Water Resources Division
Bureau of Water Protection & Land Reuse

Encl(s): License # 201808141 ; WQC CT GP Conditions

cc: File 201808141

cc (via email): Frank Smeriglio, Town of Trumbull firstselectman@trumbull-ct.gov
Joseph Canas, Tighe & Bond jacanas@tighebond.com
Diane Ray, USACE Diane.M.Ray@usace.army.mil
Nathan Margason, US EPA Margason.Nathan@epa.gov
Stephen Gephard, DEEP Fisheries steve.gephard@ct.gov



Connecticut Department of Energy and Environmental Protection License*

USACE CT GP - Pre-Construction Notification Approval

Licensee(s): Town of Trumbull

Licensee Address(s): 5866 Main Street
Trumbull CT 06611

License Number(s): 201808141-PCN

Municipality: Trumbull

Project Description: Culvert Replacement

Project Address/Location: Near 195 Strobel Road

Waters: Booth Hill Brook

Authorizing CT Statute(s) and/or Federal Law: Section 401 CWA (33 USC 1341)

Applicable Regulations of CT State Agencies: 22a-426-1 to 9

Agency Contact: Land & Water Resources Division,
Bureau of Water Protection & Land Reuse, 860-424-3019

License Expiration: Upon expiration of the Department of Army CT General Permit,
August 19, 2021

Project Site Plan Set: *Strobel Road Culvert Rehabilitation Project dated March 2016
and revised through October 2018, and prepared by Tighe &
Bond.*

License Enclosures: WQC CT GP Conditions

Authorized Activities:

The Licensee is hereby authorized to conduct the following work as described in application # 201808141-PCN:

1. The Town of Trumbull is authorized to replace the existing twin 72" concrete pipes that carry Booth Hill Brook with twin 7'X7' box culverts. The twin 7'X7' concrete box culverts

*Connecticut's Uniform Administrative Procedure Act defines License to include, "the whole or part of any agency permit, certificate, approval, registration, charter or similar form of permission required by law . . ."

will be recessed 1' below grade and backfilled with natural streambed material. The project will affect 1,328 square feet of wetlands and watercourse

Failure to comply with the terms and conditions of this license shall subject the Licensee and / or the Licensee's contractor(s) to enforcement actions and penalties as provided by law.

This license is subject to the following Terms and Conditions:

1. **License Enclosure(s) and Conditions.** The Licensee shall comply with all applicable terms and conditions as may be stipulated within the License Enclosure(s) listed above.
2. **Backfill in Culvert.** The Licensee shall use streambed material to backfill the box culvert that mimics onsite substrates containing a heterogeneous mixture of gravel, cobbles, sands, and sufficient fines to fill voids to ensure that stream flows do not flow subsurface within the culvert during low flow conditions.

Issued under the authority of the Commissioner of Energy and Environmental Protection on:

11/7/18
Date



Brian P. Thompson
Division Director
Land & Water Resources Division

**Section 401 Water Quality Certification Conditions for Department of the Army (Corps of Engineers)
General Permits for the State of Connecticut**

1. **Rights.** This certificate is subject to and does not derogate any present or future property rights or other rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state, or local laws or regulations pertinent to the property or activity affected hereby. This certification does not comprise the permits or approvals as may be required by Chapters 440, 446i, 446j and 446k of the Connecticut General Statutes.
2. **Expiration of Certificate.** The Section 401 Water Quality Certifications contained herein shall be valid until such time as the Department of the Army General Permits for the State of Connecticut expires or is modified, suspended, revoked or reissued.
3. **Compliance with Certificate.** All work and all activities authorized herein conducted by the permittee at the site shall be consistent with the terms and conditions of this certificate. Any regulated activities carried out at the site, including but not limited to, construction of any structure, excavation, fill, obstruction, or encroachment, that are not specifically identified and authorized herein shall constitute a violation of this certificate and may result in its modification, suspension, or revocation. In carrying out the certified discharge(s) authorized herein, the permittee shall not store equipment or construction material, or discharge any material including without limitation, fill, construction materials or debris in any wetland or watercourse on or off site unless specifically authorized by this certificate. Upon initiation of the activities authorized herein, the permittee thereby accepts and agrees to comply with the terms and conditions of this certificate.
4. **Transfer of Certificate.** This authorization is not transferable without the written consent of the Commissioner.
5. **Reliance on Application.** In evaluating the permittee's application, the Commissioner has relied on information provided by the permittee. If such information subsequently proves to be false, deceptive, incomplete or inaccurate, this certificate may be modified, suspended or revoked.
6. **Best Management Practices.** In constructing or maintaining the activities authorized herein, the permittee shall employ best management practices, consistent with the terms and conditions of this certificate, to control storm water discharges and erosion and sedimentation and to prevent pollution. Such practices to be implemented by the permittee at the site include, but are not necessarily limited to:
 - a. Prohibiting dumping of any quantity of oil, chemicals or other deleterious material on the ground;
 - b. Immediately informing the Commissioner's Oil and Chemical Spill Response Division at (860) 424-3338 (24 hours) of any adverse impact or hazard to the environment, including any discharges, spillage, or loss of oil or petroleum or chemical liquids or solids, which occurs or is likely to occur as the direct or indirect result of the activities authorized herein;
 - c. Separating staging areas at the site from the regulated areas by silt fences or straw/hay bales at all times;
 - d. Prohibiting storage of any fuel and refueling of equipment within twenty-five (25) feet from any wetland or watercourse;

- e. Preventing pollution of wetlands and watercourses in accordance with the document "Connecticut Guidelines for Soil Erosion and Sediment Control" as revised. Said controls shall be inspected by the permittee for deficiencies at least once per week and immediately after each rainfall and at least daily during prolonged rainfall. The permittee shall correct any such deficiencies within 48 hours of said deficiencies being found;
- f. Stabilizing disturbed soils in a timely fashion to minimize erosion. If a grading operation at the site will be suspended for a period of thirty (30) or more consecutive days, the permittee shall, within the first seven (7) days of that suspension period, accomplish seeding and mulching or take such other appropriate measures to stabilize the soil involved in such grading operation. Within seven (7) days after establishing final grade in any grading operation at the site the permittee shall seed and mulch the soil involved in such grading operation or take such other appropriate measures to stabilize such soil until seeding and mulching can be accomplished.
- g. Prohibiting the storage of any materials at the site which are buoyant, hazardous, flammable, explosive, soluble, expansive, radioactive, or which could in the event of a flood be injurious to human, animal or plant life, below the elevation of the five hundred (500) year flood. Any other material or equipment stored at the site below said elevation by the permittee or the permittee's contractor must be firmly anchored, restrained or enclosed to prevent flotation. The quantity of fuel stored below such elevation for equipment used at the site shall not exceed the quantity of fuel that is expected to be used by such equipment in one day.
- h. Immediately informing the Commissioner's Inland Water Resources Division at (860) 424-3019 and the U.S. Army Corps of Engineers at (978) 318-8879, of the occurrence of pollution or other environmental damage resulting from construction or maintenance of the authorized activity or any construction associated therewith in violation of this certificate. The permittee shall, no later than 48 hours after the permittee learns of a violation of this certificate, report same in writing to the Commissioner. Such report shall contain the following information:
 - (i) the provision(s) of this certificate that has been violated;
 - (ii) the date and time the violation(s) was first observed and by whom;
 - (iii) the cause of the violation(s), if known
 - (iv) if the violation(s) has ceased, the duration of the violation(s) and the exact date(s) and times(s) it was corrected;
 - (v) if the violation(s) has not ceased, the anticipated date when it will be corrected;
 - (vi) steps taken and steps planned to prevent a reoccurrence of the violation(s) and the date(s) such steps were implemented or will be implemented;
 - (vii) the signatures of the permittee and of the individual(s) responsible for actually preparing such report, each of whom shall certify said report in accordance with condition 7 of this certificate.

For information and technical assistance, contact the DEEP Land and Water Resources Division at (860) 424-3019.

7. Unconfined Instream Work; Installation and Removal of Confining Structures.

- Unconfined instream work is limited to the period June 1 through September 30.
- Confinement of a work area by cofferdam techniques using sand bag placement, sheet pile installation (vibratory method only), portadam, or similar confinement devices is allowed any time of the year unless specifically prohibited by a permit condition.

- The removal of such confinement devices is allowed any time of the year unless specifically prohibited by a permit condition.
 - The confinement technique used shall completely isolate and protect the confined area from all flowing water. The use of silt boom/curtain or similar technique as a means for confinement is prohibited.
 - Once a work area has been confined, in-water work within the confined area is allowed any time of the year.
8. **Certification of Documents.** Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this certificate shall be signed by the permittee, a responsible corporate officer of the permittee, a general partner of the permittee, or a duly authorized representative of the permittee and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense in accordance with Section 22a-6 under Section 53a-157 of the Connecticut General Statutes."

9. **Submission of Documents.** The date of submission to the Commissioner of any document required by this certificate shall be the date such document is received by the Commissioner. Except as otherwise specified in this certificate, the word "day" as used in this certificate means the calendar day. Any document or action which falls on a Saturday, Sunday, or legal holiday shall be submitted or performed by the next business day thereafter.

Any document or notice required to be submitted to the Commissioner under this certificate shall, unless otherwise specified in writing by the Commissioner, be directed to:

Director, Land and Water Resources Division
Bureau of Water Protection and Land Reuse
Department of Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

November 13, 2018

Regulatory Division
File Number: NAE-2018-01428
CT DEEP File Number: 201808141

Town of Trumbull
Department of Public Works
Attn: Mr. Frank Smeriglio
5866 Main Street
Trumbull, Connecticut 06611

Dear Mr. Smeriglio:

We have reviewed your application to replace existing twin, 72-inch diameter reinforced concrete pipe culverts with a new headwall and twin 7-foot by 7-foot box culverts, in which the bottom one foot would be sunk below the natural invert elevation to simulate an open bottom structure and backfilled with natural streambed materials. Also to place two rock weirs, one upstream and one downstream of the project. This project is part of a larger project to reconstruct Strobel Road. The culvert replacement would involve permanent fill within 398 square feet below the ordinary high water mark of Booth Hill Brook, consisting of 286 cubic yards of roadway embankment material, 25 cubic yards of concrete for headwall construction, 72 cubic yards of rock for the weirs, and 18 cubic yards of structural backfill material behind the headwall. There would also be temporary fill within a total of 964 square feet below ordinary high water for construction access and sediment and erosion controls. This project is located in Booth Hill Brook at the Strobel Road crossing in Trumbull, Connecticut and shown on the enclosed plans titled "STROBEL ROAD, CULVERT REHABILITATION PROJECT, TRUMBULL, CONNECTICUT, MARCH 2016," on 6 sheets, and dated "05/07/2018, REVISED 10/05/2018."

Based on the information you have provided, we have determined that the proposed activity, which includes a discharge of dredged or fill material into waters or wetlands, will have only minimal individual and cumulative impacts on waters of the United States, including wetlands. Therefore, this work is authorized under General Permit # 19 of the enclosed Federal permit known as the Connecticut General Permits (GPs). This work must be performed in accordance with the terms and conditions of the GPs and also in compliance with the following special conditions:

1. All tree cutting shall occur outside of the period of June 1 through July 31, of any year, to avoid any potential impacts to the federally-listed northern long-eared bat.
2. You must complete and return the enclosed Work Start Notification Form to this office at least two weeks before the anticipated starting date.

You are responsible for complying with all of the GPs' requirements. Please review the enclosed GPs carefully, in particular the general conditions, to be sure that you understand its requirements. You should ensure that whoever does the work also fully understands the requirements and that a copy of the GPs and this authorization letter are at the project site throughout the time the work is underway.

This authorization expires on August 19, 2021, unless the GPs are modified, suspended, or revoked before then. You must commence or have under contract to commence the work authorized herein by August 19, 2021 and complete the work by August 19, 2022. If not, you must contact this office to determine the need for further authorization *before* beginning or continuing the activity. We recommend that you contact us before this authorization expires to discuss a permit reissuance. If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law. Performing work not specifically authorized by this determination or failing to comply with any special condition(s) provided above and all the terms and conditions of the GPs may subject you to the enforcement provisions of our regulations.

The Connecticut Department of Energy & Environmental Protection (DEEP) has issued a Water Quality Certification (WQC) for this project, as required under Section 401 of the Clean Water Act, based on their review of the project.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Please contact Christina M. Comeau, of my staff, at (978) 318-8705 if you have any questions.

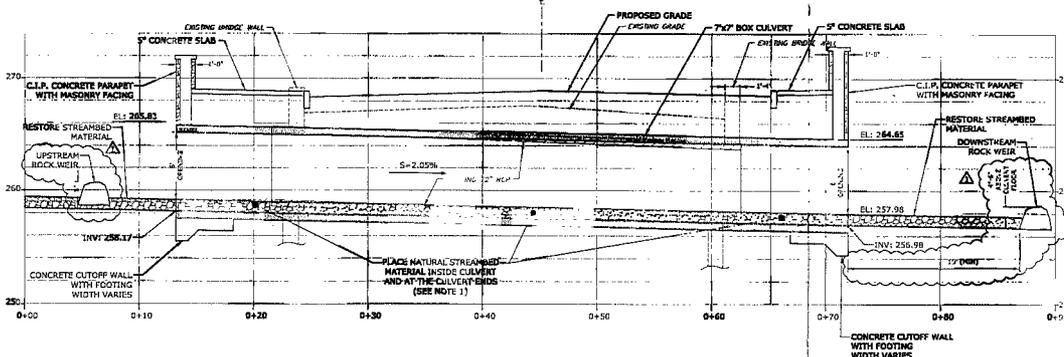
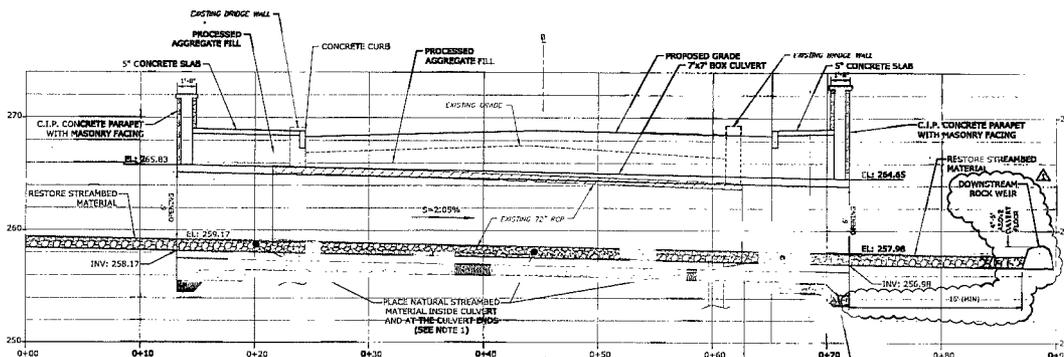
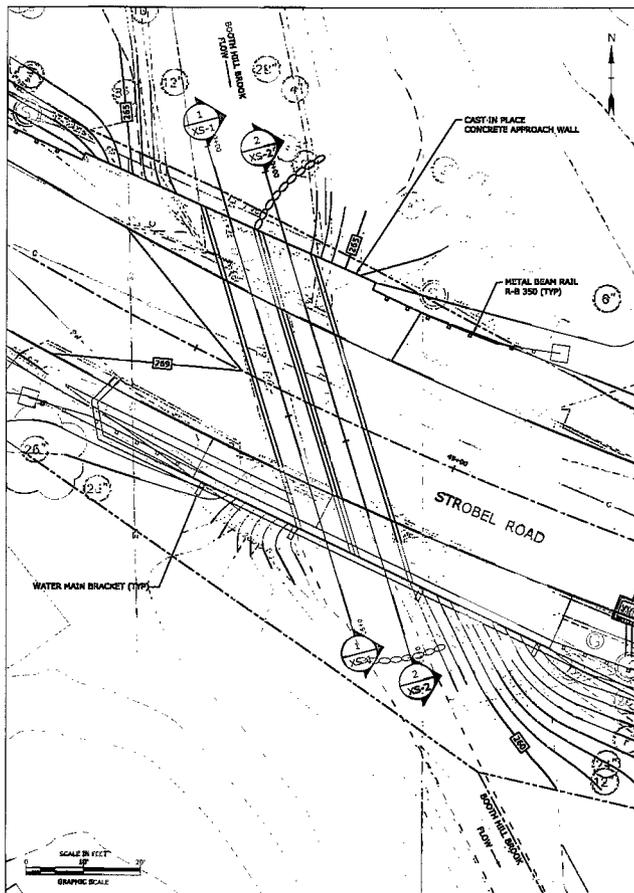
Sincerely,


Kevin R. Kotelly, P.E.
Chief, Permits & Enforcement Branch
Regulatory Division

Enclosure:

cc:

Jeff Caiola, CT DEEP, Chief, Land & Water Resources Southwest Division – via email
Nate Margason, US EPA - via e-mail
Joseph Canas, P.E., Tighe & Bond, jacanas@tighebond.com



- NOTES**
- NATURAL STREAMBED SUBSTRATE SHALL BE A HETEROGENEOUS MIXTURE OF GRAVEL, COBBLES AND FINES WITH 40% OF MATERIAL BY WEIGHT TO BE 8" - 12" COBBLES. REMAINING 60% OF MATERIAL SHALL BE SMALL COBBLES AND GRAVEL. REFER TO SPECIAL PROVISIONS.
 - PROPER SEDIMENT AND EROSION CONTROLS ARE CRITICAL TO PROTECT FISH HABITAT. PROVIDE ALL SEDIMENT AND EROSION CONTROLS SHOWN ON THESE PLANS AND SUPPLEMENTAL CONTROLS AS ORDERED OR REQUIRED TO NOT INCREASE TURBIDITY LEVELS. STABILIZE DISTURBED AREAS AS SOON AS PRACTICABLE.
 - UNCONFIRMED IN-STREAM WORK IS ALLOWED ONLY BETWEEN JUNE 1 AND SEPTEMBER 30.

Strobel Road

Culvert Rehabilitation Project

Trumbull, Connecticut

March, 2016

VERIFY SCALE
 1/4" = 1" INCH ON ORIGINAL DRAWING
 1/8" = 1" INCH ON THIS SHEET. ADJUST SCALES ACCORDINGLY

DATE:	DESIGNER:
PROJECT NO.:	DATE:
FILE: 10-120-15-C-537-C03.dwg	NO:
DRAWN BY:	CHK:
CHECKED:	APP:
APPROVED:	DATE:

CULVERT SECTIONS

SCALE: AS NOTED

C5.3

Strobel Road

Culvert Rehabilitation Project

Trumbull, Connecticut

March, 2016

VERIFY SCALE
 BAR IS 1 INCH OR
 ORIGINAL DRAWING
 IF NOT ONE INCH OR
 THIS SCALE, ADJUST
 SCALES ACCORDINGLY

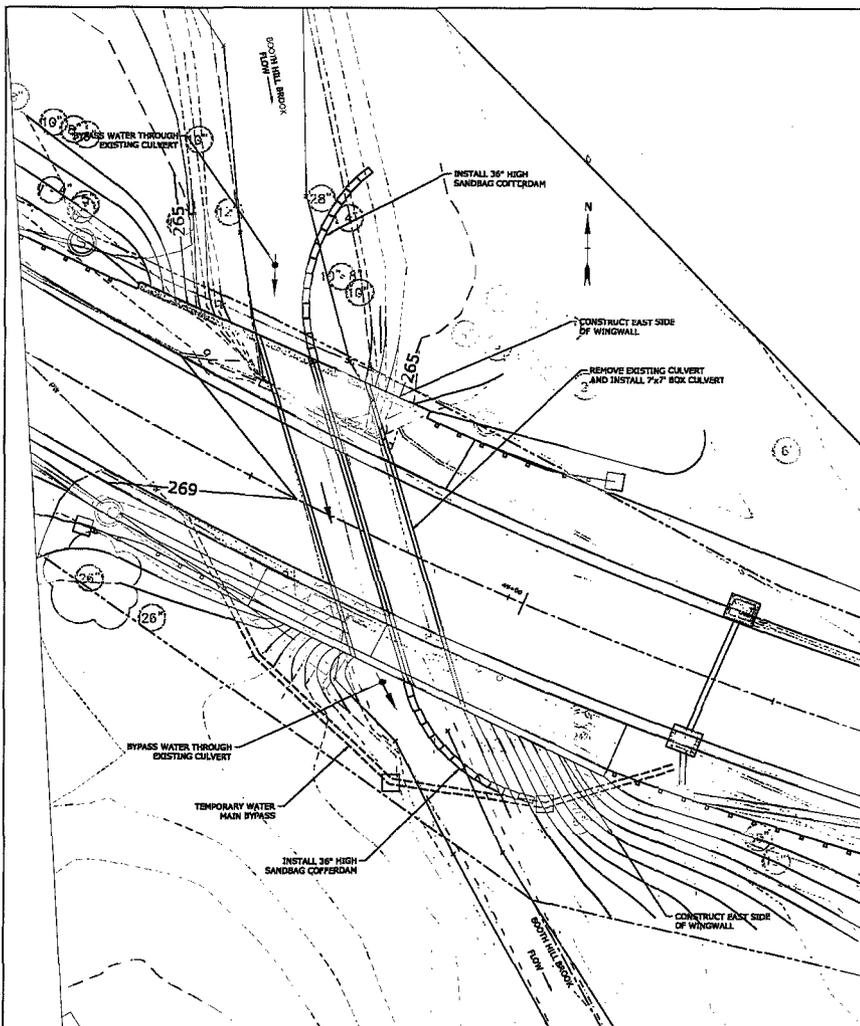
MARK	DATE	DESCRIPTION
PROJECT NO.	TIGHE	
DRAWN BY:	JLD	
CHECKED:	TMS	
APPROVED:	JLD	

WATER HANDLING PLAN

SCALE: AS NOTED

C5.4

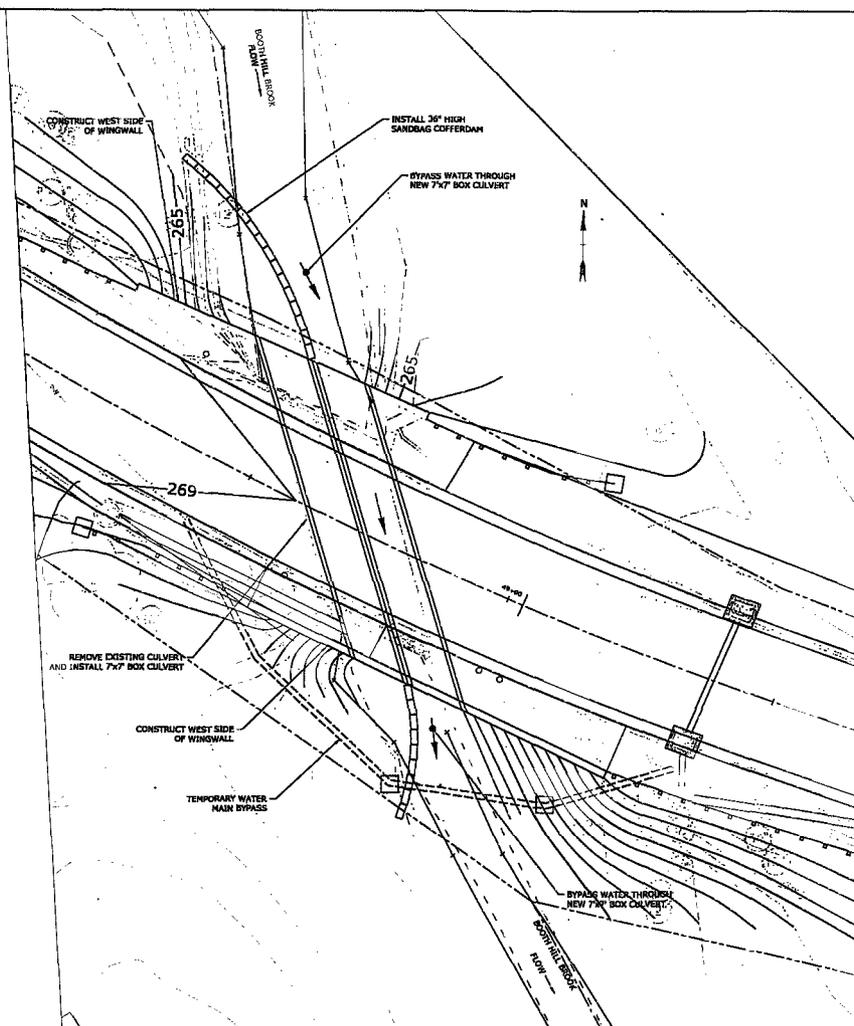
05/07/2016



WATER HANDLING - PHASE 1

STAGE 1:

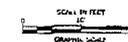
1. TEMPORARY RELOCATE WATER MAIN
2. INSTALL TEMPORARY SANDBAG COFFERDAMS
3. REMOVE THE EAST CULVERT AND INSTALL 7'x7' BOX CULVERT AND WING WALLS
4. BACKFILL CULVERT AND WING WALLS.
5. PLACE NATURAL STREAMBED MATERIAL INSIDE CULVERT AND AT THE CULVERT ENDS



WATER HANDLING - PHASE 2

STAGE 2:

1. RECONFIGURE SANDBAG COFFERDAMS ON WEST SIDE OF STREAM FOR STAGE 2
2. REMOVE THE WEST CULVERT AND INSTALL 7'x7' BOX CULVERT AND WING WALLS
3. BACKFILL CULVERT AND WING WALLS.
4. PLACE NATURAL STREAMBED MATERIAL INSIDE CULVERT AND AT THE CULVERT ENDS



MAY 07, 2016 10:51 AM
 PROJECT: STROBEL ROAD
 DRAWING: C5.4
 SHEET: 1 OF 1



**US Army Corps
of Engineers**®
New England District

WORK-START NOTIFICATION FORM
(Minimum Notice: Two weeks before work begins)

 * EMAIL TO: cenae-r@usace.army.mil; or *
 * * * * *
 * MAIL TO: U.S. Army Corps of Engineers, New England District *
 * Permits and Enforcement Branch B *
 * Regulatory Division *
 * 696 Virginia Road *
 * Concord, Massachusetts 01742-2751 *

Corps of Engineers Permit No. NAE-2018-01428 was issued to the Town of Trumbull. This work is located on Strobel Road in Trumbull, CT and authorized to replace existing twin, 72-inch diameter reinforced concrete pipe culverts with a new headwall and twin 7-foot by 7-foot box culverts, in which the bottom one foot would be sunk below the natural invert elevation to simulate an open bottom structure and backfilled with natural streambed materials. Also to place two rock weirs, one upstream and one downstream of the project.

The people (e.g., contractor) listed below will do the work, and they understand the permit's conditions and limitations.

PLEASE PRINT OR TYPE

Name of Person/Firm: _____

Business Address: _____

Telephone Numbers: () _____ () _____

Proposed Work Dates: Start: _____ Finish: _____

Permittee/Agent Signature: _____ **Date:** _____

Printed Name: _____ **Title:** _____

Date Permit Issued: _____ **Date Permit Expires:** _____

FOR USE BY THE CORPS OF ENGINEERS

PM: Comeau **Submittals Required:** _____

Inspection Recommendation: _____

Applicant: General Public, State of Connecticut

Effective Date: August 19, 2016

Expiration Date: August 19, 2021

**DEPARTMENT OF THE ARMY
GENERAL PERMITS FOR THE
STATE OF CONNECTICUT
&
LANDS LOCATED WITHIN THE
BOUNDARIES OF AN INDIAN RESERVATION¹**

The New England District of the U.S. Army Corps of Engineers (Corps) hereby issues twenty-one (21) General Permits (GPs), listed below, for activities subject to Corps jurisdiction in waters of the United States (U.S.), including navigable waters, within boundaries of the State of Connecticut and lands located within the boundaries of an Indian reservation. These GPs are issued in accordance with Corps regulations at 33 CFR 320 - 332 [see 33 CFR 325.5(c)(1)], and authorizes activity-specific categories of work that are similar in nature and cause no more than minimal individual and cumulative adverse environmental impacts. These GPs will provide protection to the aquatic environment and the public interest while effectively authorizing activities that have no more than minimal individual and cumulative adverse environmental effects.

GENERAL CRITERIA

In order for activities to qualify for these GPs, they must meet the terms and eligibility criteria and stipulations listed in Appendix A – General Permits as well as the Appendix B General Conditions.

Projects may qualify for the following:

- Self-Verification (inland) - Self -Verification Notification Form (SVNF) is required
- Self-Verification (coastal) - SVNF NOT required. Corps relies on CT DEEP, OLISP submittals.
- Pre-Construction Notification (PCN) -
 - Inland - Application to and written approval from the Corps is required.
 - Coastal - Notification to Corps provided by CT DEEP, OLISP or by applicants as necessary. Written approval from the Corps is required.

If your project is ineligible for Self-Verification (SV), it may be screened under PCN or may require an Individual Permit. The thresholds for activities eligible for Self-Verification and PCN are defined in Appendix A. These GPs do not affect the Corps Individual Permit review process or activities exempt from Corps regulation.

¹ Indian reservation lands are considered a sovereign nation, and are therefore acknowledged separately from the State of Connecticut for purposes of this General Permit.

Connecticut General Permits

An activity is authorized under GPs 1-21 below only if that activity and the permittee satisfy all of the GP's terms and conditions.

1. Aids to navigation & temporary recreational structures
2. Repair or maintenance of existing currently serviceable, authorized or grandfathered structures/fills, removal of structures
3. Moorings
4. Pile-supported structures & floats, including boat lifts/hoists and other miscellaneous Structures & work
5. Boat ramps and marine railways
6. Utility line activities
7. Dredging, transport & disposal of dredged material, beach nourishment, rock removal & rock relocation
8. Discharges of dredged or fill material incidental to the construction of bridges
9. Shoreline and bank stabilization projects
10. Aquatic habitat restoration, establishment and enhancement activities
11. Fish and wildlife harvesting activities
12. Oil spill and hazardous material cleanup
13. Cleanup of hazardous and toxic waste
14. Scientific measurement devices
15. Survey activities
16. Aquaculture projects and fisheries
17. New/expanded developments & recreational facilities
18. Linear transportation projects – wetland crossings only
19. Stream, river & brook crossings (not including wetland crossings)
20. Energy generation and renewable energy generation facilities and hydropower projects
21. Temporary fill not associated with any other GP activities

SECTION 1

REVIEW CATEGORIES AND APPLICATION PROCEDURES FOR PROJECTS WITHIN NON-TIDAL WATERS AND WETLANDS WITHIN THE STATE OF CONNECTICUT AND LANDS LOCATED WITHIN AN INDIAN RESERVATION

I. ACTIVITIES COVERED:

The discharge of dredged or fill material into Waters of the United States, which is regulated by the Corps under Section 404 of the Clean Water Act (CWA), see 33 CFR 328.

II. REVIEW PROCESS:

1. State and Local Approvals:

In order for authorizations under these GPs to be valid and before commencing any work within Corps jurisdiction, applicants must apply for and obtain State Water Quality Certification as well as any local approvals (see **General Condition 1**):

Water Quality Certification (WQC) under Section 401 of the Federal CWA (33 USC Sec. 1341). Section 401(a)(1) of the Clean Water Act requires that applicants obtain a WQC or waiver from the state water pollution control agency which in Connecticut is the Connecticut Department of Energy and Environmental Protection (CT DEEP) or U.S. EPA for Indian reservation lands to discharge dredged or fill material into waters of the U.S. (see **attached Water Quality Certification and table**).

The CT DEEP, Inland Water Resources Division (CT DEEP IWRD) has conditionally granted WQC for Self-Verification (SV) activities in inland wetlands and waterways provided those activities meet the criteria as contained in the attached **Appendix A – General Permits** document.

The CT DEEP- IWRD has granted WQC with terms, limitations and conditions specified therein.

The CT DEEP- IWRD has waived WQC for GP 12, GP 13, GP 14, and GP 15.

The U.S. EPA granted WQC for Self-Verification and PCN activities located on lands within the boundaries of an Indian Reservation.

2. General Permit Review Categories:

a. Self-Verification – An application to the Corps is NOT required. However, submittal of the attached Self-Verification Notification Form at Appendix E to the Corps and CT DEEP, IWRD is required prior to commencement of work authorized by these GPs.

Eligibility Criteria

Activities in Connecticut and lands located within the boundaries of an Indian reservation that meet the following criteria are eligible under Self-verification of this General Permit:

- are subject to Corps jurisdiction (See **General Condition 2**),
- meet the criteria of Self-Verification in the attached **Appendix A - General Permits**, and
- meet the General Conditions of the GPs.

Project proponents seeking Self-Verification authorizations must comply with the General Conditions and other federal laws such as the National Historic Preservation Act, the Endangered Species Act (ESA) and the Wild and Scenic Rivers Act. Therefore, consultation with the Corps and/or outside experts, such as the State Historic Preservation Office and any appropriate Indian tribes, is recommended when there is a high likelihood of the presence of resources of concern.

b. Pre-Construction Notification (PCN) – An application to the Corps is required.

Projects not eligible under Self-Verification of the GPs may be screened under PCN, provided they meet the criteria as defined in the attached **Appendix A – General Permits** for PCN activities.

Eligibility Criteria

Activities in Connecticut and lands located within an Indian reservation that meet the following criteria are eligible under PCN of this General Permit:

- are subject to Corps jurisdiction (See **General Condition 2**),
- meet the criteria of PCN in the attached **Appendix A – General Permits**, and
- meet the General Conditions of the GPs.

3. Applying for an authorization through the PCN process:

Applicants must also submit two copies of the following to the Corps, on a CD if available and hard copy:

- Corps application form (ENG Form 4345) found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/ObtainPermit.aspx>
- 8.5” x 11” or 11” x 17” drawings and one large-scale drawing,
- wetlands functions and values assessment,
- Federal wetland delineation documentation (data sheets),
- The CT DEEP addendum found at: http://www.ct.gov/deep/lib/deep/Permits_and_Licenses/LandUse_General_Permits/Inland_Water_General_Permits/CT_addendum_app.pdf
- Correspondence with the State Historic Preservation Office and Tribal Historic Preservation Officer indicating coordination with these entities along with a completed CT SHPO Form. The CT SHPO Form is available on the CT SHPO website under Historic Preservation – Environmental Review at http://www.cultureandtourism.org/cct/lib/cct/Project_Notification_Form_final.pdf
- a plan describing any proposed mitigation along with an Invasive Species Control Plan.

Applicants must concurrently submit three copies of the following to the CT DEEP at the address below:

- the Corps application form,
- 8.5” x 11” or 11” x 17” drawings and one large-scale drawing,
- wetlands functions and values assessment,
- Federal wetlands delineation documentation (data sheets),
- CT DEEP addendum, and
- a plan describing any proposed mitigation.

**State of Connecticut
Department of Energy & Environmental Protection
Central Permit Processing Unit
79 Elm Street
Hartford, CT 06106-5127**

NOTE: Applicants must submit all project revisions and modifications to both agencies.

The Corps will coordinate review of all PCN activities with federal and state agencies to ensure that the proposed activity results in no more than a minimal impact to the aquatic environment. To be eligible and subsequently authorized, an activity must meet the eligibility criteria in **2. General Permit Review Categories** above and result in no more than minimal impacts to the aquatic environment as determined by the Corps in conjunction with the interagency review team which consists of federal and state resource agencies. This may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal.

Written approval from the Corps for PCN activities is required before work can commence.

Emergency Situation Procedures: 33 CFR 325.2 (e) (4) states that an “emergency” is a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures.” Notification to the Corps and CT DEEP – IWRD is required. The Corps will determine if a project qualifies as an emergency and will work with all applicable agencies to expedite authorization in emergency situations. If the project qualifies as an emergency, authorization under Self-verification or PCN of the GPs is not required.

Individual Permit Procedures: Work that is **NOT** eligible for authorization under the GPs as defined in the attached **Appendix A – General Permits**, or that does not meet the terms and conditions of the GPs, will require review under the Corps Individual Permit procedures (see 33 CFR Part 325.1). The applicant shall submit the appropriate application materials (including the Corps ENG 4345 application form) to the Corps of Engineers. General information and application forms can be obtained at the Corps web site noted in Paragraph 3 above. An individual Water Quality Certification is required from the CT DEEP, IWRD. **The application form and instructions for Section 401 Water Quality Certification are available from the Connecticut DEEP web site at http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324168&depNav_GID=1643.**

TABLE 1. CONNECTICUT WATER QUALITY CERTIFICATION
Water Quality Certification – Non-Tidal Waters, Wetlands, and Watercourses *
Department of the Army - General Permits for the State of Connecticut
WQC-201607149
Page 1 of 5

	Self-Verification (SV)	Pre-Construction Notification (PCN)
	<u>WHERE GRANTED, APPENDIX E: SELF-VERIFICATION NOTIFICATION FORM AND PLANS ARE REQUIRED TO BE FILED WITH CT DEEP – See Appendix E for instructions</u>	<u>WHERE GRANTED, APPLICATION TO CT DEEP IS REQUIRED – See Section 1, II. 3. (pages 2-3) of the Army Corps GP for instructions</u>
GP 2. Repair or Maintenance of Existing Currently Serviceable, Authorized or Grandfathered Structures & Fills, Removal of Structures	<p>Granted subject to the following restriction:</p> <ul style="list-style-type: none"> • Drawdown does not exceed 18 months and one growing season (April through September) <p>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 2. (See GP 19.)</p> <p>Culvert slip-lining is not eligible for Section 401 Water Quality Certification under GP2. (See GP 19.)</p>	<p>Granted for impacts not exceed 0.5 acre, subject to the following restriction:</p> <ul style="list-style-type: none"> • Drawdown does not exceed 18 months and one growing season (April through September) <p>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 2. (See GP 19.)</p>
GP 5. Boat Ramps & Marine Railways	Granted	Granted for impacts not exceeding 0.5 acre.
GP 6. Utility Line Activities	Granted	<p>Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p>Other activities with impacts exceeding 0.5 acre require individual (regular) Section 401 Water Quality Certification.</p>
GP 9. Shoreline & Bank Stabilization Projects	<p>Granted for shoreline and banks stabilization activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for shoreline and bank stabilization activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p>Other shoreline stabilization activities exceeding 50 feet in length are not eligible for Section 401 Water Quality Certification under SV.</p> <p>Other stream, river, or brook bank stabilization activities exceeding 50 feet in total length for one stream bank or 50 feet cumulative length for both stream banks are not eligible for Section 401 Water Quality Certification under SV.</p> <p>Activities that include the placement of fill within the streambed beyond the toe of slope of the stream bank are not eligible for Section 401 Water Quality Certification under SV</p>	<p>Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p>Other shoreline stabilization activities exceeding 100 feet in total length require individual (regular) Section 401 Water Quality Certification.</p> <p>Other stream, river, or brook bank stabilization activities exceeding 100 feet in total length for one stream bank or 100 feet cumulative length for both stream banks require individual (regular) Section 401 Water Quality Certification.</p>

TABLE 1. CONNECTICUT WATER QUALITY CERTIFICATION
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	Self-Verification (SV)	Pre-Construction Notification (PCN)
	<u>WHERE GRANTED, APPENDIX E: SELF-VERIFICATION NOTIFICATION FORM AND PLANS ARE REQUIRED TO BE FILED WITH CT DEEP – See Appendix E for instructions</u>	<u>WHERE GRANTED, APPLICATION TO CT DEEP IS REQUIRED – See Section 1, II. 3. (pages 2-3) of the Army Corps GP for instructions</u>
GP 10. Aquatic Habitat Restoration, Establishment & Enhancement Activities	<p>Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) or by a federal environmental resource management agency that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p>Other activities are not eligible for Section 401 Water Quality Certification under SV.</p>	Granted
GP 11. Fish & Wildlife Harvesting Activities	Granted	Granted
GP 12. Oil Spill & Hazardous Material Cleanup	Waived	Waived
GP 13. Cleanup of Hazardous & Toxic Waste	Waived	Waived
GP 14. Scientific Measurement Devices	Waived	Waived
GP 15. Survey Activities	Waived	Waived
GP 17. New/Expanded Developments & Recreational Facilities	<p>Granted, except as noted below.</p> <p>New roadway and driveway crossings in wetlands are not eligible for Section 401 Water Quality Certification under GP 17. (See GP 18.)</p> <p>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP17. (See GP 19.)</p>	<p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative state intra-agency screening process.</p> <p>Other activities with impacts exceeding 0.5 acre require individual (regular) Section 401 Water Quality Certification.</p> <p>New roadway and driveway crossings in wetlands are not eligible for Section 401 Water Quality Certification under GP 17. (See GP 18.)</p> <p>Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 18. (See GP 19.)</p>

TABLE 1. CONNECTICUT WATER QUALITY CERTIFICATION
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	Self-Verification (SV)	Pre-Construction Notification (PCN)
	<u>WHERE GRANTED, APPENDIX E: SELF-VERIFICATION NOTIFICATION FORM AND PLANS ARE REQUIRED TO BE FILED WITH CT DEEP – See Appendix E for instructions</u>	<u>WHERE GRANTED, APPLICATION TO CT DEEP IS REQUIRED – See Section 1, II. 3. (pages 2-3) of the Army Corps GP for instructions</u>
GP 18. Linear Transportation Projects – Wetland Crossings Only	Granted Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 18. (See GP 19.)	Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP. Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process. All other activities with impacts exceeding 0.5 acre require individual (regular) Section 401 Water Quality Certification. Stream, river, brook or other watercourse crossings are not eligible for Section 401 Water Quality Certification under GP 18. (See GP 19.)
GP 19. Stream, River & Brook Crossings (Not Including Wetland Crossings) Continued on next page	Granted for stream, river or brook crossings that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP. Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process. Granted for all other stream, river, brook or other watercourse crossings by means of a BRIDGE or OPEN-BOTTOM STRUCTURE that meets the following standards: <ul style="list-style-type: none"> • spans at least 1.2 times the watercourse bank full width, • allows for the continuous, uninterrupted flow of the 50-year frequency storm flows, • no riprap is placed within or across the bed of the brook; and, • appurtenant stream bank stabilization does not exceed 50 feet along any upstream or downstream bank. Stream, river, brook and other watercourse crossings that do not meet the standards above are not eligible Section 401 Water Quality Certification for Self-Verification. Culvert slip lining is not eligible for Section 401 Water Quality Certification for Self-Verification. Wetland crossings are not eligible for Section 401 Water Quality Certification under GP 19. (See GP 18.)	Granted for stream, river or brook crossings that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP. Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process. All other stream, river and brook crossings require individual (regular) Section 401 Water Quality Certification. Wetland crossings are not eligible for Section 401 Water Quality Certification under GP 19. (See GP 18.)

TABLE 1. CONNECTICUT WATER QUALITY CERTIFICATION
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	Self-Verification (SV)	Pre-Construction Notification (PCN)
	<u>WHERE GRANTED, APPENDIX E: SELF-VERIFICATION NOTIFICATION FORM AND PLANS ARE REQUIRED TO BE FILED WITH CT DEEP – See Appendix E for instructions</u>	<u>WHERE GRANTED, APPLICATION TO CT DEEP IS REQUIRED – See Section 1, II. 3. (pages 2-3) of the Army Corps GP for instructions</u>
GP 19. Stream, River & Brook Crossings (Not Including Wetland Crossings)	<p>Granted for stream, river, brook or other watercourse crossings using a culvert provided:</p> <ul style="list-style-type: none"> • the tributary watershed to the culvert does not exceed 1 sq. mile (640 acres); • the culvert gradient (slope) is no steeper than the streambed gradient immediately upstream or downstream of the culvert, • for a crossing constructed using a single box or pipe arch culvert, the inverts are set not less than 12 inches below the streambed elevation • for a crossing constructed using multiple box or pipe arch culverts, the inverts of one of the boxes or pipe arch culverts are set not less than 12 inches below the elevation of the streambed, • for a crossing constructed using a pipe culvert, the inverts are set such that not less than 25% of the pipe diameter or 12 inches, whichever is less, is set below the streambed elevation, • the culvert is backfilled with natural substrate material matching upstream and downstream streambed substrate, • the structure, including inlet and outlet protection measures, does not otherwise impede the passage of fish and other aquatic organisms, and • the structure allows for continuous flow of the 50-year frequency storm flows 	
GP 21. Temporary Fill Not Associated With Any Other GP Activities	Granted	<p>Granted for activities that receive written approval from the Connecticut Department of Energy and Environmental Protection (CT DEEP) through a formal cooperative state interagency screening process jointly conducted by the Connecticut Department of Transportation (CT DOT) and CT DEEP.</p> <p>Granted for activities conducted or funded by the Connecticut Department of Energy and Environmental Protection (CT DEEP) that receive written approval through a formal cooperative CT DEEP intra-agency screening process.</p> <p>Other activities with impacts exceeding 0.25 acre require individual (regular) Section 401 Water Quality Certification.</p>

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*** ACTIVITIES NOT ELIGIBLE FOR SECTION 401 CERTIFICATION UNDER THIS GENERAL PERMIT CERTIFICATION**

The following activities are not eligible for Section 401 Water Quality Certification under this general permit certification and will require an individual (regular) Section 401 Water Quality Certification:

Detention or retention of stormwater in non-tidal waters, wetlands or watercourses including any watercourse or wetland crossing that by design or default functions to provide stormwater detention, and any construction of a stormwater detention or retention basin in non-tidal waters or wetlands.

Piping, boxing, enclosing or covering of a non-tidal watercourse for a purpose other than a driveway or roadway crossing.

Activities with direct, indirect or secondary impact(s) to: Special Wetlands⁽¹⁾, Threatened, Endangered, or Special Concern Species⁽²⁾, Significant Natural Communities/Critical Habitats⁽²⁾ identified by the Connecticut Natural Diversity Database.

Activities within a FEMA established floodplain that would adversely affect the hydraulic characteristics of the floodplain⁽³⁾.

DEFINITIONS

⁽¹⁾ **Special Wetlands:** Include vernal pools, bogs, fens, cedar swamps, spruce swamps, calcareous seepage swamps, and wetlands that provide habitat for threatened or endangered species or species of special concern as designated by the State of Connecticut Natural Diversity Database. The following definitions for bogs, calcareous seepage wetlands, cedar swamps, fens, spruce swamps, and vernal pools apply for the purposes of this GP:

Bog: a peat accumulating wetland dominated by sphagnum moss. Typical plant species include sphagnum moss, leatherleaf, black spruce, pitcher plant and sundew.

Calcareous Seepage Swamp: a forested wetland characterized by the discharge of groundwater with a chemistry influenced by an underlying limestone geology.

Cedar Swamp: a forested wetland characterized by the presence of Northern White Cedar or Atlantic White Cedar.

Fen: a peat accumulating wetland dominated by sedges and/or ericaceous shrubs. Typical plant species include low sedges, ericaceous shrubs, sphagnum and other mosses.

Spruce Swamp: a forested wetland characterized by the presence of Red or Black Spruce.

Vernal Pool: an often temporary body of water occurring in a shallow depression of natural or human origin that fills during spring rains and snow melt and typically dries up during summer months. Vernal pools support populations of species specially adapted to reproducing in these habitats. Such species may include wood frogs, mole salamanders (*Ambystoma* sp.), fairy shrimp, fingernail clams, and other amphibians, reptiles and invertebrates. Vernal pools lack breeding populations of fish. **All vernal pools are subject to the jurisdiction of the Connecticut Department of Energy and Environmental Protection under Connecticut Water Quality Standards.**

⁽²⁾ **Threatened, Endangered or Special Concern Species; Significant Natural Communities/Critical Habitats:** Species listed by CT DEP pursuant to Chapter 495 of the Connecticut General Statute as threatened or endangered species or species of special concern. General locations of threatened and endangered species and species of special concern, and significant natural communities/critical habitats are identified on maps published by the Connecticut Department of Energy and Environmental Protection entitled "Natural Diversity Data Base Areas" and on the CTECO Interactive Map Viewers at www.cteco.uconn.edu.

⁽³⁾ **Adverse Effect to Hydraulic Characteristics:** An adverse effect to hydraulic characteristics includes an increase in flood water surface elevation, an increase in flood flow velocity or a restriction of flood flow conveyance in a manner that would impact upstream, downstream or adjacent property.

SECTION 2:
**REVIEW CATEGORIES & APPLICATION PROCEDURES FOR PROJECTS WITHIN
TIDAL, COASTAL AND NAVIGABLE WATERS WITHIN THE STATE OF
CONNECTICUT**

Connecticut's coastal area is statutorily defined as: all lands and waters within the municipalities of Greenwich, Stamford, Darien, Norwalk, Westport, Fairfield, Bridgeport, Stratford, Shelton, Milford, Borough of Woodmont, Orange, West Haven, New Haven, Hamden, North Haven, East Haven, Branford, Guilford, Madison, Clinton, Westbrook, Deep River, Chester, Essex, Borough of Fenwick, Old Saybrook, Lyme, Old Lyme, East Lyme, Waterford, New London, Montville, Norwich, Preston, Ledyard, Groton (city, Town and Long Point Borough), Mystic and Stonington (Town & Borough) [Section 22a-94(a) CGS].

Navigable Waters: Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. The Connecticut River has been determined to be a navigable water of the United States. [Refer to Title 33 CFR Part 329]

I. ACTIVITIES COVERED:

- Work and structures that are located in, under or over any navigable water of the U.S. (defined at 33 CFR 329) that affect the course, location, condition, or capacity of such waters; or the excavating from or depositing material in navigable waters. (Regulated by the Corps under Section 10 of the Rivers and Harbors Act of 1899);
- The discharge of dredged or fill material into waters of the U.S. (defined at 33 CFR 328), which is regulated by the Corps under Section 404 of the Clean Water Act (CWA)
- The transportation of dredged material for the purpose of disposal in the ocean. The Corps regulates these activities under Section 103 of the Marine Protection, Research and Sanctuaries Act. See 33 CFR 324.

II. REVIEW PROCESS:

1. Connecticut Department of Energy & Environmental Protection, Office of Long Island Sound Programs (DEEP OLISP) approvals:

In order for authorizations under these GPs to be valid and before commencing any work within Corps jurisdiction, applicants are responsible for applying for and obtaining any of the following required State or local approvals (see **General Condition 1**):

Water Quality Certification (WQC) Issuance or waiver under Section 401 of the Federal CWA (33 USC Section 1341). Section 401(a)(1) of the Clean Water Act requires that applicants obtain a WQC or waiver from the state water pollution control agency (CT DEEP) or EPA for Indian reservation lands to discharge dredged or fill material into waters of the U.S.

Coastal Zone Management Consistency (CZM) - Concurrence under Section 307 of the Federal CZM Act of 1972, as amended. Section 307(c) of the CZM of 1972, as amended, requires applicants to obtain a certification or waiver from CT DEEP OLISP that the activity complies with the state's CZM program for activities affecting a state's Coastal Area.

Project proponents involving dredging/excavation and associated disposal within the Byram River must also coordinate with NY DOS directly to obtain a certification or waiver that the activity complies with NYDOS' CZM program. Also, all projects with disposal at any of the Long Island Sound Disposal Sites require NY DOS CZM consistency. Additional information can be found at their website: <http://www.dos.ny.gov/opd/programs/consistency/>.

2. Corps Authorizations:

a. Self-Verification (SV) – Applicants are not required to submit an Application or Appendix E to the Corps. Instead, DEEP OLISP will forward copies of application packages and their approvals to the Corps on a weekly basis. If the Corps determines that a project meets this category, the Corps will forward verification of eligibility to the applicant.

Eligibility Criteria

Activities in Connecticut and lands located within the boundaries of an Indian reservation may proceed without application or notification to the Corps if they:

- are subject to Corps jurisdiction
- meet the definition of Self-Verification in **Appendix A - General Permits**, and
- meet the General Conditions of the GPs

Note: Activities subject to Corps jurisdiction that are NOT regulated by the DEEP OLISP will be subject to the Pre-Construction Notification (PCN) screening requirements of the GPs as noted below.

Project proponents seeking eligibility under the SV category must comply with the General Conditions of the GPs and other federal laws such as the National Historic Preservation Act, the Endangered Species Act (ESA) and the Wild and Scenic Rivers Act. Therefore, consultation with the Corps and/or outside experts such as the State Historic Preservation Office and any appropriate Indian tribes is recommended when there is a likelihood of the presence of resources of concern.

b. Pre-Construction Notification (PCN) (notification/application and written authorization required)

Projects not eligible under the SV category of the GPs may be screened under PCN category, provided they meet the criteria.

Eligibility Criteria

Activities in Connecticut and lands located within the boundaries of an Indian reservation that meet the following criteria **require written approval from the Corps**:

- are subject to Corps jurisdiction,
- meet the definition of PCN in this Section, and
- meet the General Conditions of the GPs

3. Applying for authorization through the PCN process:

a. CT DEEP, OLISP regulated activities

Structures and Dredging Permit Applications: Applicants/agents shall submit to the Corps, a copy of the DEEP Permit Consultation Form for U.S. Army Corps of Engineers Review along with project plans. The Corps will then coordinate this information with the interagency review team (see paragraph 4 below) and then return the form to applicants/agents for their submission to DEEP OLISP.

Certificates of Permission (COPs), General Permits (GPs) and Modifications: OLISP will forward copies of application packages and approvals to the Corps. If a project is determined to meet any of the PCN activities and is complete, the Corps will coordinate these projects with the interagency review team. If the Corps determines that an Individual permit or additional information is required, the Corps will coordinate directly with the applicant/agent.

NOTE: For projects which involve dredging and open water disposal - Applicants/agents must submit requests for sampling plans to the DEEP, OLISP and the Corps simultaneously, along with other required information specific to dredging/open water disposal, a detailed open water disposal site alternative analysis, and a completed New York State, Department of State (NYS DOS) Federal Consistency Assessment Form found at <http://nyswaterfronts.com/downloads/pdfs/fcaf2.pdf>. Please see our website at <http://www.nae.usace.army.mil/Regulatory/> for a list of all required additional information.

b. Aquaculture activities regulated by the Connecticut Department of Agriculture

This refers to marine- and land-based aquaculture activities, including associated structures regulated by the Department of Agriculture, Bureau of Aquaculture (DA/BA), Connecticut General Statutes Section 22-11h.

Applicants should apply directly to the DA/BA using the Joint Application for Aquaculture form found at: http://www.nae.usace.army.mil/reg/Permits/CT_AquacultureApplication.pdf. The DA/BA will forward a copy of the aquaculture application package to the Corps, the State of Connecticut Department of Energy & Environmental Protection's (CT DEEP) Boating Division, Marine Fisheries Division, Office of Long Island Sound Programs (OLISP), and CT DEEP, Inland Water Resources Division (IWRD) for activities impacting inland waters.

These application packages for marine-based activities will be screened by the Corps, the Federal resource agencies, and the CT DEEP, OLISP with input from the CT DEEP Boating and Marine Fisheries Divisions. Screening will also initiate review of the application by the CT DEEP OLISP for Coastal Zone Management consistency concurrence. The CT DEEP OLISP will make a determination on the completeness of the application for CZM consistency review and/or the eligibility of the activity for state aquaculture permit exemption within 30 days from the date of the screening meeting.

4. Review Procedures:

The Corps will coordinate review of all PCN activities with federal and state agencies (interagency review team), as necessary. To be eligible and subsequently authorized, an activity must meet the eligibility criteria listed above and result in no more than minimal impacts to the aquatic environment as determined by the Corps. This may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal. Applicants are responsible for applying for the appropriate state and local approvals. Authorizations under these GPs are not valid until all required CT DEEP, OLISP authorizations are granted.

Emergency Situation Procedures: 33 CFR 325.2 (e)(4) states that an “emergency” is a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures.” Notification to the Corps is required. The Corps will determine if a project qualifies as an emergency and will work with all applicable agencies to expedite authorization in emergency situations. If the project qualifies as an emergency, authorization under these General Permits is not required.

Individual/Standard Permit Procedures: Work that is not eligible under PCN activities as described therein or that does not meet the terms and general conditions of the GPs, will require the submission of an application to the Corps for an Individual Permit (see 33 CFR Part 325.1). The applicant should submit the appropriate application form and materials at the earliest possible date. General information and application forms can be obtained at our website at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/ObtainPermit.aspx> or by calling us. Individual WQC and CZM consistency concurrence are required, when applicable, from the State of Connecticut before Corps issuance of an individual permit. Individual Water Quality Certification must be obtained from EPA for activities on lands located within the boundaries of an Indian reservation. The Corps encourages applicants to concurrently apply for a Corps Individual Permit and state permits.

APPENDIX A – GENERAL PERMITS

GP 1. AIDS TO NAVIGATION & TEMPORARY RECREATIONAL STRUCTURES (Section 10; navigable waters of the United States)

The placement of aids to navigation and regulatory markers which are approved by and installed in accordance with the requirements of the U.S. Coast Guard (see 33 CFR, chapter I, subchapter C, part 66)

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>Aids to navigation and regulatory markers that are not located within Corps Federal Navigation Projects (FNPs*).</p> <p>Temporary buoys, markers, floats, etc. for recreational use during specific events, provided they are not located within Corps FNPs and are removed within 30 days after use is discontinued.</p> <p>No structures in Submerged Aquatic Vegetation</p> <p>*FNPs are comprised of Federal Channels, anchorages and turning basins. Please click on the link below for more information: http://www.nae.usace.army.mil/Missions/Navigation/Connecticut-Projects/</p>	<p>Work not eligible for SV.</p> <p>Aids to navigation or temporary markers, floats, etc. that are within a Corps FNP.</p> <p>Temporary markers, floats, etc. that are not to be removed within 30 days.</p>

GP 2. REPAIR OR MAINTENANCE OF EXISTING CURRENTLY SERVICEABLE, AUTHORIZED OR GRANDFATHERED* STRUCTURES & FILLS, REMOVAL OF STRUCTURES (Section 10 & 404; tidal and non-tidal waters of the U.S.)

Repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Includes removal of structures and fill. **Not authorized under GP 2:** (a) Permanent impacts >1/2 acre in tidal and non-tidal waters and/or wetlands, >1000 SF in tidal Special Aquatic Site (SAS) other than vegetated shallows, or >100 SF in tidal vegetated shallows.

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

≤5,000 s.f. of impacts in non-tidal waters & wetlands.

Work not eligible for SV.

No fill in tidal waters & wetlands.

Removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap, minimum necessary to protect the structure.

Bulkhead replacement via installation of new bulkhead within 18" of existing bulkhead & backfill.

The removal of accumulated sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. Excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer.

Drawdown of impoundment for dam/levee repair provided it does not exceed 18 months and one growing season (April through September)

Drawdown of impoundment for dam/levee repair provided it does not exceed 18 months and one growing season (April through September)

Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill.

*Grandfather dates include work performed & structures installed before 1968 & fill placed before 1975 for Corps purposes only.

Any bank stabilization measures not directly associated with the structure requires a separate authorization under **GP 9**.

Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary discharges, such as sandbag cofferdams, access fills, etc. are necessary for construction activities or dewatering of construction sites.

Temporary fills must consist of materials and be placed in a manner, that will not be eroded by expected high flows. They must be removed in their entirety and the affected areas returned to pre-construction elevations and must be re-vegetated as appropriate.

Work to previously approved tide gates with a Corps-approved operation and maintenance plan and tide gates not affecting the hydraulic regime.

No impacts in Special Aquatic Sites (SAS) – see definitions.

No slip lining or culvert relining that changes invert elevation.

NOTES:

1. Removal of bridge structures in navigable waters are covered under **GP 8**, if the Coast Guard issues a bridge permit.
2. Stream, river, brook or other watercourse crossings are not eligible under **GP 2** (See **GP 19**).

GP 3. MOORINGS (Section 10; navigable waters of the U. S.)

New private, non-commercial, non-rental, single-boat moorings & temporary moorings including moorings to facilitate construction or dredging; minor relocation of previously authorized moorings and mooring field expansions, boundary reconfigurations or modifications of previously authorized mooring fields and maintenance and replacement of moorings.

Not authorized under GP 3 are: Moorings within Federal Navigation channels.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. Private, non-commercial, non-rental, single-boat moorings and temporary moorings including moorings that facilitate construction or dredging provided:</p> <p>No new moorings located in Federal anchorages;</p> <p>No new moorings located in Special Aquatic Sites (SAS);</p> <p>No new moorings located in shellfish beds;</p> <p>Authorized by local harbormaster/town;</p> <p>When existing, authorized moorings in SAS are going to be replaced, they shall be replaced with low impact mooring technology that prevents mooring chains from resting or dragging on the bottom substrate at all tides and helical anchors, or equivalent SAS protection systems.</p> <p>2. Minor relocation of previously authorized moorings, provided:</p> <p>Authorized by the local harbormaster/town;</p> <p>Not located in SAS;</p> <p>Not located in Federal anchorages.</p>	<p>Work not eligible for SV.</p> <p>Moorings associated with an existing boating facility*.</p> <p>Private moorings without harbormaster or local approval.</p> <p>Moorings located such that they, and/or vessels docked or moored at them, are within the buffer zone of the horizontal limits of a Federal Anchorage. The buffer zone is equal to 3 times the authorized depth of that channel.</p> <p><i>*Boating Facility: Facilities that provide for a fee, rent, or sell mooring space, such as marinas, yacht clubs, boat clubs, boat yards, town facilities, dockminiums, etc.</i></p> <p><i>Locating new individual moorings in SAS, including eelgrass, should be avoided to the maximum extent practicable. If SAS cannot be avoided, plans should show elastic mooring systems that prevent mooring chains from resting or dragging on the bottom substrate at all tides and helical anchors, or equivalent SAS protection systems, where practicable. For moorings that appear to impact SAS, the Corps may require an eelgrass survey.</i></p>

GP 4. PILE-SUPPORTED STRUCTURES & FLOATS, INCLUDING BOAT LIFTS/HOISTS & OTHER MISCELLANEOUS STRUCTURES & WORK (Section 10; navigable waters of the U.S.)

New, expansions, reconfigurations or modifications of structures for navigation access including floats, stairs, and boat/float lifts.

Not authorized under GP 4 are: (a) fill or excavation; (b) no structures within Federal Navigation channels; or (c) structures associated with a NEW boating facility*.

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

Private residential structures with a length limit not to exceed 40' beyond mean high water and to a depth of -4' mean low water and limited to 4' in width. The fixed pier component of the dock located in tidal wetlands shall be constructed such that the lowest horizontal member of the fixed pier is no lower than five (5) feet off the surface of any underlying wetland area.

Floats must be supported at least 18" above the intertidal and shallow sub-tidal substrate during all tidal cycles.

No structures located within Submerged Aquatic Vegetation

No structures or floats can be located within the buffer zone (3x the authorized depth of the FNP) of the horizontal limits of FNPs.

No structures or floats can extend across >25% of the waterway width at mean low water.

No new structures within 25' of riparian property line extensions.

No new structures or floats associated with boating facilities.

No new pile-supported structures within Shellfish Concentration Areas as designated by the Connecticut Department of Environmental Protection, Coastal Area Management Program under CGS Sec. 22a-90

Reconfiguration of existing authorized structures; private or commercial, provided those structures do not extend beyond the existing perimeter of the facility or encroach into Special Aquatic Sites.

Work not eligible for SV.

New structures within an existing boating facility, provided those structures do not extend beyond the existing perimeter of the facility.

Structures or work in or affecting tidal or navigable waters that are not defined under any other GP activity.

Structures that are located within 25 feet of riparian property line extensions unless the properties are owned by the same owner. If so, the Corps may require a letter of no objection from the abutter(s).

****Boating Facility: Facilities that provide for a fee, rent, or sell mooring space, such as marinas, yacht clubs, boat clubs, boat yards, town facilities, dockominiums, etc.***

GP 5. BOAT RAMPS & MARINE RAILWAYS (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Activities required for the construction of boat ramps and marine railways, including excavation and fill.

Not authorized under GP 5: (a) Permanent and temporary fill >1/2 acre of non-tidal waters and/or wetlands, (b) permanent and temporary impacts >1/2 acre in tidal waters; >1000 SF in tidal SAS other than vegetated shallows, or >100 SF in tidal vegetated shallows; or (c) dredging in navigable waters of the U.S. (see GP 7)

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

No work in tidal waters and wetlands of the United States.

≤5,000 SF of non-tidal waters and/or wetland fill (permanent and temporary).

No work April 1 through June 30 in non-tidal waters that support diadromous fish species.

Work not eligible for SV.

Work occurs in tidal waters and wetlands of the United States.

Boat ramps are located within 25 feet of riparian property line extensions unless the properties are owned by the same owner. If so, the Corps may require a letter of no objection from the abutter(s).

GP 6. UTILITY LINE ACTIVITIES (Sections 10 & 404; tidal & non-tidal waters of the U.S.)

Activities required for (a) The construction, maintenance, relocation, repair, & removal of utility lines, including outfall and intake structures, and the associated excavation, backfill, or bedding for utility lines; (b) The construction, maintenance or expansion of utility line substation facilities associated with a power/utility line in non-tidal waters; and (c) The construction and maintenance of foundations for overhead utility line towers, poles, and anchors provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible. This GP authorizes the construction of access roads to facilitate construction of the above activities provided the activity, in combination with all other activities included in one single and complete project, does not cause the permanent loss of greater than 1 acre of non-tidal waters of the U.S*. Impacts resulting from mechanized pushing, dragging or other similar activities that redeposit excavated soil material shall be figured into the area limit determination.

Not authorized under GP 6: (a) Permanent and temporary fill >1 acre of non-tidal waters and/or wetlands*, (b) permanent and temporary impacts >1/2 acre in tidal waters; >1000 SF in tidal Special Aquatic Sites other than vegetated shallows, or >100 SF in tidal vegetated shallows; or (c) blasting or storage of equipment in wetlands.

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

No work in, over or under tidal waters.

No outfalls.

≤5,000 SF of non-tidal waters and/or wetland fill (permanent and temporary).

Intake structures that are dry hydrants used exclusively for firefighting activities with no stream impoundments.

No silt producing activities from April 1 through June 30 in non-tidal waters that support diadromous fish species.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

Work not eligible for SV.

Overhead utility lines constructed over Section 10 waters and submarine utility lines that are routed in or under such waters.

**See Table 1 Connecticut Water Quality Certification (CT WQC) in Section 1 for additional details on thresholds.*

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

NOTE: Temporary fills necessary to conduct the utility line activity are also allowed, provided the utility line activity is **within** Corps jurisdiction. Material resulting from trench excavation may be temporarily sidecasted into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. If the utility line activity is not within Corps jurisdiction but temporary fill will be placed in Corps jurisdiction, then see **GP 21** for temporary fills, etc.

GP 7. DREDGING (Section 10; navigable waters of the U.S.), TRANSPORT & DISPOSAL OF DREDGED MATERIAL (Sections 10, 404 & 103; tidal waters of the U.S.), BEACH NOURISHMENT (Sections 10 & 404; tidal waters of the U.S.); ROCK REMOVAL (Section 10, navigable waters of the U.S.) & ROCK RELOCATION (Sections 10 & 404; tidal waters of the U.S.)

New, improvement* and maintenance** dredging, including: (a) Disposal of dredged material at a confined aquatic disposal, beach nourishment, near shore, designated open water or ocean water disposal site, provided the Corps finds the dredged material to be suitable for such disposal; (b) Beach nourishment not associated with dredging; (c) Rock removal and relocation for navigation.

Not authorized under GP 7 are: (a) New dredging with >1000 SF of impacts to intertidal areas or saltmarsh or > 100 SF of impacts to vegetated shallows; (b) Maintenance dredging and/or disposal with >1/2 acre of impacts to tidal Special Aquatic Sites (SAS); (c) new dredging where the primary purpose is sand mining for beach nourishment; (d) Beach scraping; (e) Rock removal and relocation for navigation >1/2 acre; or (f) blasting.

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

No work in non-tidal waters or wetlands.

Work not eligible for SV.

Maintenance dredging (with any amount of yardage) provided:

Maintenance dredging not eligible for SV; improvement dredging and new dredging.

Contained upland disposal;

Disposal options include upland disposal, open water disposal, confined aquatic disposal cells (CAD cells), near-shore disposal or beach nourishment.

Proper siltation controls used & maintained to prevent runback into waterway/wetland;

No impacts to SAS, intertidal areas or shellfish beds;

****Improvement is dredging to deeper depths in areas previously dredged or authorized.***

Not located within 100' of vegetated shallows or shellfish areas;

*****Maintenance dredging includes areas and depths previously authorized by the Corps and dredged.***

No work in the Connecticut River; and

Work occurs from October 1 through January 31.

Rock/boulder relocation with ≤200 SF of impacts and no impacts to SAS.

No rock removal.

GP 8. DISCHARGES OF DREDGED OR FILL MATERIAL INCIDENTAL TO THE CONSTRUCTION OF BRIDGES (Sections 10 & 404; navigable waters of the U.S.)

Discharges of dredged or fill material incidental to the construction and modification of bridges across navigable waters of the U.S., including cofferdams abutments, foundation seals, piers, approach fills, and temporary construction and access fills **provided that the USCG authorizes the construction of the bridge structure under Section 9 of the Rivers and Harbors Act of 1899 or other applicable laws.** A USCG Authorization Act Exemption or a STURRA (144h) exemption do not constitute USCG authorization.

Not authorized under GP 8 are causeways.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>Discharges of dredged or fill material incidental to the construction and modification of bridges.</p> <p>No fill in Special Aquatic Sites.</p> <p>No fill in the Connecticut River.</p>	<p>Work not eligible for SV.</p>

<p><u>GP 9. SHORELINE & BANK STABILIZATION PROJECTS (Sections 10 & 404; tidal and non-tidal waters of the U.S.)</u> Bank stabilization activities necessary for erosion protection along the banks of lakes, ponds, streams, estuarine and ocean waters, and any other open waters. Includes bulkheads, seawalls, riprap, revetments or slope protection & similar structures as well as vegetative planting, soil bioengineering or alternative techniques that are a combination of the two (e.g. living shorelines), specifically for the purpose of shoreline protection. <u>Not authorized under GP 9 are:</u> (a) Bank stabilization >500 LF* in total length including both stream banks; (b) Permanent and temporary impacts >1/2 acre in tidal waters, >1000 SF in tidal Special Aquatic Sites (SAS) other than vegetated shallows, or >100 SF in tidal vegetated shallows. (c) Stream channelization or relocation activities; or (d) breakwaters, groins and jetties.</p>	
<p>Self-Verification (SV) Eligible</p>	<p>Pre-Construction Notification (PCN) Required</p>
<p>Coastal shoreline & bank stabilization projects ≤200 linear feet; and other stream, river, or brook bank stabilization projects ≤200 linear feet (includes total for more than one stream bank) provided:</p> <p>≤1 cubic yard of fill per linear foot placed between the high tide line (HTL) and mean low water (MLW) or ≤1 cubic yard of fill per linear foot placed waterward of ordinary high water (OHW).</p> <p>No discharge of fill material within SAS, including mudflats, tidal wetlands, Submerged Aquatic Vegetation and/or shellfish beds.</p> <p>Soft stabilization measures such as bioengineered fiber roll revetments or equivalent, shall be used wherever practicable.</p> <p>No vertical stone structures or embankments angled steeper than 1V: 1H. No new bulkheads.</p> <p>No fill within the streambed.</p> <p>Unconfined work, not including installation and removal of cofferdams, is limited to June 30 through September 30 in non-tidal waters supporting diadromous fish.</p> <p>Unconfined work, not including installation and removal of cofferdams, in other non-tidal waters is limited to the low-flow period June 1 through September 30.</p> <p>Work occurring behind a cofferdam may occur at any time.</p> <p><i>*See Table 1 CT WQC in Section 1 for additional details on thresholds.</i></p>	<p>Work not eligible for SV.</p> <p>The slope of the structure is steeper than 1V:3H in lakes/ponds; and 1V:1H in non-tidal streams and tidal waters and streams.</p> <p>Fill waterward of the HTL in coastal waters including alternative stabilization techniques that are a combination of soft and hard shoreline stabilization techniques that will affect SAS, change the natural shoreline configuration or alter natural or ecological processes.</p> <p><i>*See Table 1 CT WQC in Section 1 for additional details on thresholds.</i></p>

GP 10. AQUATIC HABITAT RESTORATION, ESTABLISHMENT & ENHANCEMENT

ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Activities in waters of the United States associated with the restoration, enhancement and establishment of non-tidal and tidal wetlands and riparian areas, including invasive, non-native or nuisance species control; the restoration and enhancement of non-tidal streams and other non-tidal open waters; the relocation of non-tidal waters, including non-tidal streams & associated wetlands for reestablishment of a natural stream morphology and reconnection of the floodplain; the restoration and enhancement of shellfish, finfish and wildlife; and the rehabilitation or enhancement of tidal streams, tidal wetlands and tidal open waters; provided those activities result in net increases in aquatic resource functions and services.

Not authorized under GP 10 are: (a) Conversions of wetlands to open water, except for the excavation of new salt pannes and (b) Artificial reefs.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>Special Aquatic Site planting and transplanting ≤100 SF in tidal waters.</p> <p>No new ditching to eliminate mosquito breeding habitat.</p> <p>No thin layer deposition.</p> <p>No fill for purposes of converting marsh to upland.</p> <p>Placement of seed shellfish, spatted-shell or cultch in tidal waters for the restoration or enhancement of existing, publicly-managed, recreational shellfish beds provided there is no placement in or impacts to SAS and does not result in degradation of habitat for other aquatic resources.</p> <p>≤5,000 SF of non-tidal waterway and/or non-tidal wetland fill provided the activity is supported in writing by a state or non-Corps Federal environmental resource management agency.</p> <p>No stream channelization.</p>	<p>Work not eligible for SV</p> <p>Pro-active salt marsh restoration work that includes draining of ponded dieback areas through excavation of runnels with handheld tools or low-impact ground equipment; blocking or unclogging of historic mosquito ditches to restore tidal flushing; excavation of new salt pannes to increase shorebird and waterfowl foraging habitat and placing excavated materials on the marsh surface for establishing suitable vegetative beds.</p> <p>Pond or lake reestablishment or restoration.</p> <p>Water impoundments.</p> <p>Dam removals.</p> <p>Integrated Marsh Management in tidal wetlands for combined wetland enhancement and mosquito control and reduction.</p>

GP 11. FISH & WILDLIFE HARVESTING ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.)

Activities in waters of the United States associated with fish and wildlife harvesting devices including pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, and clam and oyster digging, fish aggregating devices, and small fish attraction devices such as open water fish concentrators (sea kites, etc.).

Not authorized by GP 11 are: (a) Artificial reefs, impoundment(s) or semi-impoundment(s) of water; (b) Permanent and temporary impacts >1/2 acre in tidal waters, >1000 SF in tidal Special Aquatic Sites (SAS) other than vegetated shallows, or >100 SF in tidal vegetated shallows; and (c) Shellfish dredging, either mechanical or hydraulic in SAS.

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

Activities associated with fish and wildlife harvesting devices including pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, clam and oyster digging, small fish aggregating and attraction devices such as open water fish concentrators (sea kites, etc.).

No permanent impacts to SAS, including salt marshes and Submerged Aquatic Vegetation (SAV).

No structures, cages or traps located in SAS.

Work not eligible for SV

Devices located in tidal SAS, including salt marsh and SAV.

GP 12. OIL SPILL & HAZARDOUS MATERIAL CLEANUP (Sections 10 and 404; tidal and non-tidal waters of the U.S.): **a.** Activities conducted in response to a discharge or release of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) including containment, cleanup, and mitigation efforts, provided activities are done under either **(i)** The Spill Prevent, Control & Countermeasure Plan require by 40 CFR 112.3; **(ii)** The direction or oversight of the Federal on-site coordinator designated by 40 CFR 300; or **(iii)** Any approved existing State, regional or local contingency plan provided that the Regional Response Team concurs with the proposed response efforts or does not object to the response effort. **b.** Activities required for the cleanup of oil releases in waters of the U.S. from electrical equipment that are governed by EPA’s polychlorinated biphenyl (PCB) spill response regulations at 40 CFR 761. **c.** Booms placed in tidal waters. **d.** Use of structures & fills for spill response training exercises. Special Aquatic Sites (SAS) must be restored in place to pre-impact elevations.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. Activities that are conducted in accordance with a. or b. above.</p> <p>2. Booms placed in navigable waters for hazardous and toxic waste containment, absorption and prevention, provided they are removed upon completion of the cleanup.</p> <p>3. Temporary impacts for spill response training exercises are ≤5,000 SF in non-tidal waters and ≤1,000 SF in tidal waters, and temporary structures in tidal waters with no impacts to SAS and in place for ≤30 days.</p> <p>Note: For activities in non-tidal waters of the U.S., permittees have up to two weeks following commencement of these activities to submit the Self-verification form (Appendix E).</p>	<p>Work not eligible for SV.</p> <p>1. The activity is planned or scheduled, not an emergency response, and will cause turbidity or sediment resuspension in tidal waters or streams.</p> <p>2. Permanent structures or impacts for spill response training exercises.</p>

GP 13. CLEANUP OF HAZARDOUS & TOXIC WASTE (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Specific activities to effect the containment, stabilization or removal of hazardous or toxic waste materials, including court ordered remedial action plans or related settlements which are performed, ordered or sponsored by a government agency with established legal or regulatory authority*. Special Aquatic Sites must be restored in place to pre-impact elevations.

Not authorized under GP 13 are: (a) the establishment of new disposal sites; or (b) the expansion of existing sites used for the disposal of hazardous or toxic waste.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>Permanent and temporary impacts are $\leq 5,000$ SF in non-tidal waters and wetlands.</p> <p>Booms placed in navigable waters for oil and hazardous substance containment, absorption and prevention, provided they are removed upon completion of the cleanup.</p> <p>Notes: For activities in non-tidal waters of the U.S., permittees have up to two weeks following commencement of these activities to submit the Self-verification form (Appendix E).</p>	<p>Work not eligible for SV.</p> <p>Permanent and temporary impacts are $> 5,000$ SF in non-tidal waters and wetlands.</p> <p>Work in navigable waters of the U.S. other than booms placed for hazardous and toxic waste containment, absorption and prevention.</p>

**Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act.*

GP 14. SCIENTIFIC MEASUREMENT DEVICES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Scientific devices for measuring and recording scientific data, such as staff gauges, tide and current gauges, meteorological stations, water recording and biological observation devices, water quality testing and improvement devices, and similar structures. Also eligible are small temporary weirs and flumes constructed primarily to record water quantity and velocity provided the discharge is less than 25 cubic yards.

Not authorized under GP 14 are: (a) Permanent and temporary impacts >1 acre in non-tidal waters and wetlands; and (b) Permanent and temporary impacts >1/2 acre in tidal waters, >1000 SF in tidal Special Aquatic Sites (SAS) other than vegetated shallows, or >100 SF in tidal vegetated shallows.

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

Permanent and temporary impacts are $\leq 1,000$ SF in non-tidal waters and wetlands.

No impacts in non-tidal SAS, other than non-tidal wetlands.

No fill in tidal waters and/or wetlands.

No impacts in tidal Submerged Aquatic Vegetation.

Devices in tidal waters that do not restrict movement of aquatic organisms and will not adversely affect the course, condition or capacity of a waterway.

Work not eligible for SV.

NOTE: Upon completion of the use of the device to measure and record scientific data, the measuring device, and any other structures or fills associated with that device (e.g., foundations, anchors, buoys, lines, etc.), must be removed to the maximum extent practicable.

GP 15. SURVEY ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.)

Survey activities such as soil borings, core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, exploratory trenching* and historic resources surveys.

Not authorized under GP 15 are: (a) Permanent and temporary fill >1 acre of non-tidal waters and/or wetlands, and (b) permanent and temporary impacts >1/2 acre in tidal waters; >1000 SF in tidal Special Aquatic Sites other than vegetated shallows or >100 SF in tidal vegetated shallows.

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

Permanent and temporary impacts \leq 5,000 SF in non-tidal waters and wetlands.

No impacts, other than soil borings or core sampling, in tidal waters.

No permanent structures or drilling and discharge of excavated material from test wells for oil and gas exploration allowed.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

** For the purposes of this GP, the term “exploratory trenching” means mechanical land clearing of the upper soil profile to expose bedrock or substrate, for the purpose of mapping or sampling the exposed material.*

Work not eligible for SV.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

NOTE: The area in which the exploratory trench is dug must be restored to its preconstruction elevation upon completion of the work and must not drain a water of the United States. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench.

GP 16. AQUACULTURE PROJECTS & FISHERIES (Sections 10 and 404; navigable waters of the U.S.) The installation of buoys, floats, racks, trays, nets, lines or other structures in navigable waters for the containment and cultivation of indigenous species of shellfish and seaweed/kelp. Also authorized are anchored upweller floats, small-scale shellfish hatchery seawater intake/discharge structures, and discharges of dredged or fill material associated with cultivation such as the placement of cultch or spatted-shell on bottom.

Depth of cultch or spatted-shell must comply with Special Conditions in Section 5, Part (h), items (1) through (7) of [CT DEEP, General Permit for Coastal Maintenance \(DEEP-OLISP-GP2015-02\)](#) and must not result in visible degradation of habitat for other aquatic resources. All structures must be permitted by State of Connecticut Navigation Safety/Boating Access Unit and marked in conformance with applicable State or U.S. Coast Guard Aids to Navigation. **NOTE: All facilities must be installed and operated in compliance with the attached Appendix C Aquaculture Conditions**

Not authorized under GP 16 are impacts to Special Aquatic Sites, including Submerged Aquatic Vegetation.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>Placement of seed shellfish, spatted-shell or cultch for commercial shellfish aquaculture on leased grounds when performed in compliance with the conditions in Section 5 h. of the CT DEEP General Permit for Coastal Maintenance (DEEP-OLISP-GP-2015-02).</p> <p>The installation of temporary (< six months) structures for research, educational or experimental aquaculture gear impacting ≤1,000 SF for indigenous species under the direct supervision of the Dept. of Agricultural, Bureau of Aquaculture provided there is no adverse effect to navigation.</p> <p>Suspended cages or bags located wholly below and within the footprint of an existing <u>authorized</u> fixed or floating structure in water depths ≤ 10 feet MLW; provided no loose lines and there is a vertical clearance of at least 2 feet between the bottom of the gear and the sea floor at mean low water.</p> <p>Shellfish upweller floats not to exceed 160 sf (anchored/berthed only, no piling installation), with a vertical clearance of at least 2 feet between the bottom of the gear and the sea floor at mean low water, cannot be located within the buffer of a Federal Navigation Project.</p>	<p>Work not eligible for SV.</p> <p>Vertical-drop longlines and suspended gear for the culture of shellfish or other marine organisms, such as kelp and seaweed.</p> <p>Cages, trays, racks, netting or other structures on the ocean bottom or floating on the water surface used to contain, cultivate or depurate shellfish.</p> <p>For additional information, please see “A Guide for Marine Aquaculture Permitting in Connecticut” for guidance and application materials found at: http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/CT/AquaculturePermitGuide.pdf</p> <p>Intake and discharge structure with a diameter ≤ 3 inches, for the withdrawal and discharge of water to support small-scale shellfish land-based hatchery with negative impact on source or discharge waters.</p> <p>Activities that involve a change from authorized gear for bottom culture to floating or suspended gear.</p> <p>Boundaries of Submerged Aquatic Vegetation may be required to be located/surveyed in the field. See Corps website for guidance: http://www.nae.usace.army.mil/Portals/74/docs/regulatory/JurisdictionalLimits/SubmergedAquaticVegetationSurveyGuidance(Updated7-12-2016).pdf</p>

GP 17. NEW/EXPANDED DEVELOPMENTS & RECREATIONAL FACILITIES (Section 404; non-tidal waters of the U.S.) Discharges of dredged or fill material for the construction or expansion of developments and/or recreational facilities. This GP authorizes attendant features that are necessary for the use such as parking lots, garages, and yards. Fill area includes all temporary and permanent fill, and regulated discharges associated with excavation.

Not authorized under GP 17 are: (a) Permanent impacts that are >1 acre* in non-tidal waters and wetlands; (b) Stormwater treatment or detention systems, or subsurface sewerage disposal systems in waters of the U.S.; and (c) New roadway and driveway crossings in non-tidal waters and/or wetlands. (See **GPs 18 & 19**)

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

Permanent and temporary impacts $\leq 5,000$ SF of non-tidal waters and/or wetlands provided no impacts to Special Aquatic Sites other than wetlands (e.g. riffle and pool stream habitat, shellfish beds).

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

Work not eligible for SV.

**See Table 1 CT WQC in Section 1 for additional details on thresholds.*

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

GP 18. LINEAR TRANSPORTATION PROJECTS – WETLAND CROSSINGS ONLY

(Section 404; non-tidal waters of the U.S.) Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways) and attendant features.

Not authorized under GP 18 are: (a) Permanent and temporary impacts for any single and complete project that are >1 acre* or (b) Stream, river, or brook crossing projects (see **GP 19**)

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

Permanent and temporary impacts ≤5,000 SF of non-tidal wetland fill provided:

No work in non-tidal Special Aquatic Sites other than wetlands.

No slip lining or culvert relining that changes invert elevation.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

Work not eligible for SV.

**See Table 1 CT WQC in Section 1 for additional details on thresholds.*

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

GP 19. STREAM, RIVER & BROOK CROSSINGS (NOT INCLUDING WETLAND

CROSSINGS) (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways) and attendant features, provided that work is performed in accordance with Connecticut General Permit Stream Crossing Best Management Practices to the extent practicable - See Appendix G.

Not authorized under GP 19 are: (a) Permanent impacts for any single and complete projects that are >1 acre in non-tidal waters and wetlands*, >1/2 acre in tidal waters of the U.S., >1000 SF in tidal Special Aquatic Sites (SAS) other than vegetated shallows or >100 SF in tidal vegetated shallows; (b) Temporary impacts >1 acre in tidal waters, >5000 SF in tidal SAS other than vegetated shallows, or >1000 SF in vegetated shallows; or (c) Wetland Crossings (see GP 18).

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

No impacts to tidal waters and/or wetlands.

Permanent and temporary impacts ≤5,000 SF of non-tidal waters and wetlands provided for stream, river, brook crossings by means of a Bridge or Open-Bottom Structure that meets the following standards: 1. Spans at least 1.2 times the watercourse bank full width, 2. Allows for the continuous, uninterrupted flow of the 50-year frequency storm flows, and 3. No riprap is placed within or across the bed of the brook, and appurtenant stream bank stabilization does not exceed 50 feet along any upstream or downstream bank.

Permanent and temporary impacts ≤5,000 SF of non-tidal waters and wetlands provided for stream, river, brook crossings by means of a culvert provided the tributary watershed to the culvert does not exceed 1 sq. mile (640 acres)*

No open trench excavation in flowing waters.

Unconfined, in-stream work, not including installation and removal of cofferdams, is limited to the low-flow period, June 1 through September 30 unless CT DEEP requires different resource-driven time of year restriction.

Work occurring behind a cofferdam may occur at any time.

No stream relocations; no dams or dikes; no new culvert crossings of perennial streams. No slip lining or culvert relining that changes invert elevation.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

**See Table 1 CT WQC in Section 1 for additional details on thresholds.*

Work not eligible for SV.

**See Table 1 CT WQC in Section 1 for additional details on thresholds.*

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

GP 20. ENERGY GENERATION & RENEWABLE ENERGY GENERATION FACILITIES (Sections 10 and 404; tidal waters of the U.S.) & HYDROPOWER PROJECTS (Sections 10 and 404; tidal waters of the U.S.) Structures and work in navigable waters of the U.S. and discharges of dredged or fill material into tidal waters of the U.S. for the construction, expansion, modification or removal of: **(a)** Land-based renewable energy production facilities, including attendant features; **(b)** Water-based wind or hydrokinetic renewable energy generation pilot projects and their attendant features; and **(c)** Discharges of dredged or fill material associated with hydropower projects.

Attendant features may include, but are not limited to, land-based collection and distribution facilities, control facilities, and parking lots. For each single and complete project in **(b)** above, no more than 10 generation units (e.g., wind turbines or hydrokinetic devices) are authorized in navigable waters of the U.S.

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

Not allowed under SV.

For land-based facilities, impacts are:

Permanent impacts $\leq 1/2$ acre in tidal waters; or ≤ 100 SF in tidal vegetated shallows or $\leq 1,000$ SF in other tidal Special Aquatic Sites (SAS).

Temporary impacts ≤ 1 acre in tidal waters; $\leq 1,000$ SF in vegetated shallows and $\leq 5,000$ SF in other tidal SAS.

For water-based wind or hydrokinetic renewable energy generation pilot projects, and hydropower projects permanent and temporary impacts are:

$\leq 1/2$ acre in tidal waters.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

GP 21. TEMPORARY FILL NOT ASSOCIATED WITH ANY OTHER GP ACTIVITIES

(Section 404; non-tidal waters of the U.S.) Temporary discharges, such as sandbag/earth cofferdams, access fills, etc., necessary for construction activities or dewatering of construction sites.

Not authorized under GP 21: Temporary impacts >1 acre in non-tidal waters and wetlands*

Self-Verification (SV) Eligible

Pre-Construction Notification (PCN) Required

Temporary impacts ≤5,000 SF of temporary non-tidal waters and/or non-tidal wetland.

Work not eligible for SV.

**See Table 1 CT WQC in Section 1 for additional details on thresholds.*

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.

APPENDIX B - GENERAL CONDITIONS

1. Other Permits. Permittees must obtain other Federal, State, or local authorizations required by law.

Applicants are responsible for applying for and obtaining all required State or local approvals. Work that is not regulated by the State, but is subject to Corps jurisdiction, may be eligible for these General Permits (GPs).

2. Federal Jurisdiction.

a. Applicability of the GPs shall be evaluated with reference to Federal jurisdictional limits. Applicants are responsible for ensuring that the limits depicted satisfy the Federal criteria defined at 33 CFR 328 “Waters of the United States.” and 33 CFR 329 “Navigable Waters of the United States”

NOTE: Waters of the U.S. include the subcategories “navigable waters of the United States.” and “wetlands.”

b. Pre-Construction Notification (PCN) Eligible projects require an application to the Corps which must include a delineation of wetlands, other special aquatic sites, and other waters such as lakes and ponds and perennial, intermittent, and ephemeral streams that are on the project site. Wetland delineations must be prepared in accordance with the current federal method required by the Corps. For Corps Wetland Delineation Manual, regional supplements and data sheets, and the National List of Plant Species that Occur in Wetlands, visit our website at <http://www.nae.usace.army.mil/Missions/Regulatory.aspx> and then click on “Jurisdiction and Wetlands”. The Natural Resources Conservation Service (NRCS) publishes the current hydric soil definition, criteria and lists which can be found at

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/>. For the Field Indicators for Identifying Hydric Soils in New England, visit: www.neiwpc.org/hydricsoils.asp.

3. Mitigation (Avoidance, Minimization, and Compensatory Mitigation)

a. Activities must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States (U.S.) to the maximum extent practicable at the project site (i.e., on site). Consideration of mitigation (avoiding, minimizing, rectifying, reducing, or compensating) is required to the extent necessary to ensure that the adverse effects to the aquatic environment are no more than minimal.

b. Applicants should consider riparian/forested buffers for stormwater management and low impact development (LID) best management practices (BMPs) to reduce impervious cover and manage stormwater to minimize impacts to the maximum extent practicable.

c. Compensatory mitigation¹ for effects to waters of the U.S., including direct, secondary and temporal², will generally be required for projects with permanent impacts that exceed the SV area limits, and may be required for temporary impacts that exceed the SV area limits, to offset unavoidable impacts which remain after all appropriate and practicable avoidance and minimization has been achieved and to ensure that the adverse effects to the aquatic environment are no more than minimal. Proactive restoration projects or temporary impact work with no secondary effects may generally be excluded from this requirement.

The Corps **Connecticut In-Lieu Fee Program** allows Corps permittees, as compensation for their project impacts to aquatic resources of the United States in Connecticut pursuant to Section 404 of the Clean Water Act, to make monetary payment *in-lieu* of permittee-responsible mitigation. Information is provided at <http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx> >>Mitigation>>Connecticut In-Lieu Fee Program. Please note that this only applies to Corps required mitigation and additional Connecticut DEEP mitigation may be required.

4. Discretionary Authority. Notwithstanding compliance with the terms and conditions of this permit, the Corps retains discretionary authority to require an Individual Permit review based on concerns for the aquatic environment or for any other factor of the public interest [33 CFR 320.4(a)]. This authority is invoked on a case-by-case basis whenever the Corps determines that the potential consequences of the proposal warrant Individual Permit review based on the concerns stated above. This authority may be invoked for projects with

¹ Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR 332. See also the New England District Compensatory Mitigation Guidance at <http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx>

² Temporal loss: The time lag between the losses of aquatic resource functions caused by the permitted impacts and the replacement of aquatic resource functions at the compensatory mitigation site(s) (33 CFR 332.2).

cumulative adverse environmental effects that are more than minimal, or if there is a special resource or concern associated with a particular project. Whenever the Corps notifies an applicant that an Individual Permit may be required, authorization under these GPs is voided and no work may be conducted until a Corps Individual Permit is obtained or until the Corps notifies the applicant that further review has demonstrated that the work may be reviewed under these GPs.

5. Single and Complete Projects. The term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. The GPs shall not be used for piecemeal work and shall be applied to single and complete projects.

a. For non-linear projects, a single and complete project must have independent utility. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed, even if the other phases were not built, can be considered as separate single and complete projects with independent utility.

b. Unless the Corps determines the activity has independent utility, all components of a single project and/or all planned phases of a multi-phased project (e.g., subdivisions should include all work such as roads, utilities, and lot development) shall be treated together as constituting one single and complete project.

c. For linear projects such as power lines or pipelines with multiple crossings, a “single and complete project” is all crossings of a single water of the U.S. (i.e. single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly-shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately. If any crossing requires a PCN review or an individual permit review, then the entire linear project shall be reviewed as one project under PCN or the individual permit procedures.

6. Corps Property and Federal Projects.

a. In addition to any authorization under these GPs, proponents must contact the Corps Real Estate Division at (978) 318-8585 for work occurring on or potentially affecting Corps properties and/or Corps-controlled easements to initiate reviews and determine what real estate instruments are necessary to perform work. Permittees may not commence work on Corps properties and/or Corps-controlled easements until they have received any required Corps real estate documents evidencing site-specific permission to work.

b. Any proposed temporary or permanent modification or use of a Federal project (including but not limited to a levee, dike, floodwall, channel, anchorage, seawall, bulkhead, jetty, wharf, pier or other work built but not necessarily owned by the United States), or any use which would obstruct or impair the usefulness of the Federal project in any manner, and/or would involve changes to the authorized Federal project’s scope, purpose, and/or functioning, is not eligible for SV and will also require review and approval by the Corps pursuant to 33 USC 408. Where Section 408 is applicable, a decision on a Department of the Army general permit application will not be rendered prior to the decision on a Section 408 request.

7. National Lands. Activities that impinge upon the value of any National Wildlife Refuge, National Forest, National Marine Sanctuary or any area administered by the National Park Service, U. S. Fish and Wildlife Service (USFWS) or U.S. Forest Service are not eligible for SV.

8. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g. National Park Service, U.S. Forest Service, Bureau of Land Management, U. S. Fish and Wildlife Service).

As of July 15, 2016, affected rivers in Connecticut include: the West Branch of the Farmington River from Colebrook to Canton (designated river); the Eightmile River and tributaries in Salem, Lyme and East Haddam (designated river); and the Lower Farmington River from Canton to Windsor (study river – including its tributary Salmon Brook). Additional information can be found at: <http://www.rivers.gov/connecticut.php>

9. Historic Properties.

a. No undertaking shall cause effects (defined at 33 CFR 325 Appendix C and 36 CFR 800) on properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places³, including previously unknown historic properties within the permit area, unless the Corps or another Federal action agency has satisfied the consultation requirements of Section 106 of the National Historic Preservation Act (NHPA). The State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO) and the National Register of Historic Places can assist with locating information on: i) previously identified historic properties; and ii) areas with potential for the presence of historic resources, which may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO and/or THPO(s).

b. For activities eligible for SV (inland projects), proponents must ensure and document that the activity will not cause effects as stated in 9(a).

c. Proponents must submit a PCN to the Corps as soon as possible if the authorized activity may cause effects as stated in 9(a) to ensure that the Corps is aware of any potential effects of the permitted activity on any historic property that the consultation requirements of Section 106 of NHPA are satisfied.

d. All PCN (inland projects): i) show notification to the SHPO and applicable THPO(s)⁴ for their identification of historic properties, ii) state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties, and iii) include any available documentation from the SHPO or THPO(s) indicating that there are or are not historic properties affected. Starting consultation early in project planning can save proponents time and money.

e. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

10. Federal Threatened and Endangered Species.

a. No activity is authorized which: a) is likely to directly or indirectly jeopardize the continued existence of any listed or proposed species or result in the destruction or adverse modification of designated or proposed critical habitat, as identified under the Federal Endangered Species Act (ESA); b) result in take of a listed species or adversely modifies designated critical habitat; or c) violates the ESA.

b. For listed species or critical habitat under U. S. Fish and Wildlife Service (USFWS) jurisdiction, a PCN is required when a proposed project may affect a listed species or designated critical habitat. To ensure compliance with the Endangered Species Act, project proponents must request an 'Official Species List' from the USFWS IPaC website <http://ecos.fws.gov/ipac> <http://ecos.fws.gov/ipac>>. This USFWS IPaC website will record the request and immediately email the list to you. Include the list with all applications. An activity is SV eligible if the Official Species List states the northern long-eared bat (NLEB) (*Myotis septentrionalis*) is present BUT the activity: i) will not remove trees ≥ 3 inches dbh; ii) is not within the "buffer" of a NLEB hibernacula or maternity roost tree; and iii) does not involve work on an existing dam, riprap or bridges.

³ The majority of historic properties are not listed on the National Register of Historic Places and may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO and/or THPO(s).

⁴ Appendix D, #3 Historic Resources, provides contact information and each tribe's "area of concern."

c. For listed species or habitat under NMFS jurisdiction, the Corps will coordinate with NMFS as appropriate for all work eligible for SV that may have an effect on listed species or habitat; therefore SV eligible project proponents are not required to check for listed species or habitat for their projects.

d. Federal applicants should follow their own procedures for complying with the requirements of the ESA. Work may be eligible for SV if another Federal agency has satisfied the requirements of Section 7 of the ESA. Upon request, permittees must provide the Corps with the appropriate documentation to demonstrate compliance with those requirements.

11. Pile Removal and Related Time of Year Restrictions

a. Derelict, degraded or abandoned piles and sheet piles in navigable waters, except for those inside of existing work footprints for piers, must be completely removed or cut and/or driven to 3 feet below the substrate to prevent interference with navigation and in some cases to remove polluting materials. Existing creosote piles in the project area that are affected by project activities should be completely removed. In areas of fine-grained substrates, piles must be removed by the direct, vibratory or clamshell pull method⁵ to minimize turbidity and sedimentation impacts. Removed piles shall be disposed of in an upland location landward of MHW or OHW and not in wetlands, tidal wetlands, their substrate or mudflats.

b. Piles should either be installed between November 1 and March 15 **OR** must use a soft start each day of pile driving, building up power slowly from a low energy start-up over a period of 20-40 minutes to provide adequate time for fish and marine mammals to leave the vicinity. The buildup of power should occur in uniform stages to provide a constant increase in output. Bubble curtains can be used to reduce sound pressure levels during vibratory or impact hammer pile driving.

12. Navigation.

a. No activity may cause more than a minimal adverse effect on navigation.

b. Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the U.S.

c. Any structure or work that extends closer to the horizontal limits of any Corps Federal Navigation Project than a distance of three times the project's authorized depth shall be subject to removal at the owner's expense prior to any future Corps dredging or the performance of periodic hydrographic surveys. This is applicable to SV and PCN.

d. There shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein, and no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized herein.

e. The permittee understands and agrees that if future U.S. operations require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

f. An application to the Corps is required for all work in, over or under an FNP or its buffer zone unless otherwise indicated in Appendix A.

⁵ **Direct Pull:** Each piling is wrapped with a choker cable or chain that is attached at the top to a crane. The crane then pulls the piling directly upward, removing the piling from the sediment. **Vibratory Pull:** The vibratory hammer is a large mechanical device (5-16 tons) that is suspended from a crane by a cable. The vibrating hammer loosens the piling while the crane pulls up. **Clamshell Pull:** This can remove intact, broken or damaged pilings. The clamshell bucket is a hinged steel apparatus that operates like a set of steel jaws. The bucket is lowered from a crane and the jaws grasp the piling stub as the crane pulls up. The size of the clamshell bucket is minimized to reduce turbidity during piling removal.

13. Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following: (a) damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; (b) damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest; (c) damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit; (d) design or construction deficiencies associated with the permitted work; (e) damage claims associated with any future modification, suspension, or revocation of this permit.

14. Heavy Equipment in Wetlands. Operating heavy equipment other than fixed equipment (drill rigs, fixed cranes, etc.) within wetlands shall be minimized, and such equipment shall not be stored, maintained or repaired in wetlands, to the maximum extent practicable. Where construction requires heavy equipment operation in wetlands, the equipment shall either have low ground pressure (typically <3 psi), or it shall be placed on swamp/construction/timber mats (herein referred to as “construction mats”) that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation. Construction mats are to be placed in the wetland from the upland or from equipment positioned on swamp mats if working within a wetland. Dragging construction mats into position is prohibited. Other support structures that are capable of safely supporting equipment may be used with written Corps authorization. Similarly, the permittee may request written authorization from the Corps to waive use of mats during frozen or dry conditions. An adequate supply of spill containment equipment shall be maintained on site. Construction mats should be managed in accordance with the following construction mat best management practices:

- Mats should be in good condition to ensure proper installation, use and removal.
- Where feasible, mats should be carried and not dragged unless they are being used as a grading implement.
- Where feasible, place mats in a location that would minimize the amount needed for the wetlands crossing.
- Minimize impacts to wetland areas during installation, use, and removal.
- Install adequate erosion & sediment controls at approaches to mats to promote a smooth transition to, and minimize sediment tracking onto, swamp mats.
- In most cases, construction mats should be placed along the travel area so that the individual boards are resting perpendicular to the direction of traffic. No gaps should exist between mats. Place mats far enough on either side of the resource area to rest on firm ground.
- Provide standard construction mat BMP details to work crews.

15. Temporary Fill.

a. Temporary fill, construction mats and corduroy roads shall be **entirely** removed as soon as they are no longer needed to construct the authorized work. Temporary fill shall be placed in its original location or disposed of at an upland site and suitably contained to prevent its subsequent erosion into waters of the U.S.

b. All temporary fill and disturbed soils shall be stabilized to prevent its eroding into waters of the U.S. where it is not authorized. Work shall include phased or staged development to ensure only areas under active development are exposed and to allow for stabilization practices as soon as practicable. Temporary fill must be placed in a manner that will prevent it from being eroded by expected high flows.

c. Unconfined temporary fill authorized for discharge into waters of the U.S. shall consist of material that minimizes impacts to water quality (e.g. washed stone, stone, etc.).

d. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Materials shall be placed in a location and manner that does not adversely impact surface or subsurface water flow into or out of the wetland. Temporary fill authorized for discharge into wetlands shall be placed on geotextile fabric or other appropriate material laid on the pre-construction wetland grade where practicable to minimize impacts and to facilitate restoration to the original grade. Construction mats are excluded from this requirement.

e. Construction debris and/or deteriorated materials shall not be located in waters of the U.S.

16. Restoration of Inland Wetland Areas.

a. Upon completion of construction, all disturbed wetland areas (the disturbance of these areas must be authorized) shall be stabilized with a wetland seed mix containing only plant species native to New England and shall not contain any species listed in the “Invasive and Other Unacceptable Plant Species” Appendix D in the “New England District Compensatory Mitigation Guidance” found at <http://www.nae.usace.army.mil/Portals/74/docs/regulatory/Mitigation/CompensatoryMitigationGuidance.pdf>

b. The introduction or spread of invasive plant species in disturbed areas shall be controlled. If swamp or timber mats are to be used, they shall be thoroughly cleaned before re-use.

c. In areas of authorized temporary disturbance, if trees are cut they shall be cut at or above ground level and not uprooted in order to prevent disruption to the wetland soil structure and to allow stump sprouts to revegetate the work area, unless otherwise authorized.

d. Wetland areas where permanent disturbance is not authorized shall be restored to their original condition and elevation, which under no circumstances shall be higher than the pre-construction elevation. Original condition means careful protection and/or removal of existing soil and vegetation, and replacement back to the original location such that the original soil layering and vegetation schemes are approximately the same, unless otherwise authorized.

17. Coastal Bank Stabilization. Projects involving construction or reconstruction/maintenance of bank stabilization structures within Corps jurisdiction should be designed to minimize environmental effects, effects to neighboring properties, scour, etc. to the maximum extent practicable. For example, vertical bulkheads should only be used in situations where reflected wave energy can be tolerated. This generally eliminates bodies of water where the reflected wave energy may interfere with or impact on harbors, marinas, or other developed shore areas. A revetment is sloped and is typically employed to absorb the direct impact of waves more effectively than a vertical seawall. It typically has a less adverse effect on the beach in front of it, abutting properties and wildlife. For more information on this topic, go to the Corps Coastal Engineering Manual (supersedes the Shore Protection Manual), located at <http://chl.ercd.usace.army.mil>. Select “Products/ Services,” “Publications.” Part 5, Chapter 7-8, a (2) c.

18. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the U.S. during periods of low-flow or no-flow, or during low tides.

19. Aquatic Life Movements & Management of Water Flows.

a. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity’s primary purpose is to impound water. Unless otherwise stated, activities impounding water in a stream require a PCN to ensure impacts to aquatic life species are avoided and minimized. All permanent and temporary crossings of waterbodies (e.g., streams, wetlands) shall be:

i. Suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species; and

ii. Properly aligned and constructed to prevent bank erosion or streambed scour both adjacent to and inside the culvert. Permanent and temporary crossings of wetlands shall be suitably culverted, spanned or bridged in such a manner as to preserve hydraulic and ecological connectivity between the wetlands on either side of the road.

b. To avoid adverse impacts on aquatic organisms, the low flow channel/thalweg shall remain unobstructed during periods of low flow, except when it is necessary to perform the authorized work.

c. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or

manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

20. Discharge of Pollutants. All activities involving any discharge of pollutants into waters of the U.S. authorized under these GPs shall be consistent with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. 1251), and applicable state and local laws. If applicable water quality standards, limitations, etc., are revised or modified during the term of this permit, the authorized work shall be modified to conform with these standards within 6 months of the effective date of such revision or modification, or within a longer period of time deemed reasonable by the District Engineer in consultation with the Regional Administrator of the EPA. Applicants may presume that state water quality standards are met with issuance of the Section 401 WQC (Applicable only to the Section 404 activity).

21. Spawning, Breeding, and Migratory Areas

a. Jurisdictional activities and impacts such as excavations, discharges of dredged or fill material, and/or suspended sediment producing activities in jurisdictional waters that provide value as fish migratory areas, fish and shellfish spawning or nursery areas, or amphibian and migratory bird breeding areas, during spawning or breeding seasons shall be avoided and minimized to the maximum extent practicable.

b. Jurisdictional activities in waters of the U.S. that provide value as breeding areas for migratory birds must be avoided to the maximum extent practicable. The permittee is responsible for obtaining any “take” permits required under the USFWS’s regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such “take” permits are required for a particular activity.

22. Storage of Seasonal Structures. Coastal structures, such as pier sections and floats, that are removed from the waterway for a portion of the year (often referred to as seasonal structures) shall be stored in an upland location, located above mean high water (MHW) and **not** in tidal wetlands. These seasonal structures may be stored on the fixed, pile-supported portion of the structure that is seaward of MHW. This is intended to prevent structures from being stored on the marsh substrate and the substrate seaward of MHW.

23. Environmental Functions and Values. The permittee shall make every reasonable effort to carry out the construction or operation of the work authorized herein in a manner that minimizes any adverse impacts on existing fish, wildlife, and the environmental functions to the extent practicable. The permittee will discourage the establishment or spread of plant species identified as non-native invasive species by any federal or state agency.

24. Vernal Pools.

a. Only vernal pools that meet the current definition of waters of the U.S. are regulated by the Corps.

b. Direct and indirect adverse effects to all vernal pools (VPs), including their envelopes and critical terrestrial habitats (VP Management Areas), shall be avoided and minimized to the maximum extent practicable. Site clearing, grading, and construction activities associated with a regulated activity in the VP Management Area may cause these adverse effects to the VP.

c. When any regulated activities occur within 750 feet of a vernal pool, the following management practices must be followed for all work within any VP Management Area (750’ of a VP’s edge) *in order to qualify for SV*:

i. No disturbance within the VP Depression or VP Envelope (area within 100 feet of the VP Depression’s edge)– does not apply to temporary impact associated with construction mats in previously disturbed areas of existing utility projects or linear transportation projects provided there is a Vegetation Management Plan that avoids, minimizes and mitigates impacts to aquatic resources.

ii. Maintain a minimum of 75% of the Critical Terrestrial Habitat (area within 100-750 feet of the VP Depression’s edge) as unfragmented forest with at least a partly-closed canopy of overstory trees to provide shade, deep litter and woody debris;

iii. Maintain or restore forest corridors connecting wetlands and significant vernal pools;

iv. Minimize forest floor disturbance;

- v. Maintain native understory vegetation and downed woody debris; and
- vi. Cape Cod style-curbings or no curbings options shall be used on new roads to facilitate amphibian passage.

d. A PCN is required for any regulated activity within 750' of a vernal pool when all work within the VP Management Area does not comply with the SV requirements in (c) above. Information on directional buffers in accordance with the VP Directional Buffer Guidance document may be provided in order to demonstrate minimal impact and avoid compensation requirements. Conservation of the un-impacted area within the VP Management Area will often be required.

25. Invasive Species.

a. The introduction, spread, or the increased risk of invasion of invasive plant or animal species on the project site, into new or disturbed areas, or areas adjacent to the project site caused by the site work shall be avoided. Hence, swamp and timber mats shall be thoroughly cleaned before reuse.

b. Unless otherwise directed by the Corps, all applications for PCN inland projects proposing fill in Corps jurisdiction shall include an Invasive Species Control Plan. Additional information can be found at www.hort.uconn.edu/cipwg/

26. Permit/Authorization Letter On-Site. For PCN projects, the permittee shall ensure that a copy of these GPs and the accompanying authorization letter are at the work site (and the project office) whenever work is being performed, and that all personnel with operational control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit authorization shall be made a part of any and all contracts and sub-contracts for work that affects areas of Corps jurisdiction at the site of the work authorized by these GPs. This shall be achieved by including the entire permit authorization in the specifications for work. The term "entire permit authorization" means these GPs, including General Conditions and the authorization letter (including its drawings, plans, appendices and other attachments) and also includes permit modifications. If the authorization letter is issued after the construction specifications, but before receipt of bids or quotes, the entire permit authorization shall be included as an addendum to the specifications. If the authorization letter is issued after receipt of bids or quotes, the entire permit authorization shall be included in the contract or sub-contract as a change order. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire authorization letter, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

27. Inspections. The permittee shall allow the Corps to make periodic inspections at any time deemed necessary in order to ensure that the work is being or has been performed in accordance with the terms and conditions of this permit. The Corps may also require post-construction engineering drawings for completed work or post-dredging survey drawings for any dredging work.

28. Maintenance. The permittee shall maintain the activity authorized by these GPs in good condition and in conformance with the terms and conditions of this permit. This does not include maintenance of dredging projects. Maintenance dredging is subject to the review thresholds in Appendix A – General Permit #7 as well as any conditions included in a written Corps authorization. Maintenance dredging includes only those areas and depths previously authorized and dredged. Some maintenance activities may not be subject to regulation under Section 404 in accordance with 33 CFR 323.4(a) (2).

29. Property Rights. These GPs do not convey any property rights, either in real estate or material, or any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of federal, state, or local laws or regulations.

30. Transfer of GP Verifications. When the work authorized by these GPs are still in existence at the time the property is transferred, the terms and conditions, including any special conditions, will continue to be binding on the entity or individual who received the authorization, as well as the new owner(s) of the property. If the permittee sells the property associated with a General Permit authorization, the permittee may transfer the General Permit authorization to the new owner by submitting a letter to the Corps to validate the transfer. A

copy of the General Permit authorization letter must be attached to the letter, and the letter must include the following statement: "The terms and conditions of these General Permits, including any special conditions, will continue to be binding on the new owner(s) of the property". This letter should be signed by both the seller and new property owner(s).

31. Modification, Suspension, and Revocation. This permit and any individual authorizations issued thereof may either be modified, suspended, or revoked in whole or in part pursuant to the policies and procedures of 33 CFR 325.7; and any such action shall not be the basis for any claim for damages against the United States.

32. Special Conditions. The Corps may impose other special conditions on a project authorized pursuant to this general permit that are determined necessary to minimize adverse environmental effects or based on any other factor of the public interest. These may be based on concerns from CT DEEP or a Federal resource agency. Failure to comply with all conditions of the authorization, including special conditions, will constitute a permit violation and may subject the permittee to criminal, civil, or administrative penalties and/or restoration.

33. False or Incomplete Information. If the Corps makes a determination regarding the eligibility of a project under this permit, and subsequently discovers that it has relied on false, incomplete, or inaccurate information provided by the permittee, the authorization will not be valid, and the U.S. government may institute appropriate legal proceedings.

34. Abandonment. If the permittee decides to abandon the activity authorized under this General Permit, unless such abandonment is merely the transfer of property to a third party, he/she may be required to restore the area to the satisfaction of the Corps.

35. Enforcement cases. These GPs do not apply to any existing or proposed activity in Corps jurisdiction associated with an on-going Corps or EPA enforcement action, until such time as the enforcement action is resolved or the Corps determines that the activity may proceed independently without compromising the enforcement action.

36. Duration of Authorization. These GPs expire five years from the date issued as listed at the top of the cover sheet. Activities authorized by these GPs that have either commenced (i.e., are under construction) or are under contract to commence in reliance upon this authorization will have an additional year from the expiration date to complete the work. The permittee must be able to document to the Corps' satisfaction that the project was under construction or under contract by the expiration date of these GPs. If work is not completed within the one year extended timeframe, the permittee must contact the Corps. The Corps may issue a new authorization provided the project meets the terms and conditions of the CT GPs in effect at the time.

Activities authorized under these GPs will remain authorized until the GP expires, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 325.2(e)(2). Activities completed under the SV or PCN authorizations of these GPs will continue to be authorized after its expiration date.



Jennifer L. McCarthy
Chief, Regulatory Division

19 Aug 16

Date

APPENDIX C

GENERAL PERMIT 16 - STANDARD AQUACULTURE TERMS AND CONDITIONS

DEPARTMENT OF THE ARMY/STATE OF CONNECTICUT

2016 Connecticut General Permit

1. Aquaculture activities under this General Permit as identified within Appendix 2, Section F are subject to the current General Permit Conditions and Requirements of the Connecticut General Permit.
2. All gear, including buoys shall be marked and maintained in a manner that will make it identifiable to the specific aquaculture project/lease.
3. Before the authorized structures are installed the project proponent **must** contact the CT DEEP Boating Division, Navigation Safety/Boating Access Unit, P.O. Box 280, 333 Ferry Road, Old Lyme, CT 06371-0280 to either obtain a waiver as to the need to install gear-area boundary marker buoys or submit a permit application and receive authorization for Regulatory Markers ([Link to Regulatory Marker Permit](#)). If CT DEEP Boating regulation does not apply, the applicant shall contact the U.S. Coast Guard (USCG), First District; Aids to Navigation Branch at 408 Atlantic Avenue, Boston, MA 02110-3350 (800-848-3942) to coordinate the proper buoy markers. The permittee shall install and maintain lights, markings and other features as the CT DEEP/USCG requires. Note: Documentation of this coordination will be necessary for existing operations that seek reconfigurations and/or new approvals for structures from the Dept. of Army and for authorizations from the CT DA/BA.
4. Gear may not be located over or within beds of submerged aquatic vegetation (SAV) such as eelgrass or turtle grass, and coastal wetlands (salt marsh), nor shall such beds or vegetated marsh areas be damaged or removed. Routine lease activity including cage maintenance, washing etc. shall not occur within 25 feet of the edge of beds of SAV.
5. All gear shall be designed and deployed in such a manner as to limit, to the greatest extent practicable, negative impacts on avian resources such as, but not limited to, shore birds, wading birds or members of the waterfowl group. This is meant to include nesting, feeding or resting activities by migratory birds identified at 50 CFR 10.13.
6. Installation of structures, their mooring tackle and lines and any attendant vessels shall not create a hazard or interfere with existing navigation uses in the waterway, and structures shall be set back from the Federal Navigation Project (FNP) a distance of at least 200 feet. A list of Connecticut FNP projects can be obtained from the U.S Army Corps of Engineers website <http://www.nae.usace.army.mil/Missions/Navigation/Connecticut-Projects/>

APPENDIX C

GENERAL PERMIT 16 - STANDARD AQUACULTURE TERMS AND CONDITIONS

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7. The right of the public to traverse or utilize the waters not physically occupied by authorized structures and/or moored vessels within the areal limits of the authorized gear perimeter shall not be impeded.
8. The placement of cultch shall comply with all of the Special Conditions in Section 5, part (h), items (1) through (7) of the Connecticut DEEP, General Permit for Coastal Maintenance (DEEP-OLISP-GP2015-02) as listed below:
 - Such placement of cultch shall only be conducted by a licensed shellfish operator in beds or areas designated for shellfishing under section 26-194 or section 26-242 of the General Statutes.
 - Such placement of cultch shall be conducted only in appropriate locations for colonization by oysters, based upon factors of salinity, water quality, water circulation patterns and substrate composition.
 - Such placement of cultch shall not be conducted in areas of tidal wetlands or submerged aquatic vegetation beds.
 - (Prior to the commencement of such placement of cultch, such licensed shellfish operator obtains all required authorizations from the Department of Agriculture Bureau of Aquaculture and Laboratory and the local shellfish commission, as applicable.
 - Prior to the commencement of such placement of cultch, such licensed shellfish operator obtains permission in writing from the owner or lessee of such shellfish bed or area.
 - Such placement of cultch shall be conducted in such a manner that it does not exceed a layer of cultch on the seafloor greater than 12" in depth.
 - Such placement of cultch shall be conducted such that the placement does not exceed 1,500 bushels per acre of seafloor.

APPENDIX C

GENERAL PERMIT 16 - STANDARD AQUACULTURE TERMS AND CONDITIONS

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9. The permittee shall be responsible to remove all gear and associated equipment within any leased or designated shellfish area in the event that the operator surrenders or loses the right to its use. ¹
10. The subject aquaculture activity shall not discernibly interfere with natural sedimentation and erosion processes.
11. Suspended cages or nets for the rearing or grow out of shellfish are permitted as Self Verification, provided they are located wholly below and within the footprint of an existing, authorized fixed or floating structure and provided there is a vertical clearance of at least 2 feet between the bottom of the gear and the sea floor at MLW. The structures that the gear will be adhered to must be in conformance with the structures permit for that "site."
12. Aquaculture projects authorized herein shall not interfere with public shore access at or below mean high water or interfere with the access to any riparian or littoral property.
13. The following conditions may be required as Special Conditions of an authorization to protect Federally-listed, protected sea turtles:
 - a. All gear, including buoys shall be marked and maintained in a manner that will make it identifiable to the specific aquaculture project/lease.
 - b. The length of the buoy line shall not exceed 23.1 feet (10% of the maximum water depth at MHHW at the lease site)
 - c. The gear sites shall be visited by an attendant surface vessel at least once a week, site conditions permitting.

¹ In some situations, a performance bond may be required.

APPENDIX C

GENERAL PERMIT 16 - STANDARD AQUACULTURE TERMS AND CONDITIONS

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- d. If any listed species of sea turtle is observed to be entangled or otherwise interacting with the facility structure, the permittee (or onboard staff) shall immediately contact the Mystic Aquarium & Institute for Exploration, Marine Mammal and Sea Turtle Stranding Program Hotline at 860-572-5955 x107 and notify the NOAA Fisheries 24-hour Hotline at (866) 755-6622. The permittee should also contact the NOAA Fisheries Protected Resources Division, Sea Turtle Stranding & Disentanglement Coordinator at (978) 282-8470 or NERStranding.staff@noaa.gov.
- e. The permittee shall keep the enclosed Sea Turtle Handling and Resuscitation Requirements in a visible location on the attendant vessels at all times. If a sea turtle is entangled in the authorized aquaculture gear and comatose or inactive (but not dead), resuscitation should be attempted by following these procedures.

APPENDIX D

CONTACTS FOR CONNECTICUT GENERAL PERMIT:

1. FEDERAL

U.S. Army Corps of Engineers

New England District, Regulatory Division
696 Virginia Road
Concord, Massachusetts 01742-2751
(800) 343-4789 or (978) 318-8335
(978) 318-8303 - fax

National Park Service

North Atlantic Region
15 State Street
Boston, Massachusetts 02109
(617) 223-5203
(*Wild & Scenic Rivers*)

Federal Endangered Species (F&WS):

U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
(603) 223-2541

Federal Endangered Species & EFH (NMFS)

National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930
Phone: (978) 281-9102
(978) 281-9301 - fax

U.S. Environmental Protection Agency, Region I

5 Post Office Square, Suite 100
Boston, Massachusetts 02109
(617) 918-2000

Department of Agriculture

Bureau of Aquaculture
P. O. Box 97
190 Rogers Avenue
Milford, Connecticut 06460
(203) 874-0696

2. STATE OF CONNECTICUT

Department of Energy & Environmental Protection

(Coastal Projects)

Office of Long Island Sound Programs
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3034

(Aquaculture Projects)

Connecticut Department of Agriculture
Bureau of Aquaculture & Laboratory
PO Box 97
Milford, CT 06460
(203) 874-0696

(Inland Projects)

Inland Water Resources Division
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3019

(State Endangered Species)

Bureau of Natural Resources
Wildlife Division
Natural Diversity Data
Base
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3011

(Mashantucket Pequot Tribal Nation)

Department of Natural Resources Protection &
Regulatory Affairs
550 Trolley Line Boulevard
P. O. Box 3202
Mashantucket, Connecticut 06338-3202

3. HISTORIC RESOURCES

Tribal Historic Preservation Officers

Mashantucket Pequot Tribal Nation
Marissa Turnbull, THPO
550 Trolley Line Boulevard
P. O. Box 3202
Mashantucket, Connecticut 06338-3202
Phone (860) 396-6887
Fax (860) 396-6914

Mohegan Tribe of Indians of Connecticut
James Quinn, Tribal Historic Preservation Officer
13 Crow Hill Rd.
Uncasville, CT 06382

Phone (860) 862-6393
Fax (860) 862-6395

Mohegan Tribe of Indians of Connecticut
Compliance and Regulations Department
13 Crow Hill Road
Uncasville, CT 06382

Archaeological Information

State Historic Preservation Office
Department of Economic and Community Development
Catherine Labadia, Deputy State Historic Preservation Officer
One Constitution Plaza, 2nd Floor
Hartford, Connecticut 06103-6103
(860) 256-2800 (main)
(860) 256-2764 (direct)

4. ORGANIZATIONAL WEBSITES

U. S. Army Corps of Engineers – New England District

www.nae.usace.army.mil/missions/regulatory.aspx

U. S. Army Corps of Engineers Headquarters www.usace.army.mil (click “Services for the Public”)

U.S. Environmental Protection Agency www.epa.gov/owow/wetlands/

National Marine Fisheries Service www.nmfs.noaa.gov

U.S. Fish and Wildlife Service www.fws.gov

National Park Service www.nps.gov/rivers/index.html/

Federal Emergency Management Agency www.fema.gov

Connecticut Dept. of Energy & Environmental Protection <http://www.ct.gov/deep/site/default.asp>

Connecticut Dept. of Agriculture, Bureau of Aquaculture & Laboratory
<http://www.ct.gov/doag/cwp/view.asp?a=3768&q=451508&doagNav=>

U.S. Environmental Protection Agency, Region 1 – Low Impact Development-practices and state-specific resources, including CT DEP Stormwater Quality Manual www.epa.gov/ne/topics/water/lid.html

U.S. Environmental Protection Agency – Green Infrastructure website www.epa.gov/greeninfrastructure



**US Army Corps
of Engineers**®
New England District

Appendix E: Self-Verification Notification Form

This form is required for all **non-tidal projects in Connecticut**, but **not** required if work is done within boundaries of Mashantucket Pequot or Mohegan Tribal Lands. **Before** work commences, complete **all** fields (write “none” if applicable); attach project plans (not required for projects involving the installation of construction mats only); and any state or local approval(s); and send to:

Permits & Enforcement Branch B
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751
or cenae-r@usace.army.mil

and

CT DEEP
Inland Water Resources Division
79 Elm Street
Hartford, CT 06106-5127

State or local Permit Number: _____
Date of State or local Permit: _____
State/local Project Manager: _____

Permittee: _____
Address, City, State & Zip: _____
Phone(s) and Email: _____

Contractor: _____
Address, City, State & Zip: _____
Phone(s) and Email: _____

Consultant/Engineer/Designer: _____
Address, City, State & Zip: _____
Phone(s) and Email: _____

Wetland/Soil Scientist Consultant: _____
Address, City, State & Zip: _____
Phone(s) and Email: _____

Project Location (provide detailed description & locus map): _____

Address, City, State & Zip: _____
Latitude/Longitude Coordinates: _____
Waterway Name: _____
Project Purpose (include all aspects of the project including those not within Corps jurisdiction):

Work Description: _____

Work will be done under the following GP(s) (check all that have associated impacts):

 GP. 2 - Repair or maintenance of authorized or grandfathered structures/fills

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 5 - Boat ramps/marine railways

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 6 - Utility line activities (include calculations for each single & complete crossing

- attach additional sheet if necessary)

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 9 - Shoreline and bank stabilization projects

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 10 - Aquatic habitat restoration, establishment and enhancement activities

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 11 - Fish & wildlife harvesting, enhancement and attraction devices and activities

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 12 - Oil Spill and Hazardous material cleanup

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 13 - Cleanup of hazardous and toxic waste

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 14 - Scientific measurements devices

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 15 - Survey activities

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

 GP. 17 - New/expanded developments & recreational facilities

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

_____ GP. 18 - Linear transportation projects- wetland crossings only (include calculations for each single & complete crossing - attach additional sheet if necessary)

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

_____ GP. 19 - Stream, river & brook crossings – not including wetland crossings (include calculations for each single & complete crossing – attach additional sheet if necessary)

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

_____ GP. 21 - Temporary fill not associated with any other GP activities

Area of total wetland impacts: temporary _____SF permanent _____SF

Area of total waterway impacts: temporary _____SF permanent _____SF

Does your project include any secondary effects? Yes _____ No _____

(Secondary effects include, but are not limited to non-tidal waters or wetlands drained, flooded, fragmented, or mechanically cleared resulting from a single and complete project. See Appendix F - Definitions.) If YES, describe here: _____

Proposed Work Dates: Start: _____ Finish: _____

Your name/signature below, as permittee, confirms that your project meets the self-verification criteria and that you accept and agree to comply with the applicable terms and conditions in the Connecticut General Permits.

Signature of Permittee

Date

APPENDIX F - DEFINITIONS

Artificial Reef: A structure which is constructed or placed in waters for the purpose of enhancing fishery resources and commercial and recreational fishing opportunities.

Boating facilities: These provide, rent or sell mooring space, such as marinas, boat/yacht clubs, boat yards, dockminiums, town facilities, dockminiums, etc. Not classified as boating facilities are piers shared between two abutting properties or town mooring fields that charge an equitable user fee based on the actual costs incurred.

Construction mats: Construction, swamp and timber mats (herein referred to as “construction mats”) are generic terms used to describe structures that distribute equipment weight to prevent wetland damage while facilitating passage and providing work platforms for workers and equipment. They are comprised of sheets or mats made from a variety of materials in various sizes. A timber mat consists of large timbers bolted or cabled together.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some minor maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Dredged material & discharge of dredged material: These are defined at 33 CFR 323.2(c) and (d). The term dredged material means material that is excavated or dredged from waters of the United States.

Discharge: The term “discharge” means any discharge of dredged or fill material into waters of the United States.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

Expansions: Work that increases the footprint of fill, depth of basin or drainage feature, structures or floats, or slip capacity.

Fill material & discharge of fill material: These are defined at 33 CFR 323.2(e) and (f). The term fill material is defined as material placed in waters of the U.S. where the material has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of a water of the U.S.

Federal navigation projects (FNPs): These areas are maintained by the Corps; authorized, constructed and maintained on the premise that they will be accessible and available to all on equal terms; and are comprised of Corps Federal anchorages, Federal channels and Federal turning basins. Information, including the limits, is provided at <http://www.nae.usace.army.mil/Missions/Navigation.aspx>

FNP Buffer Zone: The buffer zone of a Corps FNP is equal to three times the authorized depth of the FNP. For additional information see <http://www.nae.usace.army.mil/Missions/Navigation/Connecticut-Projects/>

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Individual Permit: A Department of the Army authorization that is issued following a case-by-case evaluation of a specific structure or work in accordance with the procedures of 33 CFR 322, or a specific project involving the proposed discharge(s) in accordance with the procedures of 33 CFR 323, and in accordance with the procedures of 33 CFR 325 and a determination that the proposed discharge is in the public interest pursuant to 33 CFR 320.

Living Shoreline: A term used to describe a combination of mostly naturally derived materials including plants, shell and rock or manufactured rock-like surfaces that are used along a shoreline exhibiting erosion to dissipate wave energy and to collect naturally deposited sediment.

Maintenance: Maintenance does not include any modification that changes the character, scope, or size of the original fill design.

Navigable waters of the United States: Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. The Connecticut River has been determined to be a Navigable water of the United States. Refer to Title 33 CFR Part 329.

Ordinary High Water Mark (OHW): A line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas. See 33 CFR 328.3(e).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation.

Secondary effects: These are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final Section 404 action is taken by permitting authorities. Some examples of secondary effects on an aquatic ecosystem are a) aquatic areas drained, flooded, fragmented, or mechanically cleared, b) fluctuating water levels in an impoundment and downstream associated with the operation of a dam, c) septic tank leaching and surface runoff from residential or commercial developments on fill, and d) leachate and runoff from a sanitary landfill located in waters of the U.S. See 40 CFR 230.11(h).

Shellfish dredging: Shellfish dredging typically consists of a net on a frame towed behind a boat to capture shellfish and leave the sediment behind. Dredges may skim the surface, utilize hydraulic jets, toothed rakes or suction apparatus.

Special aquatic sites: These include inland and saltmarsh wetlands, mud flats, vegetated shallows (submerged aquatic vegetation), sanctuaries and refuges, coral reefs, and riffle and pool complexes. These are defined at 40 CFR 230.3 and listed in 40 CFR 230 Subpart E.

Stream bed: The substrate of the stream channel between the OHW marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the streambed, but outside of the OHW marks, are not considered part of the streambed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Temporary impacts: Temporary impacts include waters of the U.S. that are temporarily filled, flooded, excavated, drained or mechanically cleared because of the regulated activity.

Tide gates: Structures such as duckbills, flap gates, manual and self-regulating tide gates, etc. that regulate or prevent upstream tidal flows.

Utility Line: Any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, data, and telegraph messages, and radio and television communication. The term utility line does not include activities that drain a water of the U.S., such as drainage tile or French drains, but it does apply to pipes conveying drainage from another area.

Vegetated shallows: Permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation, such as eelgrass and widgeon grass (*Rupia maritima*) in marine systems (doesn't include salt marsh) as well as a number of freshwater species in rivers and lakes. Note: These areas are also commonly referred to as submerged aquatic vegetation (SAV).

Vernal pools (VPs): Vernal pools (VPs): For the purposes of these GPs, VPs are depressional wetland basins that typically go dry in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending upon landscape position and parent material(s). In most years, VPs support one or more of the following obligate indicator species: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson's salamander and fairy shrimp. However, they should preclude sustainable populations of predatory fish. VP areas are:

- Depression (includes the VP depression up to the spring or fall high water mark, and includes any vegetation growing within the depression),
- Envelope (area within 0-100 feet of the VP depression's edge), and
- Critical terrestrial habitat (area within 100-750 feet of the VP depression's edge).

The envelope and critical terrestrial habitat protect the water quality of the breeding site (e.g., providing shade, leaf litter, and coarse woody material) and support the non-larval life-cycle stages of amphibian species. Note: The Corps may determine that a waterbody should not be designated as a VP based on available evidence.

Weir: A barrier across a river designed to alter the flow characteristics. In most cases, weirs take the form of a barrier, smaller than most conventional dams, across a river that causes water to pool behind the structure (not unlike a dam) and allows water to flow over the top. Weirs are commonly used to alter the flow regime of the river, prevent flooding, measure discharge and help render a river navigable.

Waters of the United States.: Waters of the United States are defined in Title 33 CFR Part 328. These waters include more than navigable waters of the U.S. and are the waters where permits are required for the discharge of dredged or fill material pursuant to Section 404 of the Clean Water Act. Waters of the U.S. include jurisdictional wetlands.



Design and construction guidance may be found in the U.S. Forest Service stream simulation manual, “Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings”¹. Section 5.3.3 Headcutting Potential and 6.2 Design of the Stream-Simulation Channel Bed are particularly relevant. Sections 7.5.2.3 Construction Methods and 8.2.11 Stream-Simulation Bed Material Placement both show important steps in the project construction. Chapter 6.1 is relevant for proper alignment and construction to prevent bank erosion or streambed scour.

Permanent Crossings in Tidal Streams

These are relevant for new and replacement crossings and culvert extensions.

1. Match the velocity, depth, cross-sectional area, and substrate of the existing stream outside the crossing, if it exists, and size crossings such that they do not restrict tidal flow over the full natural tide range seaward of the crossing. The Corps will typically require a low lying property analysis to ensure flooding is not a concern.
2. Construct crossings in dry conditions.

Permanent Crossings in Non-Tidal Streams

These are relevant for new and replacement crossings and culvert extensions.

1. Span² streams or size culverts or pipe arches such that they are wider than bankfull width (BFW). Spans are strongly preferred as they avoid or minimize disruption to the streambed, and avoid entire streambed reconstruction and maintenance inside the culvert or pipe arch (see 4, 5 & 7 below), which may be difficult in smaller structures. The span width of bridges, box culverts and arches at bankfull elevation should be ≥ 1.2 times BFW where practicable. In many cases bankfull width is not necessarily interchangeable with the elevation of ordinary high water.³
2. Embed culverts or pipe arches below the grade of the streambed. This is not required when ledge/bedrock and/or utilities prevents embedment, in which case spans are preferred. The following depths are recommended to prevent streambed washout, and ensure compliance and long-term success:
 - a. ≥ 1 -2 feet for box culverts and pipe arches⁴, or
 - b. ≥ 1 -2 feet and at least 25% for round pipe culverts.
3. Match the culvert gradient (slope) with the stream channel profile.
4. Construct crossings carrying normal flows with a natural bottom substrate within the structure matching the characteristics of the substrate in the natural stream channel and the banks

¹ www.nae.usace.army.mil/missions/regulatory.aspx >> “Stream and River Continuity.”

² For the purposes of this GP, spans are bridges, three-sided box culverts, open-bottom culverts or arches that span the stream. The use of bridge piers or similar supports does not prevent a structure from being considered as a span.

³ BFW corresponds with “bankfull stage” and this should be field delineated in accordance with the U.S. Forest Service documents: a) [U.S. Forest Service stream simulation manual](#)¹; b) [“Stream Channel Reference Sites: An Illustrated Guide to Field Technique”](#) (Harrelson, et al. 1994); and c) [“A Guide to Identification of Bankfull Stage in the Northeastern United States”](#).

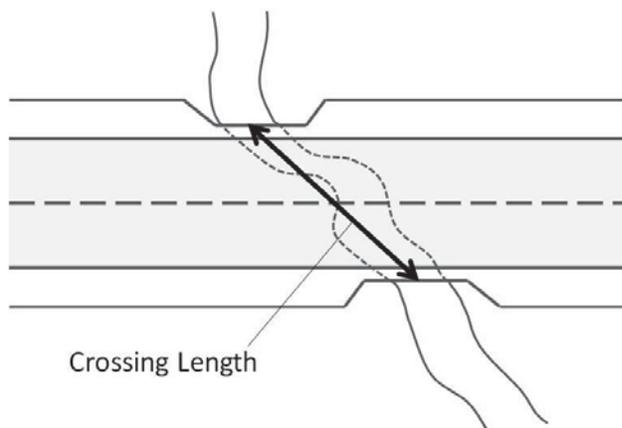
⁴ For 2(a) and 2(b), deeper embedment depths may be needed if there are elements of the constructed stream bed that are greater than 15 inches in diameter.

(mobility, slope, stability, confinement, grain and rock size) at the time of construction and over time as the structure has had the opportunity to pass substantial high flow events.

5. Construct crossings with appropriate bed forms and streambed characteristics so that water depths and velocities are comparable to those found in the natural channel at a variety of flows at the time of construction and over time. In order to provide appropriate water depths and velocities at a variety of flows and especially low flows, it is usually necessary to reconstruct the streambed (sometimes including a low flow channel), or replicate or preserve the natural channel within the structure. Otherwise, the width of the structure needed to accommodate higher flows will create conditions that are too shallow at low flows. The grain and rock size, and arrangement of streambed materials within the structure should be in accordance with (4) above. Flows could go subsurface within the structure if only large material is used without smaller material filling the voids.

6. *Openness > 0.82 feet (0.25 meters)*

Openness is the cross-sectional area of a structure opening divided by its crossing length when measured in consistent units (e.g. feet). For a box culvert, openness = (height x width)/ length.



For crossing structures with multiple cells or barrels, openness is calculated separately for each cell or barrel. At least one cell or barrel must meet the appropriate openness standard. The embedded portion of a culvert is not included in the calculation of cross-sectional area for determining openness.⁵

Openness > 0.82 feet is recommended to make the structure more likely to pass small, riverine wildlife such as turtles, mink, muskrat and otter that may tend to

avoid structures that appear too constricted. This openness standard is too small to accommodate large wildlife such as deer, bear, and moose. Structures that meet this openness standard are much more likely than traditional culverts to pass flood flows and woody debris that would otherwise obstruct water passage. It is likely that most structures that meet all the other general standards will also meet this openness standard. However, for some very long structures it may be impractical or impossible to meet this standard.

7. Construct banks on each side of the stream inside the span that match the horizontal profile of the existing stream and banks outside the span. To prevent failure, all constructed banks should have a height to width ratio of no greater than 1:1.5 (vertical:horizontal) unless the stream is naturally incised. Tie the banks into the up and downstream banks and configure them to be stable during expected high flows. Use materials that match the up and downstream banks (avoid the use of angular riprap and armored slopes, except where necessary for structural reasons, in which case they should be top-dressed with natural stream bed material). Construct a wildlife shelf on at least one of the banks. The constructed banks (with a wildlife shelf) will allow for terrestrial passage for wildlife and prevent flow from being focused to one side and

⁵ An Openness Ratio Spreadsheet shows how to calculate the open area for embedded pipe culverts to meet the 0.82 standard for openness. See www.nae.usace.army.mil/missions/regulatory.aspx >> Stream and River Continuity.

scouring the bed, especially against the structure's sidewall which may undermine the footings in the case of spans.

Temporary Crossings in Non-Tidal Streams

Temporary crossings shall consist of spans, culverts, construction mats or fords designed and constructed as follows:

1. All temporary crossings:
 - a. Impacts to the streambed or banks require restoration to their original condition (see U.S. Forest Service stream simulation manual referenced on page 1 of this document for stream simulation restoration methods). Use geotextile fabric or other appropriate bedding for stream beds and approaches where practicable to ensure restoration to the original grade.
 - b. Avoid excavating the stream or embedding crossings.
2. Culverts:
 - a. Install energy dissipating devices downstream if necessary to prevent scour.
3. Stream fords: Equipment may ford streams when: it is not feasible to construct a span or culvert (e.g., streams having no or low banks, emergency situations); the natural stream bed and banks consist of ledge, rock or sand that prevents disturbance and turbidity; and there is a stable, gradual approach.
4. Spans: Anchor spans where practicable so they do not wash out during high water.
5. Construction mats: Build construction mat stream crossings in accordance with the Construction Mat BMPs, specifically the Wetland/Stream Channel Crossing section. See www.nae.usace.army.mil/missions/regulatory.aspx >> [State General Permits](#) >> Connecticut General Permit Documents.

Report By: TJS Date: 7/18 Checked By: JED Date: 7/18 Recommended By: <i>David A. Sawicki</i> David A. Sawicki 2018.07.20 14:52:43-04'00'	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION OFFICE OF THE STATE TRAFFIC ADMINISTRATION TRAFFIC INVESTIGATION REPORT	OSTA No.: 144-1804-01 Loc. No.: N/A Approved by OSTA
See Previous Traffic Investigation Report No.: N/A		Town of Trumbull Location: Strobel Road at Booth Hill Brook Culvert (Temporary Signal)
Requested By: Mr. Michael Lombardo Chief of Police How Requested: Signal Application Date: May 3, 2018		

Recommendation:

Grant permission to the Town of Trumbull to install, operate and maintain a temporary fixed time traffic control signal on Strobel Road at the Booth Hill Brook Culvert crossing to accommodate alternating one-way traffic operations during the reconstruction of the culvert.

The Town shall maintain a reproducible record of the approved traffic signal plan.

Note: This form is the SIGNAL PERMIT and shall be retained by the Municipality. Any changes to the signal shall only be allowed subject to review and/or approval by the Office of the State Traffic Administration.

TABLE OF CONTENTS OF SPECIAL PROVISIONS

Note: This Table of Contents 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 Table of Contents shall not be considered part of the contract.

August 2018

LOTICIP PROJECT NO. L144-0002

STROBEL ROAD RECONSTRUCTION PROJECT

Town of Trumbull

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 817, 2016 as revised by Supplemental Specifications dated January 2018 (otherwise collectively as “ConnDOT Form 817”), is hereby made part of this contract, as modified by the Special Provisions contained herein.

The Special Provisions relate in particular to the STROBEL ROAD RECONSTRUCTION PROJECT in the Town of Trumbull.

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ITEM #1111600A EXTENSION BRACKET
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NOTICE TO THE CONTRACTOR – CONTRACT TIME AND LIQUIDATED DAMAGES

Four Hundred Fifty-Five (455) calendar days will be allowed for completion of the work on this project. Calendar days shall commence upon issues of the Notice to Proceed. The inter shutdown period will be from December 1st through the following March 31st, these days will be excluded from the calendar days for the Contract Period. If the Contractor choses to work during winter shutdown, then those days will be counted as calendar days.

If the Contractor fails to complete the work in its entirety, liquidated damages shall be assessed and deducted from any money due the Contractor in the amount of Two Thousand, Two Hundred Dollars (\$2,200.00) per calendar day for which work shall remain uncompleted.

If the Contractor selects to work during the winter shutdown period, December 1 through April 1, approval of the work to be completed shall be approved by the Engineer prior to commencement.

NOTICE TO CONTRACTOR – COORDINATION WITH EXISTING UTILITY COMPANIES

Utility relocations by others, is required within the project limits. The Contractor shall schedule his operations in such a manner as to minimize interference with utility relocation/protection activities. There are utility relocations for both aerial and underground utilities planned for the project area. The proposed relocations are shown on the utility relocation plans for information purposes only and are subject to change to meet the facility owner's needs.

As required by State Law, the Contractor shall contact "Call Before You Dig." Telephone 1-800-922-4455 for the location of public utility underground facilities in accordance with section 16-345 of the Regulations of the Department of Public Utility Control. The underground activities should be clearly delineated within the areas of proposed excavation prior to performing actual excavation. The notification to "Call Before You Dig" must be made at least 48 hours in advance.

Contractors are cautioned that it is their responsibility to verify location, conditions and filed dimensions of all existing features as actual conditions may differ from information shown on the plans or continued elsewhere in the specifications.

The Contractor shall place fill or excavate to within 1 foot of finished grade before poles/anchors are set. Additionally, the Contractor is required to mark out necessary road markings (edge of curb, sidewalk etc.) in field prior to pole/anchor placement.

The Contractor shall consider in his bid any inconvenience and work required to meet these conditions. The work to repair or replace any damage to utilities caused by the Contractor's operations will be solely at the Contractor's expense, in accordance with Form 816, Section 1.07.

In the areas where the proposed drainage is to be located, the Contractor is advised to use extra precaution where this drainage passes near the existing utilities. The Contractor will be responsible for providing temporary and permanent supports in these areas. Exposure and undermining is required to be kept at a minimum.

The Contractor shall notify the Engineer prior to the start of his work and shall be responsible for all coordination. The Contractor shall allow the Engineer complete access to the work.

The Contractor is hereby notified that the utility work schedules will have to be accommodated prior to proceeding. The Contractor shall coordinate with the utility companies to accommodate his schedule with all utility company schedules. Any inconvenience or delay that may result from the utility company work shall be included in the contract bid for the work.

The contractor is hereby notified that the following utility work taking place within the project limits by the respective utility company:

- United Illuminating and Frontier Communications will be relocating multiple utility poles on Strobel Road

The proposed relocations are shown on the utility relocation plans for information purposes only and are subject to change.

The contractor shall notify the following utility company representatives a minimum of two (2) weeks prior to the start of the road construction work that could affect their utilities.

**SANITARY SEWER – TOWN OF TRUMBULL WATER
POLLUTION CONTROL AUTHORITY**

Mr. Frank Smeriglio
Town Engineer
5866 Main St.
Trumbull, CT 06611
(203) 452-5050
fsmeriglio@trumbull-ct.gov

STORM WATER – TOWN OF TRUMBULL

Mr. Frank Smeriglio
Town Engineer
5866 Main St.
Trumbull, CT 06611
(203) 452-5050
fsmeriglio@trumbull-ct.gov

AQUARION WATER COMPANY OF CONNECTICUT

Mr. Carlos Vizcarrondo
Relocations Coordinator
600 Lindley Street
Bridgeport, CT 06606
(203) 337-5950
cvizcarrondo@aquarionwater.com

UNITED ILLUMINATING – ELECTRIC DISTRIBUTION

Mr. Fred Arnold
180 March Hill Road
Orange, CT 06477
(203) 499-3922
Fred.arnold@uinet.com

FRONTIER COMMUNICATIONS OF CONNECTICUT

Ms. Jan Possidente – Russo
Manager – Conduit
Construction Group
1441 North Colony Road
Meriden, CT 06450-4101
(203) 383-6645
jan.possidente-russo@ftr.com

CHARTER COMMUNICATIONS ENTERTAINMENTS I, LLC

Mr. Keith Cournoyer,
Construction Supervisor
207 Tuckie Road
North Windham, CT 06256
(860)-456-8346
Keith.Cournoyer@charter.com

LIGHTTOWER FIBER NETWORKS

Mr. Terry Shea
1781 Highland Avenue
Cheshire, CT 06410
(203) 649-3905
tshea@lighttower.com

KINDER MORGAN, INC. (TENNESSEE GAS PIPELINE L.L.C.)

Mr. David Wood
Project Manager - Ops
8 Anngina Drive
Enfield, CT 06082
(860) 763-6005
(413) 530-7117 (Mobile)
David_Wood@kindermorgan.com

THE SOUTHERN CONNECTICUT GAS COMPANY

Mr. Kevin Gerety, P.E.
Engineering Manager
60 Marsh Hill Road
Orange, CT 06477
(203) 795-7767
KGerety@soconngas.com

NOTICE TO THE CONTRACTOR – EXISTING UTILITIES

Existing utilities, shall be maintained during construction except as stated in the notice to contractor and/or noted on the plans. The Contractor shall verify the location of underground, structure mounted, and overhead utilities. Construction work within the vicinity of utilities shall be performed in accordance with current safety regulations.

The Contractor shall notify “Call before You Dig,” telephone: 1-800-922-4455, for the location of public utilities, in accordance with Section 16-345 of the Regulations of the Department of Utility Control.

Contractors are cautioned that it is their responsibility to verify locations, conditions, and field dimensions of all existing features, as actual conditions may differ from the information shown on the plans or contained elsewhere in the specifications.

Also, refer to “Section 1.07 - Legal Relations and Responsibilities.”

NOTICE TO CONTRACTOR - POTENTIAL MODIFIED AWARD SCHEDULE

The contractor is hereby given notice that this contract may not be awarded until all Federal and State financial approvals have been received. If all financial approvals are not received, this contract may be withdrawn and re-advertised at the direction of the Municipality, in consultation with the State. This shall not be the basis for any claims by any bidder.

**NOTICE TO CONTRACTOR – CONTRACTOR TRAINING
REQUIREMENT FOR 10-HOUR OSHA CONSTRUCTION SAFETY AND
HEALTH COURSE**

In accordance with Connecticut General Statute 31-53b and Public Act No. 08-83, the Contractor is required to furnish proof that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53, 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.

Proof of compliance with the provisions of the statute shall consist of a student course completion card issued by the federal Occupational Safety and Health Administration, or other such proof as deemed appropriate by the Commissioner of the Connecticut Department of Labor, dated no earlier than five years prior to the commencement of the project. Each employer shall affix a copy of the construction safety course completion card for each applicable employee to the first certified payroll submitted to the Department of Transportation on which the employee's name first appears.

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.

This section does not apply to employees of public service companies, as defined in section 16-1 of the 2008 supplement to the General Statutes, 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.

The internet website for the federal Occupational Safety and Health Training Institute is <http://www.osha.gov/fso/ote/training/edcenters>.

Additional information regarding this statute can be found at the Connecticut Department of Labor website, <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>.

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".

NOTICE TO CONTRACTOR - VEHICLE EMISSIONS

All motor vehicles and/or construction equipment (both on-highway and non-road) shall comply with all pertinent State and Federal regulations relative to exhaust emission controls and safety.

The contractor shall establish staging zones for vehicles that are waiting to load or unload at the contract area. Such zones shall be located where the emissions from the vehicles will have minimum impact on abutters and the general public.

Idling of delivery and/or dump trucks, or other equipment shall not be permitted during periods of non-active use, and it should be limited to three minutes in accordance with the Regulations of Connecticut State Agencies Section 22a-174-18(b)(3)(c):

No mobile source engine shall be allowed “to operate for more than three (3) consecutive minutes when the mobile source is not in motion, except as follows:

- (i) When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,
- (ii) When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,
- (iii) When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source,
- (iv) To bring the mobile source to the manufacturer’s recommended operating temperature,
- (v) When the outdoor temperature is below twenty degrees Fahrenheit (20 degrees F),
- (vi) When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes, or
- (vii) When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation.”

All work shall be conducted to ensure that no harmful effects are caused to adjacent sensitive receptors. Sensitive receptors include but are not limited to hospitals, schools, daycare facilities, elderly housing and convalescent facilities. Engine exhaust shall be located away from fresh air intakes, air conditioners, and windows.

A Vehicle Emissions Mitigation plan will be required for areas where extensive work will be performed in close proximity (less than 50 feet (15 meters)) to sensitive receptors. No work will proceed until a sequence of construction and a Vehicle Emissions Mitigation plan is submitted in writing to the Engineer for review and all comments are addressed prior to the commencement of any extensive construction work in close proximity (less than 50 feet (15 meters)) to sensitive receptors. The mitigation plan must address the control of vehicle emissions from all vehicles and construction equipment.

If any equipment is found to be in non-compliance with this specification, the contractor will be issued a Notice of Non-Compliance and given a 24 hour period in which to bring the equipment into compliance or remove it from the project. If the contractor then does not comply, the Engineer shall withhold all payments for the work performed on any item(s) on which the non-conforming equipment was utilized for the time period in which the equipment was out of compliance.

Any costs associated with this "Vehicle Emissions" 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".

NOTICE TO CONTRACTOR - SECTION 4.06 AND M.04 MIX DESIGNATION EQUIVALENCY AND PG BINDER EQUIVALENCY

Sections 4.06 and M.04 have been replaced in their entirety with the Special Provisions included as part of this contract. These Special Provisions reflect changes in mix designations for various types of hot-mix asphalt (HMA) and include the removal of mixes designed and governed by the Marshall Mix Design method. The following table is to be used to associate mix designations noted on the plans with those in the contract specifications and related documents. Mix designations on each row are equivalent and refer to a single mix, which shall be subject to the requirements of the Section 4.06 and M.04 Special Provisions for the Official Mix Designation in the leftmost column of the corresponding row in the table.

Mix Designation Equivalency Table

Official Mix Designation	Equivalent Mix Designation (a)	Equivalent Mix Designation (b)
(c)	Superpave 1.5 inch	Superpave 37.5 mm
HMA S1	Superpave 1.0 inch	Superpave 25.0 mm
HMA S0.5	Superpave 0.5 inch	Superpave 12.5 mm
HMA S0.375	Superpave 0.375 inch	Superpave 9.5 mm
HMA S0.25	Superpave 0.25 inch	Superpave 6.25 mm
(c)	Superpave #4	Superpave #4
HMA S0.5 (d)	Bituminous Concrete Class 1 (e)	Bituminous Concrete Class 1 (e)
HMA S0.375 (d)	Bituminous Concrete Class 2 where it is specified in lifts 1.25 or thicker (e)	Bituminous Concrete Class 2 where it is specified in lifts 1.25 or thicker (e)
HMA S0.25 (d)	Bituminous Concrete Class 2 where it is specified in lifts 1.0 inches to less than 1.25 inches (e); Bituminous Concrete Class 12 (e)	Bituminous Concrete Class 2 where it is specified in lifts 1.0 inches to less than 1.25 inches (e); Bituminous Concrete Class 12 (e)
HMA S1 (d)	Bituminous Concrete Class 4 (e)	Bituminous Concrete Class 4 (e)
Curb Mix	Bituminous Concrete Class 3	Bituminous Concrete Class 3

Notes

(a) This mix designation is generally included with projects where the English measurement system is used. The mix designation may contain both the English measurement system

designation and the SI (metric) measurement system designation, one of which would be in parenthesis.

(b) This mix designation is generally included with projects where the SI (metric) measurement system is used. The mix designation may contain both the English measurement system designation and the SI measurement system designation, one of which would be in parenthesis.

(c) This mix is no longer in use except by contract-specific Special Provision; if this mix is called for in the Plans but no such Special Provision is included for this contract a suitable substitute must be approved by the Engineer.

(d) Unless approved by the Engineer, the Superpave Design Level for the Official Mix Designation bituminous concrete replacing a Marshall mix called for in the plans or other contract documents shall be Design Level 2 for mixes used on mainline or shoulders of state-maintained roadways and Design Level 1 elsewhere, including but not limited to driveways or sidewalks.

(e) All mixes designed under the Marshall mix-design method are no longer covered by the 4.06 Special Provision. Wherever they appear in Contract plans and documents they shall be substituted by the "Official Mix Designation" in the same row of the Mix Designation Equivalency Table. Unless approved by the Engineer, the Superpave Design Level shall be Level 1.

PG Binder Designation Equivalency Table

Official Binder Designation	Equivalent Binder Designation	Use
PG 64S-22	PG 64-22	Hot-Mix Asphalt (HMA S* pay items and pay items using HMA S* materials)(a),(b)
PG 64E-22	PG 76-22	Polymer-Modified Asphalt (PMA S* pay items and pay items using HMA S* materials)(a),(b)

Notes

- (a) Use the Mix Designation Equivalency Table above to identify the Official Mix Designation for materials using the Marshall mix design method, i.e. “Bituminous Concrete Class *.”
- (b) Refer to the NTC – Superpave Design Level for the Superpave Design Level to use for each mix on a project. The PG Binder Designation Equivalency Table can be used to obtain the Official Binder Designation for each mix identified in the NTC – Superpave Design Level.

NOTICE TO CONTRACTOR - SUPERPAVE DESIGN LEVEL INFORMATION

Hot-Mix Asphalt (HMA) and Polymer-Modified Asphalt (PMA) constructed according to the Superpave mix-design system are required to attain a Superpave Design Level and are required to use a Performance Graded (PG) binder. The Superpave Design Levels required for this project are listed in Table 1. The required PG binder is indicated for each mix with an “X” in the appropriate box in Table 1.

TABLE 1 – Superpave Design Level and Performance Graded (PG) Binder

Mix Designation	PG Binder		All Roads	Route	Route	Route	Route
	PG 64S-22	PG 64E-22	Design Level	Design Level	Design Level	Design Level	Design Level
HMA S0.25	-	-	-	-	-	-	-
HMA S0.375	X	-	2	-	-	-	-
HMA S0.5	-	-	-	-	-	-	-
HMA S1	X	-	2	-	-	-	-
PMA S0.25	-	-	-	-	-	-	-
PMA S0.375	-	-	-	-	-	-	-
PMA S0.5	-	-	-	-	-	-	-
PMA S1	-	-	-	-	-	-	-

Note: Please note that PMA mix designations typically use PG 64E-22 and HMA mix designations use PG 64S-22

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.01 – Transfer of Work or Contract: *Add the following after the last paragraph:*

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. Also, any retained monies on a subcontractor's work shall be paid to the subcontractor within thirty (30) days after satisfactory completion of all the subcontractor's work.

For the purpose of this Item, satisfactory completion shall have been accomplished when:

- (1) The subcontractor has fulfilled the contract requirements of both the Department and the subcontract for the subcontracted work, including the completion of any specified material and equipment testing requirement or plant establishment period and the submission of all submittals (i.e.: certified payrolls, material samples and certifications, required state and federal submissions, etc.) required by the specifications and the Department, and
- (2) The work done by the subcontractor has been inspected and approved by the Department and the final quantities of the subcontractor's work have been determined and agreed upon.

If the Contractor determines that a subcontractor's work is not complete, the Contractor shall notify the subcontractor and the Engineer, in writing, of the reasons why the subcontractor's work is not complete. This written notification shall be provided to the subcontractor and the Engineer within twenty-one (21) days of the subcontractor's request for release of retainage.

The Engineer will institute administrative procedures to expedite the determination of final quantities for the subcontractor's satisfactorily completed work.

The inspection and approval of a subcontractor's work does not eliminate the Contractor's responsibilities for all the work as defined in Article 1.07.12, "Contractor's Responsibility for Work."

The inspection and approval of the subcontractor's work 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 a finding that the subcontractor is non-responsible on future subcontract assignments.

For any dispute regarding prompt payment or release of retainage, 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 1.08.04 - Limitation of Operations - Add the following:

In order to provide for traffic operations as outlined in the Special Provision "Maintenance and Protection of Traffic," the Contractor will not be permitted to perform any work which will interfere with the described traffic operations on all project roadways as follows:

All Roadways – Replace with the following:

STROBEL ROAD RE-CONSTRUCTION PHASING

DANIELS FARM ROAD and STROBEL INTERSECTION & PHASE 1 AREA

- 1) Roadway reconstruction work must occur over school summer vacation months for Phase I. Drainage work can occur during school year.

Summer road work hours are as follows:

- a) Contractor is allowed to start work at 7:00 am.
- b) Contractor must maintain two lanes of traffic from 7:00 to 9:30 AM.
- c) Contractor must maintain 1 lane of alternating traffic from 9:30 am to 4:30 pm on Daniels Farm Road. Contractor is allowed to shut down Strobel road from 8:00am to 4:30pm
- d) Contractor must reclaim Daniels Farm Road on a weekend over school summer vacation months and pave binder course within 4 days of reclaiming. All manholes, catch basins and valve covers must be flush with reclaimed material and raised during paving operations.
- e) Contractor can reclaim Strobel road during the week over school summer vacation months and pave binder course within 4 days of reclaiming. All manholes, catch basins and valves must be flush with reclaimed material and raised during paving operations.

For work outside of school summer vacation months:

- 2) Contractor is allowed to start work at 8:00 am.
- 3) Contractor must maintain two lanes of traffic from 8:00 to 9:30 AM.
- 4) Contractor must maintain 1 lane of alternating traffic from 9:30 am to 2:00 pm.
- 5) Contractor is not allowed to work in the roadway from 2:00pm to 3:00pm during school dismissal.
- 6) Contractor must maintain 1 lane of traffic from 3:00 to 4:30 pm.
- 7) Contractor must reclaim Daniels Farm Road on a weekend over school summer vacation months and pave binder course within 4 days of reclaiming.
- 8) Contractor must reclaim Strobel road over school summer vacation months and pave binder course within 4 days of reclaiming.
- 9) 1 day a month during the school year, school opens at 9:00 am, no work can occur until 9:00am during those days. Dates will be finalized as part of school scheduling and forward to contractor during construction.
- 10) Structures must not be elevated during construction. Contractor must keep all manhole covers, catch basin tops and valve covers flush or buried until top surface of asphalt is installed. Catch basin tops shall be flush with roadway during construction.

11) Contractor must maintain 1 open lane at all times for emergency vehicles.

PHASES 2 AND 3

- 1) All Cut and Fill areas requiring full road reconstruction must occur over summer vacation months.
- 2) Utilize temporary lights for alternating traffic to replace the culvert over the school summer months.
- 3) a) Contractor first must prep shoulder areas to allow Utility Companies to relocate utility poles and wires in all 3 phases. Contractor must protect the existing poles from vehicular traffic (phases 1 – 3).
b) Contractor must coordinate their own work around the utility company as to not interrupt the utility companies from relocating their utility pole and not charge Town for time delay (Phases 1 – 3).
- 4) Contractor is allowed to start work at 7:00 am.
- 5) Contractor must allow vehicular traffic one way towards High School until 8:30 am (at the discretion of the traffic control).
- 6) Contractor must allow vehicular traffic until 8:30 am. Contractor is allowed to shut down roadway for vehicular travel and utilize detour route at 8:30AM to 4:30 PM.
- 7) Contractor must maintain 1 open lane at all times for emergency vehicles.
- 8) Contractor must maintain 1 open lane for school buses to travel through the project to pick up and drop off students at their respective bus stops in the work area (phases 1-3) at all times.
- 9) Roadway must be open to two traffic at the end of each day. However, Contractor shall install “Strobel Road under construction, Use Alternate route” sign on either end of each phase at the ends of each day.
- 10) Roadway may be closed for overnight for a 1 week period. However, refer to item above for emergency and school bus traffic.
- 11) Contractor must install temporary asphalt at the end of each day for utility trench work (phases 1 – 3).
- 12) Contractor must install asphalt (full width) at the end of each week for roadway as part of re-profiling roadway.
- 13) Contractor/Town must coordinate with Traffic Authority for officer supervision during construction. An officer at each end of detour may be required as determined by Traffic Authority.
- 14) Structures must not be elevated during construction. Contractor must keep all manhole covers flush or buried until top surface of asphalt is installed. Catch basin tops and valve covers shall be flush with roadway during construction.
- 15) During the installation of the Stone Masonry Facing on the Retaining Walls and the Culvert Parapet Walls, the contractor must contain work to the shoulder area and maintain two lanes of traffic.

Note: Please coordinate with the Town of Trumbull if night work will be allowed.

Additional Lane Closure Restrictions – Replace with the following:

It is anticipated that work on adjacent projects may be ongoing simultaneously with this project. The Contractor shall be aware of those projects and anticipate that coordination will be required to maintain proper traffic flow at all times on all project roadways, in a manner consistent with these specifications and acceptable to the Engineer.

The Contractor will not be allowed to perform any work that will interfere with traffic operations on a roadway when traffic operations are being restricted on that same roadway, unless there is at least a one-mile clear area length where the entire roadway is open to traffic or the closures have been coordinated and are acceptable to the Engineer. The one-half mile clear area length shall be measured from the end of the first work area to the beginning of the signing pattern for the next work area.

Replace 1.08.13 – “Termination of the Contractor's Responsibility” with the following:

1.08.08 - Extension of Time:

Delete the sixth paragraph, “If an approved extension of Contract time... the following April 1”.

Article 1.08.09 - Failure to Complete Work on Time:

Delete the second paragraph, "If the last day...the project is substantially completed" and replace it with "Liquidated damages as specified in the Contract shall be assessed against the Contractor per calendar day from that day until the date on which the project is substantially completed."

1.08.13 - Acceptance of Work and Termination of the 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 2.86 - DRAINAGE TRENCH EXCAVATION, ROCK IN DRAINAGE TRENCH EXCAVATION

2.86.01—Description

2.86.03—Construction Methods

2.86.04—Method of Measurement

2.86.05—Basis of Payment

2.86.01—Description: Drainage trench excavation consists of the excavation necessary for the proper installation of drainage structures, pipes, pipe ends and any other incidental drainage items.

It shall include earth and rock excavation, removal of existing pipes, dewatering, backfill, and disposal of materials; to the trench limits described herein, to the dimensions shown on the plans, or as directed by the Engineer.

Classifications:

- (1) **Drainage Trench Excavation** will include only the excavation necessary for the construction of the drainage items and the removals specified above.
- (2) **Rock in Drainage Trench Excavation**, insofar as it applies to drainage trench excavation, shall be defined as **1/2 cubic yard or more** in volume of the following obstructions removed from the limits of the drainage trench:
 - (a) rock in definite ledge formation
 - (b) boulders, or portions of boulders
 - (c) cement masonry structures
 - (d) concrete or reinforced concrete structures
 - (e) reinforced concrete pipe
 - (f) subsurface concrete pavement or concrete base

The removal shall be as indicated or directed from within the limits defined in 2.86.03 for drainage trench excavation.

2.86.03—Construction Methods:

(1) Drainage Trench Excavation Limits:

Horizontal Limits: Trench widths for pipes, pipe ends, pipe-arches, and drainage structures shall be as follows:

- (a) 2 feet greater than the nominal inside diameter of circular pipe or nominal inside span of elliptical pipe or pipe-arch for such diameters or spans of less than 30 inches
- (b) 3 feet greater than the nominal inside diameter of circular pipe or the nominal inside span of elliptical pipe or pipe-arch for such diameters or spans that are 30 inches or greater
- (c) 4 feet greater than the nominal inside diameter or nominal horizontal inside span for pipe-arches fabricated from structural plates
- (d) 2 feet beyond the neat lines of all exterior or foundation walls of drainage structures

Vertical Limits: Trench depths shall extend vertically as follows:

- (a) From the bottom of the trench to the bottom of the roadway excavation, or in areas away from roadway excavation, to the top of existing ground surface.

(b) Where drainage pipe is to be laid in a fill area, the embankment shall be placed and compacted to a minimum elevation 12 inches above the top of the proposed pipe, whereupon the drainage trench excavation shall be performed and the pipe installed.

- (2) **Drainage Trench Excavation:** Drainage trench excavation shall be made in conformity with the requirements of the plans, or as directed by the Engineer. The Contractor shall furnish and employ such shores, braces, pumps, or ancillary equipment as needed for the proper protection of property, proper completion of the work, as well as safety of the public and employees of both the Contractor and the Department. All bracing and shoring shall be removed when no longer required for the construction or safety of the work. When required, the Contractor shall provide or have on the Site at all times any OSHA certification for equipment to be used, per 1.07.07. For support of trenches greater than 10 feet in depth, working drawings shall be submitted, in accordance with 1.05.02. The Contractor shall control erosion and sedimentation at trench locations and ensure that pumped water from the drainage excavation is discharged in accordance with the requirements of 1.10.

Where a firm foundation is not encountered at the grades established due to unsuitable material, such as soft, spongy, or unstable soil, the unsuitable material shall be removed and replaced with approved backfill, thoroughly compacted in lifts not to exceed 6 inches, for the full trench width. The Engineer shall be notified prior to removal of the unsuitable material in order to determine the depth of removal necessary.

After the excavation is complete, the Contractor shall notify the Engineer and no drainage structure or material shall be placed in the excavated area until the Engineer has approved the depth of excavation and the character of the foundation material.

- (3) **Rock in Drainage Trench Excavation:**

- (a) Rock in Drainage Trench Excavation - Ledge: When rock in definite ledge form is encountered, the Contractor shall excavate a minimum of 12 inches below the bottom of the proposed pipe or drainage structure; and this depth shall be filled with bedding material (as specified in M.08.03-1) below the proposed pipe; or granular fill (as specified in M.02.01) below the proposed drainage structure, which shall be thoroughly compacted in lifts not to exceed 6 inches.
- (b) Rock in Drainage Trench Excavation - Boulders: When boulders are encountered, the Contractor shall remove them from the trench and if backfill is required, the void shall be filled with bedding material, surplus excavated material (as specified in 2.02.03-8) or granular fill which shall be thoroughly compacted in lifts not to exceed 6 inches.
- (c) Rock in Drainage Trench Excavation –Structures: When cement masonry, concrete or reinforced concrete structures are encountered within the drainage trench limits, the Contractor shall remove the structure in its entirety or as directed by the Engineer, and if backfill is required, the void shall be filled with bedding material, surplus excavated material or granular fill which shall be thoroughly compacted in lifts not to exceed 6 inches.

- (4) **Backfill:** Suitable material excavated from the drainage trench shall be used as backfill material prior to consideration of using any other source of backfill. Backfill material used shall be of a quality satisfactory to the Engineer and shall be free from large or frozen lumps, wood and other extraneous material. Rock fill or stones larger than 5 inches shall not be placed within 1 foot of the drainage structure or pipe. The grading shall be

completed to the lines shown on the plans, or as ordered, by refilling to the required elevation with approved material, placed in layers not to exceed 6 inches in depth after compaction, which shall be thoroughly compacted with equipment approved by the Engineer.

All surplus or unsuitable material shall be removed and disposed of as directed. Should additional material be required for backfilling, it may be obtained from the Project surplus excavation in accordance with 2.02.03-8 or from borrow pits, gravel pits, or elsewhere as directed by the Engineer.

2.86.04—Method of Measurement:

Drainage Trench Excavation: Drainage trench excavation will not be measured for payment.

If granular fill or borrow is required to replace unsuitable material it will be measured for payment as directed by the Engineer.

Rock in Drainage Trench Excavation: If any material meeting the definition of Rock in Drainage Trench Excavation is encountered, the Contractor shall strip it of sufficient overlying material to allow for proper measurement and shall then notify the Engineer that the rock surface is ready for measurement. If the Contractor fails to give such notice, the Engineer will presume that the measurements taken at the time the Engineer first saw the material in question will give the true quantity of excavation.

Rock in Drainage Trench Excavation will be measured according to the classification provided in 2.86.01 and within the drainage trench excavation limits provided in 2.86.03.

For the removal of underground obstructions, as classified in 2.86.01-2, the measurement shall be the actual volume of rock removed (1/2 cubic yard or more) as approved by the Engineer.

Rock in Drainage Trench Excavation will not be measured for payment in fills.

Bedding Material or other suitable fill, as specified in 2.86.03(3), used to fill voids after rock is excavated will not be measured for payment.

2.86.05—Basis of Payment:

Drainage Trench Excavation: There will be no direct payment for drainage trench excavation required for the installation of drainage pipes, pipe ends, catch basins, drop inlets, manholes, and other drainage structures, or any other incidental drainage work including materials, tools, equipment and labor necessary to complete the drainage trench excavation in conformity with the plans or as directed by the Engineer.

There will be no direct payment for backfill or disposal of surplus material necessary for the satisfactory completion of this work.

There will be no direct payment made for shoring, bracing, dewatering, or for material or equipment necessary for the satisfactory completion of the work.

Where called for on the plans to install temporary earth retaining systems for the support of existing facilities, pavement, utilities, or for other constraints, payment will be made in accordance with such items in the Contract.

If granular fill or borrow is used to replace unsuitable material, payment will be made at the respective Contract unit prices, or in the absence of such items in the Contract, as Extra Work in accordance with 1.04.05.

Rock in Drainage Trench Excavation: When rock, conforming to the description in 2.86.01 is encountered within the limits of drainage trench excavation, its removal will be classified and

paid for at the Contract unit price per cubic yard for "Rock in Drainage Trench Excavation 0' – 10' Deep," or "Rock in Drainage Trench Excavation 0' – 20' Deep," as the case may be.

Those portions of drainage trench excavation classified and paid for as "Rock in Drainage Trench Excavation" of the various depths will be the actual volumes of rock excavated within the limits for drainage trench excavation, at the applicable bottom depth price.

Where no item or items for "Rock in Drainage Trench Excavation" at the applicable depth appear in the proposal and rock is encountered in drainage trench excavation, its removal will be paid for as Extra Work in accordance with 1.04.05.

When excavation is necessary in fill, no such excavation will be paid for as "Rock in Drainage Trench Excavation."

When excavation is necessary for any purpose other than drainage-related items, no such excavation will be paid under this item.

Bedding material or any other suitable material used to fill voids vacated by excavated rock will not be paid for but shall be included in the unit price per cubic yard for "Rock in Drainage Trench Excavation."

Pay Item	Pay Unit
Rock in Drainage Trench Excavation 0' - 10' Deep	c.y.
Rock in Drainage Trench Excavation 0' - 20' Deep	c.y.

ITEM # 0406000A – BITUMINOUS CONCRETE

Work under this item shall conform to the requirements of Section 4.06.03 – Construction Methods amended as follows:

Article 4.06.03-7

The Contractor will not be permitted to use the Method I – Notched Wedge Joint.

The Contractor shall use the Method II – Butt Joint for all paving. When using this method, the Contractor is not allowed to leave a vertical edge exposed at the end of a work shift and must complete paving of the roadway full width “curb to curb.”

SECTION 4.06 - BITUMINOUS CONCRETE

Section 4.06 is being deleted in its entirety and replaced with the following:

4.06.01—Description

4.06.02—Materials

4.06.03—Construction Methods

4.06.04—Method of Measurement

4.06.05—Basis of Payment

4.06.01—Description: Work under this section shall include the production, delivery, placement, and compaction of an uniform textured, non-segregated, smooth bituminous concrete pavement to the grade and cross section shown on the plans.

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

Bituminous Concrete: A composite material consisting of prescribed amounts of asphalt binder, and aggregates. Asphalt binder may also contain additives engineered to modify specific properties and/or behavior of the composite material. References to bituminous concrete apply to all of its forms, such as those identified as hot-mix asphalt (HMA), or polymer-modified asphalt (PMA).

Bituminous Concrete Plant (Plant): A structure where aggregates and asphalt binder are combined in a controlled fashion into a bituminous concrete mixture suitable for forming pavements and other paved surfaces.

Course: A continuous layer (a lift or multiple lifts) of the same bituminous concrete mixture placed as part of the pavement structure.

Density Lot: The total tonnage of all bituminous concrete placed in a single lift and as defined in Article 4.06.03.

Disintegration: Erosion or fragmentation of the pavement surface which can be described as polishing, weathering-oxidizing, scaling, spalling, raveling, or formation of potholes.

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

Hot Mix Asphalt (HMA): A bituminous concrete mixture typically produced at 325°F.

Job Mix Formula (JMF): A recommended aggregate gradation and asphalt binder content to achieve the required mixture properties.

Lift: An application of a bituminous concrete mixture placed and compacted to a specified thickness in a single paver pass.

Percent Within Limits (PWL): The percentage of the lot falling between the Upper Specification Limit (USL) and the Lower Specification Limit (LSL).

Polymer-Modified Asphalt (PMA): A bituminous concrete mixture containing a polymer modified asphalt binder and using a qualified warm mix technology.

Production Lot: The total tonnage of a bituminous concrete mixture from a single source that may receive an adjustment.

Production Sub Lot: Portion of the production lot typically represented by a single sample.

Quality Assurance (QA): All those planned and systematic actions necessary to provide ConnDOT the confidence that a Contractor will perform the work as specified in the Contract.

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

Superpave: A bituminous concrete mix design used in mixtures designated as “S*” Where “S” indicates Superpave and * indicates the sieve related to the nominal maximum aggregate size of the mix.

Segregation: A non-uniform distribution of a bituminous concrete mixture in terms of gradation, temperature, or volumetric properties.

Warm Mix Asphalt (WMA) Technology: A qualified additive or technology that may be used to produce a bituminous concrete at reduced temperatures and/or increase workability of the mixture.

4.06.02—Materials: All materials shall conform to the requirements of Section M.04.

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

2. Recycled Materials: Reclaimed Asphalt Pavement (RAP), Crushed Recycled Container Glass (CRCG), Recycled Asphalt Shingles (RAS), or crumb rubber (CR) from recycled tires may be incorporated in bituminous concrete mixtures in accordance with Project Specifications.

4.06.03—Construction Methods:

1. Material Documentation: All vendors producing bituminous concrete must have Plants with automated vehicle-weighting scales, storage scales, and material feeds capable of producing a delivery ticket containing the information below.

- a. "State of Connecticut" printed on ticket.
- b. Name of producer, identification of Plant, and specific storage silo if used.
- c. Date and time.
- d. Mixture Designation; Mix type and level Curb mixtures for machine-placed curbing must state "curb mix only".
- e. If WMA Technology is used, the additive name and dosage rate or water injection rate must be listed.
- f. Net weight of mixture loaded into the vehicle (When RAP and/or RAS is used the moisture content shall be excluded from mixture net weight).
- g. Gross weight (equal to the net weight plus the tare weight or the loaded scale weight).
- h. Tare weight of vehicle (Daily scale weight of the empty vehicle).
- i. Project number, purchase order number, name of Contractor (if Contractor other than Producer).
- j. Vehicle number - unique means of identification vehicle.
- k. For Batch Plants, individual aggregate, recycled materials, and virgin asphalt max/target/min weights when silos are not used.
- l. For every mixture designation the running daily total delivered and sequential load number.

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

The Contractor must notify the Engineer immediately if, during production, there is a malfunction of the weight recording system in the automated Plant. Manually written tickets containing all required information will be allowed for no more than one hour.

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

2. Transportation of Mixture: The mixture shall be transported in vehicles that are clean of all foreign material, excessive coating or cleaning agents, and, that have no gaps through which mixture might spill. Any material spilled during the loading or transportation process shall be quantified by re-weighing the vehicle. The Contractor shall load vehicles uniformly so that segregation is minimized. Loaded vehicles shall be tightly covered with waterproof covers acceptable to the Engineer. Mesh covers are prohibited. The cover must minimize air infiltration. Vehicles found not to be in conformance shall not be loaded.

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

The State reserves the right to check the gross and tare weight of any vehicle. If the gross or tare weight varies from that shown on the delivery ticket by more than 0.4 percent, the Engineer will recalculate the net weight. The Contractor shall correct the discrepancy to the satisfaction of the Engineer.

If a vehicle delivers mixture to the project and the delivery ticket indicates that the vehicle is overweight, the load may not be rejected but a "Measured Weight Adjustment" will be taken in accordance with Article 4.06.04.

Vehicle body coating and cleaning agents must not have a deleterious effect on the mixture. The use of solvents or fuel oil, in any concentration, is prohibited for the coating of vehicle bodies.

For each delivery, the Engineer shall be provided a clear, legible copy of the delivery ticket.

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

Refueling or cleaning of equipment is prohibited in any location on the project where fuel or solvents might come in contact with paved areas or areas to be paved. Solvents used in cleaning mechanical equipment or hand tools shall be stored off of areas paved or to be paved.

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

Rollers: All rollers shall be self-propelled and designed for compaction of bituminous concrete. Roller types shall include steel-wheeled, pneumatic or a combination thereof. Rollers that operate in a dynamic mode shall have drums that use a vibratory or oscillatory system or combination of. Vibratory rollers shall be equipped with indicators for amplitude, frequency and speed settings/readouts to measure the impacts per foot during the compaction process. Oscillatory rollers shall be equipped with frequency indicators. Rollers can operate in the dynamic mode using the oscillatory system on concrete structures such as bridges and catch basins if at the lowest frequency setting.

Pneumatic tire rollers shall be equipped with wide-tread compaction tires capable of exerting an average contact pressure from 60 to 90 pounds per square inch uniformly over the surface, The Contractor shall furnish documentation to the Engineer regarding tire size; pressure and loading

to confirm that the proper contact pressure is being developed and that the loading and contact pressure is uniform for all wheels.

Lighting: For paving operations, which will be performed during hours of darkness, the paving equipment shall be equipped with lighting fixtures as described below, or with an approved equal. Lighting shall minimize glare to passing traffic. The lighting options and minimum number of fixtures are listed in Tables 4.06-1 and 4.06-2:

TABLE 4.06-1: Minimum Paver Lighting

Option	Fixture Configuration	Fixture Quantity	Requirement
1	Type A	3	Mount over screed area
	Type B (narrow) or Type C (spot)	2	Aim to auger and guideline
	Type B (wide) or Type C (flood)	2	Aim 25 feet behind paving machine
2	Type D Balloon	2	Mount over screed area

TABLE 4.06-2: Minimum Roller Lighting

Option	Fixture Configuration*	Fixture Quantity	Requirement
1	Type B (wide)	2	Aim 50 feet in front of and behind roller
	Type B (narrow)	2	Aim 100 feet in front of and behind roller
2	Type C (flood)	2	Aim 50 feet in front of and behind roller
	Type C (spot)	2	Aim 100 feet in front of and behind roller
3	Type D Balloon	1	Mount above the roller

*All fixtures shall be mounted above the roller.

Type A: Fluorescent fixture shall be heavy-duty industrial type. Each fixture shall have a minimum output of 8,000 lumens. The fixtures shall be mounted horizontally, and be designed for continuous row installation.

Type B: Each floodlight fixture shall have a minimum output of 18,000 lumens.

Type C: Each fixture shall have a minimum output of 19,000 lumens.

Type D: Balloon light: Each balloon light fixture shall have a minimum output of 50,000 lumens, and emit light equally in all directions.

Material Transfer Vehicle (MTV): A MTV shall be used when placing a bituminous concrete surface course as indicated in the contract documents.

The MTV must be a vehicle specifically designed for the purpose of delivering the bituminous concrete mixture from the delivery vehicle to the paver. The MTV must continuously remix the bituminous concrete mixture throughout the placement process.

The use of a MTV will be subject to the requirements stated in Article 1.07.05- Load Restrictions. The Engineer may limit the use of the vehicle if it is determined that the use of the MTV may damage highway components, utilities, or bridges. The Contractor shall submit to the Engineer at time of pre-construction the following information:

- The make and model of the MTV.
- The individual axle weights and axle spacing for each piece of paving equipment (haul vehicle, MTV and paver).
- A working drawing showing the axle spacing in combination with all pieces of equipment that will comprise the paving echelon.

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

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

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

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

Permanent Transitions: Defined as any gradual change in pavement elevation that remains as a permanent part of the work.

A transition shall be constructed no closer than 75 feet from either side of a bridge expansion joint or parapet. All permanent transitions, leading and trailing, shall meet the following length requirements:

- a) Posted speed limit is greater than 35 MPH: 30 feet per inch of elevation change.
- b) Posted speed limit is 35 MPH or less: 15 feet per inch of elevation change.

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

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

- a) Posted speed limit is greater than 50 MPH
 - (1) Leading Transitions = 15 feet per inch of vertical change (thickness)
 - (2) Trailing Transitions = 6 feet per inch of vertical change (thickness)
- b) Posted speed limit is 40, 45, or 50 MPH
 - (1) Leading and Trailing = 4 feet per inch of vertical change (thickness)
- c) Posted speed limit is 35 MPH or less
 - (1) Leading and Trailing = 3 feet per inch of vertical change (thickness)

Note: Any temporary transition to be in-place over the winter shutdown period or during extended periods of inactivity (more than 14 calendar days) shall conform to the greater than 50 MPH requirements shown above.

6. Spreading and Finishing of Mixture: Prior to the placement of the mixture, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance.

Immediately before placing a bituminous concrete lift, a uniform coating of tack coat shall be applied to all existing underlying pavement surfaces and on the exposed surface of a wedge joint. Such surfaces shall be clean and dry. Sweeping or other means acceptable to the Engineer shall be used.

The mixture shall not be placed whenever the surface is wet or frozen.

The Engineer may verify the mixture temperature by means of a probe or infrared type of thermometer. The Engineer may reject the load based on readings from a probe type thermometer and the specify temperature in the quality control plan (QCP) for placement.

Tack Coat Application: The tack coat shall be applied by a pressurized spray system that results in uniform overlapping coverage at an application rate of 0.03 to 0.05 gallons per square yard for a non-milled surface and an application rate of 0.05 to 0.07 gallons per square yard for a milled surface. For areas where both milled and un-milled surfaces occur, the tack coat shall be an application rate of 0.03 to 0.05 gallons per square yard. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall not be heated in excess of 160°F and shall not be further diluted.

Tack coat shall be allowed sufficient time to break prior to any paving equipment or haul vehicles driving on it.

The Contractor may request to omit the tack coat application between bituminous concrete layers that have not been exposed to traffic and are placed during the same work shift. Requests to omit tack coat application on the exposed surface of a wedge joint will not be considered.

Placement: The mixture shall be placed and compacted to provide a smooth, dense surface with a uniform texture and no segregation at the specified thickness and dimensions indicated in the plans and specifications.

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

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

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

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

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

- a) Thickness- Where the average thickness of the lift exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the Engineer will calculate the thickness adjustment in accordance with Article 4.06.04.

TABLE 4.06-3: Thickness Tolerances

Mixture Designation	Lift Tolerance
S1	+/- 3/8 inch
S0.25, S0.375, S0.5	+/- 1/4 inch

Where the thickness of the lift of mixture is less than that shown on the plans beyond the tolerances shown in Table 4.06-3, the Contractor, with the approval of the Engineer, shall take corrective action in accordance with this specification.

- b) Area- Where the width of the lift exceeds that shown on the plans by more than the specified thickness, the Engineer will calculate the area adjustment in accordance with Article 4.06.04.

- c) Delivered Weight of Mixture - When the delivery ticket shows that the vehicle exceeds the allowable gross weight for the vehicle type, the Engineer will calculate the weight adjustment in accordance with Article 4.06.04.

Transverse Joints: All transverse joints shall be formed by saw-cutting to expose the full thickness of the lift. Tack coat shall be applied to the sawn face immediately prior to additional mixture being placed.

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

When placing a lift with a specified thickness less than one and one-half (1 ½) inches, or a wedge course, the Contractor shall provide a minimum rolling pattern as determined by the development of a compaction curve. The procedure to be used shall be documented in the Contractor's QCP for placement and demonstrated on the first day of placement.

The use of the vibratory system on concrete structures is prohibited. When approved by the Engineer, the Contractor may operate a roller using an oscillatory system at the lowest frequency setting.

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

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

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

Surface Requirements:

Each lift of the surface course shall not vary more than ¼ inch from a Contractor-supplied 10 foot straightedge. For all other lifts, the tolerance shall be ⅜ inch. Such tolerance will apply to all paved areas.

Any surface that exhibits these characteristics or exceeds these tolerances shall be corrected by the Contractor at its own expense.

7. Longitudinal Joint Construction Methods: The Contractor shall use Method I- Notched Wedge Joint (see Figure 4.06-1) when constructing longitudinal joints where lift thicknesses are between 1½ and 3 inches. S1.0 mixtures shall be excluded from using Method I. Method II Butt Joint (see Figure 4.06-2) shall be used for lifts less than 1½ inches or greater than or equal to 3 inches. During placement of multiple lifts, the longitudinal joint shall be constructed in such a

manner that it is located at least 6 inches from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines. Each longitudinal joint shall maintain a consistent offset from the centerline of the roadway along its entire length. The difference in elevation between the two faces of any completed longitudinal joint shall not exceed $\frac{1}{4}$ inch in any location.

Method I - Notched Wedge Joint:

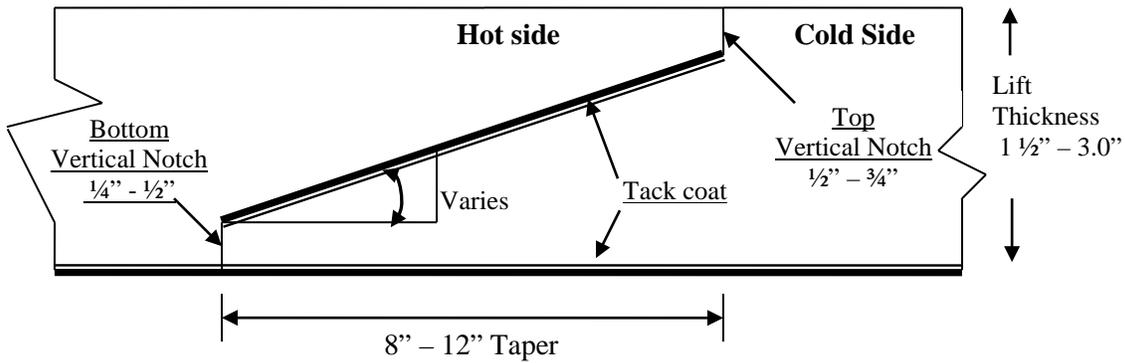


FIGURE 4.06-1: Notched Wedge Joint

A notched wedge joint shall be constructed as shown in Figure 4.06-1 using a device that is attached to the paver screed and is capable of independently adjusting the top and bottom vertical notches. The device shall have an integrated vibratory system.

The taper portion of the wedge joint must be placed over the longitudinal joint in the lift immediately below. The top vertical notch must be located at the centerline or lane line in the final lift. The requirement for paving full width “curb to curb” as described in Method II may be waived if addressed in the QC plan and approved by the Engineer.

The taper portion of the wedge joint shall be evenly compacted using equipment other than the paver or notch wedge joint device.

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

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

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

If Method I, Notched Wedge Joint cannot be used on lifts between 1.5 and 3 inches, Method III Butt Joint may be substituted according to the requirements below for “Method III – Butt Joint with Hot Pour Rubberized Asphalt Treatment.”

Method II - Butt Joint:

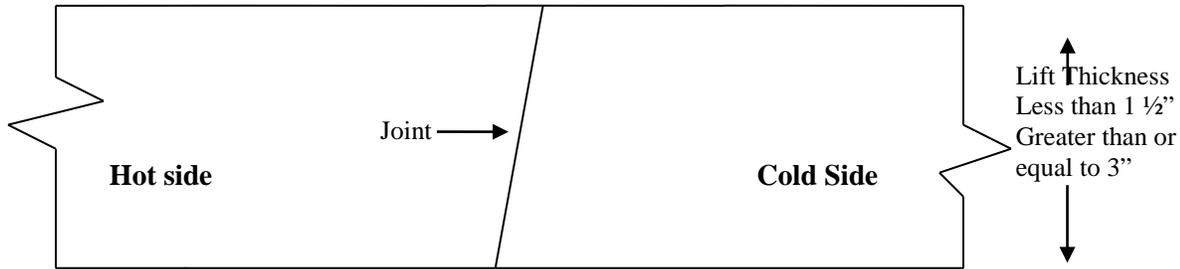


FIGURE 4.06-2: Butt Joint

When adjoining passes are placed, the Contractor shall utilize equipment that creates a near vertical edge (refer to Figure 4.06-2). The completing pass (hot side) shall have sufficient mixture so that the compacted thickness is not less than the previous pass (cold side). The end gate on the paver should be set so there is an overlap onto the cold side of the joint.

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

Method III- Butt Joint with Hot Poured Rubberized Asphalt Treatment: If Method I Wedge Joint cannot be used due to physical constraints in certain limited locations; the contractor may submit a request in writing for approval by the Engineer, to utilize Method III Butt Joint as a substitution in those locations. There shall be no additional measurement or payment made when the Method III Butt Joint is substituted for the Method I Notched Wedge Joint. When required by the contract or approved by the Engineer, Method III (see Figure 4.06-3) shall be used.

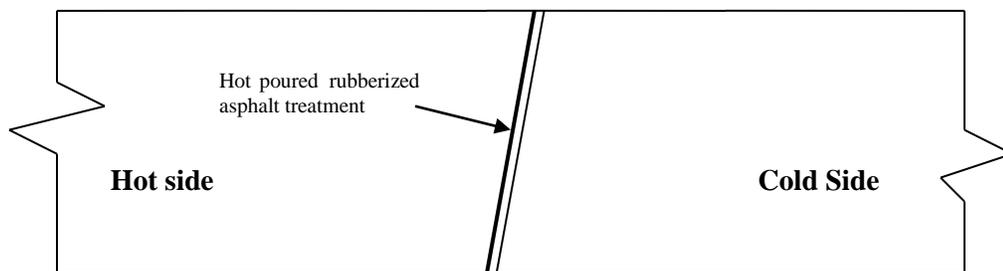


FIGURE 4.06-3: Butt Joint with Hot Poured Rubberized Asphalt Treatment

All of the requirements of Method II must be met with Method III. In addition, the longitudinal vertical edge must be treated with a rubberized joint seal material meeting the requirements of ASTM D 6690, Type 2. The joint sealant shall be placed on the face of the “cold side” of the butt joint as shown above prior to placing the “hot side” of the butt joint. The joint seal material shall be applied in accordance with the manufacturer’s recommendation so as to provide a uniform coverage and avoid excess bleeding onto the newly placed pavement.

8. Contractor Quality Control (QC) Requirements: The Contractor shall be responsible for maintaining adequate quality control procedures throughout the production and placement operations. Therefore, the Contractor must ensure that the materials, mixture and work provided by Subcontractors, Suppliers and Producers also meet contract specification requirements.

This effort must be documented in Quality Control Plans and address the actions, inspection, or sampling and testing necessary to keep the production and placement operations in control, to determine when an operation has gone out of control and to respond to correct the situation in a timely fashion.

The Standard QCP for production shall consist of the quality control program specific to the production facility.

There are three components to the QCP for placement: a Standard QCP, a Project Summary Sheet that details project specific information, and if applicable a separate Extended Season Paving Plan as required in Section 9 “Temperature and Seasonal Requirements”.

The Standard QCP for both production and placement shall be submitted to the Department for approval each calendar year and at a minimum of 30 days prior to production or placement.

Production or placement shall not occur until all QCP components have been approved by the Engineer.

Each QCP shall include the name and qualifications of a Quality Control Manager (QCM). The QCM shall be responsible for the administration of the QCP, and any modifications that may become necessary. The QCM shall have the ability to direct all Contractor personnel on the project during paving operations. All Contractor sampling, inspection and test reports shall be reviewed and signed by the QCM prior to submittal to the Engineer. The QCPs shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor.

Approval of the QCP does not relieve the Contractor of its responsibility to comply with the project specifications. The Contractor may modify the QCPs as work progresses and must document the changes in writing prior to resuming operations. These changes include but are not limited to changes in quality control procedures or personnel. The Department reserves the right to deny significant changes to the QCPs.

QCP for Production: Refer to Section M.04.03-1.

QCP for Placement: The Standard QCP, Project Summary Sheet, and Extended Season Paving Plan shall conform to the format provided by the Engineer. The format is available at http://www.ct.gov/dot/lib/dot/documents/dconstruction/pat/qcp_outline_hma_placement.pdf.

The Contractor shall perform all quality control sampling and testing, provide inspection, and exercise management control to ensure that placement conforms to the requirements as outlined in its QCP during all phases of the work. The Contractor shall document these activities for each day of placement.

The Contractor shall submit complete field density testing and inspection records to the Engineer within 48 hours in a manner acceptable to the Engineer.

The Contractor may obtain one (1) mat core and one (1) joint core per day for process control, provided this process is detailed in the QCP. The results of these process control cores shall not be used to dispute the Department determinations from the acceptance cores. The Contractor shall submit the location of each process control core to the Engineer for approval prior to taking the core. The core holes shall be filled to the same requirements described in sub-article 4.06.03-10.

9. Temperature and Seasonal Requirements: Paving, including placement of temporary pavements, shall be divided into two seasons, “In-Season” and “Extended-Season”. In-Season paving occurs from May 1 – October 14, and Extended Season paving occurs from October 15- April 30. The following requirements shall apply unless otherwise authorized or directed by the Engineer:

- Mixtures shall not be placed when the air or sub base temperature is less than 40°F regardless of the season.
- Should paving operations be scheduled during the Extended Season, the Contractor must submit an Extended Season Paving Plan for the project that addresses minimum delivered mix temperature considering WMA, PMA or other additives, maximum paver speed, enhanced rolling patterns and the method to balance mixture delivery and placement operations. Paving during Extended Season shall not commence until the Engineer has approved the plan.

10. Obtaining Bituminous Concrete Cores: This Section describes the methodology and sampling frequency the Contractor shall use to obtain pavement cores.

Coring shall be performed on each lift specified to a thickness of one and one-half (1 ½) inches or more within 5 days of placement. The Contractor shall extract cores (4 or 6 inch diameter for S0.25, S0.375 and S0.5 mixtures 6 inch diameter for S1.0 mixtures) from locations determined

by the Engineer. The Engineer must witness the extraction, labeling of cores and filling of the core holes.

A density lot will be complete when the full designed paving width and length of the lot has been placed and shall include all longitudinal joints between the curb lines. HMA S1 mixes are excluded from the longitudinal joint density requirements.

A standard density lot is the quantity of material placed within the defined area exclusive of any structures. A combo density lot is the quantity of material placed within the defined area inclusive of structures less than or equal to 500 feet long. A bridge density lot is the quantity of material placed on a structure larger than 500 feet in length.

Prior to paving, the type and number of lot (s) shall be determined by the Engineer. The number of cores per lot shall be determined in accordance to Tables 4.06-4, 4.06-5A and 4.06-5B. Noncontiguous areas such as highway ramps may be combined to create one lot. Combined areas should be set up to target a 2000 ton lot size. The longitudinal locations of mat cores within a lot containing multiple paving passes will be determined using the total distance covered by the paver. The locations of the joint cores will be determined using the total length of longitudinal joints within the lot.

Sampling is in accordance with the following tables:

TABLE 4.06-4: Bridge Density Lot(s)

Length of Each Structure (Feet)	No. of Mat Cores	No. of Joint Cores
≤ 500'	See Table 4.06-5(A or B)	See Table 4.06-5(A or B)
501' – 1500'	3	3
1501' – 2500'	4	4
2501' and greater	5	5

All material placed on structures less than or equal to 500 feet in length shall be included as part of a standard lot as follows:

TABLE 4.06-5A: Standard and Combo Density Lot(s) ≥ 500 Tons

Lot Type	No. of Mat Cores		No. of Joint Cores		Target Lot Size (Tons)
Standard Lot / Without Bridge (s)	4		4		2000
Combo Lot / Lot With Bridge(s) ⁽¹⁾	4 plus	1 per structure (≤ 300')	4 plus	1 per structure (≤ 300')	2000
		2 per structure (301' – 500')		2 per structure (301' – 500')	

TABLE 4.06-5B: Standard and Combo Density Lot < 500 Tons

Lot Type	No. of Mat Cores		No. of Joint Cores	
Standard Lot / Without Bridge (s)	3		3	
Combo Lot / Lot With Bridge(s) ⁽¹⁾	2 plus	1 per structure	2 plus	1 per structure

Note:

⁽¹⁾ If a combo lot mat or joint core location randomly falls on a structure, the core is to be obtained on the structure in addition to the core(s) required on the structure.

After the lift has been compacted and cooled, the Contractor shall cut cores to a depth equal to or greater than the lift thickness and remove them without damaging the lift(s) to be tested. Any core that is damaged or obviously defective while being obtained will be replaced with a new core from a location within 2 feet measured in a longitudinal direction.

A mat core shall not be located any closer than one foot from the edge of a paver pass. If a random number locates a core less than one foot from any edge, the location will be adjusted by the Engineer so that the outer edge of the core is one foot from the edge of the paver pass.

Method I, Notched Wedge Joint cores shall be taken so that the center of the core is 5 inches from the visible joint on the hot mat side (Figure 4.06-5).

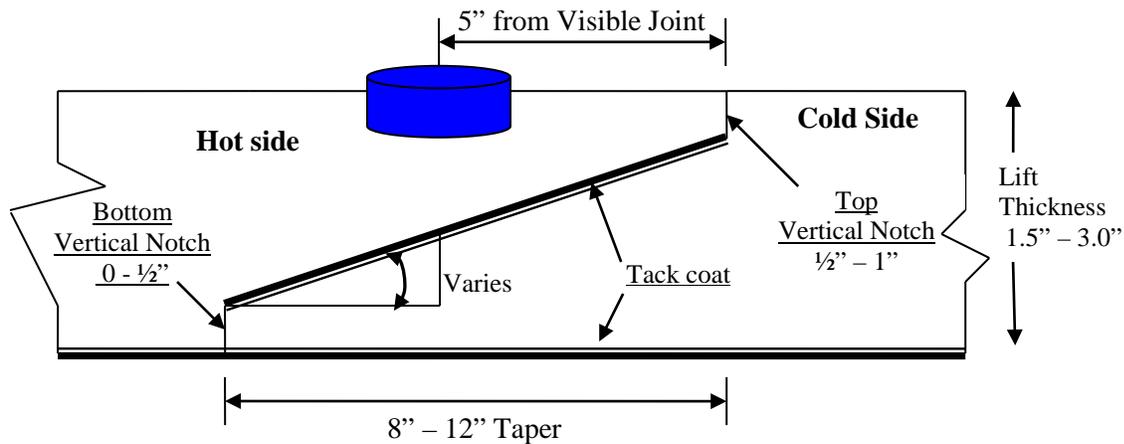


FIGURE 4.06-5: Notched Wedge Joint Cores

When Method II or Method III Butt Joint is utilized, cores shall be taken from the hot side so the edge of the core is within 1 inch of the longitudinal joint.

The cores shall be labeled by the Contractor with the project number, date placed, lot number and sub-lot number. The core's label shall, include "M" for a mat core and "J" for a joint core. A mat core from the second lot and first sub-lot shall be labeled "M2 - 1" (Figure 4.06-4). The Engineer shall fill out a MAT-109 to accompany the cores. The Contractor shall deliver the

cores and MAT-109 to the Department's Central Lab. The Contractor shall use a container approved by the Engineer. The container shall have a lid capable of being locked shut and tamper proof. The Contractor shall use foam, bubble wrap, or another suitable material to prevent the cores from being damaged during handling and transportation. Once the cores and MAT-109 are in the container the Engineer will secure the lid using a security seal. The security seal's identification number must be documented on the MAT-109. Central Lab personnel will break the security seal and take possession of the cores.

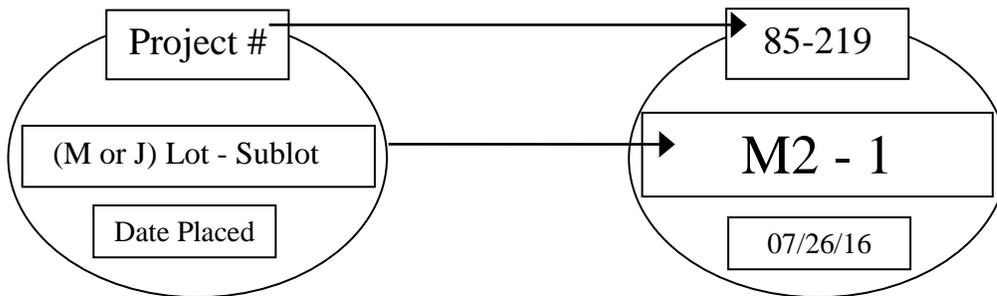


FIGURE 4.06-4: Labeling of Cores

Each core hole shall be filled within four hours upon core extraction. Prior to being filled, the hole shall be prepared by removing any free water and applying tack coat using a brush or other means to uniformly cover the cut surface. The core hole shall be filled using a bituminous concrete mixture at a minimum temperature of 240°F containing the same or smaller nominal maximum aggregate size and compacted with a hand compactor or other mechanical means to the maximum compaction possible. The bituminous concrete shall be compacted to 1/8 inch above the finished pavement.

11. Acceptance Sampling and Testing: Sampling and testing shall be performed at a frequency not less than the minimum frequency specified in Section M.04 and sub-article 4.06.03-10.

Sampling shall be performed in accordance with ASTM D 3665, or a statistically based procedure of stratified random sampling approved by the Engineer.

Plant Material Acceptance: The Contractor shall provide the required sampling and testing during all phases of the work in accordance with Section M.04. The Department will verify the Contractor's acceptance test results. Should any test results exceed the specified tolerances in the Department's current QA Program for Materials, the Contractor test results for a subject lot or sub lot may be replaced with the Department's results for the purpose of calculating adjustments. The verification procedure is included in the Department's current QA Program for Materials.

Density Acceptance: The Engineer will perform all acceptance testing in accordance with AASHTO T 331. The density of each core will be determined using the daily production's

average maximum theoretical specific gravity (Gmm) established during the testing of the parent material at the Plant. When there was no testing of the parent material or any Gmm exceeds the specified tolerances in the Department's current QA Program for Materials, the Engineer will determine the maximum theoretical density value to be used for density calculations.

12. Density Dispute Resolution Process: The Contractor and Engineer will work in partnership to avoid potential conflicts and to resolve any differences that may arise during quality control or acceptance testing for density. Both parties will review their sampling and testing procedures and results and share their findings. If the Contractor disputes the Engineer's test results, the Contractor must submit in writing a request to initiate the Dispute Resolution Process within 7 calendar days of the notification of the test results. No request for dispute resolution will be allowed unless the Contractor provides quality control results within the timeframe described in sub-article 4.06.03-9 supporting its position. No request for Dispute Resolution will be allowed for a Density Lot in which any core was not taken within the required 5 calendar days of placement. Should the dispute not be resolved through evaluation of existing testing data or procedures, the Engineer may authorize the Contractor to obtain a new set of core samples per disputed lot. The core samples must be extracted no later than 14 calendar days from the date of Engineer's authorization.

The number and location (mat, joint, or structure) of the cores taken for dispute resolution must reflect the number and location of the original cores. The location of each core shall be randomly located within the respective original sub lot. All such cores shall be extracted and the core hole filled using the procedure outlined in Article 4.06.03. The dispute resolution results shall be added to the original results and averaged for determining the final in-place density value.

13. Corrective Work Procedure:

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

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

- b) Any corrective courses placed as the final wearing surface shall match the specified lift thickness after compaction.

14. Protection of the Work: The Contractor shall protect all sections of the newly finished pavement from damage that may occur as a result of the Contractor's operations for the duration of the Project.

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

4.06.04—Method of Measurement:

1. HMA S* or PMA S*: The quantity of bituminous concrete measured for payment will be determined by the documented net weight in tons accepted by the Engineer in accordance with this specification and Section M.04.

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

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

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

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

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

Tons Adjusted for Area (T_A) = [(L x W_{adj})/9] x (t) x 0.0575 Tons/SY/inch = (-) Tons

Where: L = Length (ft)

(t) = Actual thickness (inches)

W_{adj} = (Designed width (ft) + tolerance /12) - Measured Width

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

Tons Adjusted for Thickness (T_T) = A x t_{adj} x 0.0575 = (-) Tons

Where: A = Area = {[L x (Designed width + tolerance (lift thickness)/12)] / 9}

t_{adj} = Adjusted thickness = [(Dt + tolerance) - Actual thickness]

Dt = Designed thickness (inches)

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

$$\text{Tons Adjusted for Weight (Tw)} = \text{GVW} - \text{DGW} = (-) \text{Tons}$$

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

- d) Mixture Adjustment: The quantity of bituminous concrete representing the production lot at the Plant will be adjusted as follow:

- i. Non-PWL Production Lot (less than 3500 tons):

The adjustment values in Table 4.06-6 and 4.06-7 shall be calculated for each sub lot based on the Air Void (AV) and Asphalt Binder Content (PB) test results for that sub lot. The total adjustment for each day's production (lot) will be computed using tables and the following formulas:

$$\text{Tons Adjusted for Superpave Design (TSD)} = [(\text{AdjAV}_t + \text{AdjPB}_t) / 100] \times \text{Tons}$$

$$\text{Percent Adjustment for Air Voids} = \text{AdjAV}_t = [\text{AdjAV}_1 + \text{AdjAV}_2 + \text{AdjAV}_i + \dots + \text{AdjAV}_n] / n$$

Where: AdjAV_t = Total percent air void adjustment value for the lot

AdjAV_i = Adjustment value from Table 4.06-7 resulting from each sub lot or the average of the adjustment values resulting from multiple tests within a sub lot, as approved by the Engineer.

n = number of sub lots based on Table M.04.03-2

TABLE 4.06-6: Adjustment Values for Air Voids

Adjustment Value (AdjAV _i) (%)	S0.25, S0.375, S0.5, S1 Air Voids (AV)
+2.5	3.8 - 4.2
+3.125*(AV-3)	3.0 - 3.7
-3.125*(AV-5)	4.3 - 5.0
20*(AV-3)	2.3 - 2.9
-20*(AV-5)	5.1 - 5.7
-20.0	≤ 2.2 or ≥ 5.8

$$\text{Percent Adjustment for Asphalt Binder} = \text{AdjPB}_t = [(\text{AdjPB}_1 + \text{AdjPB}_2 + \text{AdjPB}_i + \dots + \text{AdjPB}_n) / n]$$

Where: AdjPB_t = Total percent asphalt binder adjustment value for the lot

AdjPB_i = Adjustment value from Table 4.06-7 resulting from each sub lot

n = number of binder tests in a production lot

TABLE 4.06-7: Adjustment Values for Binder Content

Adjustment Value (AdjAV_i) (%)	<u>S0.25, S0.375, S0.5, S1</u> Pb
0.0	JMF Pb ± 0.3
- 10.0	≤ JMF Pb - 0.4 or ≥ JMF Pb + 0.4

ii. PWL Production Lot (3500 tons or more):

For each lot, the adjustment values shall be calculated based on PWL for AV, VMA and PB test results. The lot will be considered as being normally distributed and all applicable equations in AASHTO R9 and AASHTO R42 Appendix X4 will apply.

Only one test result will be considered for each sub lot. The specification limits are listed in Section M.04.

For AV, PB and voids in mineral aggregate (VMA), the individual material quality characteristic adjustment (Adj) will be calculated as follow:

For PWL between 50 and 90%: $Adj(AV_t \text{ or } PB_t \text{ or } VMA_t) = (55 + 0.5 \text{ PWL}) - 100$

For PWL at and above 90%: $Adj(AV_t \text{ or } PB_t \text{ or } VMA_t) = (77.5 + 0.25 \text{ PWL}) - 100$

Where:

AdjAV_t = Total percent AV adjustment value for the lot

AdjPB_t = Total percent PB adjustment value for the lot

AdjVMA_t = Total percent VMA adjustment value for the lot

Lots with PWL less than 50% in any of the three individual material quality characteristics will be evaluated under 1.06.04.

The total adjustment for each production lot will be computed using the following formula:

$$\text{Tons Adjusted for Superpave Design (T}_{SD}) = [(0.5AdjAV_t + 0.25AdjPB_t + 0.25AdjVMA_t) / 100] \times \text{Tons}$$

iii. Partial Lots:

Lots with less than 4 sublots will be combined with the prior lot. If there is no prior lot with equivalent material or if the last test result of the prior lot is over 30 calendar days old, the adjustment will be calculated as indicated in 4.06.04-2.d.i.

Lots with 4 or more sublots will be calculated as indicated in 4.06.04-2.d.ii.

- e) **Density Adjustment:** The quantity of bituminous concrete measured for payment in a lift of pavement specified to be 1½ inches or greater may be adjusted for density. Separate density adjustments will be made for each lot and will not be combined to establish one density adjustment. The final lot quantity shall be the difference between the total payable tons for the project and the sum of the previous lots. If either the Mat or Joint adjustment value is “remove and replace”, the density lot shall be removed and replaced (curb to curb).

No positive adjustment will be applied to a Density Lot in which any core was not taken within the required 5 calendar days of placement.

Tons Adjusted for Density (T_D) = [(P_M x .50) + (P_J x .50)] / 100] X Density Lot Tons

Where: T_D = Total tons adjusted for density for each lot

P_M = Mat density percent adjustment from Table 4.06-9

P_J = Joint density percent adjustment from Table 4.06-10

TABLE 4.06-9: Adjustment Values for Pavement Mat density

Average Core Result Percent Mat Density	Percent Adjustment (Bridge and Non-Bridge) ⁽¹⁾⁽²⁾
97.1 - 100	-1.667*(ACRPD-98.5)
94.5 – 97.0	+2.5
93.5 – 94.4	+2.5*(ACRPD-93.5)
92.0 – 93.4	0
90.0 – 91.9	-5*(92-ACRPD)
88.0 – 89.9	-10*(91-ACRPD)
87.0 – 87.9	-30
86.9 or less	Remove and Replace (curb to curb)

TABLE 4.06-10: Adjustment Values for Pavement Joint Density

Average Core Result Percent Joint Density	Percent Adjustment (Bridge and Non-Bridge) ⁽¹⁾⁽²⁾
97.1 – 100	-1.667*(ACRPD-98.5)
93.5 – 97.0	+2.5
92.0 – 93.4	+1.667*(ACRPD-92)
91.0 – 91.9	0
89.0 – 90.9	-7.5*(91-ACRPD)
88.0 – 88.9	-15*(90-ACRPD)
87.0 – 87.9	-30
86.9 or less	Remove and Replace (curb to curb)

⁽¹⁾ ACRPD = Average Core Result Percent Density

⁽²⁾ All Percent Adjustments to be rounded to the second decimal place. For example, 1.667 is to be rounded to 1.67.

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

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

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

5. Material for Tack Coat: The quantity of tack coat will be measured for payment by the number of gallons furnished and applied on the Project and approved by the Engineer. No tack coat material shall be included that is placed in excess of the tolerance described in Article 4.06.03.

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

b. Vehicle Method-

i. Measured by Weight: The number of gallons furnished will be determined by weighing the material on calibrated scales furnished by the Contractor. To convert weight to gallons, one of the following formulas will be used:

$$\text{Tack Coat (gallons at } 60^{\circ}\text{F)} = \frac{\text{Measured Weight (pounds)}}{\text{Weight per gallon at } 60^{\circ}\text{F}}$$

$$\text{Tack Coat (gallons at } 60^{\circ}\text{F)} = \frac{0.996 \times \text{Measured Weight (pounds)}}{\text{Weight per gallon at } 77^{\circ}\text{F}}$$

ii. Measured by automated metering system on the delivery vehicle:

Tack Coat (gallons at 60°F) = Factor (from Table 4.06-11) multiplied by the measured gallons.

TABLE 4.06-11: Factor to Convert Volume of Tack Coat to 60°F

Tack Coat Application Temperature (°F)	Factor	Tack Coat Application Temperature (°F)	Factor
75	0.996	120	0.985
80	0.995	125	0.984
85	0.994	130	0.983
90	0.993	135	0.982
95	0.991	140	0.980
100	0.990	145	0.979
105	0.989	150	0.978
110	0.988	155	0.977
115	0.986	160	0.976

6. Material Transfer Vehicle (MTV): The furnishing and use of a MTV will be measured separately for payment based on the actual number of surface course tons delivered to a paver using the MTV.

4.06.05—Basis of Payment:

1. HMA S* or PMA S*: The furnishing and placing of bituminous concrete will be paid for at the Contract unit price per ton for “HMA S*” or “PMA S*”.

- All costs associated with providing illumination of the work area are included in the general cost of the work.
- All costs associated with cleaning the surface to be paved, including mechanical sweeping, are included in the general cost of the work. All costs associated with constructing longitudinal joints are included in the general cost of the work.

- All costs associated with obtaining cores for acceptance testing and dispute resolution are included in the general cost of the work.

2. Bituminous Concrete Adjustment Costs: The adjustment will be calculated using the formulas shown below if all of the measured adjustments in Article 4.06.04 are not equal to zero. A positive or negative adjustment will be applied to monies due the Contractor.

Production Lot: $[T_T + T_A + T_W + T_{SD}] \times \text{Unit Price} = \text{Est. (P)}$

Density Lot: $T_D \times \text{Unit Price} = \text{Est. (D)}$

Where: Unit Price = Contract unit price per ton per type of mixture

T_* = Total tons of each adjustment calculated in Article 4.06.04

Est. () = Pay Unit represented in dollars representing incentive or disincentive.

The Bituminous Concrete Adjustment Cost item if included in the bid proposal or estimate is not to be altered by the Contractor.

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

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

5. Material for tack coat will be paid for at the Contract unit price per gallon at 60°F for "Material for Tack Coat".

6. The Material Transfer Vehicle (MTV) will be paid at the Contract unit price per ton for a "Material Transfer Vehicle".

<u>Pay Item*</u>	<u>Pay Unit*</u>
HMA S*	ton
PMA S*	ton
Bituminous Concrete Adjustment Cost	est.
Material for Tack Coat	gal.
Material Transfer Vehicle	ton

*For contracts administered by the State of Connecticut, Department of Administrative Services, the pay items and pay units are as shown in contract award price schedule.

SECTION 5.86 - CATCH BASINS, MANHOLES AND DROP INLETS

5.86.01—Description

5.86.02—Materials

5.86.03—Construction Methods

5.86.04—Method of Measurement

5.86.05—Basis of Payment

5.86.01—Description: The work under this Section shall consist of furnishing, preparing, and installing catch basins, manholes and drop inlets (and also the removal, abandonment, alteration, reconstruction, or conversion of such existing structures) in conformity with the lines, grades, dimensions and details shown on the plans.

This Section shall also include resetting or replacing catch basin tops as well as manhole frames and covers.

5.86.02—Materials: The materials for this work shall meet the following requirements:

Drainage structures shall meet the requirements of M.08.02 and shall utilize concrete with a 28-day minimum compressive strength of 4000 psi.

Galvanizing shall meet the requirements of M.06.03.

Mortar shall meet the requirements of M.11.04.

Butyl rubber joint seal shall meet the requirements of ASTM C990.

Granular fill, if necessary, shall meet the requirements of M.02.01.

Protective compound material shall be a type appearing on the Department's Qualified Products List and be acceptable to the Engineer, as specified in M.03.09.

5.86.03—Construction Methods: Drainage trench excavation, including rock in drainage trench excavation and backfilling, shall be performed in accordance with 2.86.03 and the requirements of the plans.

Where a drainage structure is to be installed below the surface, a drainage trench shall be excavated to the required depth, the bottom of which shall be graded to the elevation of the bottom of the proposed drainage structure or to ensure a uniform foundation for the structure.

Where a firm foundation is not encountered at the grades established due to unsuitable material, such as soft, spongy, or unstable soil, the unsuitable material shall be removed and replaced with approved granular fill, thoroughly compacted in lifts not to exceed 6 inches. The Engineer shall be notified prior to removal of the unsuitable material in order to determine the depth of removal necessary.

When rock, as defined in 2.86.01-2, is encountered, work shall be performed in accordance with 2.86.03 and the requirements of the plans.

When a drainage structure outside of proposed drainage trench limits is to be removed, it shall be completely removed and all pipes shall be removed or plugged with cement masonry.

When a drainage structure is to be abandoned, the structure shall be removed to a depth 2 feet below the subgrade or as directed by the Engineer. The floor of the structure shall be broken and all pipes shall be plugged with cement masonry.

Drainage structures shall be constructed in accordance with the plans and the requirements contained herein for the character of the work involved. The provisions of 6.02.03 pertaining to bar reinforcement shall apply except that shop drawings need not be submitted for approval unless called for in the plans, Contract or directed by the Engineer. Welding shall be performed in accordance with the applicable sections of the AWS Structural Welding Code, D1.1.

When it becomes necessary to increase the horizontal dimensions of manholes, catch basins and drop inlets to sizes greater than those shown on the plans in order to provide for multiple pipe installations, large pipes or for other reasons, the Contractor shall construct such manholes, catch basins and drop inlets to modified dimensions as directed by the Engineer.

The surfaces of the tops of all catch basins, and drop inlets shall be given a coat of protective compound material, at the manufacturer's recommended application rate, immediately upon completion of the concrete curing period.

All masonry units shall be laid in full mortar beds.

Metal fittings for catch basins, manholes or drop inlets shall be set in full mortar beds or otherwise secured as shown on the plans.

All inlet and outlet pipes shall be set flush with the inside face of the wall of the drainage structure as shown on the plans. The pipes shall extend through the walls for a sufficient distance beyond the outside surface to allow for satisfactory connections, and the concrete or masonry shall be constructed around them neatly to prevent leakage along their outer surfaces.

When constructing a new drainage structure within a run of existing pipe, the section of existing pipe disturbed by the construction shall be replaced with new pipe of identical type and size extending from the drainage structure to the nearest joint of the existing pipe in accordance with 6.86.03 or as directed by the Engineer.

Backfilling shall be performed in accordance with 2.86.03.

Frames, covers and tops which are to be reset shall be removed from their present beds, the walls or sides shall be rebuilt to conform to the requirements of the new construction and the frames, covers and tops shall be reset as shown on the plans or as directed by the Engineer.

5.86.04—Method of Measurement:

Drainage Trench Excavation: In accordance with 2.86.04, excavation for drainage trench will not be measured for payment but shall be included in the Contract unit price for the type of structure being installed.

Rock in Drainage Trench Excavation: Rock in Drainage Trench Excavation will be measured in accordance with the drainage trench excavation limits described in 2.86.03.

Manholes, Catch Basins and Drop Inlets will be measured as separate units.

Resetting of Manholes, Catch Basins and Drop Inlets will be measured as separate units.

Replacement of frames, covers, and tops will be measured as a unit for catch basin top or manhole frame and cover.

Conversion of drainage structures as specified on the plans, or as directed by the Engineer, including structure reconstruction will be measured for payment as a unit.

Removal or abandonment of drainage structures outside of drainage trench excavation limits, as defined in 2.86.03, will be measured as separate units.

There will be no measurement or direct payment for the application of the protective compound material, the cost of this work shall be considered as included in the general cost of the work.

Measurement for payment for work and materials involved with installing pipes to connect new drainage structures into a run of existing pipe will be as provided for under the applicable Contract items in accordance with 6.86.04.

There will be no measurement or direct payment for plugging existing pipes with cement masonry, the cost of this work will be considered as included in the general cost of the work.

5.86.05—Basis of Payment:

Drainage Trench Excavation for the installation of proposed structures described herein will be paid for under the respective drainage Contract item(s) for which the excavation is being performed, in accordance with the provisions of 2.86.05.

Rock in Drainage Trench Excavation will be paid for in accordance with the provisions of 2.86.05.

Manholes and Catch Basins will be paid for at the Contract unit price for each "Manhole," or "Catch Basin," of the type specified, at "0' to 10' Deep" or "0' to 20' Deep," complete in place, which price shall include all excavation, backfill, materials, equipment, tools and labor incidental thereto.

Drop Inlets will be paid for at the Contract unit price for each "Drop Inlet," of the type specified, complete in place, which price shall include all excavation, backfill, materials, equipment, tools and labor incidental thereto.

Manholes, Catch Basins and Drop Inlets constructed to modified dimensions as directed by the Engineer, will be paid for as follows:

Where the interior floor area has to be increased to accommodate existing field conditions, as measured horizontally at the top of the base of the completed structure, and does not exceed 125% of the interior floor area as shown on the plans for that structure, then the structure shall be paid for at the Contract unit price for each "Manhole," "Catch Basin," or "Drop Inlet" of the type specified. Where the floor area is greater than 125%, the increase in the unit price for the individual structure shall be in direct proportion to the increase of the completed structure interior floor area as compared to the interior floor area as shown on the plans for that structure. Such increased unit price shall include all excavation, materials, equipment, tools, and labor incidental to the completion of the structure.

Reset Units will be paid for at the Contract unit price each for "Reset Manhole," "Reset Catch Basin," or "Reset Drop Inlet," of the type specified, respectively, complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement structure, and all materials, equipment, tools and labor incidental thereto, except when the work requires reconstruction greater than 3 feet, measured vertically, then the entire cost of resetting the unit will be paid for as Extra Work in accordance with the provisions of 1.04.05.

Frames, Covers, and Tops when required in connection with reset units, will be paid for at the Contract unit price each for such "Manhole Frame and Cover" or "(Type) Catch Basin Top," complete in place, including all incidental expense; or when no price exists, the furnishing and placing of such material will be paid for as Extra Work in accordance with the provisions of 1.04.05.

When the catch basin top has a stone or granite curb in its design, the curb or inlet shall be included in the cost of the "(Type) Catch Basin Top."

Conversion of drainage structures will be paid for at the Contract unit price each for "Convert Catch Basin to (Type) Catch Basin," "Convert Catch Basin to (Type) Manhole," or

"Convert Manhole to (Type) Catch Basin," complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement, backfill, all alterations to existing structure, all materials including catch basin frame and grate of the type specified, or manhole frame and cover, all equipment, tools and labor incidental thereto.

The maximum change in elevation of frame under these items shall not exceed 3 feet. Greater depth changes, if required, shall be paid for as Extra Work, in accordance with 1.04.05.

Removal or abandonment of drainage structures outside of drainage trench excavation limits as defined in 2.86.03 will be paid for at the Contract unit price each for "Remove Drainage Structure – 0' to 10' Deep," "Remove Drainage Structure – 0' to 20' Deep," or "Abandon Drainage Structure," which price shall include excavation, cutting of pavement, removal and replacement of pavement, backfill, and all equipment, tools and labor incidental thereto.

Pay Item	Pay Unit
(Type) Catch Basin – 0' to 10' Deep	ea.
(Type) Catch Basin – 0' to 20' Deep	ea.
Manhole (Size) – 0' to 10' Deep	ea.
Manhole (Size) – 0' to 20' Deep	ea.
(Type) Drop Inlet	ea.
Reset Catch Basin	ea.
Reset Manhole	ea.
Reset Drop Inlet	ea.
Convert Catch Basin to (Type) Catch Basin	ea.
Convert Catch Basin to (Type) Manhole	ea.
Convert Manhole to (Type) Catch Basin	ea.
Manhole Frame and Cover	ea.
(Type) Catch Basin Top	ea.
Remove Drainage Structure – 0' to 10' Deep	ea.
Remove Drainage Structure – 0' to 20' Deep	ea.
Abandon Drainage Structure	ea.

SECTION 6.86 - DRAINAGE PIPES, DRAINAGE PIPE ENDS

6.86.01—Description

6.86.02—Materials

6.86.03—Construction Methods

6.86.04—Method of Measurement

6.86.05—Basis of Payment

6.86.01—Description: This work shall consist of furnishing, preparing and installing drainage pipes of the size and type specified, bedding material, joint sealant, rubber gaskets, clamps, collars, grout, grout collars, drainage trench excavation, backfilling or satisfactory disposal of all materials, the removal of which is necessary for the proper completion of the work, connecting proposed drainage systems to existing systems, plugging or abandoning existing pipes and removal of existing pipe within trench limits, as shown on the plans or as directed by the Engineer.

This Section shall also include removal of drainage pipes outside of drainage trench excavation limits, as defined in 2.86.03-1.

6.86.02—Materials: The materials for this work shall meet the following requirements: Drainage Pipe, Drainage Pipe Ends, Sealers, Gaskets and connection hardware shall meet the requirements of M.08.01.

Bedding Material shall meet the requirements of M.08.03-1.

Granular Fill, if necessary, shall meet the requirements of M.02.01.

Brick Masonry shall meet the requirements of M.11.03 and Mortar shall meet the requirements of M.11.04.

Concrete used for Concrete Pipe Connections shall be Class “F” Concrete meeting the requirements of M.03.

6.86.03—Construction Methods:

(1) **Drainage Trench Excavation:** Drainage trench excavation and backfilling shall be performed in accordance with 2.86.03 and the requirements of the plans.

Where drainage pipe is to be laid below the surface, a drainage trench shall be excavated to the required depth, the bottom of which shall be graded to the elevation of the bottom of the bedding material.

Where drainage pipe is to be laid in a fill area, the embankment shall be placed and compacted to a minimum elevation 12 inches above the top of the proposed pipe, whereupon the drainage trench excavation shall be performed and the pipe installed.

(2) **Rock in Drainage Trench Excavation:** When rock, as defined in 2.86.01-2, is encountered, work shall be performed in accordance with 2.86.03 and the requirements of the plans.

(3) **Drainage Pipe Installation:** New or re-laid drainage pipes shall be installed on 4 inches of bedding material (12 inches if over rock in ledge formation), the details as shown on the plans, or as directed by the Engineer. Prior to placement of the drainage pipe, in accordance with the plans, bedding material shall be pre-shaped to 10% of the total height

of the pipe in order to keep the pipe in the center of the trench. Following placement of the drainage pipe, bedding material backfill shall be placed in accordance with the following table:

Internal Pipe Diameter	Required Bedding Material Backfill
< 48 inches *	25% of total height of the pipe
≥ 48 inches *	12 inches above the top of the pipe
*Includes pipe arch of equivalent internal horizontal span See Standard Drawing	

The placement of the drainage pipe shall start at the downstream end and progress upstream or as shown on the plans, or as directed by the Engineer. All drainage pipes shall be carefully laid in the center of the drainage trench, true to the lines and grades given. Bell ends shall face upgrade and all joints shall be tight.

Joints in concrete pipe shall be sealed with cold-applied bituminous sealer, preformed plastic gaskets or flexible, watertight, rubber-type gaskets. Portland cement mortar shall not be used for sealing pipe joints except with permission of the Engineer.

When cold-applied bituminous sealer is used, the bell and spigot ends shall be wiped clean and dry before applying the bituminous sealer to the pipe ends. Before the drainage pipes are placed in contact with each other, the spigot or tongue end shall be completely covered with bituminous sealer; then the pipe shall be laid to line and grade so the inside surface of all abutting pipes are flush. Additional bituminous sealer shall be applied to the joint after the connection has been made to ensure a water tight connection.

Where the end of an existing drainage pipe is not compatible with the end of a proposed concrete pipe, the Contractor shall align the inner diameters of the pipes being connected, butt the pipe ends together, and construct a cast-in-place concrete pipe connection, as shown in the plans. Incompatible bell/spigot or tongue/groove ends shall be cut off as required to ensure the interior drainage pipe walls are aligned to provide a smooth transition between the pipes.

Metal pipe and pipe arches shall be carefully joined and firmly clamped together by approved connecting bands, which shall be properly bolted in place before any backfill is placed.

Newly installed drainage pipe which is not in true alignment, or which shows any settlement or distortion, shall be reinstalled in accordance with 1.05.03.

When drainage pipe outside of proposed drainage trench limits is to be removed, it shall be removed to the limits shown on the plans and all remaining pipes shall be plugged with cement masonry.

Where shown on the plans or directed by the Engineer, the Contractor shall plug abandoned existing pipes with cement masonry.

(4) Drainage Pipe End Installation: Reinforced concrete drainage pipe ends shall be placed on a prepared bed of the existing ground and accurately aligned as shown on the plans. The joints shall be sealed as specified in 6.86.03-3 and backfill shall be placed around both sides of the unit simultaneously to the elevation shown on the plans.

Metal drainage pipe ends shall be placed on a prepared bed of the existing ground and accurately aligned as shown on the plans. After the attachment of the drainage pipe end, backfill shall be placed around both sides of the unit up to the elevation shown on the plans, exercising caution to avoid displacement or deformation of the unit.

6.86.04—Method of Measurement: This work will be measured as follows:

Drainage Trench Excavation, in accordance with 2.86.04, will not be measured for payment.

Rock in Drainage Trench Excavation will be measured in accordance with 2.86.04.

Bedding Material will not be measured for payment.

New and Re-laid Pipes and Pipe Arches will be measured for payment by the actual number of linear feet of pipe or pipe arch of the various sizes and types, completed and accepted and measured in place along the invert. Coupling bands and fittings for pipes and pipe arches will not be measured for payment.

Reinforced Concrete Drainage Pipe Ends and Metal Drainage Pipe Ends will be measured for payment as separate units.

Corrugated Metal Pipe Elbows (of the Size and Type specified) will be measured for payment by the actual number of linear feet of pipe elbows completed and accepted, based on 6 linear feet per elbow, as shown on the plans. Coupling bands for elbows will not be measured for payment.

Concrete Pipe Connection will be measured for payment by the number of each concrete pipe connection constructed at locations where proposed concrete pipes tie into an existing pipe with an incompatible end, completed and accepted by the Engineer.

Removal of drainage pipe outside of drainage trench excavation limits, as defined in 2.86.03, will be measured for payment by the actual number of linear feet of drainage pipe removed.

There will be no measurement for plugging existing pipes with cement masonry.

6.86.05—Basis of Payment:

Drainage Trench Excavation for the installation of drainage pipes will not be paid separately but shall be included in the Contract unit price for the respective drainage pipe or pipe end item(s), in accordance with the provisions of 2.86.05.

Rock in Drainage Trench Excavation will be paid for in accordance with the provisions of 2.86.05.

Bedding Material necessary for the installation of drainage items described herein will be included in the Contract unit price for the respective drainage pipe or pipe end item(s). Bedding material required to fill voids when rock in drainage trench is encountered will not be measured for payment but shall be included in the Contract unit price for "Rock in Drainage Trench Excavation," in accordance with 2.86.05.

New Pipes and Pipe Arches will be paid for at the Contract unit price per linear foot for "(Size and Type) Pipe (Thickness) – 0' to 10' Deep," "(Size and Type) Pipe (Thickness) – 0' to 20' Deep," "(Size) Pipe Arch (Thickness) – 0' to 10' Deep" or "(Size) Pipe Arch (Thickness) – 0' to 20' Deep" complete in place, including materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

Relaid Pipes and Pipe Arches will be paid for at the Contract unit price per linear foot for "Relaid Pipe (Size and Type) – 0' to 10' Deep," "Re-laid Pipe (Size and Type) – 0' to 20' Deep," "Relaid Pipe Arch (Size and Type) – 0' to 10' Deep," or "Relaid Pipe Arch (Size and Type) – 0' to 20' Deep," complete in place, including all materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

Reinforced Concrete Drainage Pipe Ends and Metal Drainage Pipe Ends will be paid for at the Contract unit price for each drainage pipe end of the Size and Type specified, complete in place, including all excavation, materials, attachment systems, equipment, tools and labor incidental thereto.

Corrugated Metal Pipe Elbows will be paid for at the Contract unit price per linear foot for "(Size and Type) Corrugated Metal Pipe Elbow" including all materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

Concrete Pipe Connection will be paid for at the Contract unit price each for "Concrete Pipe Connection" complete in place, including all materials, equipment, tools and labor incidental thereto.

Removal of drainage pipes of all types and sizes, outside of drainage trench excavation limits, as defined in 2.86.03-1, will be paid for at the Contract unit price per linear foot for "Remove Existing Pipe – 0' to 10' Deep," or "Remove Existing Pipe – 0' to 20' Deep," which price shall include excavation, temporary trench protection, backfill, and all equipment, tools and labor incidental thereto.

There will be no direct payment for the plugging of existing drainage pipes, but the cost thereof shall be included in the respective drainage Contract item(s).

Pay Item	Pay Unit
(Size and Type) Pipe (Thickness) – 0' to 10' Deep	l.f.
(Size and Type) Pipe (Thickness) – 0' to 20' Deep	l.f.
(Size and Type) Pipe Arch (Thickness) – 0' to 10' Deep	l.f.
(Size and Type) Pipe Arch (Thickness) – 0' to 20' Deep	l.f.
Relaid (Size and Type) Pipe– 0' to 10' Deep	l.f.
Relaid (Size and Type) Pipe– 0' to 20' Deep	l.f.
(Size and Type) Relaid Pipe Arch – 0' to 10' Deep	l.f.
(Size and Type) Relaid Pipe Arch – 0' to 20' Deep	l.f.
(Size) Reinforced Concrete Drainage Pipe End	ea.
(Size) Metal Drainage Pipe End	ea.
(Size and Type) Corrugated Metal Pipe Elbow	l.f.
Concrete Pipe Connection	ea.
Remove Existing Pipe – 0' to 10' Deep	l.f.
Remove Existing Pipe – 0' to 20' Deep	l.f.

SECTION M.04 BITUMINOUS CONCRETE MATERIALS

Section M.04 is being deleted in its entirety and replaced with the following:

M.04.01—Bituminous Concrete Materials and Facilities

M.04.02—Mix Design and Job Mix Formula (JMF)

M.04.03—Production Requirements

M.04.01—Bituminous Concrete Materials and Facilities: Each source of component material, Plant and laboratory used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. AASHTO or ASTM Standards noted with an (M) have been modified and are detailed in Table M.04.03-6.

Aggregates from multiple sources of supply must not be blended or stored in the same stockpile.

1. Coarse Aggregate:

All coarse aggregate shall meet the requirements listed in Section M.01.

2. Fine Aggregate:

All fine aggregate shall meet the requirements listed in Section M.01

3. Mineral Filler:

Mineral filler shall conform to the requirements of AASHTO M 17.

4. Performance Graded (PG) Asphalt Binder:

a. General:

i. PG asphalt binder shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binder shall be properly heated and stored to prevent damage or separation.

ii. The binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29. The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in accordance with AASHTO R 26(M). The Certified Test Report must also indicate the binder specific gravity at 77°F; rotational viscosity at 275°F and 329°F and the mixing and compaction viscosity-temperature chart for each shipment.

iii. The Contractor shall submit the name(s) of personnel responsible for receipt, inspection, and record keeping of PG binder. Contractor plant personnel shall document specific storage tank(s) where binder will be transferred and stored until used, and provide binder samples to the Engineer upon request. The person(s) shall assure that each shipment is accompanied by a statement certifying that the transport vehicle was inspected before loading and was found acceptable for the material

shipped, and, that the binder is free of contamination from any residual material, along with two (2) copies of the bill of lading.

iv. The blending or combining of PG binders in one storage tank at the Plant from different suppliers, grades, or additive percentages is prohibited.

b. Basis of Approval:

The request for approval of the source of supply shall list the location where the material will be manufactured, and the handling and storage methods, along with necessary certification in accordance with AASHTO R 26(M). Only suppliers/refineries that have an approved "Quality Control Plan for Performance Graded Binders" formatted in accordance with AASHTO R 26(M) may supply PG binders to Department projects.

c. Standard Performance Grade (PG) Binder:

i. Standard PG binder shall be defined as "Neat". Neat PG binders shall be free from modification with: fillers, extenders, reinforcing agents, adhesion promoters, thermoplastic polymers, acid modification and other additives such as re-refined motor oil, and shall indicate such information on each bill of lading and certified test report.

ii. The standard asphalt binder grade shall be PG 64S-22.

d. Modified Performance Grade (PG) Binder:

The modified asphalt binder shall be Performance Grade PG 64E-22 asphalt modified solely with a Styrene-Butadiene-Styrene (SBS) polymer. The polymer modifier shall be added at either the refinery or terminal and delivered to the bituminous concrete production facility as homogenous blend. The stability of the modified binder shall be verified in accordance with ASTM D7173 using the Dynamic Shear Rheometer (DSR). The DSR $G^*/\sin(\delta)$ results from the top and bottom sections of the ASTM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report. The binder shall meet the requirements of AASHTO M 332 (including Appendix X1) and AASHTO R 29.

e. Warm Mix Additive or Technology:

i. The warm mix additive or technology must be listed on the North East Asphalt User Producer Group (NEAUPG) Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at <http://www.neaupg.uconn.edu>.

ii. The warm mix additive shall be blended with the asphalt binder in accordance with the manufacturer's recommendations.

iii. The blended binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29 for the specified binder grade. The Contractor shall submit a Certified Test Report showing the results of the testing demonstrating the binder grade. In addition, it must include the grade of the virgin

binder, the brand name of the warm mix additive, the manufacturer's suggested rate for the WMA additive, the water injection rate (when applicable) and the WMA Technology manufacturer's recommended mixing and compaction temperature ranges.

5. Emulsified Asphalts:

a. General:

- i. The emulsified asphalt shall meet the requirements of AASHTO M 140 or AASHTO M 208 as applicable.
- ii. The emulsified asphalts shall be free of contaminants such as fuel oils and other solvents.
- iii. The blending at mixing plants of emulsified asphalts from different suppliers is prohibited.

b. Basis of Approval

- i. The request for approval of the source of supply shall list the location where the material is manufactured, the handling and storage methods, and certifications in accordance with AASHTO PP 71. Only suppliers that have an approved "Quality Control Plan for Emulsified Asphalt" formatted in accordance with AASHTO PP 71 and submit monthly split samples per grade to the Engineer may supply emulsified asphalt to Department projects.
- ii. Each shipment of emulsified asphalt delivered to the project site shall be accompanied with the corresponding Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon at 77°F and Material Certificate.
- iii. Anionic emulsified asphalts shall conform to the requirements of AASHTO M-140. Materials used for tack coat shall not be diluted and meet grade RS-1 or RS-1H. When ambient temperatures are 80°F and rising, grade SS-1 or SS-1H may be substituted if permitted by the Engineer.
- iv. Cationic emulsified asphalt shall conform to the requirements of AASHTO M-208. Materials used for tack coat shall not be diluted and meet grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the Engineer. When ambient temperatures are 80°F and rising, grade CSS-1 or CSS-1H may be substituted if permitted by the Engineer.

6. Reclaimed Asphalt Pavement (RAP):

- a. General: RAP is a material obtained from the cold milling or removal and processing of bituminous concrete pavement. RAP material shall be crushed to 100% passing the ½ inch sieve and free from contaminants such as joint compound, wood, plastic, and metals.
- b. Basis of Approval: The RAP material will be accepted on the basis of one of the following criteria:
 - i. When the source of all RAP material is from pavements previously constructed on Department projects, the Contractor shall provide a Materials Certificate listing the detailed locations and lengths of those pavements and that the RAP is only from those locations listed.
 - ii. When the RAP material source or quality is not known, the Contractor shall request for approval to the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a Material Certificate and applicable test results stating that the RAP consists of aggregates that meet the specification requirements of sub articles M.04.01-1 through 3, and, that the binder in the RAP is substantially free of solvents, tars and other contaminants. The Contractor is prohibited from using unapproved material on Department projects and shall take necessary action to prevent contamination of approved RAP stockpiles. Stockpiles of unapproved material shall remain separate from all other RAP materials at all times. The request for approval shall include the following:
 - 1. A 50-pound sample of the RAP to be incorporated into the recycled mixture.
 - 2. A 25-pound sample of the extracted aggregate from the RAP.

7. Crushed Recycled Container Glass (CRCG):

- a. Requirements: The Contractor may propose to use clean and environmentally-acceptable CRCG in an amount not greater than 5% by weight of total aggregate.
- b. Basis of Approval: The Contractor shall submit to the Engineer a request to use CRCG. The request shall state that the CRCG contains no more than 1% by weight of contaminants such as paper, plastic and metal and conform to the following gradation:

CRCG Grading Requirements	
<u>Sieve Size</u>	<u>Percent Passing</u>
3/8-inch	100
No. 4	35-100
No. 200	0.0-10.0

The Contractor shall submit a Materials Certificate to the Engineer stating that the CRCG complies with all the applicable requirements in this specification.

8. Joint Seal Material:

- a. Requirements: Joint seal material must meet the requirements of ASTM D 6690 – Type 2. The Contractor shall submit a Material Certificate in accordance with Article 1.06.07 certifying that the joint seal material meets the requirements of this specification.

9. Recycled Asphalt Shingles (RAS)

- a. Requirements: RAS shall consist of processed asphalt roofing shingles from post-consumer asphalt shingles or from manufactured shingle waste. The RAS material under consideration for use in bituminous concrete mixtures must be certified as being asbestos free and shall be entirely free of whole, intact nails. The RAS material shall meet the requirements of AASHTO MP 23.

The producer shall test the RAS material to determine the asphalt content and the gradation of the RAS material. The producer shall take necessary action to prevent contamination of RAS stockpiles.

The Contractor shall submit a Materials Certificate to the Engineer stating that the RAS complies with all the applicable requirements in this specification.

10. Plant Requirements:

- a. General: The Plant producing bituminous concrete shall comply with AASHTO M 156.
- b. Storage Silos: The Contractor may use silos for short-term storage with the approval of the Engineer. A silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. When multiple silos are filled, the Contractor shall discharge one silo at a time. Simultaneous discharge of multiple silos for the same Project is not permitted.

<u>Type of silo cylinder</u>	<u>Maximum storage time for all classes (hr)</u>	
	HMA	WMA/PMA
Open Surge	4	Mfg Recommendations*
Unheated – Non-insulated	8	Mfg Recommendations*
Unheated – Insulated	18	Mfg Recommendations*
Heated – No inert gas	TBD by the Engineer	

*Not to exceed HMA limits

- c. Documentation System: The mixing plant documentation system shall include equipment for accurately proportioning the components of the mixture by weight and in the proper order, controlling the cycle sequence and timing the mixing operations. Recording equipment shall monitor the batching sequence of each component of the

mixture and produce a printed record of these operations on each Plant ticket, as specified herein.

If recycled materials are used, the Plant tickets shall include their dry weight, percentage and daily moisture content.

If a WMA Technology is added at the Plant, the Plant tickets shall include the actual dosage rate.

For drum Plants, the Plant ticket shall be produced at 5 minute intervals and maintained by the vendor for a period of three years after the completion of the project.

For batch Plants, the Plant ticket shall be produced for each batch and maintained by the vendor for a period of three years after the completion of the project. In addition, an asterisk (*) shall be automatically printed next to any individual batch weight(s) exceeding the following tolerances:

Each Aggregate Component	±1.5% of individual or cumulative target weight for each bin
Mineral Filler	±0.5% of the total batch
Bituminous Material	±0.1% of the total batch
Zero Return (Aggregate)	±0.5% of the total batch
Zero Return (Bituminous Material)	±0.1% of the total batch

The entire batching and mixing interlock cut-off circuits shall interrupt and stop the automatic batching operations when an error exceeding the acceptable tolerance occurs in proportioning.

The scales shall not be manually adjusted during the printing process. In addition, the system shall be interlocked to allow printing only when the scale has come to a complete rest. A unique printed character (m) shall automatically be printed on the ticket when the automatic batching sequence is interrupted or switched to auto-manual or full manual during proportioning.

- d. Aggregates: Aggregate stockpiles shall be managed to prevent segregation and cross contamination. For drum plants only, the percent moisture content at a minimum prior to production and half way through production shall be determined.
- e. Mixture: The dry and wet mix times shall be sufficient to provide a uniform mixture and a minimum particle coating of 95% as determined by AASHTO T 195(M) .

Bituminous concrete mixtures shall contain no more than 0.5% moisture when tested in accordance with AASHTO T 329.

- f. RAP: RAP moisture content shall be determined a minimum of twice daily (prior to production and halfway through production).
- g. Asphalt Binder: A binder log shall be submitted to the Department's Central Lab on a monthly basis.
- h. Warm mix additive: For mechanically foamed WMA, the water injection rate shall be monitored during production and not exceed 2.0% by total weight of binder. For additive added at the Plant, the dosage rate shall be monitored during production.
- i. Plant Laboratory: The Contractor shall maintain a laboratory at the production facility to test bituminous concrete mixtures during production. The laboratory shall have a minimum of 300 square feet, have a potable water source and drainage in accordance with the CT Department of Public Health Drinking Water Division, and be equipped with all necessary testing equipment as well as with a PC, printer, and telephone with a dedicated hard-wired phone line. In addition, the PC shall have internet connection and a functioning web browser with unrestricted access to <https://ctmail.ct.gov>. This equipment shall be maintained in working order at all times and be made available for use by the Engineer.

The laboratory shall be equipped with a heating system capable of maintaining a minimum temperature of 65°F. It shall be clean and free of all materials and equipment not associated with the laboratory. Sufficient light and ventilation must be provided. During summer months, adequate cooling or ventilation must be provided so the indoor air temperature shall not exceed the ambient outdoor temperature.

The laboratory testing apparatus, supplies, and safety equipment shall be capable of performing all tests in their entirety that are referenced in AASHTO R 35 and AASHTO M 323. The Contractor shall ensure that the Laboratory is adequately supplied at all times during the course of the project with all necessary testing supplies and equipment.

The Contractor shall maintain a list of laboratory equipment used in the acceptance testing processes including but not limited to, balances, scales, manometer/vacuum gauge, thermometers, gyratory compactor, clearly showing calibration and/or inspection dates, in accordance with AASHTO R 18. The Contractor shall notify the Engineer if any modifications are made to the equipment within the laboratory. The Contractor shall take immediate action to replace, repair, and/or recalibrate any piece of equipment that is out of calibration, malfunctioning, or not in operation.

M.04.02—Mix Design and Job Mix Formula (JMF)

1. Curb Mix:

- a. Requirements: The Contractor shall use bituminous concrete that meets the requirements of Table M.04.02-1. RAP may be used in 5% increments by weight up to 30%.

- b. Basis of Approval: Annually, an approved JMF based on a mix design for curb mix must be on file with the Engineer prior to use. .
Any change in component source of supply or consensus properties must be approved by the Engineer. A revised JMF shall be submitted prior to use.

**TABLE M.04.02 – 1:
Control Points for Curb Mix Mixtures**

Notes: (a) Compaction Parameter 50gyration N _{des} . (b) The percent passing the #200 sieve shall not exceed the percentage of bituminous asphalt binder.		
Mix	Curb Mix	Production Tolerances from JMF target
Grade of PG Binder content %	PG 64S-22 6.5 - 9.0	0.4
Sieve Size		
# 200	3.0 – 8.0 (b)	2.0
# 50	10 - 30	4
# 30	20 - 40	5
# 8	40 - 70	6
# 4	65 - 87	7
¼"		
3/8 "	95 - 100	8
½ "	100	8
¾"		8
1"		
2"		
Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%		
Mixture Temperature		
Binder	325°F maximum	
Aggregate	280-350° F	
Mixtures	265-325° F	
Mixture Properties		
Air Voids (VA) %	0 – 4.0 (a)	

2. Superpave Design Method – S0.25, S0.375, S0.5, and S1

- a. Requirements: All designated mixes shall be designed using the Superpave mix design method in accordance with AASHTO R 35. A JMF based on the mix design shall meet the requirements of Tables M.04.02-2 through Table M.04.02-5. Each JMF must be submitted no less than seven (7) days prior to production and must be approved by the Engineer prior to use. All approved JMFs expire at the end of the calendar year.

All aggregate component consensus properties and tensile strength ratio (TSR) specimens shall be tested at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP certified technicians.

All bituminous concrete mixes shall be tested for stripping susceptibility by performing the tensile strength ratio (TSR) test procedure in accordance with AASHTO T 283(M) at a minimum every 36 months. The compacted specimens may be fabricated at the Plant and then tested at an AMRL accredited facility. TSR specimens, and corresponding JMF shall be submitted with each test report.

i. Superpave Mixtures with RAP: RAP may be used with the following conditions:

- RAP amounts up to 15% may be used with no binder grade modification.
- RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance with AASHTO M 323 Appendix X1, or by testing that shows the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
- Two representative samples of RAP shall be obtained. Each sample shall be split and one split sample shall be tested for binder content in accordance with AASHTO T 164 and the other in accordance AASHTO T 308.
- RAP material shall not be used with any other recycling option.

ii. Superpave Mixtures with RAS: RAS may be used solely in HMA S1 mixtures with the following conditions:

- RAS amounts up to 3% may be used.
- RAS total binder replacement up to 15% may be used with no binder grade modification.
- RAS total binder replacement up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance to AASHTO M 323 appendix X1 or by testing that shows the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
- Superpave Mixtures with RAS shall meet AASHTO PP 78 design considerations. The RAS asphalt binder availability factor (F) used in AASHTO PP 78 shall be 0.85.

iii. Superpave Mixtures with CRCG: CRCG may be used solely in HMA S1 mixtures. One percent of hydrated lime, or other accepted non-stripping agent, shall be added to all mixtures containing CRCG. CRCG material shall not be used with any other recycling option.

- b. Basis of Approval: The following information must be included with the JMF submittal:
- Gradation, consensus properties and specific gravities of the aggregate, RAP or RAS.
 - Average asphalt content of the RAP or RAS by AASHTO T 164.
 - Source of RAP or RAS, and percentage to be used.
 - Warm mix Technology, manufacturer's recommended additive rate and tolerances and manufacturer recommended mixing and compaction temperatures.
 - TSR test report and anti-strip manufacturer and recommended dosage rate if applicable.
 - Mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
 - JMF ignition oven correction factor by AASHTO T 308.

With each JMF submittal, the following samples shall be submitted to the Division of Materials Testing:

- 4 - one quart cans of PG binder, with corresponding Safety Data Sheet (SDS)
- 1 - 50 lbs bag of RAP
- 2 - 50 lbs bag of plant blended virgin aggregate

A JMF may not be approved if any of the properties of the aggregate components or mix do not meet the verification tolerances as described in the Department's current QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures.

Any material based on a JMF, once approved, shall only be acceptable for use when it is produced by the designated plant, it utilizes the same components, and the production of material continues to meet all criteria as specified herein, and component aggregates are maintained within the tolerances shown in Table M.04.02-2. A new JMF must be submitted to the Engineer for approval whenever a new component source is proposed.

Only one mix with one JMF will be approved for production at any one time. Switching between approved JMF mixes with different component percentages or sources of supply is prohibited.

- c. Mix Status: Each facility will have each type of mixture rated based on the results of the previous year's production. Mix Status will be provided to each bituminous concrete producer annually prior to the beginning of the paving season.

The rating criteria are based on compliance with Air Voids and Voids in Mineral Aggregate (VMA) as indicated in Table M.04.03-4 and are calculated as follows:

Criteria A: Percentage of acceptance test results with compliant air voids.

Criteria B: The average of the percentage of acceptance test results with compliant VMA, and percentage of acceptance test results with compliant air voids.

The final rating assigned will be the lower of the rating obtained with Criteria A or B.

Mix status is defined as:

“A” – Approved:

Assigned to each mixture type from a production facility with a current rating of 70% or greater, or to each mixture type completing a successful PPT.

“PPT” – Pre-Production Trial:

Temporarily assigned to each mixture type from a production facility when:

1. there are no compliant acceptance production test results submitted to the Department from the previous year;
2. there is a source change in one or more aggregate components
3. there is a component percentage change of more than 5% by weight;
4. there is a change in RAP percentage;
5. the mixture has a rating of less than 70% from the previous season;
6. a new JMF not previously submitted.

Bituminous concrete mixtures with a “PPT” status cannot be used on Department projects. Testing shall be performed by the Producer with NETTCP certified personnel on material under this status. Test results must confirm that specifications requirements in Table M.04.02-2 and Table M.04.02-5 are met before material can be used. One of the following methods must be used to verify the test results:

Option A: Schedule a day when a Department Inspector can be at the facility to witness testing or,

Option B: When the Contractor or their representative performs testing without being witnessed by an Inspector, the Contractor shall submit the test results and a split sample including 2 gyratory molds, 5,000 grams of boxed bituminous concrete, and 5,000 grams of cooled loose bituminous concrete for verification testing and approval.

Option C: When the Contractor or their representative performs testing without being witnessed by a Department Inspector, the Engineer may verify the mix in the Contractor’s laboratory.

Witnessing or verifying by the Department of compliant test results will change the mix’s status to an “A”.

The differences between the Department’s test results and the Contractor’s must be within the “C” tolerances included in the Department’s QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures in order to be verified.

“U” – Not Approved:

Status assigned to a type of mixture that does not have an approved JMF. . Bituminous concrete mixtures with a “U” status cannot be used on Department projects.

TABLE M.04.02 – 2: Superpave Mixture Design Criteria

Notes: ⁽¹⁾ For all mixtures using a WMA technology, the mix temperature shall meet PG binder and WMA manufacturer's recommendations.								
Sieve	S0.25		S0.375		S0.5		S1	
	CONTROL POINTS		CONTROL POINTS		CONTROL POINTS		CONTROL POINTS	
inches	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)
2.0	-	-	-	-	-	-	-	-
1.5	-	-	-	-	-	-	100	-
1.0	-	-	-	-	-	-	90	100
3/4	-	-	-	-	100	-	-	90
1/2	100	-	100	-	90	100	-	-
3/8	97	100	90	100	-	90	-	-
#4	75	90	-	75	-	-	-	-
#8	32	67	32	67	28	58	19	45
#16	-	-	-	-	-	-	-	-
#30	-	-	-	-	-	-	-	-
#50	-	-	-	-	-	-	-	-
#100	-	-	-	-	-	-	-	-
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0
VMA (%)	16.5 ± 1		16.0 ± 1		15.0 ± 1		13.0 ± 1	
VA (%)	4.0 ± 1		4.0 ± 1		4.0 ± 1		4.0 ± 1	
Gse	JMF value		JMF value		JMF value		JMF value	
Gmm	JMF ± 0.030		JMF ± 0.030		JMF ± 0.030		JMF ± 0.030	
Dust / binder	0.6 – 1.2		0.6 – 1.2		0.6 – 1.2		0.6 – 1.2	
Mix Temp ⁽¹⁾	265 – 325°F		265 – 325°F		265 – 325°F		265 – 325°F	
TSR	> 80%		> 80%		> 80%		> 80%	
T-283 Stripping	Minimal, as determined by the Engineer							

TABLE M.04.02–3: Superpave Consensus Properties Requirements for Combined Aggregate

Notes: (1) 95/90 denotes that a minimum of 95% of the coarse aggregate, by mass, shall have one fractured face and that a minimum of 90% shall have two fractured faces.. (2) Criteria presented as maximum Percent by mass of flat and elongated particles of materials retained on the #4 sieve, determined at 5:1 ratio.					
Traffic Level	Design ESALs (80 kN), Millions	Coarse Aggregate Angularity ⁽¹⁾ ASTM D 5821, Minimum %	Fine Aggregate Angularity AASHTO T 304, Method A Minimum %	Flat and Elongated Particles ⁽²⁾ ASTM D 4791, Maximum %	Sand Equivalent AASHTO T 176, Minimum %
1	< 0.3	55/- -	40	10	40
2	0.3 to < 3.0	75/- -	40	10	40
3	≥ 3.0	95/90	45	10	45

TABLE M.04.02– 4: Superpave Traffic Levels and Design Volumetric Properties

Traffic Level	Design ESALs (million)	Number of Gyration by Superpave Gyrotory Compactor			Percent Density of Gmm from HMA/WMA specimen			Voids Filled with Asphalt (VFA) Based on Nominal mix size – inch			
		Nini	Ndes	Nmax	Nini	Ndes	Nmax	0.25	0.375	0.5	1
1	< 0.3	6	50	75	≤ 91.5	96.0	≤ 98.0	70 - 80	70 - 80	70 - 80	67 - 80
2	0.3 to < 3.0	7	75	115	≤ 90.5	96.0	≤ 98.0	65 - 78	65 - 78	65 - 78	65 - 78
3	≥ 3.0	8	100	160	≤ 90.0	96.0	≤ 98.0	65 - 77	73 - 76	65 - 75	65 - 75

**TABLE M.04.02– 5:
Superpave Minimum Binder Content by Mix Type and Level**

Mix Type	Level	Binder Content Minimum
S0.25	1	5.70
S0.25	2	5.60
S0.25	3	5.50
S0.375	1	5.70
S0.375	2	5.60
S0.375	3	5.50
S0.5	1	5.10
S0.5	2	5.00
S0.5	3	4.90
S1	1	4.60
S1	2	4.50
S1	3	4.40

M.04.03— Production Requirements:

1. Standard Quality Control Plan (QCP) for Production:

The QCP for production shall describe the organization and procedures which the Contractor shall use to administer quality control. The QCP shall include the procedures used to control the production process, to determine when immediate changes to the processes are needed, and to implement the required changes. The QCP must detail the inspection, sampling and testing protocols to be used, and the frequency for each.

Control Chart(s) shall be developed and maintained for critical aspect(s) of the production process as determined by the Contractor. The control chart(s) shall identify the material property, applicable upper and lower control limits, and be updated with current test data. As a minimum, the following quality characteristics shall be included in the control charts: percent passing #4 sieve, percent passing #200 sieve, binder content, air voids, Gmm and VMA. The control chart(s) shall be used as part of the quality control system to document variability of the bituminous concrete production process. The control chart(s) shall be submitted to the Engineer the first day of each month.

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications.

The Contractor shall submit complete production testing records to the Engineer within 24 hours in a manner acceptable to the Engineer.

The QCP shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor. The QCP must also include a list of sampling & testing methods and frequencies used during production, and the names of all Quality Control personnel and their duties.

Approval of the QCP does not imply any warranty by the Engineer that adherence to the plan will result in production of bituminous concrete that complies with these specifications. The Contractor shall submit any changes to the QCP as work progresses.

2. Acceptance Requirements:

i. General:

Acceptance samples shall be obtained from the hauling vehicles and tested by the Contractor at the Plant.

The Contractor shall submit all acceptance tests results to the Engineer within 24 hours or prior to the next day's production. All acceptance test specimens and supporting documentation must be retained by the Contractor and may be disposed of with the approval of the Engineer. All quality control specimens shall be clearly labeled and separated from the acceptance specimens.

Contractor personnel performing acceptance sampling and testing must be present at the facility prior to, during, and until completion of production, and be certified as a NETTCP HMA Plant Technician or Interim HMA Plant Technician and be in good standing. Production of material for use on State projects must be suspended by the Contractor if such personnel are not present. Technicians found by the Engineer to be non-compliant with NETTCP policies and procedures or Department policies may be removed by the Engineer from participating in the acceptance testing process for Department projects until their actions can be reviewed.

Anytime during production that testing equipment becomes defective or inoperable, production can continue for a maximum of 1 hour. The Contractor shall obtain box sample(s) in accordance with Table M.04.03-2 to satisfy the daily acceptance testing requirement for the quantity shipped to the project. The box sample(s) shall be tested once the equipment issue has been resolved to the satisfaction of the Engineer. Production beyond 1 hour may be considered by the Engineer. Production will not be permitted beyond that day until the subject equipment issue has been resolved.

Verification testing will be performed by the Engineer in accordance with the Department's QA Program for Materials.

Should the Department be unable to verify the Contractor's acceptance test result(s) due to a failure of the Contractor to retain acceptance test specimens or supporting documentation, the Contractor shall review its quality control plan, determine the cause of the nonconformance and

respond in writing within 24 hours to the Engineer describing the corrective action taken. In addition, the Contractor must provide supporting documentation or test results to validate the subject acceptance test result(s). The Engineer may invalidate any adjustments for material corresponding to the subject acceptance test(s). Failure of the Contractor to adequately address quality control issues at a facility may result in suspension of production for Department projects at that facility.

ii. Curb Mix Acceptance Sampling and Testing Procedures:

Curb Mix shall be tested in accordance to Table M.04.03-1 by the Contractor at a frequency of one test per every 250 tons of cumulative production, regardless of the day of production.

TABLE M.04.03 – 1: Curb Mix Acceptance Test Procedures

Protocol	Reference	Description
1	AASHTO T 30(M)	Mechanical Analysis of Extracted Aggregate
2	AASHTO T 168	Sampling of Bituminous Concrete
3	AASHTO T 308	Binder content by Ignition Oven method (adjusted for aggregate correction factor)
4	AASHTO T 209(M)⁽²⁾	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
5	AASHTO T 312⁽²⁾	⁽¹⁾ Superpave Gyration molds compacted to N _{des}
6	AASHTO T 329	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

Notes: ⁽¹⁾ One set equals two six-inch molds. Molds to be compacted to 50 gyrations

⁽²⁾ Once per year or when requested by the Engineer

a. Determination of Off-Test Status:

- i. Curb Mix is considered “off test” when the test results indicate that any single value for bitumen content or gradation are not within the tolerances shown in Table M.04.02-1. If the mix is “off test”, the Contractor must take immediate actions to correct the deficiency and a new acceptance sample shall be tested on the same day or the following day of production.
- ii. When multiple silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the “off test” status.
- iii. The Engineer may cease supply from the plant when test results from three consecutive samples are not within the JMF tolerances or the test results from two consecutive samples not within the control points indicated in Table M.04.02-1 regardless of production date.

b. JMF revisions

- i. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF revision as allowed by the Engineer prior to any additional testing. Consecutive test results outside the requirements of Table M.04.02-1 JMF tolerances may result in rejection of the mixture.
- ii. Any modification to the JMF shall not exceed 50% of the JMF tolerances indicated in Table M.04.02-1 for any given component of the mixture without approval of the Engineer. When such an adjustment is made to the bitumen, the corresponding production percentage of bitumen shall be revised accordingly.

iii. Superpave Mix Acceptance:

a. Sampling and Testing Procedures

Production Lot: The Lot will be defined as one of the following types:

- Non-PWL Production Lot for total estimated project quantities per mixture less than 3500 tons: All mixture placed during a single continuous paving operation.
- PWL Production Lot for total estimated project quantities per mixture of 3500 tons or more: Each 3500 tons of mixture produced within 30 calendar days.

Production Sub Lot:

- For Non-PWL: As defined in Table M.04.03 – 2
- For PWL: 500 tons (the last Sub Lot may be less than 500 tons)

Partial Production Lots (For PWL only): A Lot with less than 3500 tons due to:

- completion of the Course
- a Job Mix Formula revision due to changes in:
 - o cold feed percentages over 5%
 - o target combined gradation over 5%
 - o target binder over 0.15%
 - o any component specific gravity
- a Lot spanning 30 calendar days

The acceptance sample(s) location(s) shall be selected using stratified – random sampling in accordance with ASTM D 3665 based on:

- the total daily estimated tons of production for non-PWL lots, or
- the total lot size for PWL lots.

One acceptance sample shall be obtained and tested per Sub Lot. The Engineer may direct that additional acceptance samples be obtained. For non-PWL lots, one acceptance test shall always be performed in the last sub-lot based on actual tons of material produced.

For Non-PWL lots, quantities of the same mixture per plant may be combined daily for multiple State projects to determine the number of sub lots.

The payment adjustment will be calculated as described in 4.06.

**TABLE M.04.03 – 2:
Superpave Acceptance Testing Frequency per Type/Level/Plant for Non-PWL lots**

Daily quantity produced in tons (lot)	Number of Sub Lots/Tests
0 to 150	0, Unless requested by the Engineer
151 to 500	1
501 to 1,000	2
1,001 to 2,000	3
2,001 or greater	1 per 500 tons or portions thereof

The following test procedures shall be used for acceptance:

TABLE M.04.03– 3: Superpave Acceptance Testing Procedures

Protocol	Procedure	Description
1	AASHTO T 168	Sampling of bituminous concrete
2	AASHTO R 47	Reducing samples to testing size
3	AASHTO T 308	Binder content by ignition oven method (adjusted for aggregate correction factor)
4	AASHTO T 30(M)	Gradation of extracted aggregate for bituminous concrete mixture
5	AASHTO T 312	⁽¹⁾ Superpave gyratory molds compacted to N_{des}
6	AASHTO T 166	⁽²⁾ Bulk specific gravity of bituminous concrete
7	AASHTO R 35	⁽²⁾ Air voids, VMA
8	AASHTO T 209(M)	Maximum specific gravity of bituminous concrete (average of two tests)
9	AASHTO T 329	Moisture content of bituminous concrete

Notes: ⁽¹⁾ One set equals two six-inch molds. Molds to be compacted to N_{max} for PPTs and to N_{des} for production testing. The first subplot of the year will be compacted to N_{max}

⁽²⁾ Average value of one set of six-inch molds.

If the average ignition oven corrected binder content differs by 0.3% or more from the average of the Plant ticket binder content in five (5) consecutive tests regardless of the production date (moving average), the Contractor shall immediately investigate, determine an assignable cause and correct the issue. When two consecutive moving average differences are 0.3% or more and no assignable cause has been established, the Engineer may require a new ignition oven aggregate correction factor to be performed or to adjust the current factor by the average of the differences between the corrected binder content and production Plant ticket for the last five (5) acceptance results.

The test specimen must be placed in an ignition oven for testing in accordance with AASHTO T 308 within thirty minutes of being obtained from the hauling vehicle and the test shall start immediately after.

The Contractor shall perform TSR testing within 30 days after the start of production for all design levels of HMA- and PMA- S0.5 plant-produced mixtures, in accordance with AASHTO T 283(M). The TSR test shall be performed at an AMRL certified laboratory by NETTCP certified technicians. The compacted specimens may be fabricated at the Plant and then tested at an AMRL accredited facility. The test results and specimens shall be submitted to the Engineer for review. Superpave mixtures that require anti-strip additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and bituminous concrete. The Contractor shall submit the name, manufacturer, percent used, technical datasheet and SDS for the anti-strip additive (if applicable) to the Engineer.

b. Determination of Off-Test Status:

- i. Superpave mixes shall be considered “*off test*” when any Control Point Sieve, binder content, VA, VMA, or Gmm value is outside of the limits specified in Table M.04.03-4 or the target binder content at the Plant is below the minimum binder content stated in Table M.04.02-5. Note that further testing of samples or portions of samples not initially tested for this purpose cannot be used to change the status.
- ii. Any time the bituminous concrete mixture is considered Off-test:
 1. The Contractor shall notify the Engineer when the Plant is “*off test*” for any mix design that is delivered to the project in any production day. When multiple silos are located at one site, mixture supplied to one project is considered as coming from one source for the purpose of applying the “*off test*” determination.
 2. The Contractor must take immediate actions to correct the deficiency, minimize “*off test*” production to the project, and obtain an additional Process Control (PC) test after any corrective action to verify production is in conformance to the specifications. A PC test will not be used for acceptance and is solely for the use of the Contractor in its quality control process.

c. Cessation of Supply for Superpave Mixtures in non-PWL lots:

A mixture shall not be used on Department’s projects when it is “off test” for:

- i. four (4) consecutive tests in any combination of VA, VMA or Gmm, regardless of date of production, or,
- ii. two (2) consecutive tests in the Control Point sieves in one production shift.

As a result of cessation of supply, the mix status will be changed to PPT.

d. JMF revisions:

JMF revisions are only permitted prior to or after a production shift. A JMF revision is effective from the time it was submitted and is not retroactive to the previous test(s).

JMF revisions shall be justified by a documented trend of test results.

Revisions to aggregate and RAP specific gravities are only permitted when testing is performed at an AMRL certified laboratory by NETTCP certified technicians.

A JMF revision is required when the Plant target RAP and/or bin percentage deviates by more than 5% and/or the Plant target binder content deviates by more than 0.15% from the active JMF.

TABLE M.04.03– 4: Superpave Mixture Production Requirements

Notes: (1) 300°F minimum after October 15. (2) JMF tolerances shall be defined as the limits for production compliance. (3) For all mixtures with WMA technology, changes to the minimum aggregate temperature will require Engineer's approval. (4) For PMA and mixtures with WMA technology, the mix temperature shall meet manufacturer's recommendations. In addition, for all mixtures with WMA technology, the maximum mix temperature shall not exceed 325°F.(5) 0.4 for PWL lots (6) 1.3 for PWL lots (7) 1.2 for PWL lots									
	S0.25		S0.375		S0.5		S1		Tolerances
Sieve	CONTROL POINTS		CONTROL POINTS		CONTROL POINTS		CONTROL POINTS		From JMF Targets (2)
inches	Min(%)	Max(%)	Min(%)	Max(%)	Min(%)	Max(%)	Min(%)	Max(%)	±Tol
1.5	-	-	-	-	-	-	100	-	
1.0	-	-	-	-	-	-	90	100	
3/4	-	-	-	-	100	-	-	90	
1/2	100	-	100	-	90	100	-	-	
3/8	97	100	90	100	-	90	-	-	
#4	75	90	-	75	-	-	-	-	
#8	32	67	32	67	28	58	19	45	
#16	-	-	-	-	-	-	-	-	
#200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0	
Pb	JMF value		JMF value		JMF value		JMF value		0.3 ⁽⁵⁾
VMA (%)	16.5		16.0		15.0		13.0		1.0 ⁽⁶⁾
VA (%)	4.0		4.0		4.0		4.0		1.0 ⁽⁷⁾
Gmm	JMF value		JMF value		JMF value		JMF value		0.030
Agg. Temp ⁽³⁾	280 – 350F		280 – 350F		280 – 350F		280 – 350F		
Mix Temp ⁽⁴⁾	265 – 325 F ⁽¹⁾		265 – 325 F ⁽¹⁾		265 – 325 F ⁽¹⁾		265 – 325 F ⁽¹⁾		
Prod. TSR	N/A		N/A		≥80%		N/A		
T-283 Stripping	N/A		N/A		Minimal as determined by the Engineer		N/A		

**TABLE M.04.03– 5:
Superpave Traffic Levels and Design Volumetric Properties**

Traffic Level	Design ESALs	Number of Gyration by Superpave Gyratory Compactor	
	(million)	Nini	Ndes
1	< 0.3	6	50
2	0.3 to < 3.0	7	75
3	≥3.0	8	100

**TABLE M.04.03-6:
Modifications to Standard AASHTO and ASTM Test Specifications and Procedures**

AASHTO Standard Method of Test	
Reference	Modification
T 30	Section 7.2 thru 7.4 Samples are not routinely washed for production testing
T 168	<p>Samples are taken at one point in the pile. Samples from a hauling vehicle are taken from only one point instead of three as specified.</p> <p>Selection of Samples: Sampling is equally important as the testing, and the sampler shall use every precaution to obtain samples that are truly representative of the bituminous mixture.</p> <p>Box Samples: In order to enhance the rate of processing samples taken in the field by construction or maintenance personnel the samples will be tested in the order received and data processed to be determine conformance to material specifications and to prioritize inspections by laboratory personnel.</p>
T 195	Section 4.3 only one truck load of mixture is sampled. Samples are taken from opposite sides of the load.
T 209	<p>Section 7.2 The average of two bowls is used proportionally in order to satisfy minimum mass requirements.</p> <p>8.3 Omit Pycnometer method.</p>
T 283	When foaming technology is used, the material used for the fabrication of the specimens shall be cooled to room temperature, and then reheated to the manufactures recommended compaction temperature prior to fabrication of the specimens.

AASHTO Standard Recommended Practices	
Reference	Modification
R 26	<p>All laboratory technician(s) responsible for testing PG-binders be certified or Interim Qualified by the New England Transportation Technician Certification Program (NETTCP) as a PG Asphalt Binder Lab Technician.</p> <p>All laboratories testing binders for the Department are required to be accredited by the AASHTO Materials Reference Laboratory (AMRL).</p> <p>Sources interested in being approved to supply PG-binders to the Department by use of an “in-line blending system,” must record properties of blended material, and additives used.</p> <p>Each source of supply of PG-binder must indicate that the binders contain no additives used to modify or enhance their performance properties. Binders that are manufactured using additives, modifiers, extenders etc., shall disclose the type of additive, percentage and any handling specifications/limitations required.</p> <p>All AASHTO M 320 references shall be replaced with AASHTO M 332.</p> <p>Once a month, one split sample and test results for each asphalt binder grade and each lot shall be submitted by the PG binder supplier to the Department’s Central Lab. Material remaining in a certified lot shall be re-certified no later than 30 days after initial certification. Each April and September, the PG binder supplier shall submit test results for two (2) BBR tests at two (2) different temperatures in accordance with AASHTO R 29.</p>

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

BID

Bid Due Date:

Description (*Project Name— Include Location*):

BOND

Bond Number:

Date:

Penal sum _____

\$ _____

(Words)

(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER

SURETY

(Seal)

(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By:

Signature

By:

Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest:

Signature

Attest:

Signature

Title

Title

Note: Addresses are to be used for giving any required notice.

Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2 All Bids are rejected by Owner, or
 - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00520

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION
CONTRACT

This Agreement is by and between the Town of Trumbull hereinafter called Owner and _____ hereinafter called Contractor.

Owner and Contractor hereby agree as follows:

ARTICLE 1 WORK

- 1.1 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described with the following title:

”Strobel Road Reconstruction Project”.

ARTICLE 2 ENGINEER

- 2.1 The part of the Project that pertains to the Work has been designed by Tighe & Bond, Inc
- 2.2 The Owner has retained Tighe & Bond (“Engineer”) to act as Owner’s representative, assuming all duties and responsibilities, rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 3 CONTRACT TIMES

3.1 Time of the Essence

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

3.2 Substantial Completion and Final Payment

- A. The Work will be substantially completed within 425 days from the date of the Notice to Proceed and completed and ready for final payment in accordance with paragraph 15.06 of the General Conditions within 425 days from the date of the Notice to Proceed.

3.3 Liquidated Damages

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 3.1 above and that Owner will suffer financial and other losses if the Work is not completed within the times specified in Paragraph 3.2 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner \$2,200.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 3.1 above for Substantial Completion until the Work is substantially complete.
2. Complete and Ready for Final Payment: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract), for completion and readiness for final payment, Contractor shall pay Owner \$250 for each day that expires after such time until the Work is completed and ready for final payment.
3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

ARTICLE 4 CONTRACT PRICE

- 4.1 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount equal to the prices stated in Contractor's Bid, attached hereto as an exhibit, subject to adjustment under the Contract.
- 4.2 The total amount will be adjusted by measurement of actual installed quantities in strict conformity with the provisions contained herein.

ARTICLE 5 PAYMENT PROCEDURES

- 5.1 Applications for Payment shall be processed in accordance with Article 15 of the General Conditions.
- 5.2 Owner shall make progress payments on account of the Contract Price on the basis of processed Applications for Payment monthly during construction, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All progress payments will be measured by the Schedule of Values established as provided in the General Conditions, or in the event there is no schedule of values, as provided elsewhere in the Contract.
- 5.3 Owner shall retain from progress payments 5 percent of the value of Work completed.
- 5.4 Final Payment
 - A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 6 CONTRACTOR'S REPRESENTATIONS

- 6.1 Contractor makes the following representations:
 - A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
 - B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the

general, local, and Site conditions that may affect cost, progress, and performance of the Work.

- C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
- E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.
- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 7 CONTRACT DOCUMENTS

7.1 Contents

- A. The Contract Documents consist of the following:

- 1. This Agreement (pages 00520-1 to 00520-6, inclusive);

2. Performance Bond (pages 1 to 3, inclusive);
 3. Payment Bond (pages 1 to 3, inclusive);
 4. General Specifications (1 to 26, inclusive);
 5. Notices to Contractor;
 6. Special Provision;
 7. Drawings (not attached but incorporated by reference) consisting of a cover sheet and sheets numbered C0.1 to C8.22 and TCC-01 through TCC-004 inclusive, with each sheet bearing the following general title: Phase 1 Drainage and Paving Project;
 8. Addenda (numbers _____ to _____, inclusive);
 9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (Bid Form, inclusive);
 - b. Addenda;
 10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed;
 - b. Work Change Directives;
 - c. Change Order(s);
 - d. Field Orders
- B. The documents listed in Paragraph 7.1.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 8 MISCELLANEOUS

8.1 Terms

- A. Terms used in this Agreement will have the meanings indicated in the General Specifications and the Special Provisions.

8.2 Assignment of Contract

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary

in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.3 Successors and Assigns

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

8.4 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

8.5 Contractor Certifications

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.5:
 - 1. “corrupt practice” means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 - 2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 - 3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 - 4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. This Agreement will be effective on _____, 2018 (which is the Effective Date of the Contract).

OWNER:

CONTRACTOR:

By: _____

By: _____

Title: _____

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest _____

Attest _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution of other documents authorizing execution of Owner-Contractor Agreement.)

License No. _____
(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Certified as to the availability of funds:

END OF SECTION

PERFORMANCE BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: None See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal *(seal)*

Surety's Name and Corporate Seal *(seal)*

By: _____
Signature

By: _____
Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence,

to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims

for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: None See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

_____ *(seal)*

Contractor's Name and Corporate Seal

_____ *(seal)*

Surety's Name and Corporate Seal

By: _____

Signature

By: _____

Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____

Signature

Attest: _____

Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
 - 5.1 Claimants who do not have a direct contract with the Contractor,
 - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2 Pay or arrange for payment of any undisputed amounts.
 - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. **Definitions**
 - 16.1 **Claim:** A written statement by the Claimant including at a minimum:
 1. The name of the Claimant;
 2. The name of the person for whom the labor was done, or materials or equipment furnished;
 3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 4. A brief description of the labor, materials, or equipment furnished;
 5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 7. The total amount of previous payments received by the Claimant; and
 - 16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
 - 16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
 - 16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.
18. Modifications to this Bond are as follows:

ITEM #0202216A – EXCAVATION AND REUSE OF EXISTING CHANNEL BOTTOM MATERIAL

Description: This work shall consist of excavating existing channel bottom material in areas where the channel bottom is to be disturbed and regraded to create a work area for a bridge, culvert, articulated concrete block placement or cofferdam installation. This item shall also include the stockpiling and protecting of the excavated material on the Site, subsequent placement of the stockpiled material in the channel, and the removal and proper disposal of all unused and unacceptable material.

Materials: The material for this item shall consist of the existing naturally-formed rocks, cobbles, gravel, soils and clean natural sediments from within the channel.

Any material excavated from ledge (bedrock) formations or broken from larger boulders will not be accepted. Broken concrete will not be accepted.

Construction Methods: The Contractor shall submit for the Engineer's approval a proposed location for stockpiling material. The proposed location shall be upland where disruption to the stream channel or impact to wetland areas caused by moving the excavated channel bottom material to and from the stockpile are minimized during the placement of material. The Contractor shall prepare the area approved by the Engineer, suitable in size and location for stockpiling the existing channel bottom material.

The stockpile shall be located where it can remain undisturbed for the duration of the stream channel construction and shall be protected using sedimentation control measures. The stockpile area shall be cleared and cleaned adequately to prevent mixing with underlying soil or other materials, including the use of a separation barrier such as: structural fabric, polyethylene sheeting, or similar. The stockpile area shall be adequately covered to protect the excavated channel bottom material from erosion by rain or other forces.

After clearing and grubbing, the Engineer will identify the limits of the exposed channel bottom material to be excavated under this item. The Engineer will identify the bottom limit of excavation, an amount up to but not exceeding 24 inches in depth, based upon visual inspection of the channel bottom material, unless otherwise specified in the Contract. After the limits of excavation have been determined, the Contractor shall excavate the channel bottom material, separate from any other roadway, structure, channel or unsuitable material excavation in the area. After the channel bottom material, and approved supplemental streambed channel material if needed, has been placed in the stockpile area, no other excavated or off-Site material shall be placed in the stockpile.

The stockpiled channel bottom material shall be placed at the designated location(s) to the required thickness as shown on the plans, denoted on the permit application, or as directed by the Engineer. Equipment and placement techniques shall prevent integration with the surrounding material and shall keep the channel bottom material relatively homogenous. Channel material

shall be placed in a manner that replicates the original condition of the channel prior to excavation.

The Contractor shall perform all containment, diversion, or other separation of the channel flow when placing the channel bottom material to minimize sediment transport downstream.

The disposal of any surplus or unsuitable material shall be in accordance with Section 2.02. Restore the stockpile area as directed by the Engineer.

If it is agreed by the Engineer that there is an insufficient quantity of excavated channel bottom material within the Project limits, the Contractor shall obtain Supplemental Streambed Channel Material as specified under that item.

Method of Measurement: This work will be measured for payment by the number of cubic yards of channel bottom material excavated, stockpiled, maintained, and accepted, including disposal of unacceptable and surplus materials.

The Engineer will delineate the horizontal pay limit prior to the start of excavation. The vertical pay limit will be measured from the top of the existing channel bottom to the bottom of excavation required specifically for the stockpiling of channel bottom material.

Any material excavated beyond the approved horizontal pay limits or deeper than the depth of channel bottom material identified and approved by the Engineer will not be measured for payment under this item. Should such additional excavation be required to complete the Contract work, it will be measured for payment separately under the applicable pay items.

Basis of Payment: Payment for this work will be made at the Contract unit price per cubic yard for "Excavation and Reuse of Existing Channel Bottom Material." The price shall include all materials, equipment, tools and labor incidental to the preparation of the stockpile area, excavation of channel bottom, hauling of the material to the stockpile, and separation of any rock ledge or concrete debris, storing, and protecting (including but not limited to sedimentation controls and covering of excavated material).

Payment for clearing and grubbing of the approved stockpile area will be included in the item "Clearing and Grubbing."

Payment for the removal and proper disposal of all unused and unacceptable material will be in accordance with Article 1.09.04 – Extra and Cost-Plus Work.

Payment for supplemental streambed channel material will be included in the item "Supplemental Streambed Channel Material." If no item appears in the proposal, the work will be in accordance with Article 1.09.04 – Extra and Cost-Plus Work.

Payment for all containment, diversion or other separation of stream flow from the excavation of channel bottom material will be included in the item "Cofferdam and Dewatering" or special provision for "Handling Water."

Excavation of material not identified by the Engineer for stockpiling and reuse in accordance with this specification will be paid in accordance with Section 2.02.

Pay Item	Pay Unit
Excavation and Reuse of Existing Channel Bottom Material	c.y.

ITEM #0202217A – SUPPLEMENTAL STREAMBED CHANNEL MATERIAL

Description: This work shall consist of procuring, transporting and placing supplemental streambed channel material meeting the visual inspection requirements herein, along stream bank/channel improvement locations as shown on the plans or denoted on the Project's permit applications. This work shall also include any necessary temporary protection and stockpiling of the supplemental streambed channel material on the Site and removal and proper disposal of all unused material.

Materials: When a sufficient quantity of material is not available from the existing streambed channel within the permitted footprint of the Site, the Contractor shall furnish visually inspected and accepted supplemental streambed channel material from an off-Site source.

The supplemental streambed channel material for this item shall be consistent with the existing naturally-formed cobbles and rocks, gravel, and clean natural sediments found within the existing channel. Rock excavated from ledge (bedrock) formations, broken from larger boulders, broken concrete or angular material will not be accepted. Rock larger than 12 inches in diameter will not be accepted. Silts and clays will not be accepted.

The visual inspection of the supplemental streambed channel material shall be performed by the Engineer at the off-Site source prior to delivery of material to the Site. The Contractor shall notify the Engineer at least 10 days in advance of the need for inspection of proposed off-Site material.

Construction Methods: At the start of construction, the Contractor shall prepare an area, approved by the Engineer, suitable in size and location for stockpiling the supplemental streambed channel bottom material. The Contractor shall select an upland location where disruption to the stream channel or impact to wetland areas caused by moving the supplemental streambed channel bottom material to and from the stockpile are minimized during the placement of material. The stockpile shall be located where it can remain undisturbed for the duration of the stream channel construction and shall be protected using sedimentation control measures.

The stockpile area shall be cleared and cleaned adequately to prevent mixing with underlying soil or other materials, including the use of structural fabric if required. The stockpile area shall be adequately covered to protect the supplemental streambed channel material from erosion by rain or other forces. After the supplemental streambed channel material and the excavated channel bottom material to be reused have been placed in the stockpile areas, no other excavated or off-Site material shall be placed in the stockpiles.

The reused and supplemental streambed channel material shall be placed at the designated location(s) to the required thickness as shown on the plans or denoted on the permit application, or as directed by the Engineer. Equipment and placement techniques shall prevent integration with the surrounding material and shall keep the channel bottom material relatively homogenous. Reused and supplemental streambed channel material shall be placed in a manner that replicates the original condition of the channel prior to excavation.

The Contractor shall perform all containment, diversion, or other separation of the channel flow when placing the reused and supplemental streambed channel material to minimize sediment transport downstream.

The disposal of any surplus or unsuitable material shall be in accordance with Section 2.02. Restore the stockpile area as directed by the Engineer.

Method of Measurement: Work under this item shall be measured for payment as provided under Article 1.09.04 – Extra and Cost-Plus Work.

The sum of money shown on the estimate and in the itemized proposal as “Estimated Cost” for this work will be considered the price bid even though payment will be made only for actual work performed. 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 bid for the Contract.

Basis of Payment: This work will be paid for under Article 1.09.04 – Extra and Cost Plus Work.

Payment for clearing and grubbing of the approved stockpile area will be included in the item “Clearing and Grubbing.”

Payment for excavation and reuse of existing channel bottom material will be included in the item “Excavation and Reuse of Existing Channel Bottom Material.”

Payment for all containment, diversion or other separation of stream flow from the excavation of channel bottom material will be included in the item “Cofferdam and Dewatering” or special provision for "Handling Water."

Pay Item	Pay Unit
Supplemental Streambed Channel Material	est.

ITEM #0202451A - TEST PIT EXCAVATION

Description:

Excavate and backfill a designated area to determine the exact location of utility facilities as indicated.

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 trench excavation.

If unsuitable backfill material is excavated, dispose as directed by the Engineer. Replace with suitable backfill and compact in accordance with Section 2.14.

Repair all damaged bituminous pavement in accordance with Section 4.06.03. Sawcut the edges to neat lines if there will be no subsequent excavation at the test pit for a foundation or drainage item.

Method of Measurement:

Test pit excavation will be measured at the contract unit price per cubic yard for the material actually removed from within the limits specified as directed by the engineer.

When necessary, rock in trench excavation will be measured at the contract price per cubic yard for the rock actually removed in accordance with Article 2.02.04.

Basis of Payment:

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

<u>Pay Item</u>	<u>Pay Unit</u>
Test Pit Excavation	c.y.

ITEM # 0203001A – STRUCTURE EXCAVATION EARTH (Complete) For Culvert
ITEM # 0203100A – STRUCTURE EXCAVATION ROCK (Complete) For Culvert

Work under this item shall conform to the requirements of Section 2.03 amended as follows:

Method of Measurement: *Add the following:*

This work will include

Removal and disposal of existing culverts, and headwalls

Temporary earth retaining systems

Lateral earth retaining systems.

Pay Item	Pay Unit
STRUCTURE EXCAVATION EARTH (Complete)	C.Y.
STRUCTURE EXCAVATION ROCK (Complete)	C.Y.

ITEM #0219011A – CATCH BASIN SEDIMENT FILTER

Add the following:

Article 02.19.02 – Material:

Include catch basins inserts. Catch basin insert type to be approved by the Engineer and as detailed in the drawings..

Article 02.19.04 - Method of Measurement:

Add the following:

This work will be measured for payment by the actual number Each of “Catch Basin Sediment Filters” installed and accepted.

Delete the last sentence in the first paragraph and substitute the following:

Replacement systems damaged by the Contractor’s operation or rendered inoperative by any cause as a result of early installation without approval of the Engineer will not be measured for payment.

Article 02.19.05 – Basis of Payment:

Add the following:

Payment for this work will be made at the Contract unit price per Each for “Catch Basin Sediment Filter” complete in place, which price shall include all materials, equipment, tools and labor incidental to the installation, maintenance, replacement, removal and disposal of the system and surplus material. No payment shall be made for the clean out of accumulated sediment.

Pay Item

Catch Basin Sediment Filter

Pay Unit

EA.

ITEM #0403869A - COLD RECLAIMED ASPHALT PAVEMENT

4.03.01 - Description: Work under this item shall consist of the preparation of a stabilized subbase course composed of a mixture of the existing bituminous concrete pavement and the underlying granular material. The manufacture of the stabilized subbase course shall be done by in-place pulverizing and blending of the existing pavement and underlying granular materials, the introduction of the additive calcium chloride and compaction. The process which results in a stabilized subbase course shall be accomplished in accordance with these specifications and conform to the specified grades and cross-sections shown on the plans or as directed by the Engineer.

Where necessary, existing subgrades will be modified (raised, lowered or modified with additional aggregate) to meet required design specifications. Any modification of this nature, if required, such as but not limited to the excavation and replacement of unsuitable materials, and shaping and fine grading the subgrade, will be accomplished under separate payment items. Movement of the cold reclaimed asphalt pavement subbase material to and from the roadway for these modifications is also to be accomplished under a separate payment item.

Existing asphalt pavement shall be pulverized to a depth of Thirteen (13) inches from the top of the existing pavement surface unless otherwise specified.

A 500 foot test strip will be constructed at the beginning of the project at a location approved by the Engineer.

4.03.02 - Materials: Materials for reclaimed asphalt pavements shall consist of existing bituminous pavement and the underlying granular material. When it is necessary to alter the gradation of the cold reclaimed asphalt pavement subbase course or raise the grade line, additional aggregate or subbase material may be added as directed by the Engineer.

If it is necessary to raise or lower any utilities or underdrains, the trench backfill material shall meet Section M.02.05 or have the approval of the Engineer.

Samples of material will be obtained by the Materials Testing Laboratory as often as deemed necessary by the Assistant Manager of Materials Testing.

A liquid calcium chloride solution shall be added to stabilize the surface of the reclaimed asphalt pavement subbase that will carry traffic prior to placement of bituminous concrete. The calcium chloride solution shall be provided by the manufacturer as a true solution and shall not be reconstituted from flake calcium chloride.

The calcium chloride solution shall meet the following material specifications (ASTM D98; AASHTO-M144):

Calcium Chloride	35% +/-1%
Alkali Chloride as NaCl	2% max.
Magnesium as MgCl	0.1%

Typical composition (in lbs. per gallon)

Calcium Chloride	5.05
Sodium Chloride	0.2
Magnesium Chloride	0.004
Calcium Sulfate	0.004
Water	<u>6.002</u>
	11.260

Prior to the application of calcium chloride solution the surface of the cold reclaimed asphalt pavement subbase that will carry traffic shall be scuffed or furrowed by a grader to provide grooves approximately two inches in depth spaced approximately one foot apart, or as approved by the Engineer, to allow for sufficient penetration of the calcium chloride. The calcium chloride solution shall be uniformly distributed over the cold reclaimed asphalt pavement subbase at an application rate of 0.4 gallons per square yard or as determined by the Engineer.

The distributor for the calcium chloride solution shall be capable of applying liquid calcium chloride in accurately measured quantities at any rate between 0.1 to 2.0 gallons per square yard of roadway, at any length of spray bar up to twenty feet. The distributor shall be capable of maintaining a uniform rate of distribution of solution regardless of change in grade, width or direction of the road. The distributor shall be equipped with a Digital Volumetric Accumulator capable of measuring gallons applied and distance traveled. The volume and measuring device shall be equipped with a power unit for the pump so that application is by pressure and not gravity. The spray nozzles and pressure system shall provide a sufficient and uniform fan-shaped spray of solution throughout the entire length of the spray bar at all times while operating, and shall be adjustable laterally and vertically.

Application of the calcium chloride solution shall be completed in continuous segments. Each segment must be reclaimed, compacted, stabilized by calcium chloride and compacted again before it is opened to traffic. The calcium chloride solution shall not be applied when it is raining or when rain is forecast within one hour of placement.

Additional aggregate, if required, shall meet or exceed Article M.02.06 sections (2) Plasticity, (3) Resistance to Abrasion, and (4) Soundness.

4.03.03 - Construction Methods: Prior to the start of the pavement pulverization, all utilities and drainage systems shall be relocated as necessary.

Methods, equipment, tools, and any machinery to be used during construction shall be approved by the Engineer prior to the start of the project. Prior to the actual pulverization of the pavement, drop inlets or catch basins that might be affected shall be sufficiently barricaded so as to prevent silt or runoff from plugging the drainage system.

Sufficient surface drainage must be provided for each stage of construction so that ponding does not occur on the stabilized subbase course prior to the placement of bituminous concrete.

Reclamation shall be accomplished by means of a self-propelled, traveling rotary reclaimer or equivalent machine capable of cutting through existing asphalt to depths of up to twelve (12) inches with one pass. Equipment such as road planers or cold milling machines designed to mill or shred the existing bituminous concrete, rather than crush or fracture it, shall NOT be allowed. Existing bituminous concrete and the underlying granular material must be pulverized and mixed so as to form a homogenous mass of cold reclaimed asphalt pavement subbase material which will bond together when compacted.

Cold reclaimed asphalt pavement subbase shall conform to the grading requirements set forth in Article M.02.06, Grading B.

The need for additional aggregate will be determined by examining the results of a 500 foot test strip to be performed at the beginning of the project. Additional aggregate, if necessary, shall be added during the pulverization process to ensure that it is thoroughly mixed into the cold reclaimed asphalt pavement subbase. Subgrade changes will be necessary to meet proposed grade lines and cross sections. In areas where the proposed roadway grade is below the present grade, the existing asphalt shall be reclaimed in-place and then placed in windrows or stockpiled while the additional excavation is performed. When the proposed subgrade elevation is achieved the reclaimed asphalt material will be placed back onto the roadway in lifts no greater than five (5) inches in depth before being compacted. Calcium chloride solution will be placed over the final lift of cold reclaimed asphalt pavement subbase after it is compacted and furrowed as described in Section 4.03.02. The treated surface will be compacted again before traffic is allowed to pass over it.

Compaction shall be achieved by the use of a vibratory roller having the capability of producing high amplitude and low frequency vibrations. The compaction of each lift of cold reclaimed asphalt pavement subbase shall be a minimum of 95% of the proctor wet density (AASHTO T-180D).

4.03.04 - Method of Measurement: The cold reclaimed asphalt pavement work shall be measured for payment in square yards. The thickness will be as indicated on the plans, within plus or minus one (1) inch.

Measurement to determine the thickness will be made by the Engineer at intervals of 250 feet or as directed by the Engineer. Areas not within allowable tolerance shall be corrected, as ordered by the Engineer, without additional cost to the State.

Additional aggregate, if required, shall be measured for payment by the number of tons of aggregate delivered and incorporated into the cold reclaimed asphalt pavement subbase.

4.03.05 - Basis of Payment: This work shall be paid for at the contract unit price per square yard for "Cold Reclaimed Asphalt Pavement". This price shall include all pulverizing, preparation, mixing, shaping, compacting and finishing of the cold reclaimed asphalt pavement subbase as well as the addition of liquid calcium chloride and final compaction after it is applied. The unit price also includes all materials, equipment, tools and labor incidental to the work described above.

Additional aggregate, if required, will be paid in accordance with Article 1.09.04 "Extra and Cost-Plus Work" by the unit price per ton delivered to the project site. Handling cold reclaimed asphalt pavement when removed from and returned to the roadway shall also be paid under a separate pay item.

Pay Item	Pay Unit
Cold Reclaimed Asphalt Pavement	S.Y.

ITEM #0403871A - HANDLING COLD RECLAIMED ASPHALT PAVEMENT

Description: Work under this item shall consist of the movement of the cold reclaimed asphalt pavement subbase material to and from the roadway; spreading the material after the proper subgrade elevation has been achieved; and fine grading of the cold reclaimed asphalt pavement to plan as required. Compaction shall be accomplished under the reclamation item included in the contract.

Construction Methods: The Contractor shall investigate and verify the amount of cold reclaimed asphalt pavement to be moved and where it can be stored (windrow or stockpile) while the subgrade is under excavation.

In areas where the proposed grade lines require only minor subgrade changes, the reclaimed material may be placed in windrows or stockpiled while the additional excavation is performed. The Engineer must approve of any plan to windrow the cold reclaimed asphalt pavement. The area of stockpile may be determined by the Contractor but must be approved by the Engineer. The Contractor may not interfere with commercial store fronts or residential access, and as such, must maintain a safe and clear opening free of any obstructions to all driveways and town roads.

Any areas affected by the temporary stockpiling or windrowing of cold reclaimed asphalt pavement shall be reestablished or repaired as directed by the Engineer at no cost to the State.

The Contractor shall be responsible for the scheduling of work under this item so as not to interfere with any sequence of operations developed for this project. Delays as a result of work required under this item shall not constitute a claim for an extension of contract time.

Method of Measurement: This work shall be measured for payment by the actual number of square yards equal to the area of "Cold Reclaimed Asphalt Pavement" completed and accepted. This item will be measured for payment ONLY ONE TIME, regardless of the actual number of times the material is handled.

Basis of Payment: The handling of cold reclaimed asphalt pavement work shall be paid at the contract unit price per square yard of "Handling Cold Reclaimed Asphalt Pavement" complete and accepted, which price shall include all materials, equipment, tools, disposal of surplus material and labor incidental thereto. The reclamation of the asphalt pavement shall be paid for as a separate item. In addition, the establishment of any and all stockpile areas shall be included in the general cost of the item.

ITEM #0406999A - ASPHALT ADJUSTMENT COST

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

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

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

Construction Methods:

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

- I. For HMA and PMA mixtures:
 - a. The HMA or PMA mixture for which the adjustment would be applied is listed as a Contract item with a pay unit of tons.
 - b. *The total quantity for all HMA and PMA mixtures in the Contract or individual purchase order (Department of Administrative Service contract awards) exceeds 1000 tons or the Project duration is greater than 6 months.*
 - c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.
- II. For Ultra-Thin Bonded HMA mixtures:
 - a. The Ultra-Thin Bonded HMA mixture for which the adjustment would be applied is listed as a Contract item.
 - b. The total quantity for Ultra-Thin Bonded HMA mixture in the Contract exceeds:
 - i. 800 tons if the Ultra-Thin Bonded HMA item has a pay unit of tons.
 - ii. 30,000 square yards if the Ultra-Thin Bonded HMA item has a pay unit of square yards.

Note: The quantity of Ultra-Thin Bonded HMA measured in tons shall be determined from the material documentation requirements set forth in the Ultra-Thin Bonded HMA item Special Provision.
 - c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.
 - d. No Asphalt Adjustment Cost will be applied to the liquid emulsion that is specified as part of the Ultra-Thin Bonded HMA mixture system.
- III. Regardless of the binder used in all HMA or PMA mixtures, the Asphalt Adjustment Cost will be based on PG 64-22.

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

The selling price furnished from the Asphalt Weekly Monitor ® is based on United States dollars per standard ton (US\$/ST).

Method of Measurement:

Formula: $HMA \times [PG\%/100] \times [(Period\ Price - Base\ Price)] = \$ \underline{\hspace{2cm}}$

where

- **HMA:**
 1. For HMA, PMA, and Ultra-Thin Bonded HMA mixtures with pay units of tons:
The quantity in tons of accepted HMA, PMA, or Ultra-Thin Bonded HMA mixture measured and accepted for payment.
 2. For Ultra-Thin Bonded HMA mixtures with pay units of square yards:
The quantity of Ultra-Thin Bonded HMA mixture delivered, placed, and accepted for payment, calculated in tons as documented according to the Material Documentation provision (Construction Methods, paragraph G) of the Ultra-Thin Bonded HMA Special Provision.
- **Asphalt Base Price:** The asphalt price posted on the CTDOT website 28 days before the actual bid opening posted.
- **Asphalt Period Price:** The asphalt price posted on the CTDOT website during the period the HMA or PMA mixture was placed.
- **PG%:** Performance-Graded Binder percentage
 1. For HMA or PMA mixes:
 - $PG\% = 4.5$ for HMA S1 and PMA S1
 - $PG\% = 5.0$ for HMA S0.5 and PMA S0.5
 - $PG\% = 6.0$ for HMA S0.375, PMA S0.375, HMA S0.25 and PMA S0.25
 2. For Ultra-Thin Bonded HMA mixes:
 $PG\% = \text{Design \% PGB}$ (Performance Graded Binder) in the approved job mix formula, expressed as a percentage to the tenth place (e.g. 5.1%)

The asphalt adjustment cost shall not be considered as a changed condition in the Contract as result of this provision since all bidders are notified before submission of bids.

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

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

Pay Item
Asphalt Adjustment Cost

Pay Unit
est.

ITEM #0601082A - (7' X 7') PRE-CAST CONCRETE BOX CULVERT

Description: Work under this item shall consist of designing, load rating, furnishing and installing a precast concrete box culvert(s) in accordance with the details shown on the plans and as ordered by the Engineer. This item also includes all hardware, inserts and dowels for connections as shown on the plans.

Materials: The precast concrete shall meet the requirements of M.14.01-1. The concrete mix design shall be submitted to the Engineer and shall attain a minimum compressive strength ($f'c$) of 5,000 psi and a minimum electrical resistivity of 29 $k\Omega$ -cm in accordance with AASHTO T 358 at 28 days.

All reinforcing steel including dowel bar mechanical connectors shall be galvanized and meet the requirements of M.06.01.

All threaded concrete inserts, lifting fixtures, and miscellaneous hardware cast into precast concrete components shall be galvanized in accordance with ASTM A153 or ASTM B695 Grade 50 as shown on the plans.

Non-shrink grout shall meet the requirements of M.03.05, except that the non-shrink grout shall attain a minimum compressive strength of 3,000 psi prior to the passage of flowing water over the grout.

Gaskets shall be flexible, expanded rubber meeting the requirements of ASTM D1056. Silicone Joint Sealant shall meet the requirements of M.03.08-5(b).

Construction Methods:

1. Design and Load Rating: The design of the precast concrete box culvert(s) shall meet the requirements of the AASHTO LRFD Bridge Design Specifications, as supplemented by ASTM C1433 and amended as follows:

- Unless otherwise shown on the plans, the precast concrete box sections shall achieve a minimum load rating factor of 1.20 for all design, legal, and permit vehicle loads in accordance with CTDOT Load Rating Manual.
(http://www.ct.gov/dot/lib/dot/documents/dbridedesign/conndot_lr_manual.pdf).
- 1/800 of the span (clear distance between the inside face of walls) is the maximum allowable deflection of the precast concrete box sections due to live load.
- Design the precast concrete box sections for all construction load effects that may be applied during all stages/phases of construction.

The live load ratings shall be determined by the Load and Resistance Factor Rating (LRFR) method in accordance with the AASHTO Manual for Bridge Evaluation.

All load ratings shall be performed using software as specified in CTDOT Load Rating Manual.

2. Submittals

(a) **Working Drawings, Design Computations Submittal:** The Contractor shall submit an individually packaged set of working drawings and design computations for each precast box culvert location to the Engineer for review in accordance with 1.05.02-2a. Each package shall include working drawings and computations, with all details and documents necessary for fabrication and erection, and shall address all unique culvert sections and loading conditions. The package shall include the following:

- Title sheet
- Table of contents
- Contact information for designer and fabricator – contact information shall 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
- Precast box working drawings, design computations and supporting data

PDF - Created on ANSI D (22 inch x 34 inch) full scale sheet

Includes: Border
 Title block
 Rectangular box for reviewer stamp (2 1/4 inch wide x 1 3/4 inch high)
 Uppercase text with a height of 1/8 inch minimum

Design computations, procedures and other supporting data:

PDF - Created on ANSI A (8 1/2 inch x 11 inch Letter) sheet

The drawings shall include complete details of the precast concrete box sections and connections for the headwall, nosing and closure pours where shown on the plans. The drawings shall include, but not be limited to, the following:

- Project number, town and crossing
- Bridge number, when shown on the plans
- Layout plan of the precast concrete boxes and headwalls. The plan shall include the dimensions of each box culvert and headwall section. The Contractor shall determine that the length of each box culvert section, including all tolerances, satisfies the stages of construction, sequence of construction, and construction methodology shown on the plans.
- Plan indicating sequence of erection and stage construction of precast concrete box culvert sections.
- Plans and cross-sections of the box and headwall sections detailing the length, width, height and thickness of wall, floor and roof slabs.
- Type, size, location and spacing of steel reinforcing, mechanical connectors and concrete inserts for anchoring threaded deformed steel bars, bending diagrams, material lists and catalog cuts for mechanical connectors and inserts as applicable.
- Type, size and location of fixtures and lifting holes.

- Location and size of all holes to be cast and additional reinforcement as required.
- Type, size and location of joints, gaskets and additional steel reinforcement.
- Material specification designations for all components.

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

- Project number, town and crossing
- Bridge number, if applicable
- References to design specifications, including interim specifications
- Diagrams identifying all members and load conditions and combinations
- Descriptions for each notation used, and references to applicable specification sections and articles
- Bending moment and shear diagrams
- Section specific computations for box sections
- Computations for reinforcing development and splice lengths and diagrams identifying splice locations
- Complete tabulated results from **all** load conditions and load combinations including shipping, handling, and erection

(b) Load Rating Submittals: The Contractor shall submit an individually packaged load rating report(s) for each precast box culvert location to the Engineer for review in accordance with 1.05.02-2a and the CTDOT Load Rating Manual.

3. Fabrication and Manufacture: The fabrication and manufacture of the precast concrete box sections shall meet the requirements of M.08.02-4 as supplemented by the following:

(a) Test Cylinders: During the casting of the sections, the Contractor shall make a minimum of four 4 inch x 6 inch test cylinders during each production run. Cylinders shall be cured under the requirements of ASTM C31 and shall be used to determine the 28 day compressive strength ($f'c$).

(b) Finishing: All fins, runs, or mortar shall be removed from the concrete surfaces which will remain exposed. Form marks on exposed surfaces shall be smoothed by grinding. All exposed, outside concrete surfaces shall be given a grout clean-down finish in accordance with 6.01.03-10.

(c) Handling and Storage: Storage, transportation and handling of sections prior to final placement shall be performed without damage to the sections. Any damaged sections shall be repaired or replaced by the Contractor, at its own expense, as directed by the Engineer.

(d) Repairs: The Contractor shall submit to the Engineer, for review, the proposed methods and materials to be used in the repair operation.

4. Fabrication Tolerances: Tolerance of forming precast concrete box sections shall be as follows:

- (a) **Internal Dimensions:** The internal dimensions shall be within 1% of the design dimensions or within 1-1/2 inches, whichever is less.
- (b) **Slab and Wall Thickness:** the slab and wall thickness shall be within 1/4 inch of the thicknesses shown in the design.
- (c) **Laying Length of Opposite Surfaces:** Variations in laying lengths of two opposite surfaces of the box section shall be less than 1/8 inch/ft of internal span.
- (d) **Length of Section:** The length of a section shall not vary from the designed length by more than 1/2 inch in any box section.
- (e) **Position of Reinforcement:** The maximum variation in position of the reinforcement shall be $\pm 1/2$ inch. The minimum cover over the reinforcement shall be 1 1/2 inches for the outside steel and 1 inch for the inside steel as measured to the external or internal surface of the culvert.
- (f) **Area of Reinforcement:** The areas of steel reinforcement shall be the design steel areas as shown in the manufacturer's working drawings.

5. Acceptance of Box Sections: Box sections shall conform to all dimensions within tolerances noted herein and shall be free of defects. The Department shall be given at least 5 working days' notice to inspect and evaluate the sections prior to shipping.

6. Installation: The installation of the precast concrete box sections, and headwalls where applicable, shall be in accordance with the final working drawings and the following:

All box culvert joints shall be sealed with rubber gaskets and must provide a silt-tight fit. The gasket shall be compressed to a minimum of 1/2 of its uncompressed width. The gasket shall be uniformly compressed along all vertical and horizontal surfaces. A positive means, through the use of seating devices, shall be used for pulling each section against the adjacent section to assure an adequate silt-tight joint.

Details for the seating method shall be submitted to the Engineer for review. The lap joints shall be seated such that they make a continuous line of box sections with a smooth interior, free from irregularities in the invert line.

The top portions of the horizontal lap joints for the roof and floor slabs and the outside face of the vertical lap joints (full height on each side) shall be neatly filled with non-shrink grout after seating the sections. The exposed portions of the lap joints within the haunches or fillets shall also be neatly filled with non-shrink grout. The finished surface shall be smooth and level with the adjacent concrete.

After its installation, any box section, headwall, or joint that is, as determined by the Engineer, not acceptable in vertical or horizontal alignment for any reason, including but not limited to

settlement, displacement, excess camber or misfit, shall be removed by the Contractor and correctly installed, as directed by the Engineer and at the Contractor's expense.

All fixtures or holes cast into the sections for lifting or seating shall be neatly filled with non-shrink grout. The finished surface shall be smooth and level with the adjacent concrete.

The surface preparation, mixing, placing, curing, and finishing of the non-shrink grout shall follow the written instructions provided by the manufacturer of the grout. The Contractor shall furnish the Engineer with copies of the instructions. The grout shall be cured at least 3 days unless determined otherwise by the Engineer.

7. Erection Tolerances: The Contractor shall be responsible for ensuring the overall length of the box culvert meets the layout requirements of the plans.

Method of Measurement: This work will be measured along the structure centerline for payment by the number of linear feet of precast concrete box culvert completed and accepted.

Basis of Payment: This work will be paid for at the Contract unit price per linear foot for "(Size) Precast Concrete Box Culvert," complete in place, which price shall include all equipment, materials, tools and labor incidental to the design, manufacture, shipping, repair and installation of the precast concrete box culvert of the specified size(s) at the locations specified on the plans.

Pay Item	Pay Unit
(7' x 7' Size) Precast Concrete Box Culvert	l.f.

ITEM # 0601109A – CLASS “A” CONCRETE FOR RETAINING WALLS AND CULVERT WING WALLS

Work under this item shall conform to the requirements of Section 6.01 amended as follows:

Description:

Work under this item shall consist of furnishing and installing concrete for retaining walls and culvert wing walls as indicated on the plans. This work shall include excavation, backfill, ¾” crushed stone, 6” underdrain, filter fabric and steel reinforcement.

Method of Measurement: *Add the following:*

This work will be measured for payment by the actual volume of cubic yards of completed and accepted Class “A” Concrete For Retaining Walls and Culvert Wing Walls.

Excavation, backfill, ¾” crushed stone, 6” underdrain, filter fabric and steel reinforcement. will not be measured for payment, but the cost shall be considered as included in the price bid for Class “A” Concrete For Retaining Walls and Culvert Wing Walls.

Basis of Payment: *Add the following:*

This work will be paid for at the contract unit price per cubic yard for Class “A” Concrete For Retaining Walls and Culvert Wing Walls.

Pay Item

Pay Unit

CLASS A CONCRETE FOR RETAINING WALLS AND CULVERT WING WALLS

C.Y.

ITEM #0602910A - DRILLING HOLES AND GROUTING DOWELS

Description: Work under this item consists of drilling holes in concrete and grouting dowels as shown on the plans, in accordance with the manufacturer's recommendations, and as directed by the Engineer. For the purpose of this specification, a dowel is defined as a reinforcing bar.

Materials: The chemical anchoring material shall conform to Article M.03.07 - Chemical Anchors.

Construction Methods: Before fabricating any materials, the Contractor shall submit manufacturer's specifications and installation instructions for the chemical anchoring material to the Engineer for review in accordance with Article 1.05.02. This shall include, but not limited to, the type of drill, diameter of bit, method of cleaning holes and method of placement of the adhesive bonding material. The weight of the drill shall not exceed 15 pounds.

Holes for the dowels shall be located as shown on the plans. The holes shall clear the existing reinforcement and provide the minimum cover as shown on the plans. A pachometer shall be used to locate existing reinforcing steel. If existing reinforcing is encountered during the drilling operation, the holes shall be relocated.

The depth and diameter of each hole shall be as shown on the plans. If the depth and diameter of a hole are not shown on the plans, the hole shall conform to the manufacturer's recommendations for the diameter of the dowel being anchored such that the grouted dowels will be able to develop a pull-out resistance of 125 percent of its nominal yield strength or 100 percent of its tensile strength, whichever is greater.

Hole drilling methods shall not cause spalling, cracking, or other damage to the existing concrete. Those areas damaged by the Contractor shall be repaired by him in a manner suitable to the Engineer and at no expense to the State.

Prior to placing the chemical anchoring material in the holes, the holes shall be cleaned of all dirt, moisture, concrete dust and other foreign material. The dowel and the chemical anchoring material shall be installed in the holes in accordance with the chemical anchoring material manufacturer's recommendations.

The Contractor, as directed by the Engineer, shall take adequate precautions to prevent any materials from dropping to the area below, which may result in damage to any existing construction or to adjoining property. Should any damage occur to the structure as a result of the Contractor's operations, the Contractor shall make repairs at his own expense. The repair work shall be approved in advance and shall be of a quality acceptable to the Engineer.

Method of Measurement: This work will be measured for payment by the actual number of drilled holes in which dowels are embedded and accepted.

Basis of Payment: This work will be paid for at the contract unit price each for "Drilling Holes and Grouting Dowels," which price shall include drilling and preparing holes, furnishing and installing the chemical anchoring material in the holes and all material, equipment, tools and labor incidental thereto.

The cost for furnishing dowels will be included in this item.

Pay Item

Drilling Holes and Grouting DowelsPay

Unit

Each.

ITEM #0603591A - WATER MAIN BRACKETS

Description: Work under this item shall consist of fabrication, delivery and erection of structural steel for support of the water main at the south bridge fascia.

The anticipated supports are shown schematically on the project plans based on the size and location of the existing water main. Prior to fabricating the structural steel, the Contractor shall contact Aquarion to ensure that the proposed utility supports are coordinated with the details of the proposed replacement gas main, including the size, type and location of the proposed pipe as well as any insulation and protective covering that may be required. See "Notice to Contractor - Utility Coordination" for contact information. Any proposed changes to the utility support locations and details shall be brought to the attention of the engineer immediately.

Materials: Structural shapes, plates and rods shall be of the grade indicated on the contract plans and shall conform to the requirements of Form 817, Section M.06.02.

Structural steel and hardware shall be galvanized after fabrication.

Submittals:

Shop drawings for the structural steel gas main supports. As part of the shop drawing submission, provide catalogue cuts for any rollers, hold-down devices or other such appurtenances that will support the proposed gas main. If catalogue cuts include multiple sizes of appurtenances, identify the appropriate size.

Mill certificates for structural steel and proof of U.S. origin.

Construction Methods: Field welding and field drilling of the utility supports will not be permitted.

Method of Measurement: Water Main Bracket shall be measured for payment based on each bracket fabricated and installed.

No direct payment will be made for galvanizing; the cost thereof shall be included in the unit price of Water Main Bracket.

Basis of Payment: The structural steel, incorporated in the completed and accepted structure, will be paid for at the Contract unit price per each Water Main Bracket.

Payment shall be for structural steel, complete in place, which price shall include quality control, furnishing, fabricating, galvanizing, transporting, storing, erecting, and all materials, equipment, tools and labor incidental thereto.

Pay Item

Pay Unit

Water Main Bracket

Each

ITEM #0605003A - MASONRY FACING FOR RETAINING WALLS AND CULVERT WING WALLS

Work under this item shall conform to Section 6.05 - Masonry Facing and supplemented by the following:

6.5.2 - Materials: Supplement with the following:

The stones used for facing shall “**New England Fieldstone Wall**” as provided
O&G Industries Mason Store & Earth Products Showcase
325 Hancock Avenue
Bridgeport, CT 06605,

or approved equivalent by the Town Engineer.

The contractor shall provide samples of the stone facing to the Town Engineer for approval prior to ordering any material.

Mortar shall conform to the requirements of Article M.11.04. The proposed mortar mix including color and texture shall be approved by the Engineer prior to its use.

Stone anchors shall conform to ASTM A615 and galvanized in accordance with ASTM A767. Steel inserts shall conform to ASTM A569 or ASTM A366 and galvanized in accordance with ASTM A653 G60.

6.5.3 - Construction Methods: Supplement with the following:

The facing stone shall be set in the location and to the dimensions shown on the plans or as ordered by the Engineer. When required by the Engineer, the stone facing shall be supported by such bracing and framework as may be necessary to prevent movement.

All stones shall be set by competent and experienced masons.

Galvanized steel inserts and stone anchors of the type and spacing called on the plans or as ordered by the Engineer shall be installed during stone placement.

6.5.4 - Method of Measurement: Replace with the following:

The quantity of stone masonry facing shall be measured for payment by the actual number of square feet of face area of accepted masonry facing, completed within the neat lines as shown on the plans or as ordered by the Engineer. Galvanized steel inserts, stone anchors and mortar will not be measured for payment.

6.5.5 - Basis of Payment: Replace with the following:

This work will be paid at the contract unit price per square feet for "Masonry Facing", complete in place, which price shall include all materials including galvanized steel inserts, stone anchors and mortar, tools, equipment and labor incidental thereto.

Wall Stone • O&G Industries Earth Products Showcase



New England Fieldstone Wall

Category: Wall Stone

Tag:

ITEM # 0686000A – DRAINAGE PIPES

Work under this item shall conform to the requirements of Section 6.86 amended as follows:

Description:

Work under this item shall consist of furnishing and installing ¾” crushed stone bedding and filter fabric as indicated on the plans.

Method of Measurement: *Add the following:*

¾” crushed stone and filter fabric will not be measured for payment, but the cost shall be considered as included in the price bid for drainage pipes.

ITEM #0707009A- MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMERIC)

Description: Work under this item consists of furnishing and installing a seamless elastomeric waterproofing membrane system applied to a concrete or steel surface as shown on the plans, in accordance with this specification and as directed by the Engineer. Work shall also include conditioning of the surface to be coated and all quality-control testing noted herein.

The completed membrane system shall be comprised of a primer coat followed by the membrane coating which is applied in one or two layers for a minimum total thickness of 80 mil (2 mm). This work shall also include an additional 40 mil (1mm) membrane layer with aggregate broadcast into the material while still wet.

Materials: The membrane waterproofing system shall be one of the following:

1. Eliminator
Manufacturer: Stirling Lloyd Products, Inc.
152 Rockwell Road, Building A
Newington, CT 06111
860-666-5008

2. Bridge Deck Membrane System
Manufacturer: Bridge Preservation, LLC
87 Shawnee Ave.
Kansas City, Kansas 66105
913-321-9006

The membrane system shall meet the following requirements:

1. Primer: The primer shall be a 100% reactive, acrylic based, two component, spray applied resin capable of full cure in 40 minutes at 68°F (20°C).
2. Membrane: The membrane shall be 100% solvent free reactive, acrylic based, two component, spray applied material.
3. Aggregate: The aggregate shall be a nonfriable, durable #8 aggregate stone.

The membrane shall meet or exceed the following performance requirements:

<u>PERFORMANCE REQUIREMENT</u>	<u>TEST METHOD</u>	<u>UNITS</u>
Water Vapor Transmission	ASTME96	0.3 Perms or less
Adhesion (Concrete)	ASTMD4541	150 psi (1.0 MPa) or failure in concrete
Adhesion (Steel)	ASTMD4541	300 psi (2.1 MPa)
Minimum Tensile Strength	ASTM D638, Method A, Die C	940 psi (6.4 MPa)
Minimum Elongation at Break	ASTM D638, Method A, Die C	80%
Crack Bridging	ASTM 1305	Pass @ 10 cycles, 0.125 inch (3.2mm) -15°F (-26°C)
Resistance to Heat Aging	ASTM C1522	Pass

Test Reports: The Contractor shall submit to the Engineer Notarized Test Reports showing conformance with the identified Performance Requirements listed in this specification in tests done no longer than 5 years prior to the anticipated installation date.

Materials Certificate: The Contractor shall submit to the Engineer a Materials Certificate for the primer and membrane in accordance with the requirements of Article 1.06.07 .

Construction Methods: At least ten days prior to installation of the membrane system, the Contractor shall submit to the Engineer, the manufacturer' s recommended procedure for preparing the deck surface, pre-treatment or preparing at cracks and gaps, treatment at curbs, vertical surfaces or discontinuities, applying the primer and membrane, and placing of aggregated coat. Procedures shall also include recommended repairs of system non-compliant issues identified during application. The system shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.

A technical representative, in the direct employ of the manufacturer, shall be present on-site immediately prior to and during application of the membrane. The representative shall inspect and approve the surface prior to priming, and provide guidance on the handling, mixing and addition of components and observe application of the primer and membrane. The representative shall perform all required quality-control testing and remain on the Project site until the membrane has fully cured.

All quality-control testing, including verbal direction or observations on the day of the installation, shall be recorded and submitted to the Engineer for inclusion in the Project's records. A submittal of the quality-control testing data shall be received by project personnel prior to any paving over the finished membrane or within 24 hours following completion of any staged portion of the work.

1. Applicator Approval: The Contractor's membrane Applicator shall be fully trained and licensed by the membrane manufacturer and shall have successfully completed at least three spray membrane projects in the past five years. The Contractor shall furnish references from those projects, including names of contact persons and the names, addresses and phone numbers of persons who supervised the projects. This information shall be submitted to the Engineer prior to the start of construction. The Engineer shall have sole authority to determine the adequacy and compliance of the submitted information. Inadequate proof of ability to perform the work will be grounds to reject proposed applicators.

2. Job Conditions:

- (a) Environmental Requirements: Air and substrate temperatures shall be between 32°F (0°C) and 104°F (40°C) providing the substrate is above the dew point. Outside of this range, the Manufacturer shall be consulted.

The Applicator shall be provided with adequate disposal facilities for non hazardous waste generated during installation of the membrane system. The applicator shall follow safety instructions regarding respirators and safety equipment.

- (b) Safety Requirements: All open flames and spark producing equipment shall be removed from the work area prior to commencement of application.

"No Smoking" signs shall be visibly posted at the job site during application of the membrane waterproofing.

Personnel not involved in membrane application shall be kept out of the work area.

3. Delivery, Storage and Handling:

- (a) Packaging and Shipping: All components of the membrane system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the products type and batch number.
 - (b) Storage and Protection: The Applicator shall be provided with a storage area for all components. The area shall be cool, dry and out of direct sunlight and shall be in accordance with the Manufacturer's recommendations and relevant health and safety regulations.

Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site for review by the Engineer or other personnel.

- (c) Shelf Life - Membrane Components: Packaging of all membrane components shall include a shelf life date sealed by the Manufacturer. No membrane components whose shelf life has expired shall be used.

4. Surface Preparation:

- (a) Protection: The Applicator shall be responsible for the protection of equipment and adjacent areas from over spray or other contamination. Parapets and bridge joints shall be masked prior to application of the materials.
- (b) Surface Preparation: Sharp peaks and discontinuities shall be ground smooth. The surface profile of the prepared substrate is not to exceed 1/4 inch (6 mm) (peak to valley) and areas of minor surface deterioration of 1/2 inch (13 mm) and greater in depth shall also be repaired. The extent and location of the surface patches require the approval of the Engineer before the membrane system is applied.

Surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae, growth, laitance, friable matter, dirt, bituminous products, and previous waterproofing materials. If required, degreasing shall be done by detergent washing in accordance with ASTM D4258.

The surface shall be abrasively cleaned, in accordance with ASTM D4259, to provide a sound substrate free from laitance.

Voids, honeycombed areas, and blow holes on vertical surfaces shall be repaired in the same manner.

All steel components to receive membrane waterproofing shall be blast cleaned in accordance with SSPC SP6 and coated with the membrane waterproofing system within the same work shift.

5. Inspection and Testing: Prior to priming of the surface, the Engineer, Applicator and Manufacturer's technical representative shall inspect and approve the prepared substrate.

- (a) Random tests for deck moisture content shall be conducted on the substrate by the Applicator at the job site using a "Sovereign Portable Electronic Moisture Master Meter," a "Tramex CMEXpertII Concrete Moisture Meter" or approved equal. The minimum frequency shall be one test per 1000 s.f. (100 sq.m) but not less than three tests per day per bridge. Additional tests may be required if atmospheric conditions change and retest of the substrate moisture content is warranted.

The membrane system shall not be installed on substrate with a moisture content greater than that recommended by the system's manufacturer, but shall not be greater than 6%, whichever is less.

- (b) Random tests for adequate tensile bond strength shall be conducted on the substrate using an adhesion tester in accordance with the requirements of ASTM D4541. The minimum frequency shall be one test per 5,000 s.f. (500 sq.m) but not less than three adhesion tests per bridge.

Adequate surface preparation will be indicated by tensile bond strengths of primer to the substrate greater than or equal to 150 psi (1.0 MPa) or failure in a concrete surface and greater than or equal to 300 psi (2.1 MPa) for steel surfaces.

If the tensile bond strength is lower than the minimum specified, the Engineer may request additional substrate preparation. Any primer not adequately applied shall be removed and a new primer applied at the Contractor's expense, as directed by Engineer.

- (c) Cracks and grouted joints shall be treated in accordance with the Manufacturer's recommendations, as approved or directed by the Engineer.

6. Application:

- (a) The System shall be applied in four distinct steps as follows:
 - 1) Substrate preparation and gap/joint bridging preparation
 - 2) Priming
 - 3) Membrane application
 - 4) Membrane with aggregate
- (b) Immediately prior to the application of any components of the System, the surface shall be dry (see Section 5a of this specification) and any remaining dust or loose particles shall be removed using clean, dry oil-free compressed air or industrial vacuum.
- (c) Where the area to be treated is bound by a vertical surface (e.g. curb or wall), the membrane system may be continued up the vertical, as shown on the plans or as directed by the Engineer.
- (d) The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results, in accordance with the Manufacturer's recommendations or as approved or directed by the Engineer.
- (e) A neat finish with well defined boundaries and straight edges shall be provided by the Applicator.

- (f) Primer: The primer shall consist of one coat with an overall coverage rate of 125 to 175 s.f./gal (3.0 to 4.3sq.m/ 1) unless otherwise recommended in the manufacturer's written instructions.

All components shall be measured and mixed in accordance with the Manufacturer's recommendations.

The primer shall be spray applied using a single component spray system approved for use by the Manufacturer. If required by site conditions and allowed by the manufacturer, brush or roller application will be allowed.

The primer shall be allowed to cure tack-free for a minimum of 30 minutes or as required by the Manufacturer's instructions, whichever time is greater, prior to application of the first lift of waterproofing membrane.

Porous concrete (brick) may require a second coat of primer should the first coat be absorbed.

- (g) Membrane: The waterproofing membrane shall consist of one or two coats for a total dry film thickness of 80 mils (2 mm). If applied in two coats, the second coat shall be of a contrasting color to aid in quality assurance and inspection.

The membrane shall be comprised of Components A and B and a hardener powder which is to be added to Component B in accordance with the Manufacturer' s recommendations.

The substrate shall be coated in a methodical manner.

Thickness checks: For each layer, checks for wet film thickness using a gauge pin or standard comb-type thickness gauge shall be carried out typically once every 100 s.f. (9 sq.m). Where rapid set time of the membrane does not allow for wet film thickness checks, ultrasonic testing (steel surfaces only), calibrated point-penetrating (destructive) testing, in-situ sampling (cutout of small sections for measuring thicknesses), or other methods approved by the Engineer shall be employed for determination of dry film thickness. The measured thickness of each and every individual test of the membrane shall be greater than or equal to the required thickness.

Bond Strength: Random tests for adequate tensile bond strength shall be conducted on the membrane in accordance with the requirements of ASTM 0 4541. The minimum test frequency shall be one test per 5,000 s.f. (500 sq.m) but no less than three adhesion tests per bridge. Adequate adhesion will be indicated by tensile bond strengths of the membrane to the substrate of greater than or equal to 150 psi (0.7 MPa) or failure in a concrete surface and greater than or equal to 300 psi (2.1 MPa) for steel surfaces.

Spark Testing: Following application of the membrane, test for pin holes in the cured membrane system over the entire application area in accordance with ASTM D4787- " Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates." Conduct the test at voltages recommended by the manufacturer to prevent damage to the membrane.

Repair the membrane system following destructive testing and correct any deficiencies in the membrane system or substrate noted during quality-control testing in accordance with the manufacturer's recommendations to the satisfaction of the Engineer at no additional cost to the State.

- (h) Repairs: If an area is left untreated or the membrane becomes damaged, a patch repair shall be carried out to restore the integrity of the system. The damaged areas shall be cut back to sound materials and wiped with solvent (e.g. acetone) up to a width of at least four inches (100 mm) on the periphery, removing any contaminants unless otherwise recommended by the manufacturer. The substrate shall be primed as necessary, followed by the membrane. A continuous layer shall be obtained over the substrate with a four inches (100 mm) overlap onto existing membrane.

Where the membrane is to be joined to existing cured material, the new application shall overlap the existing by at least four inches (100 mm). Cleaning and surface preparation on areas to be lapped shall be as recommended in the manufacturer's written instructions.

- (i) Aggregated Finish:
- 1) Apply an additional 40 mil (1 mm) thick layer of the membrane material immediately followed by an aggregate coating, before the membrane cures, at a rate to fully cover the exposed area. The membrane and aggregate shall be fully integrated after the aggregate has been applied and the membrane cured.
 - 2) Localized areas not fully coated shall be touched-up with additional membrane and aggregate as needed.
 - 3) Remove loose and excess aggregate from the surface to the satisfaction of the Engineer and dispose of properly after application prior to allowing traffic onto finished surface or application of tack coat.

- (j) Tack Coat:
Prior to application of a bituminous concrete overlay, the aggregated finish shall be coated with tack coat in accordance with Section 4.06.

7. Final Review: The Engineer and the Applicator shall jointly review the area(s) over which the completed System has been installed. Any irregularities or other items that do not meet the requirements of the Engineer shall be addressed at this time.

Method of Measurement: This item shall be measured by the number of square yards of waterproofed surface completed and accepted.

Basis of Payment: This item will be paid for at the contract unit price per square yard of "Membrane Waterproofing (Cold Liquid Elastomeric)," complete in place, which price shall include all surface preparation, furnishing, storing and applying the system, technical representative and quality control tests, and any necessary repairs and remediation work as well as all materials, equipment, tools, labor incidental to this work.

Pay Item

Membrane Waterproofing (Cold Liquid Elastomeric)

Pay

Unit

s.y.

ITEM #0950001A – RESET BELGIUM BLOCK APRON

Description: This work shall consist of removing and resetting or adjusting the existing Belgium block apron, reusing existing block and bed material, so as to fit neatly and firmly, constructed in such shape and such place as indicated on the plan or as directed by the Engineer and in accordance with these specifications.

Materials: The Contractor shall re-use existing blocks from the existing block paving. Mortar material, if required, shall conform to the requirements of Article M.11.04. The Contractor shall provide any additional blocks (if required) that resemble as close as possible the existing blocks.

Construction Methods: The Contractor shall take photographs and field measurements of the existing Belgium blocks to be used for reconstruction prior to removing the existing blocks. The existing blocks shall be carefully removed, cleaned and stored. The blocks shall be reset using the existing materials removed. Prior to resetting the existing blocks, the foundation shall be prepared as directed by the Engineer. Any foundation soil found to be unsuitable shall be removed and replaced.

Method of Measurement: This work will be measured for payment for the actual number of Square feet of Belgium Blocks Apron completed and accepted.

Basis of Payment: This work will be paid for at the contract price per square foot for "Reset Belgium Block Apron", complete and accepted, which price shall include all work, equipment, materials, additional approved blocks, mortar, crushed stones, tools and labor incidental thereto.

Pay Item

Reset Belgium Block Apron

Pay Unit

S.Y.

ITEM #0950005A – RESET STONE CURB

Description: This work shall consist of removing and resetting or adjusting the existing stone curb in driveways, reusing existing stone curbs and bedding material, so as to fit neatly and firmly, constructed in such shape and such place as indicated on the plan or as directed by the Engineer and in accordance with these specifications.

Materials: The Contractor shall re-use existing stone curbs from the existing driveways. Mortar material, if required, shall conform to the requirements of Article M.11.04. The Contractor shall provide any additional stone curbs (if required) that resemble as close as possible the existing stone curbs.

Construction Methods: The Contractor shall take photographs and field measurements of the existing stone curbs to be used for reconstruction prior to removing the existing stone curbs. The existing stone curbs shall be carefully removed, cleaned and stored. The stone curbs shall be reset using the existing materials removed. Prior to resetting the existing stone curbs, the foundation shall be prepared as directed by the Engineer. Any foundation soil found to be unsuitable shall be removed and replaced.

Method of Measurement: This work will be measured for payment for the actual number of Lineal Feet of Stone Curbs completed and accepted.

Basis of Payment: This work will be paid for at the contract price per square foot for "Reset Stone Curb", complete and accepted, which price shall include all work, equipment, materials, additional approved stone curbs, mortar, crushed stones, tools and labor incidental thereto.

Pay Item
Reset Stone Curb

Pay Unit
L.F.

ITEM #0950019A - TURF ESTABLISHMENT - LAWN

Description: The work included in this item shall consist of providing an accepted stand of grass by furnishing and placing seed as shown on the plans or as directed by the Engineer.

Materials: The materials for this work shall conform to the requirements of Section 9.50 of Standard Specification Form 817. The following mix shall be used for this item:

Turf Seed Mix:

In order to preserve and enhance the diversity, the source for seed mixtures shall be locally obtained within the Northeast USA including New England, New York, Pennsylvania, New Jersey, Delaware, or Maryland. One approved seed mixture is detailed below. Other proposed mixtures must be approved by the Conn DOT Landscape Design office.

Proportion (Percent)	Species Common name	Scientific name
25	Abbey Kentucky Bluegrass	Poa pratensis
15	Envicta Kentucky Bluegrass	Poa pratensis
25	Pennlawn Red Fescue	Festuca rubra
15	Ambrose Chewing Fescue	Festuca rubra
20	Manhattan Ryegrass	Lolium perenne

Fertilizer:

Fertilizer shall be Starter fertilizer.

Mulch:

Mulch shall be Mulch Master shredded hay. Salt hay or straw hay shall not be permitted.

Construction Methods: Construction Methods shall be those established as agronomically acceptable and feasible and that are approved by the Engineer. Rate of application shall be field determined in Pure Live Seed (PLS) based on the minimum purity and minimum germination of the seed obtained. Calculate the PLS for each seed species in the mix. Adjust the seeding rate for the above composite mix, based on 250 lbs. (274 kg.) per acre (hectare). The seed shall be mulched in accordance with Article 9.50.03.

Method of Measurement: This work will be measured for payment by the number of square yards (square meters) of surface area of accepted established grasses as specified or by the number of square yards (square meters) of surface area of seeding covered and as specified.

Basis of Payment: This work will be paid for at the contract unit price per square yard (square meters) for "Turf Establishment - Lawn" which price shall include all materials maintenance, equipment, tools, labor, and work incidental thereto. Partial payment of up to 60% may be made for work completed, but not accepted.

Pay Item
Turf Establishment -Lawn

Pay Unit
S.Y.

ITEM #0969060A - CONSTRUCTION FIELD OFFICE, SMALL

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

Furnishings/Materials/Supplies/Equipment: All furnishings, materials, equipment and supplies shall be in like new condition for the purpose intended and require approval of the Engineer.

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

Description \ Office Size	Small	Med.	Large	Extra Large
Minimum Sq. Ft. of floor space with a minimum ceiling height of 7 ft.	400	400	1000	2000
Minimum number of exterior entrances.	2	2	2	2
Minimum number of parking spaces.	7	7	10	15

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

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

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

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

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

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

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

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

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

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

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

Data Communications Facility Wiring: Contractor shall install a Category 6 568B patch panel in a central wiring location and Cat 6 cable from the patch panel to each PC station, Smart Board location, Multifunction Laser Printer/Copier/Scanner/Fax, terminating in a (Category 6 568B) wall or surface mount data jack. The central wiring location shall also house either the data circuit with appropriate power requirements or a category 5 cable run to the location of the installed data circuit. The central wiring location will be determined by the CTDOT OIS staff in coordination with the designated field office personnel as soon as the facility is in place.

For Small, Medium and Large field offices the Contractor shall run a CAT 6 LAN cable a minimum length of 25 feet for each CTDOT networked device (including but not limited to: smartboards and Multi-Function Laser Printer/Copier/Scanner/Fax) to LAN switch area leaving an additional 10 feet of cable length on each side with terminated RJ45 connectors. For an Extra-Large field office the Contractor shall run CAT 6 LAN cables from workstations, install patch panel in data circuit demark area and terminate runs with RJ45 jacks at each device location. Terminate runs to patch panel in LAN switch area. Each run / jack shall be clearly labeled with an identifying Jack Number.

The Contractor shall supply cables to connect the Wi-Fi printer to the Contractor supplied internet router and to workstations/devices as needed. These cables shall be separate from the LAN cables and data Jacks detailed above for the CTDOT network.

The number of networked devices anticipated shall be at least equal to the number of personal computer tables, Multi-Function Laser Printer/Copier/Scanner/Fax, and smartboards listed below.

The installation of a data communication circuit between the field office and the CTDOT OIS in Newington will be coordinated between the CTDOT District staff, CTDOT OIS staff and the local utility company once the Contractor supplies the field office phone numbers and anticipated installation date. The Contractor shall provide the field office telephone number(s) to the CTDOT Project Engineer within 10 calendar days after the signing of the Contract as required by Article 1.08.02. This is required to facilitate data line and computer installations.

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

Furnishing Description	Office Size
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	Small	Med.	Large	Extra Large
	Quantity			
Office desk (2.5 ft. x 5 ft.) with drawers, locks, and matching desk chair that have pneumatic seat height adjustment and dual wheel casters on the base.	1	3	5	8
Standard secretarial type desk and matching desk chair that has pneumatic seat height adjustment and dual wheel casters on the base.	-	-	-	1
Personal computer tables (4 ft. x 2.5 ft.).	2	3	5	8
Drafting type tables (3 ft. x 6 ft.) and supported by wall brackets and legs; and matching drafters stool that have pneumatic seat height adjustment, seat back and dual wheel casters on the base.	1	1	1	2
Conference table, 3 ft. x 12 ft.	-	-	-	1
Table – 3 ft. x 6 ft.	-	-	-	1
Office Chairs.	2	4	8	20
Mail slot bin – legal size.	-	-	1	1
Non-fire resistant cabinet.	-	-	2	4
Fire resistant cabinet (legal size/4 drawer), locking.	1	1	2	3
Storage racks to hold 3 ft. x 5 ft. display charts.	-	-	1	2
Vertical plan racks for 2 sets of 2 ft. x 3 ft. plans for each rack.	1	1	2	2
Double door supply cabinet with 4 shelves and a lock – 6 ft. x 4 ft.	-	-	1	2
Case of cardboard banker boxes (Min 10 boxes/case)	1	1	2	3
Open bookcase – 3 shelves – 3 ft. long.	-	-	2	2
White Dry-Erase Board, 36" x 48" min. with markers and eraser.	1	1	1	1
Interior partitions – 6 ft. x 6 ft., soundproof type, portable and freestanding.	-	-	6	6
Coat rack with 20 coat capacity.	-	-	-	1
Wastebaskets - 30 gal., including plastic waste bags.	1	1	1	2
Wastebaskets - 5 gal., including plastic waste bags.	1	3	6	10
Electric wall clock.	-	-	-	2
Telephone.	1	1	1	-
Full size stapler 20 (sheet capacity, with staples)	1	2	5	8
Desktop tape dispensers (with Tape)	1	2	5	8
8 Outlet Power Strip with Surge Protection	3	4	6	9
Rain Gauge	1	1	1	1
Business telephone system for three lines with ten handsets, intercom capability, and one speaker phone for conference table.	-	-	-	1
Mini refrigerator - 3.2 c.f. min.	1	1	1	1
Hot and cold water dispensing unit. Disposable cups and	1	1	1	1

bottled water shall be supplied by the Contractor for the duration of the project.				
Microwave, 1.2 c.f. , 1000W min.	1	1	1	1
Fire extinguishers - provide and install type and *number to meet applicable State and local codes for size of office indicated, including a fire extinguisher suitable for use on a computer terminal fire.	*	*	*	*
Electric pencil sharpeners.	1	2	2	2
Electronic office type printing calculators capable of addition, subtraction, multiplication and division with memory and a supply of printing paper.	1	1	2	4
Small Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under <u>Computer Related Hardware and Software</u> .	1	1		
Large Multi-Function Laser Printer/Copier/Scanner/Fax combination unit, network capable, as specified below under <u>Computer Related Hardware and Software</u> .			1	1
Field Office Wi-Fi Connection as specified below under <u>Computer Related Hardware and Software</u>	1	1	1	1
Wi-Fi Printer as specified below under <u>Computer Related Hardware and Software</u> .	1	1	1	1
Digital Camera as specified below under <u>Computer Related Hardware and Software</u> .	1	1	3	3
Video Projector as specified below under <u>Computer Related Hardware and Software</u> .	-	-	-	1
Smart Board as specified below under <u>Computer Related Hardware and Software</u> .	-	-	-	1
Infrared Thermometer, including annual third party certified calibration, case, and cleaning wipes.	1	1	1	2
Concrete Curing Box as specified below under Concrete Testing Equipment.	1	1	1	1
Concrete Air Meter and accessories as specified below under Concrete Testing Equipment as specified below. Contractor shall provide third party calibration on a quarterly basis.	1	1	1	1
Concrete Slump Cone and accessories as specified below under Concrete Testing Equipment.	1	1	1	1
First Aid Kit	1	1	1	1
Flip Phones as specified under <u>Computer Related Hardware and Software</u> .	-	-	-	-
Smart Phones as specified under <u>Computer Related Hardware and Software</u> .	-	-	-	-

The furnishings and equipment required herein shall remain the property of the Contractor. Any supplies required to maintain or operate the above listed equipment or furnishings shall be provided by the Contractor for the duration of the project.

Computer Related Hardware and Software: The CTDOT will supply by its own means the actual Personal Computers for the CTDOT representatives. The Contractor shall supply the Field Office Wi-Fi Connection, Wi-Fi Printer, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors, and Smart Board(s) as well as associated hardware and software, must meet the requirements of this specification as well as the latest minimum specifications posted, as of the project advertising date, at CTDOTs web site <http://www.ct.gov/dot/cwp/view.asp?a=1410&q=563904>

Within 10 calendar days after the signing of the Contract but before ordering/purchasing the Wi-Fi Printer (separate from the Multifunction Laser Printer/Copier/Scanner/Fax), Field Office Wi-Fi, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projector(s) and Smart Board(s) as well as associated hardware, the Contractor must submit a copy of their proposed order(s) with catalog cuts and specifications to the Administering CTDOT District for review and approval. The Wi-Fi Printer, Wi-Fi Router, Flip Phones, Smart Phones, digital cameras, Projector(s) and Smart Board(s) will be reviewed by CTDOT District personnel. The Multifunction Laser Printer/Copier/Scanner/Fax will be reviewed by the CTDOT OIS. The Contractor shall not purchase the hardware, software, or services until the Administering CTDOT District informs them that the proposed equipment, software, and services are approved. The Contractor will be solely responsible for the costs of any hardware, software, or services purchased without approval.

The Contractor and/or their internet service provider shall be responsible for the installation and setup of the field office Wi-Fi, Wi-Fi printer, and the configuration of the wireless router as directed by the CTDOT. Installation will be coordinated with CTDOT District and Project personnel.

After the approval of the hardware and software, the Contractor shall contact the designated representatives of the CTDOT administering District, a minimum of 2 working days in advance of the proposed delivery or installation of the Field Office Wi-Fi Connection, Wi-Fi Printer, Digital Camera(s), Flip Phones, Smart Phones, Multifunction Laser Printer/Copier/Scanner/Fax, Video Projectors and Smart Board(s), as well as associated hardware, software, supplies, and support documentation.

The Contractor shall provide all supplies, paper, maintenance, service and repairs (including labor and parts) for the Wi-Fi printers, copiers, field office Wi-Fi, fax machines and other equipment and facilities required by this specification for the duration of the Contract. All repairs must be performed with-in 48 hours. If the repairs require more than a 48 hours then an equal or better replacement must be provided.

Once the Contract has been completed, the hardware and software will remain the property of the Contractor.

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

Rain Gauge: The Contractor shall supply install and maintain a rain gauge for the duration of the project, meeting these minimum requirements. The rain gauge shall be installed on the top of a post such that the opening of the rain gauge is above the top of the post an adequate distance to avoid splashing of rain water from the top of the post into the rain gauge. The Location of the rain gauge and post shall be approved by the Engineer. The rain gauge shall be made of a durable material and have graduations of 0.1 inches or less with a minimum total column height of 5 inches. If the rain gauge is damaged the Contractor shall replace it prior to the next forecasted storm event at no additional cost.

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

- A) Concrete Cylinder Curing Box – meeting the requirements of Section 6.12 of the Standard Specifications.
- B) Air Meter – The air meter provided shall be in good working order and meet the requirements of AASHTO T 152.
- C) Slump Cone Mold – Slump cone, base plate, and tamping rod shall be provided in like-new condition and meet the requirements of AASHTO T119, Standard Test Method for Slump of Hydraulic-Cement Concrete.

All testing equipment will remain the property of the Contractor at the completion of the project.

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

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

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

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

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

<u>Pay Item</u>	<u>Pay Unit</u>
Construction Field Office, (Type)	Month

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

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.

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 an authorized Trafficperson may be obtained. In no case shall this temporary use exceed 8 hours for any 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.

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.

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":

All 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 & Residential Driveways

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

Article 9.71.03 - Construction Method is supplemented as follows:

General

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

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

The Contractor shall schedule operations so that pavement removal and roadway resurfacing shall be completed full width across a roadway (bridge) section by the end of a workday (work night), or as directed by the Engineer.

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

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3-foot shoulder between the work area and travel lanes, with traffic drums spaced every 50 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.

Construction vehicles entering travel lanes at speeds less than the posted speed are interfering with traffic, and shall not be allowed without a lane closure. The lane closure shall be of sufficient length to allow vehicles to enter or exit the work area at posted speeds, in order to merge with existing traffic.

Existing Signing

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

Requirements for Winter

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

Signing Patterns

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

Pavement Markings -Non-Limited Access Multilane Roadways

Secondary and Local Roadways

During construction, the Contractor shall maintain all pavement markings on paved surfaces on all roadways throughout the limits of the project.

Interim Pavement Markings

The Contractor shall install painted pavement markings, which shall include centerlines, shoulder edge lines, lane lines (broken lines), lane-use arrows, and stop bars, on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work day/night. If the next course of bituminous concrete pavement will be placed within seven days, shoulder edge lines are not required. The painted pavement markings will be paid under the appropriate items.

If the Contractor will install another course of bituminous concrete pavement within 24 hours, the Contractor may install Temporary Plastic Pavement Marking Tape in place of the painted pavement markings by the end of the work day/night. These temporary pavement markings shall include centerlines, lane lines (broken lines) and stop bars; shoulder edge lines are not required. Centerlines shall consist of two 4 inch wide yellow markings, 2 feet in length, side by side, 4 to 6 inches apart, at 40-foot intervals. No passing zones should be posted with signs in those areas where the final centerlines have not been established on two-way roadways. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of the Temporary Plastic Pavement Marking Tape when another course of bituminous concrete pavement is installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless directed otherwise by the Engineer.

Final Pavement Markings

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

The Contractor shall install permanent Epoxy Resin Pavement Markings in accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings, Symbols, and Legends" after such time as determined by the Engineer.

TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS

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

TRAFFIC CONTROL PATTERNS

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

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

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

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

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

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

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

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

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate 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 travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 3.g) Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.
- 3.h) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

SECTION 4. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

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

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

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

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

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

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

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

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

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

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

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

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

SECTION 6. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

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

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

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

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

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

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

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

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

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

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

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

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

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

7.i) The messages that are allowed on the CMS are as follows:

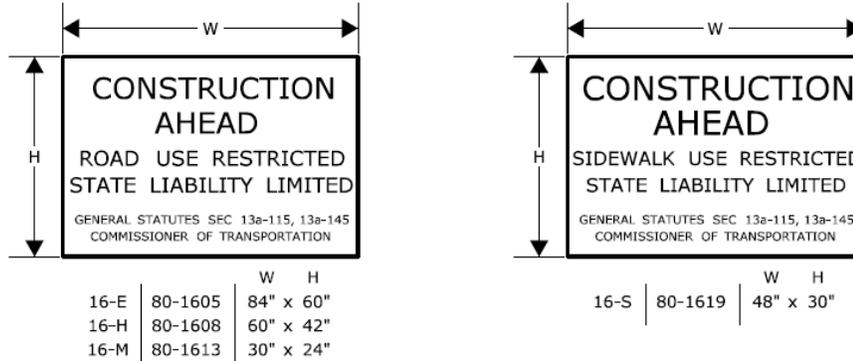
<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>	<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	WORKER S ON ROAD	REDUCE SPEED
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	WORKER S ON ROAD	SLOW DOWN
5	RIGHT LANE CLOSED	MERGE LEFT	13	EXIT XX CLOSED	USE EXIT YY
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	EXIT XX CLOSED USE YY	FOLLOW DETOUR
7	RIGHT LANE CLOSED	REDUCE SPEED	15	2 LANES SHIFT AHEAD	USE CAUTION
8	2 RIGHT LANES CLOSED	REDUCE SPEED	16	3 LANES SHIFT AHEAD	USE CAUTION

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

SECTION 8. USE OF STATE POLICE OFFICERS

- 8.a) State Police may be utilized only on limited access highways and secondary roadways under their primary jurisdiction. One Officer may be used per critical sign pattern. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Likewise in areas with moderate traffic and wide, unobstructed medians, left lane closures can be implemented without State Police presence. Under some situations it may be desirable to have State Police presence, when one is available. Examples of this include: nighttime lane closures; left lane closures with minimal width for setting up advance signs and staging; lane and shoulder closures on turning roadways/ramps or mainline where sight distance is minimal; and closures where extensive turning movements or traffic congestion regularly occur, however they are not required.
- 8.b) Once the pattern is in place, the State Police Officer should be positioned in a non-hazardous location in advance of the pattern. If traffic backs up beyond the beginning of the pattern, then the State Police Officer shall be repositioned prior to the backup to give warning to the oncoming motorists. The State Police Officer and TMA should not be in proximity to each other.
- 8.c) Other functions of the State Police Officer(s) may include:
- Assisting entering/exiting construction vehicles within the work area.
 - Enforcement of speed and other motor vehicle laws within the work area, if specifically requested by the project.
- 8.d) State Police Officers assigned to a work site are to only take direction from the Engineer.

SERIES 16 SIGNS



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.

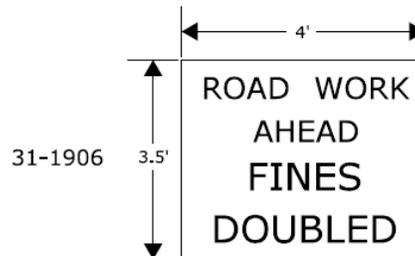
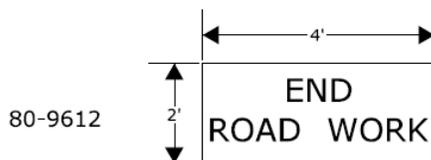
REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

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 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.



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN
REQUIRED SIGNS

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

Charles S. Harlow
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



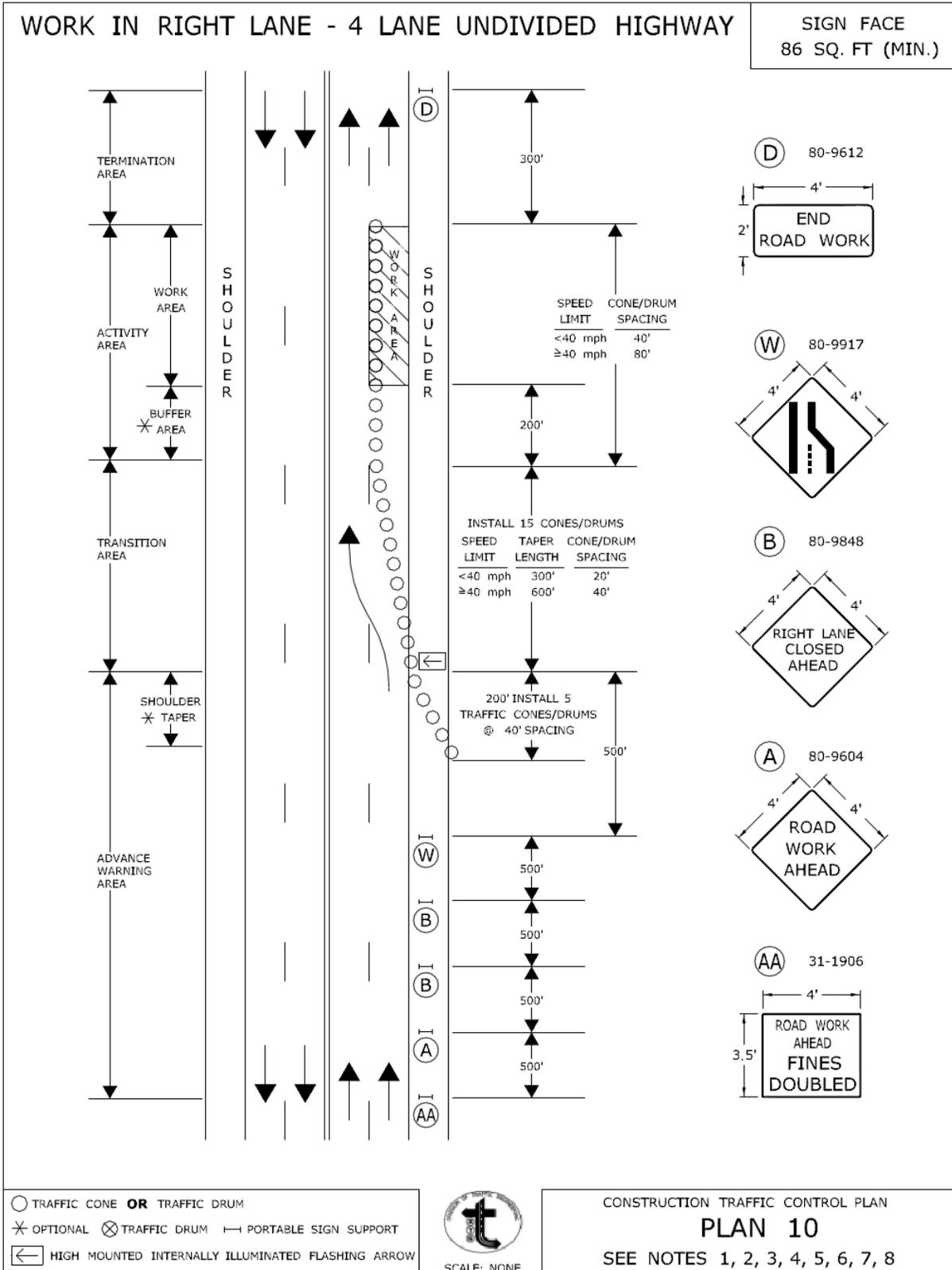
SCALE: NONE

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

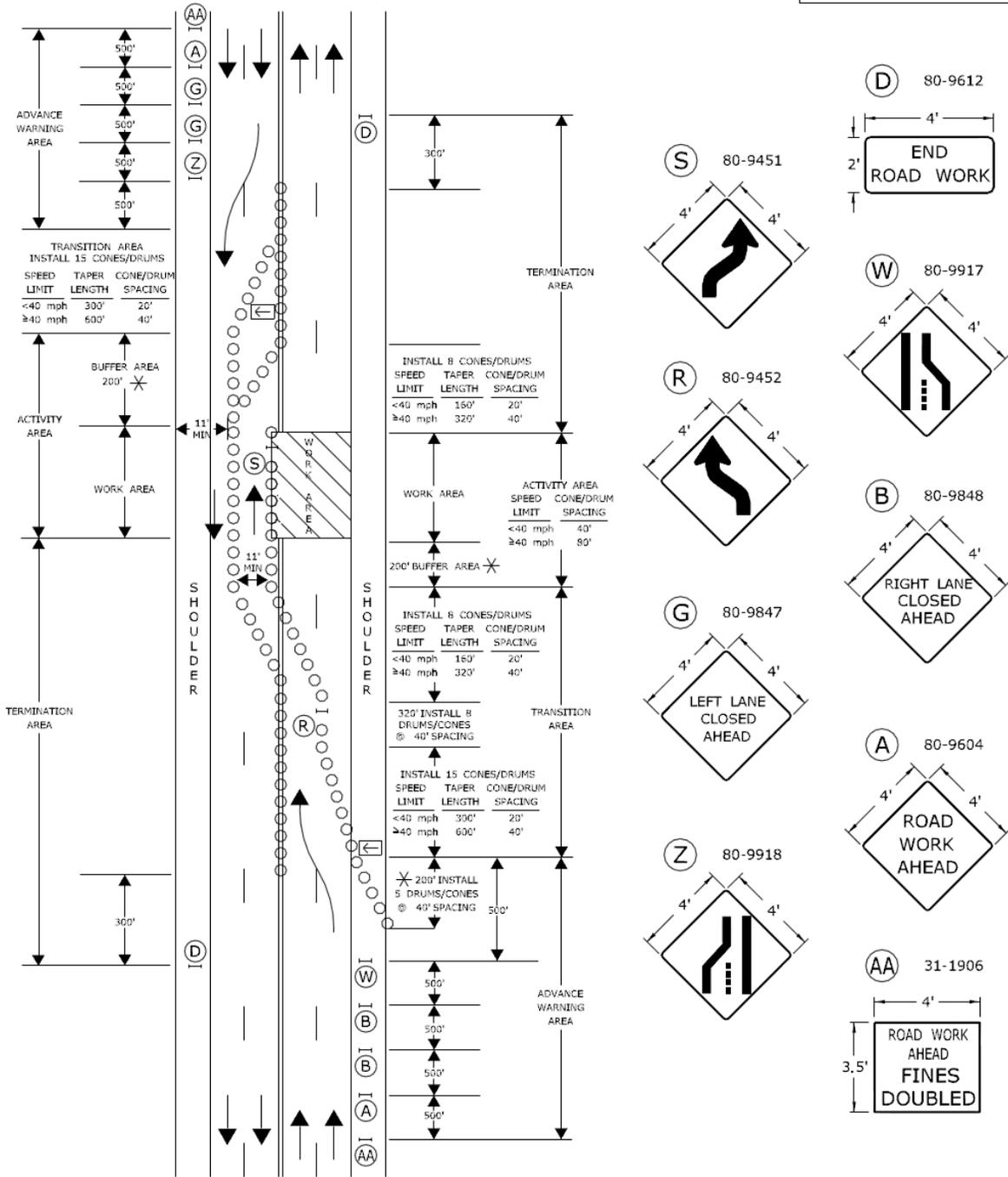


CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:54:15-0400
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



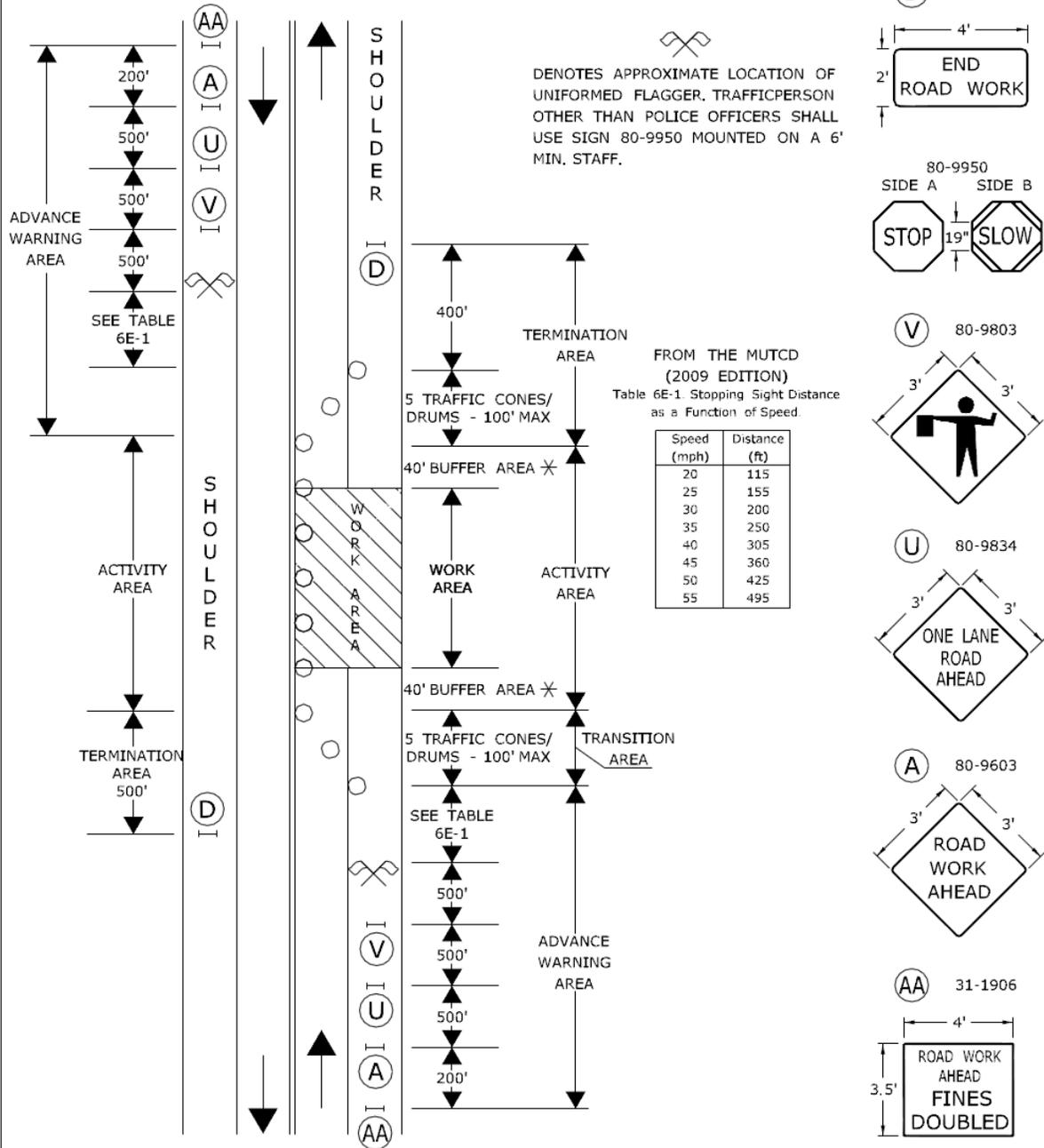
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 12
SEE NOTES 1, 2, 3, 4, 5, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:55:01-0400
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



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* 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

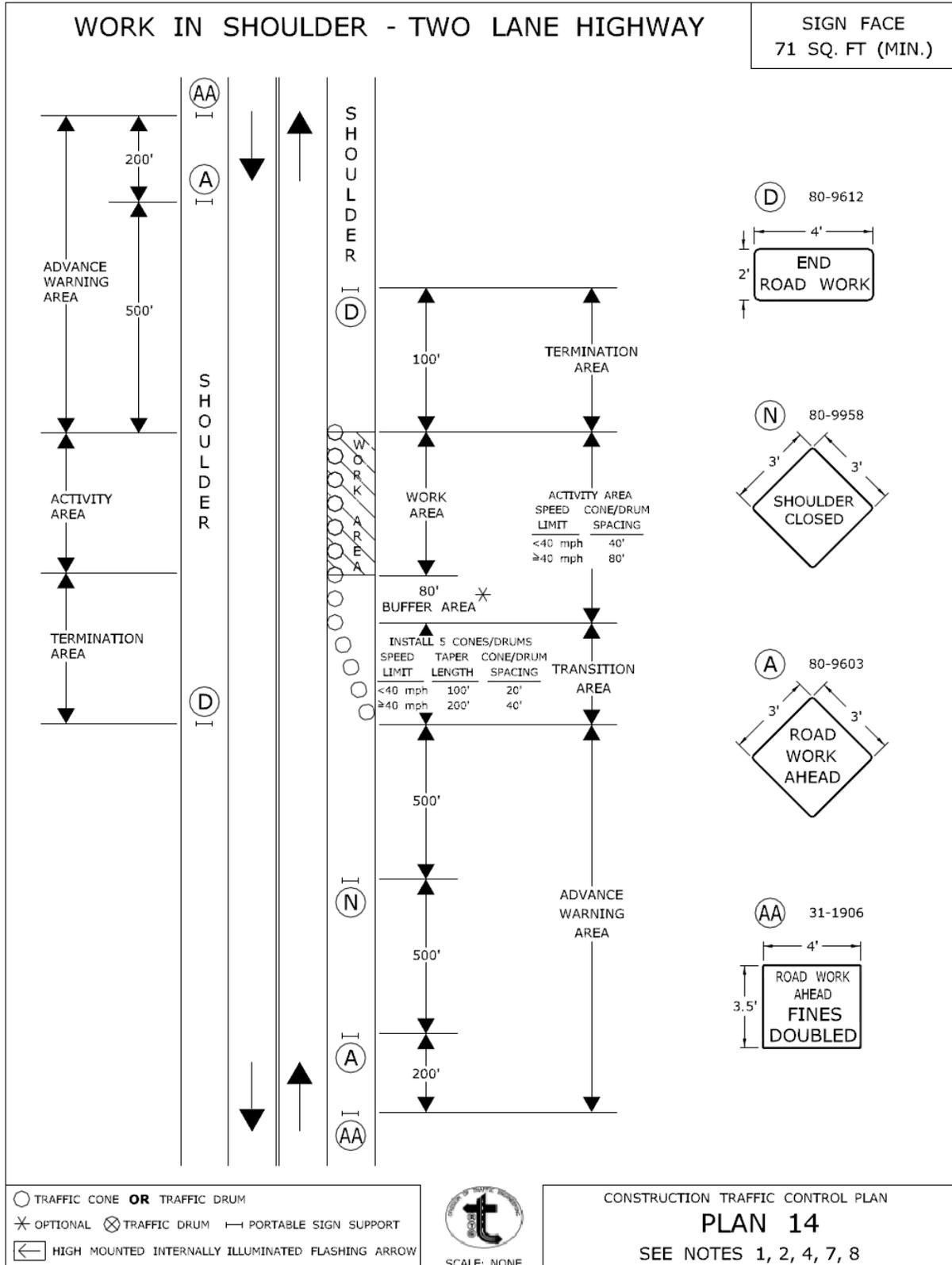


SCALE: NONE

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



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



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

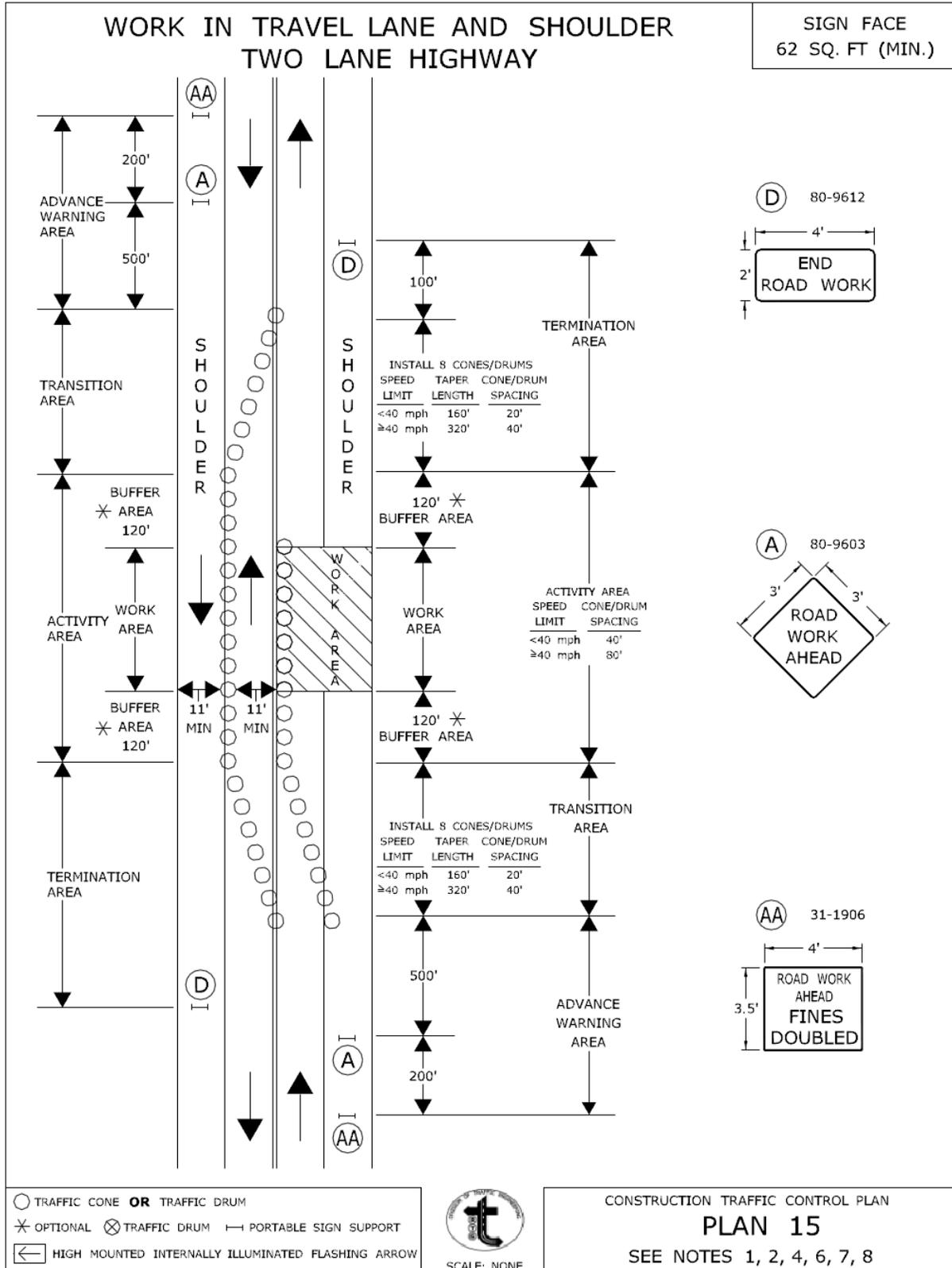
PLAN 14

SEE NOTES 1, 2, 4, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
 BUREAU OF ENGINEERING & CONSTRUCTION

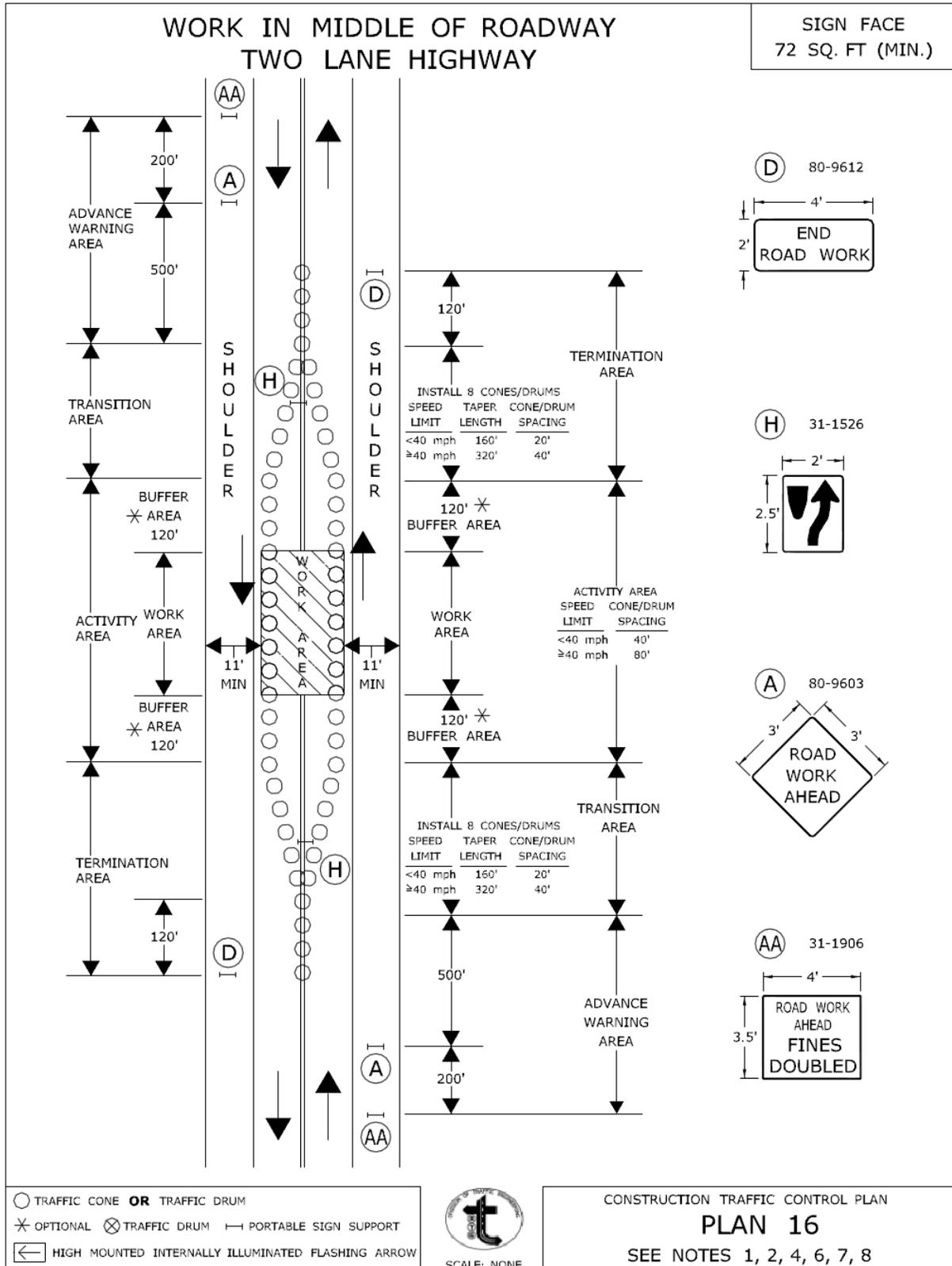
APPROVED

Charles S. Harlow
 Charles S. Harlow
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 PRINCIPAL ENGINEER

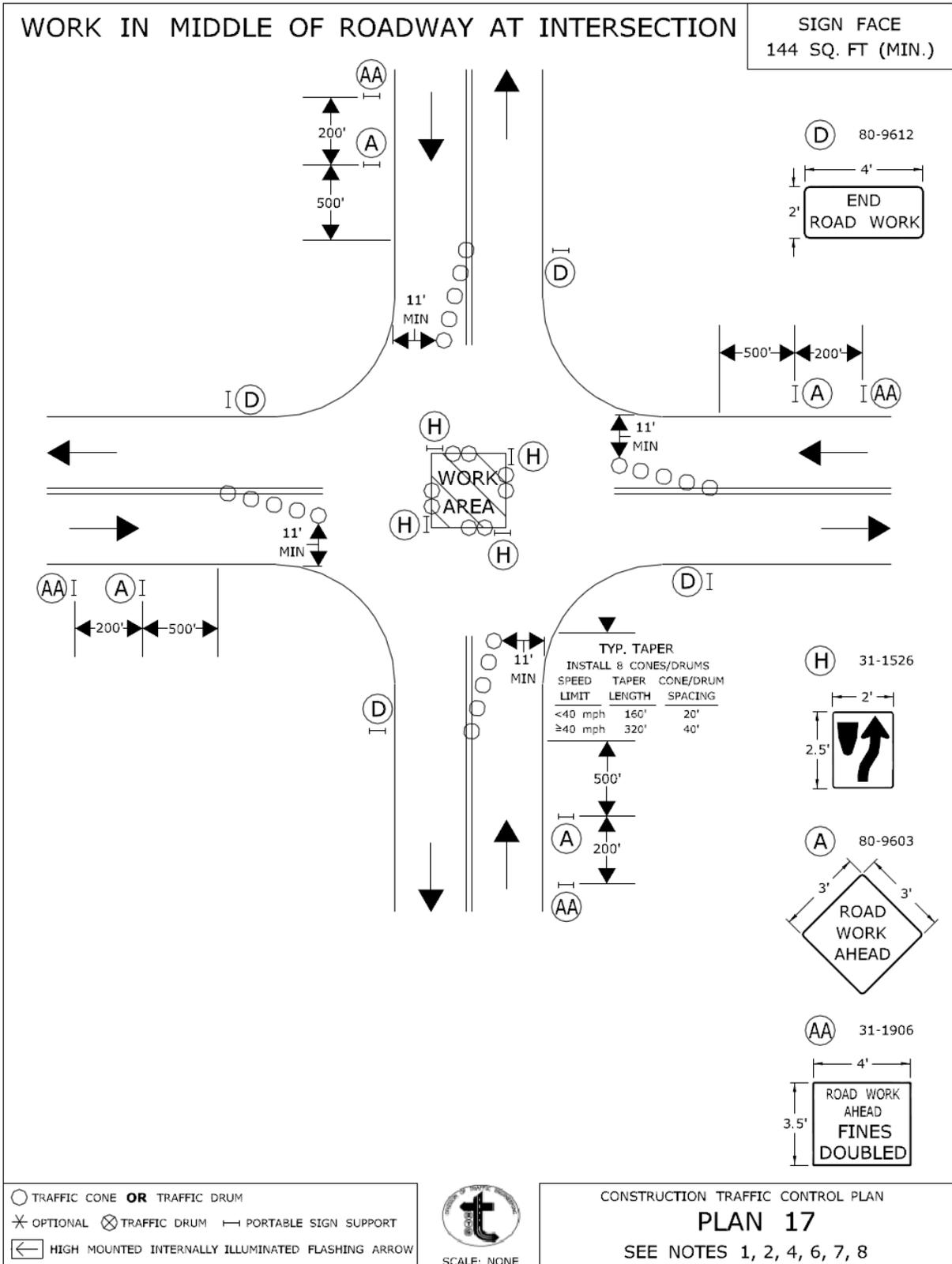


APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:56:29-04'00"
PRINCIPAL ENGINEER

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION



APPROVED *Charles S. Harlow* Charles S. Harlow
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 PRINCIPAL ENGINEER



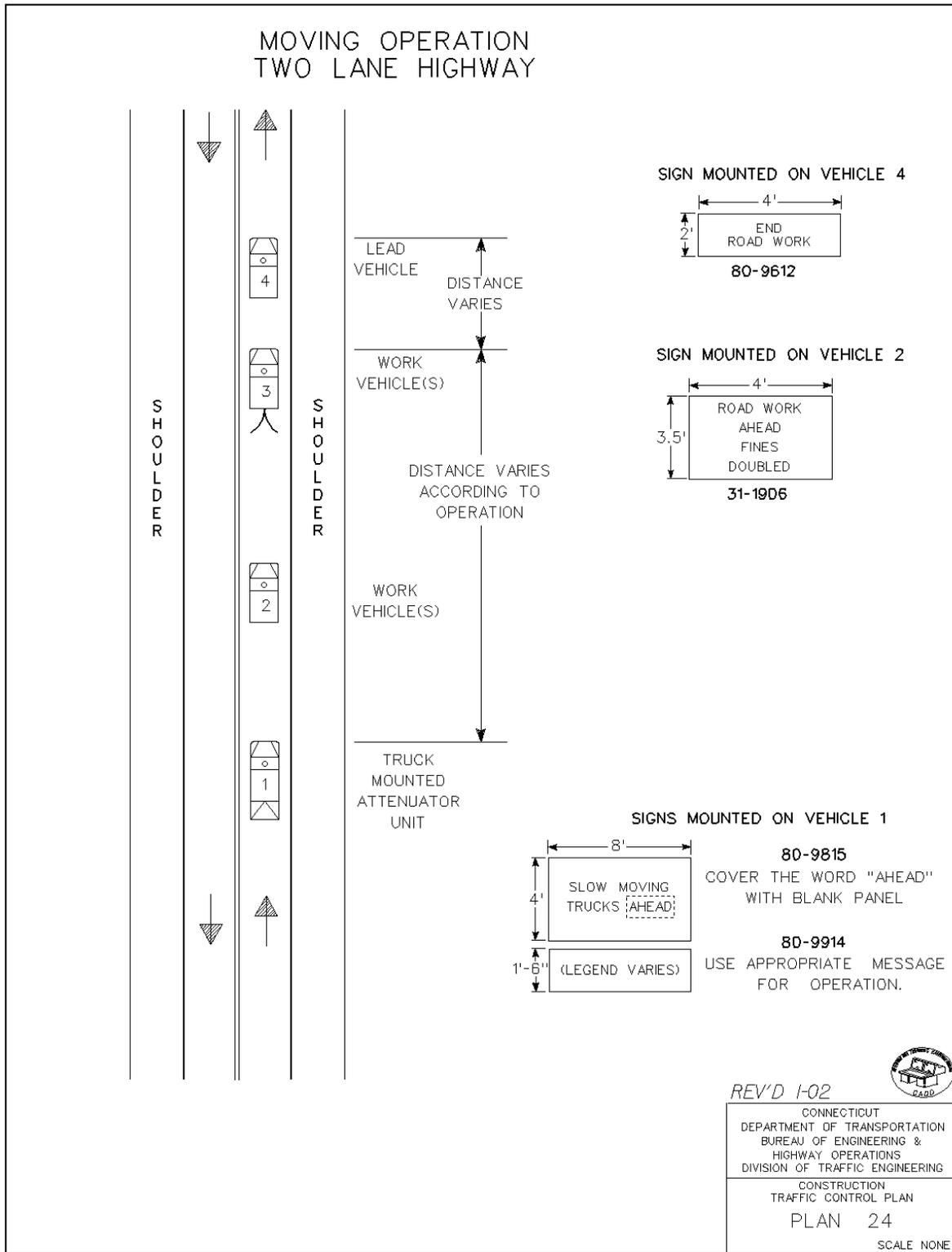
- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ← HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



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*
PRINCIPAL ENGINEER
2012.08.05 15:57:16-04'00"



APPROVED John D. McCall DATE 1-30-02
PRINCIPAL ENGINEER

Article 9.71.05 – Basis of Payment is supplemented by the following:

The temporary relocation of signs and supports, and the furnishing, installation and removal of any temporary supports shall be paid for under the item “Maintenance and Protection of Traffic”. Temporary overhead sign supports and foundations shall be paid for under the appropriate item(s).

The cost of furnishing, installing, and removing the material for the 4H:1V traversable slope shall be paid for under the item “Maintenance and Protection of Traffic.”

ITEM #0980001A – CONSTRUCTION STAKING

Add the following:

9.80.1 —Description: The work under this item shall also include a preconstruction video or photo log of the project area. The precondition survey shall document existing conditions both within the project limits and those areas adjacent to the project limits to record the condition prior to the beginning of construction. The video or photo log shall be recorded in digital format and provided to the Town of Trumbull as part of the project record documents prior to the beginning of construction. In addition, the preconstruction survey shall include digital photographs of each property that will be affected by construction to provide documentation for both the Contractor and the Town of existing conditions prior to the initiation of work. All preconstruction survey data shall be provided to the Town of Trumbull.

ITEM #1002202A – TRAFFIC CONTROL FOUNDATION – MAST ARM

Description: Work under this item shall consist of designing and constructing drilled shaft foundations for mast arm assemblies, in accordance with the details shown on the plans, in accordance with these specifications and as ordered by the Engineer.

Materials: The reinforcing steel shall be uncoated, ASTM A615, Grade 60 reinforcement conforming to the requirements of Article M.06.01.

The concrete for the drilled shaft shall be dense, homogeneous, fluid, resistant to segregation and consolidate under self-weight. The concrete for the drilled shaft shall be a Contractor designed Portland cement concrete with a 3/8" (No. 8) maximum coarse aggregate size and a minimum of 705 lbs/cubic yard of cementitious materials. The initial concrete slump shall be 7" \pm 1". The concrete shall maintain a minimum 4" slump for the duration of the concrete placement. The concrete shall contain 1% - 7% air entrainment. The 28 day minimum compressive strength of the concrete in the constructed foundation shall be 4,000 psi. The concrete mix design, including admixtures, shall be submitted to the Engineer for approval.

The slurry shall be Contractor designed mineral slurry that meets the range of values listed herein. The slurry mix design, including admixtures, shall be submitted to the Engineer for approval.

Rigid metal conduit, ground rod sleeves and related hardware, and end caps shall be galvanized steel conduit, and shall conform to Article M.15.09.

Ground rods shall be 5/8" in diameter by 12'-0" long copper clad steel. The copper cladding shall be a minimum thickness of 0.128". The ground clamp shall be a square-head bolt type, approved for direct burial.

Bare copper wire shall conform to Article M.15.13.

Topsoil shall conform to Article M.13.01.

Fertilizer shall conform to Article M.13.03.

Seed mixture shall conform to Article M.13.04.

Mulch shall conform to Article M.13.05.

Erosion control matting shall conform to Article M.13.09.

Construction Methods: For the purpose of bidding this item, the Contractor shall assume that the subsurface conditions for each drilled shaft foundation location consists of cohesionless, medium dense, granular soil (AASHTO A-1 or A-2) with cobbles present and a high

groundwater table which requires the use of wet construction/concreting methods. During excavation and construction of each foundation, should the Contractor encounter subsurface conditions that differ materially from those assumed at the time of bid, the Contractor shall notify the Engineer. All matters regarding increased cost relating to an agreed upon change in subsurface conditions will be handled per Section 1.04.04 – Differing Site Conditions.

The design of drilled shaft foundations shall conform to the requirements of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals – latest edition, including the latest interim specifications, available prior to the advertising date of the contract, amended as follows:

- The foundation shall be designed for the soils and rock properties and parameters based on the subsurface conditions (character of the soil and rock, presence of ground water, etc.) in the location of, adjacent to and below the drilled shaft foundation excavation. The need and extent of all subsurface explorations and investigations shall be determined by the Contractor.
- The specified compressive strength, f'_c , of the concrete used in the design shall be 4,000 psi.
- The reinforcement shall be uncoated and conform to ASTM A615, Grade 60.
- The foundation shall be designed for the mast arm assembly reactions of all group loads and load combinations. The reactions shall include axial, shear, flexural and torsional load effects. No reduction of the reactions or increase in the allowable stresses of the materials is permitted.
- The diameter of the drilled shaft foundation shall be 3'-0", unless otherwise allowed by the Engineer.
- The design of the drilled shaft foundation shall include embedment of the foundation in soil, the embedment of the foundation in rock or the embedment of the foundation partially in soil and partially in rock, as applicable.
- The design of the drilled shaft embedment depth shall account for the slope of the finished grade.
- The minimum embedment for a drilled shaft foundation, constructed entirely in soil, shall be no less than 12'-0" below the finished grade at the low side of a sloping grade. The minimum embedment for a drilled shaft foundation, constructed entirely in rock shall be no less than 8'-0" below the finished grade at the low side of a sloping grade.
- The embedment depth for a drilled shaft foundation, determined by the Brom's design method, shall have a minimum factor of safety of 3.25 applied to the shear

and moment load effects. The factor of safety applied to the torsional load effect shall be no less than 1.3.

- The load factor method shall be used for the structural design of the drilled shaft foundation. The load factor applied to all loads, dead, wind and ice, and their effects, axial, shear, flexure and torsion, shall be no less than 1.6. The drilled shaft may be designed in accordance with the load factor method presented in the latest edition of the Building Code Requirements for Reinforced Concrete”, ACI 318.
- The structural design of the drilled shaft shall be based on stress and strain compatibility in the circular drilled shaft cross section. The use of methods equating circular to rectangular drilled shaft cross sections is not permitted.
- The drilled shaft foundation shall be reinforced with longitudinal and transverse reinforcement. The area of longitudinal reinforcement should be no less than the sum of the reinforcement required for flexure and the longitudinal reinforcement required for torsion. The area of transverse reinforcement should be no less than the sum of the reinforcement required for shear and the transverse reinforcement required for torsion.
- The minimum number of longitudinal reinforcing bars shall be 16. The minimum size of longitudinal reinforcing bars shall be #8. The minimum area of longitudinal reinforcing bars shall be no less than 1% of the gross cross-sectional area of the shaft. The minimum clear distance between longitudinal reinforcing bars shall be no less than 5 times the maximum aggregate size or 5”, whichever is greater. The reinforcement shall extend full length of the drilled shaft foundation, including the pedestal. Splicing of the longitudinal reinforcement is not permitted.
- The drilled shaft foundation shall be transversely reinforced with spirals or circular, one piece, enclosed ties. The minimum size of the transverse reinforcement shall be #4. The maximum spacing/pitch of the transverse reinforcement shall be no more than 6”. The minimum spacing/pitch of the transverse reinforcement shall be no more than 4”. The spiral reinforcement shall be terminated at the top and the bottom with 1 ½ turns of the reinforcing and a 135° standard hook. Spirals may be spliced with lap splices or mechanical connectors. For spirals, the minimum lap splice length shall be 1.7 times the tension development length (including modification factors) of the bar or 48 bar diameters, whichever is greater. For spirals, the mechanical connectors shall develop both in tension and compression 125% of the specified yield strength of the bar and conform to the latest edition of the AASHTO LRFD Bridge Design Specifications, including the latest interim specifications. For ties, the minimum lap splice length shall be no less than 1.7 times the tension development length (including modification factors) of the bar. Tie lap splices shall be alternated.

- The design of the foundation shall be coordinated with the traffic structure to avoid conflicts between the embedded support anchorage and the foundation reinforcement.

The Contractor's foundation designer shall obtain a Professional Liability Insurance Policy in accordance with the requirements of Article 1.05.02-2a. A Contractor shall submit a copy of the certificate of insurance to the Engineer in accordance with the requirements of Article 1.05.02-2a.

Prior to excavating for the foundation, the Contractor shall submit working drawings and design computations for each mast arm assembly foundation 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 construction, including a copy of the certificate of insurance, shall be prepared and submitted for **each** mast arm assembly foundation. **A single set of drawings with tabulated data for multiple foundation locations is not permitted.** The alpha-numeric support 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 foundation shall be submitted in an individual file in electronic portable document format (.pdf) with appropriate bookmarks and commenting enabled. The packaged set shall include the following:

- title sheet
- table of contents
- contact information for designer – contact information should include name and address of design firm, name of contact person with phone number and email address
- copy of the certificate of insurance
- foundation working drawings
- foundation design computations

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.

The electronic portable document format (.pdf) working drawings 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 foundation components. The drawings shall include, but not be limited to the following:

- the project number, town and support identification number
- reference to the design specifications, including interim specifications
- material specifications for all components
- embedment depths for foundation in soil, rock and a combination of soil and rock
- anchor bolt details, including dimensions, embedment and projection

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

- the project number, town and support identification number
- 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 foundation with dimensions, loads and references to the local and global coordinate systems used (as applicable), to facilitate review of the results
- sign support reactions of all group loads and load combinations
- soil and rock design parameters
- computations demonstrating the geotechnical and structural capacity of the drilled shaft is adequate for all group load combinations

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

The reviewed and stamped working drawings and calculations shall be sent by the reviewer (Engineer of Record,) along with a recommendation regarding acceptance, to the Contractor. The reviewer (Engineer of Record) shall distribute copies of the working drawings and calculations. An electronic copy of each packaged set of working drawings and calculations shall be e-mailed to the following Department offices:

Bridge Safety and Evaluation – Robert Zaffetti@ct.gov
Research and Materials – RoberLauzon@ct.gov; DOT MatTesting@ct.gov
Traffic Engineering – DOT.TrafficElectrical@ct.gov
Traffic Signal Lab
Engineer of Record

Prior to excavating for the foundation, the Contractor shall submit the following:

Reinforcing Steel Shop Drawings: Based on the accepted foundation design, the Contractor shall prepare reinforcing steel shop drawings for each foundation in accordance with Subarticle 1.05.02-3. The drawings shall be reviewed and stamped approved (or approved as noted) by the foundation designer. Four copies of each reviewed and stamped drawing shall be submitted to the Engineer at the District Construction office. One copy of each reviewed and stamped drawing shall be submitted to the project's "Engineer of Record".

Concrete and Slurry Mix Designs: The Contractor shall submit to the Engineer at the District Construction office the concrete mix design and the slurry mix design, including admixtures, for review.

Foundation Construction Procedure: The Contractor shall submit to the Engineer at the District Construction office a written foundation construction procedure outlining the equipment; drilling procedure for soil and rock, including removal of obstructions and removal of excavated spoils; temporary casing placement and removal; slurry placement; reinforcement, anchor bolt and conduit placement; and concrete placement required for the drilled shaft foundation construction for review. The procedure should include contingencies for the various soil, rock and subsurface water conditions that may be encountered during the foundation construction. Also required in this submission are the following;

The Engineer will evaluate the foundation construction procedure for conformance with the contract documents and will then notify the Contractor of any additional information required and/or changes necessary to meet the contract requirements. All procedural approvals given by the Engineer shall be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work as detailed in the plans and specifications. The Contractor shall not commence construction of the drilled shafts until the Engineer has accepted the foundation construction procedure.

Excavations required for shafts shall be performed through whatever materials are encountered, to the dimensions and elevations in the working drawings or as ordered by the Engineer. The methods and equipment used shall be suitable for the intended purpose and materials encountered. Shaft excavation may be performed by combinations of augering, rotary drilling, down-the-hole hammer, reverse circulation drilling, clamming, scraping, or other means approved by the Engineer. Generally, either the dry method, wet method, or temporary casing method may be used, as necessary, to produce sound, durable concrete foundation shafts free of defects. The Contractor shall select and use the method that is needed to properly accomplish the work, as determined by site conditions and subject to the approval of the Engineer. The Contractor is responsible for maintaining the stability of the shaft excavation during all phases of construction.

The dry method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation, and placing the shaft concrete in a relatively dry excavation. The dry construction method shall be used only at sites where the groundwater table and site conditions are suitable to permit construction of the shaft in a relatively dry excavation, and where the sides and bottom of the shaft are stable and may be visually inspected prior to placing the concrete. The use of the dry construction method is permitted if less than one foot of water accumulates in the bottom of a hole without pumping over a one hour period, the excavation remains stable and any loose material and water can be removed prior to placement of concrete.

The wet construction method shall be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. Wet construction methods consist of using a mineral slurry to maintain stability of the hole perimeter while advancing the excavation to final depth, placing the reinforcing cage and shaft concrete. This procedure may require desanding and cleaning the slurry; final cleaning of the excavation by means of a bailing bucket, air lift, submersible pump or other devices; and placing the shaft concrete with a tremie. Unless it is demonstrated to the satisfaction of the Engineer that the surface casing is not required, temporary surface casings shall be provided to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation. Surface casing is defined as the amount of casing required from the ground surface to a point in the shaft excavation where sloughing of the surrounding soil does not occur.

The temporary casing construction method shall be used at all sites where the dry or wet construction methods are inappropriate. Temporary casing construction method consists of advancing the excavation through caving material by the wet method. Temporary casing may be installed by driving or vibratory procedures in advance of excavation to the lower limits of the caving material. When a nearly impervious formation is reached, a casing is placed in the hole and sealed in the nearly impervious formation. After the drilling fluid is removed from the casing, drilling may proceed as with the dry method except that the casing is withdrawn when the shaft concrete is placed. If seepage conditions prevent use of the dry method, excavation is completed using the wet method. Temporary casing may be installed by driving or vibratory procedures in advance of excavation to the lower limits of the caving material. Slurry may be omitted if the casing can be installed with only minor caving of the hole.

If the Engineer determines that the foundation material encountered during excavation is unsuitable or differs from that anticipated in the design of the shaft, or if rock is encountered at an unanticipated elevation, the Contractor's foundation designer shall determine if the foundation embedment should be revised from that shown on the working drawings. If rock is encountered, the Engineer shall be notified to inspect and determine the elevation of the top of competent rock. Any revisions to the foundation embedment during construction shall be reviewed by the Engineer.

Excavated materials which are removed from the shaft excavation and any drilled fluids used shall be disposed of by the Contractor as directed by the Engineer and in accordance with Section 1.10.

Casings shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. The outside diameter of casing shall not be less than the specified size of the shaft. Temporary casings shall be removed while the concrete remains workable (i.e., a slump of 4" or greater). Before the casing is withdrawn and while the casing is being withdrawn, a 5'-0" minimum head of fresh concrete in the casing shall be maintained so that all the fluid trapped behind the casing is displaced upward without contaminating the shaft concrete. The required minimum concrete head may have to be increased to counteract groundwater head outside the casing. Separation of the concrete by hammering or otherwise vibrating the casing, during withdrawal operations, shall be avoided. Casing extraction shall be at a slow, uniform rate with the pull in line with the shaft axis.

Slurry used in the drilling process shall be a mineral slurry. The slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. The level of the slurry shall be maintained at a height sufficient to prevent caving of the hole.

The mineral slurry shall be premixed thoroughly with clean fresh water at a temperature above 41° F and adequate time allotted for hydration prior to introduction into the shaft excavation. The elevation of the slurry within the shaft foundation shall be maintained within 24" of the top casing and at least 48" above the existing water level during drilling and until the concrete placement is essentially complete. The slurry properties shall be maintained at all times, including non-working periods and stoppages. The slurry shall be circulated and agitated, continuously if necessary, to maintain the slurry properties and to prevent it from setting up in the shaft.

The Contractor, in the presence of the Engineer, shall perform control tests on the slurry to ensure that the density, viscosity, and pH fall within the acceptable limits tabulated below. The Contractor shall provide all equipment required to perform the tests. If desanding is required, sand content shall not exceed 4% (by volume) at any point in the shaft excavation as determined by the American Petroleum Institute sand content test.

Range of Values (at 68°F)

Property (Units)	Time of Slurry Introduction	Time of Concreting (in Hole)	Test Method
Density (pcf)	64.3 to 69.1	64.3 to 75.0	Density Balance
Viscosity (seconds per quart)	28 to 45	28 to 45	Marsh Cone
pH	8 to 11	8 to 11	pH paper or meter

The control tests to determine unit weight (density), viscosity, and pH values of the slurry shall be done during the shaft excavation to establish a consistent working pattern.

Prior to placing shaft concrete, slurry samples shall be taken from the bottom and at intervals not exceeding 10'-0" for the full height of slurry. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be eliminated. The mineral slurry shall be within specification requirements immediately before shaft concrete placement.

The hole shall be covered when left unattended.

After completing the shaft excavation, all loose material existing at the bottom of the hole shall be removed.

Prior to placing the reinforcement into the shaft, the Contractor, in the presence of the Engineer, shall determine the shaft dimensions, depth and alignment of the shaft. The concrete shaft shall not be out of plumb by more than ¼ inch per foot of depth. The Contractor shall provide all equipment necessary for checking the shaft excavation. The Engineer shall inspect the shaft and verify that it has been properly cleaned.

The reinforcing steel shall be fabricated and assembled in accordance with Article 6.02.03. All reinforcement shall be assembled with wire ties. Welding to assemble the reinforcement is not permitted.

Immediately after the shaft excavation has been inspected and approved by the Engineer and prior to placement of the concrete, the assembled reinforcing steel cage, including cage stiffener bars, spacers, centralizers, and other necessary appurtenances, shall be carefully placed into the shaft excavation as a unit. Dropping or forcing cages into the shaft will not be allowed. The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances of its intended position until the concrete will support the reinforcing steel. When concrete is placed by tremie methods, temporary hold-down devices shall be used to prevent uplifting of the reinforcing steel cage during concrete placement. Concrete spacers or other approved noncorrosive spacing devices shall be used at sufficient intervals not exceeding 5'-0" along the shaft to insure concentric location of the cage within the shaft excavation. When

the size of the longitudinal reinforcing steel is larger than a #8 bar, such spacing shall not exceed 10'-0". After placement of the reinforcing cage, the Engineer shall inspect the shaft to ensure that it has remained clean. If the inspection indicates that loose material has accumulated at the bottom of shaft excavation, the Contractor shall remove the reinforcing cage and reclean the shaft.

If directed by the Engineer, the top of the shaft shall be formed square with the length of the sides matching the diameter of the shaft.

Concrete construction shall conform to Subarticle 6.01.03-2,3,4,5 and 6 as amended herein.

Concrete shall be placed in the shaft excavation as soon as possible, but no more than 4 hours after completion of excavation and cleaning of the bottom of the excavation, and no more than 2 hours after placement of the reinforcing steel cage. Concrete shall be placed in a continuous operation to the top of the shaft. The concrete level shall be horizontal during the pouring operations. Concrete placement shall continue after the shaft is full until good quality concrete is evident at the top of the shaft. The elapsed time from the beginning of concrete placement in the shaft to the completion of placement shall not exceed 2 hours.

In dry construction, concrete shall be placed in a single continuous operation with the flow of concrete down the center of the shaft excavation so as to consolidate the concrete on impact. During placement operations, the concrete is not permitted to hit the reinforcing steel. A dropchute, consisting of a hopper and flexible hose, may be used to direct the concrete down the center of the foundation and prevent the concrete from hitting the reinforcing steel. Accumulated water shall be removed before placing the concrete. At the time of concrete placement, no more than 2" of water may exist at the bottom of the excavation and loose sediment no more than 1/2" over one-half the base is acceptable.

In wet (slurry) construction, concrete to be placed by the tremie method, where the concrete displaces the slurry from bottom of the excavation to the top. The concrete shall be placed through a top metal hopper and into a rigid leak-proof elephant trunk tremie tube, sufficiently large enough to permit free flow of concrete. The tremie tube shall be positioned so that it can be removed without disturbing the reinforcing. Initially, the discharge end of the tremie tube shall be sealed closed (plugged) to prevent slurry from entering the tube after it is placed in the excavation and before the tube is filled with concrete. After concrete placement has started, the tremie tube shall be kept full of concrete to the bottom of the hopper to maintain a positive concrete head. The flow of concrete shall be induced by slightly raising the discharge end of the tube, always keeping the tube end in the deposited concrete. No horizontal movement of the tremie tube will be permitted.

The shaft concrete shall be vibrated or rodded to a depth of 5'-0" below the ground surface except where soft uncased soil or slurry remaining in the excavation will possibly mix with the concrete.

Exposed concrete shall be cured and finished in accordance with Subarticle 6.01.03-7, 9 and 10.

Anchor bolt assemblies shall be embedded in the concrete as shown on the working drawings. A template plate shall be used to hold the anchor bolt assemblies, conduits and ground rod sleeve in the correct position. The anchor bolts shall be installed plumb.

All conduit ends terminating below grade shall be capped with a malleable iron caps. All above-grade conduit ends shall be terminated with an insulated bonding bushing with tinned insert.

Ground rod and ground wire shall be installed as shown on the plans.

No construction operations that would cause soil movement adjacent to the shaft, other than mild vibration, shall be conducted for at least 48 hours after shaft concrete has been placed.

The top of the foundations shall be backfilled and the adjacent disturbed ground surfaces restored to match the surrounding area after the concrete has cured and the forms are removed. Placement of topsoil shall conform to Articles 9.44.01 and 9.44.03. Turf establishment shall conform to Article 9.50.03.

The mast arm assemblies shall not be erected on the foundation until the concrete in the shaft has attained a 28 day compressive strength, f'_c , greater than or equal to 4,000 psi.

Method of Measurement: This work will be measured for payment by the number of foundation units, each completely installed and accepted.

The work to remove rock from the foundation excavation will be measured from the top of rock to the bottom of rock excavation.

Basis of Payment: The work will be paid for at the contract unit price each for "Traffic Control Structure – Mast Arm," completed and accepted in place, which price shall include all equipment, materials, tools and labor incidental to the subsurface exploration, design, fabrication, construction and disposal of drilling spoils, of the foundations at the locations specified on the plans.

Backfilling and restoration of adjacent ground surfaces (pavement, slope protection, topsoil & seed, etc.) in all areas disturbed by the work will not be paid for separately, but will be included as part of the work. The Engineer will determine the type, thickness and horizontal limits of the surfaces to be restored.

When rock is encountered within the limits of excavation, its removal will be paid for at the contract unit price per vertical foot for "Rock in Foundation Excavation," which price shall include any additional excavation to remove the rock and any additional concrete required to fill the excavation beyond the designed foundation hole dimensions. Rock, in so far as it applies to "Rock in Foundation Excavation," shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures or portland cement

concrete pavement which has a cross-sectional area that exceeds 50% of the cross-sectional area of the designed foundation hole.

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
 - P.V.C Slip fitting that complies with Utility Company requirements.
 - 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

Locations served by United Illuminating (UI) or Wallingford Electric Division (WED)

Meter socket rated at 100 amps

Locations served by Eversource (formerly Connecticut Light and Power Co. [CL&P])

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), 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.

Locations served by United Illuminating

Contact the UI office to have a Job Number assigned. 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 United Illuminating, Work in Progress office, to report the job number and to schedule a service connection.

Locations served by Wallingford Electric Division

Contact the Electric Division, Engineering Office to arrange for service and/or to schedule work by the Electric Division on utility poles above 10 feet (3 meters). 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 Electric Division 24 hours prior to the desired connection date.

Locations served by Eversource and all other electric power providers

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 #1102002A - 8' ALUMINUM PEDESTAL

Article 11.02.02 – Materials: The materials for this work shall conform to the requirements of Article M.16.03.

Article M.16.03 – Materials:

Add the following paragraph:

The shaft, base and all brackets and hardware shall be coated at the manufacturer's site prior to shipping and protected from damage during shipping. The color shall be Black, Federal Standard No. 595, Color No. 37038 as approved by the Town of Trumbull. Submit the proposed costing process and a color sample on a representative material of the final products to the Town of Trumbull.

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.

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 40° 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)
$F_y \leq 36 \text{ ksi (250 MPa)}$	$\leq 4 \text{ (100)}$	20	25 (34) at 40°F (4°C)
$36 \text{ ksi (250 MPa)} < F_y \leq 50 \text{ ksi (345 MPa)}$	$\leq 2 \text{ (50)}$	20	25 (34) at 40°F (4°C)
$36 \text{ ksi (250 MPa)} < F_y \leq 50 \text{ ksi (345 MPa)}$	$2 < t \leq 4$ $(50 < t \leq 100)$	24	30 (41) at 40°F (4°C)
$50 \text{ ksi (345 MPa)} < F_y \leq 70 \text{ ksi (485 MPa)}$	$\leq 4 \text{ (100)}$	28	35 (48) at -10°F (-23°C)

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 shall be 40'-0" (12 000 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).

- 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 1/2" (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"; 279 mm x 432 mm; Ledger/Tabloid) 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" (216 mm x 279 mm) (Letter) sheets.

Working drawings submitted in an electronic portable document format (.pdf) shall be created on ANSI D (22" x 34"; 559 mm x 864 mm) 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 (57 mm wide x 44 mm 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", 216 mm x 279 mm) 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.

For contract plans with a signature from the “Office of Engineering”, the Department is the “Engineer of Record” and the working drawings and calculations shall be submitted to the following person and address:

Mr. Joseph C. Cancelliere
Transportation Principal Engineer
Connecticut Department of Transportation

State Bridge Design
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Joseph.Cancelliere@CT.gov

The reviewed and stamped working drawings and calculations shall be sent by the reviewer, along with a recommendation regarding acceptance, to the District Construction office for review, comment and distribution. After the District Construction 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 District offices, 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 - John F. Carey - Tracy L. Fogarty
Traffic Signal Lab - James F. Nesci
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 Department 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 Department.

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.

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" or "XX Steel Combination 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 #1105105A - 1 WAY, 5 SECTION MAST ARM 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.

Sub Article 4 - Brackets:

Add the following at the end of the last paragraph:

Install a 2” wide yellow retroreflective strip (Type IV sheeting) along the perimeter of the face of the backplate.

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.
STROBEL ROAD

GE Lighting Solutions
Corporate Headquarters

ITEM #1105105A

860 N. Dorothy Dr., Suite 600
Richardson, TX 75081

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, current edition governs**. 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 LED ARROWS	GREEN/WHITE or BROWN/WHITE, YELLOW/WHITE, with WHITE neutral
----------------------------	-----------------------------------------------------------------

Wires shall be terminated with a Block Spade, 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:

Third coat: Replace the first two sentences with the following:

All brackets and hardware shall be painted yellow by the manufacturer. The color shall be No. 13538, Federal Standard No. 595.

At intersections at Merritt Parkway interchanges, all brackets and hardware shall be painted dark green by the manufacturer. The color shall be No. 14056, Federal Standard No. 595.

ITEM#1106003A- 1 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED

ITEM#1106004A- 2 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.

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-pixelated.
- 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: ≥ 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.

Warranty

- Five years from date ownership is accepted.

Section M.16.07 F. Painting:

Third coat: Replace the first two sentences with the following:

All brackets and hardware shall be painted yellow by the manufacturer. The color shall be No. 13538, Federal Standard No. 595.

At intersections at Merritt Parkway interchanges, all brackets and hardware shall be painted dark green by the manufacturer. The color shall be No. 14056, Federal Standard No. 595.

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. 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.

D. Vibrotactile Arrow Pushbutton

- Pushbutton contained in a circular assembly which fits inside the housing and is attached to the housing with 4 screws.
- Actuation of pushbutton initiates speech message "Wait".
- 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 \geq 1.5" (38), Height \geq 1.0" (25)
 - Color: Sharp contrast to background color of pushbutton and housing

E. 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.

F. 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 \geq 60 degrees apart, at the same height.
- Available extension bracket of a size indicated on the plan – 18" maximum.
- Wire entrance through the rear.
- Stainless steel mounting hardware.
- Color: The color shall be yellow No. 13538, Federal Standard No. 595. At intersections at Merritt Parkway interchanges, all brackets and hardware shall be painted dark green by the manufacturer. The color shall be No. 14056, Federal Standard No. 595.
- 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 APS&Ds 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, extension brackets, all necessary cable, 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 #1108115A - FULL ACTUATED CONTROLLER 8 PHASE

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.

Article 11.08.03 – Construction Methods: Delete the entire second paragraph.

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.

Ventilation:

For cabinets that will be painted other than Department-approved gray, the cabinet ventilation shall include two intakes, exhausts, filtrations, two fans, and one thermostat assembly. Each electric fan shall be equipped with ball or roller bearings and with a capacity of at least 100 cfm. The fans shall be mounted inside the front top of the cabinet ventilation holes. The fans shall be controlled by one manually adjustable thermostat.

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

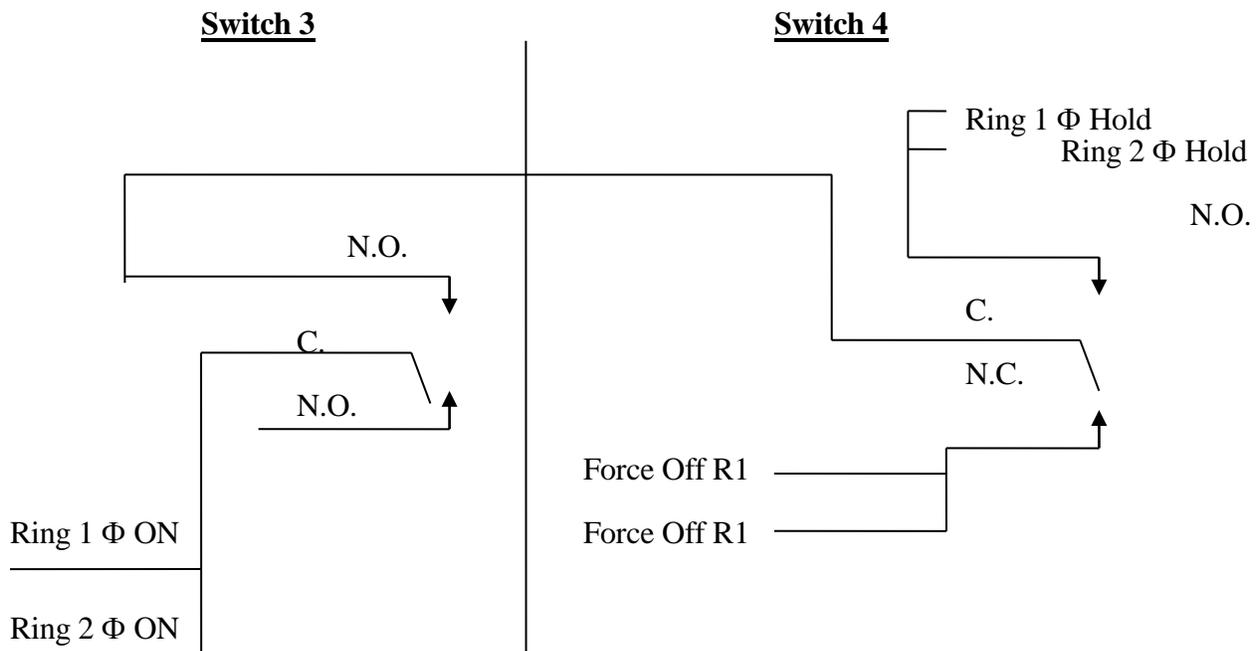


FIG. 1

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.

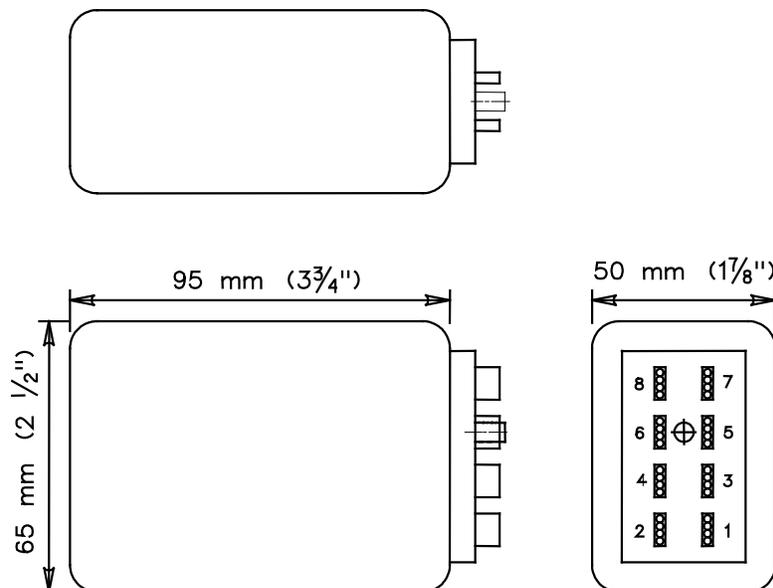
SIZE:

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:

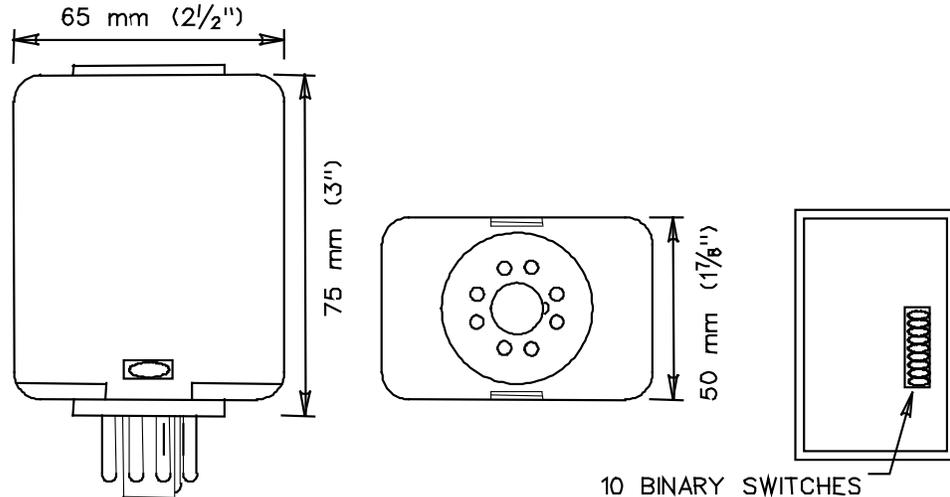
The socket shall be the same as that for the 24 volt relay Type A.

TIME DELAY RELAY

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

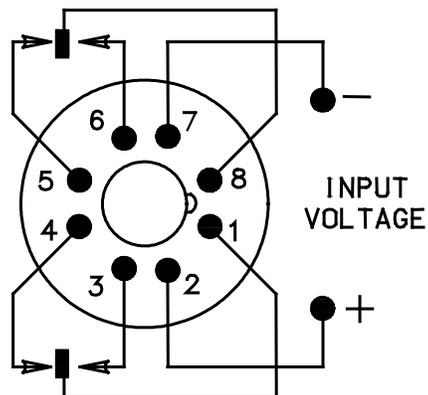
DESCRIPTION:

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.



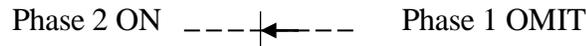
OCTAL (8 PIN) BASE

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.

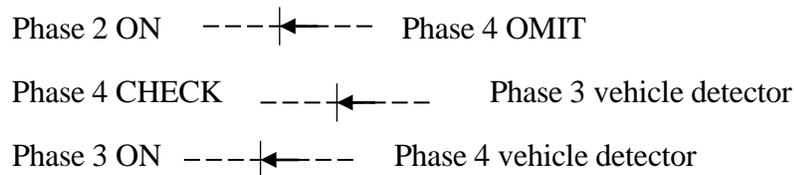
Example: Phase 1 is the advance phase (extendable), in minimum recall.
Phase 2 is the artery, in recall.
Phase 4 is the minor street, in non-lock.



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.

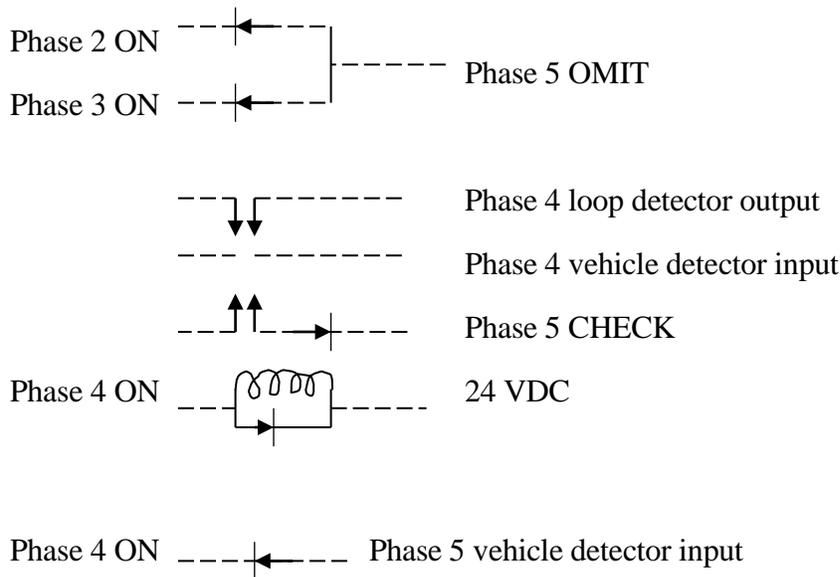


ACTUATED ADVANCE GREEN

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.

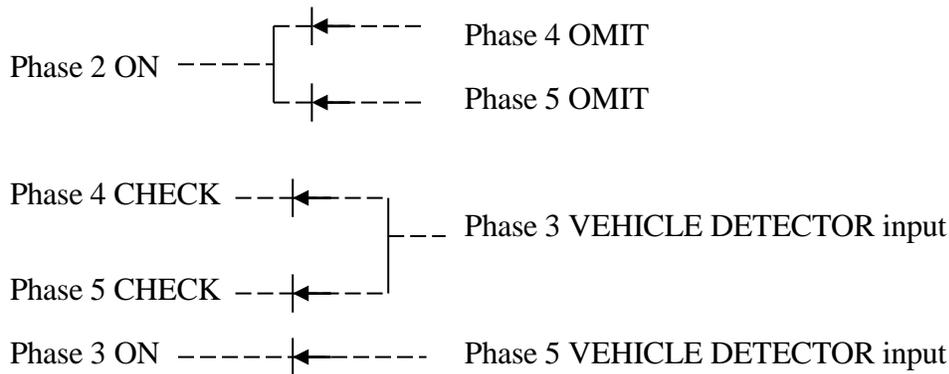
NON-ACTUATED CLEARANCE PHASE

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.



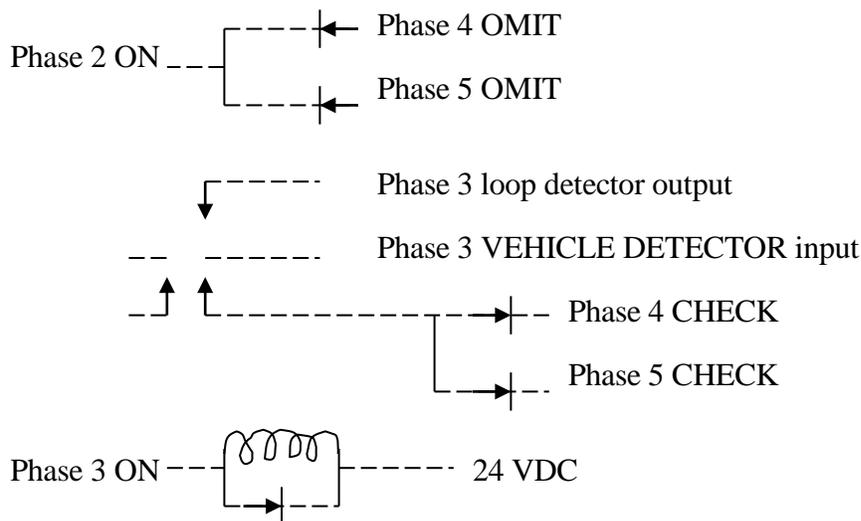
ACTUATED CLEARANCE PHASE

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.



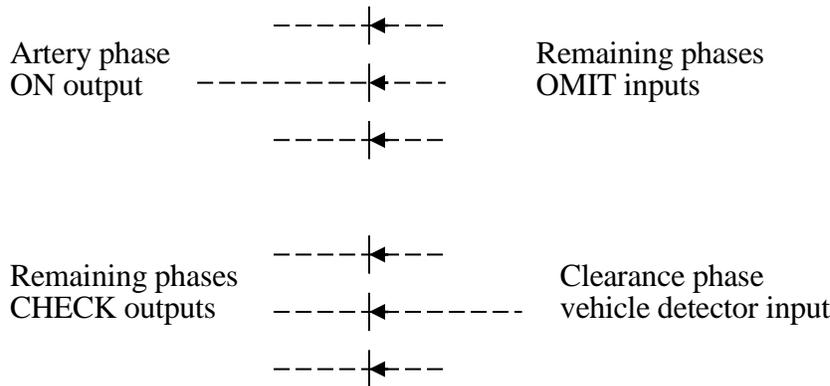
The 24 VDC relay shall be Type C as previously described in these specifications.

FLASHING STOP AHEAD SIGN

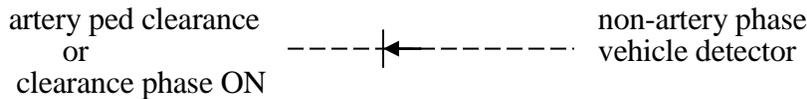
Where the timing and sequence indicates a flashing stop ahead sign, the clearance interval following the phase that the sign is off shall be timed by the following method.

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.

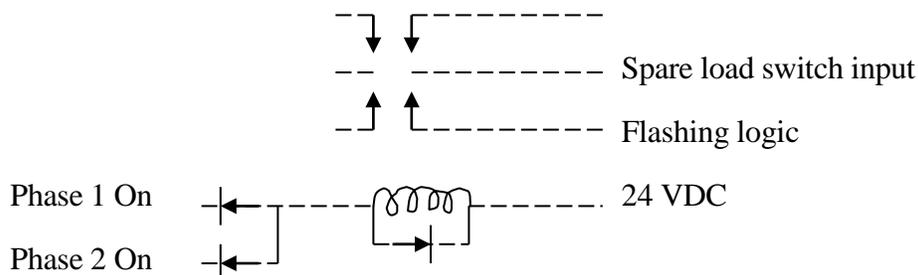
The artery phase ON output shall be diode connected to all other phase OMIT inputs except the clearance phase and the artery phase. The CHECK outputs from the remaining phases (as needed) shall be diode connected to the sign clearance phase vehicle detector input. The clearance phase shall be in the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

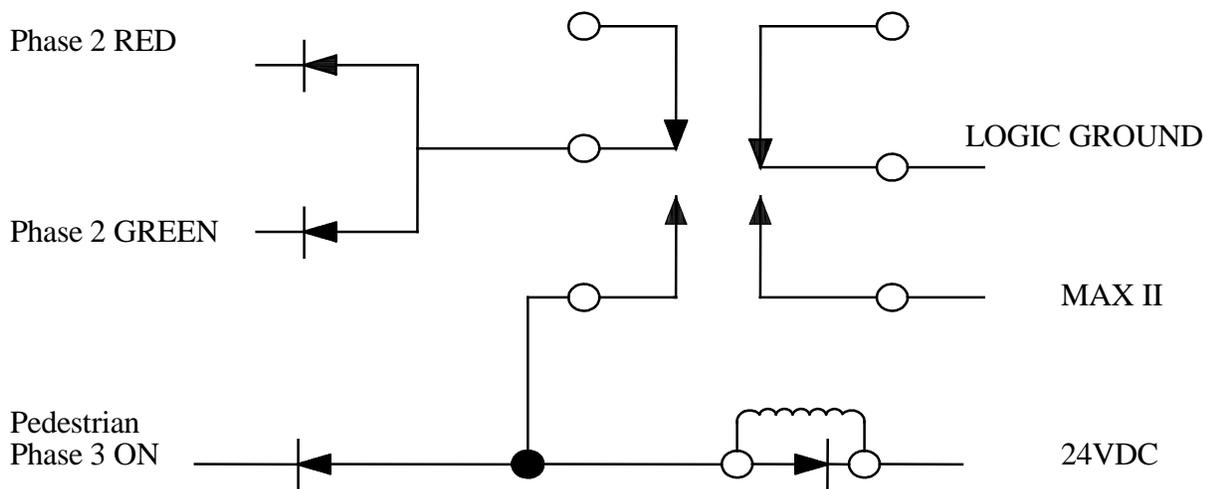
When the sum of the split times, including the walk and don't walk, exceed the background cycle length, the designer may choose to either allow a double cycle of the background timer or reduce the phase timings when the ped phase is called. Reduction of the phase timing by switching to MAX 2 avoids double 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 #1111407A – CAMERA VIDEO DETECTION SYSTEM

Description:

Furnish and Install a Video Imaging Vehicle Detection System (VIVDS) that monitors vehicles on a roadway via processing of video images and provides detector outputs to a traffic controller or similar device for purposes of detection and/or data collection as shown on the plans or as directed by the Engineer.

The system is composed of these principal items: camera assembly(ies), camera mounting bracket, the field communications link between each camera and the VIVDS Processor, VIVDS Processor (with software), video monitor, associated equipment required to setup and maintain the VIVDS Processor and software to communicate to the VIVDS Processor.

If a span pole or mast arm shaft mounted Extension Bracket is required and shown on the plans, the Extension Bracket shall be included and paid under item no. 1111600A – Extension Bracket.

Definitions

VIVDS Processor: The electronic unit that converts the video image provided by the cameras, generates vehicle detections for defined zones and collects vehicular data as specified.

Central Control: A remotely located control center, which communicates with the VIVDS Processor. The VIVDS operator at the central control has the ability to monitor the operation and modify detector placement and configuration parameters. The equipment that constitutes central control is comprised of a workstation microcomputer along with the associated peripherals as described in this special specification.

Field Setup Computer: A portable microcomputer used to set up and monitor the operation of the VIVDS Processor.

Field Communications Link: The communications connection between the camera(s) and the VIVDS Processor.

Remote Communications Link: The communications connection between the VIVDS Processor and the Central Control.

Camera Assembly: The complete camera or optical device assembly used to collect the visual image. The camera assembly consists of a CMOS camera, environmental enclosure, temperature control mechanism, and all necessary mounting hardware.

Occlusion: The phenomenon when a vehicle passes through the detection zone but the view from the sensor is obstructed by another vehicle. This type of occlusion results in the vehicle not being detected by the sensor. **Or** When a vehicle in one lane passes through the detection zone of an adjacent lane. This type of occlusion can result in the same vehicle being counted in more than one lane.

Detection Zone: The detection zone is an area selected through the VIVDS Processor that when occupied by a vehicle, sends a vehicle detection to the traffic controller or freeway management system.

Detection Accuracy: The measure of the basic operation of a detection system (shows detection when a vehicle is in the detection zone and shows no detection when there is not a vehicle in the detection zone).

Live Video: Video being viewed or processed at 5 to 10 frames per second.

Lux: The measure of light intensity at which a camera may operate. A unit of illumination equal to one lumen per square meter or to the illumination of a surface uniformly one meter distant from a point source of one candle.

Materials:

All hardware shall be new, corrosion resistant and current production.

Camera Assembly

- A. Camera. The video detection system shall use high resolution, color image sensors as the video source for real time vehicle detection. The cameras shall be approved for use with the VIVDS Processor unit by the supplier of the VIVDS. As a minimum, each camera shall provide the following capabilities:
1. Images shall be produced with a CMOS sensing element with horizontal resolution of at least 2580 lines and vertical resolution of at least 1920 lines. Images shall be output in digital format as MJPEG image.
 2. Useable video and resolvable features in the video image must be produced when those features have luminance levels as low 1.0 lux for color, for night use.
 3. Useable video and resolvable features in the video image must be produced when those features have luminance levels as high as 10,000 lux during the day.
 4. The camera shall include an electronic shutter control based upon average scene luminance and must be equipped with fixed field of view and fixed focus lens which does not require opening the camera enclosure. The fixed focus lens must be always in focus without any required end-user adjustments.
 5. Vibration and shock resistance shall meet the requirements of Sections 2.1.9 and 2.1.10, respectively, of NEMA TS 2.

B. Camera and Lens Assembly. The camera and lens assembly shall be housed in an environmental enclosure that provides the following capabilities:

1. The enclosure shall be waterproof and dust tight to the latest NEMA 4 specifications.
2. The enclosure must allow the camera to operate satisfactorily over an ambient temperature range from -30°F to +165°F while exposed to precipitation as well as direct sunlight.
3. The camera, mounting hardware, and any related material, when installed, shall withstand 150 MPH wind speed.
4. The enclosure must include a provision for connection of the field communications link (CAT5e cable). Input power to the environmental enclosure must be included in the Ethernet interface.
5. A thermostatically controlled heater shall be at the front of the enclosure to prevent the formation of ice and condensation. The heater shall not interfere with the operation of the camera electronics, and it must not cause interference with the video signal.
6. The enclosure shall be light colored or unfinished and shall be designed to minimize solar heating. Any plastics used in the enclosure shall include ultra violet inhibitors.
7. The total weight of the image sensor in the environmental enclosure shall be less than 10 lb.

Use waterproof, quick disconnect connectors to the camera for the field communication link connection.

Camera mounting hardware shall accommodate vertical or horizontal mounting to the camera enclosure.

Field Communications Link

The field communications link shall be a two way communications connection from the camera to the VIVDS Processor. The primary communications link media shall be burial grade CAT5e cable.

The following requirements shall govern for the various types of field communications link media described on the plans:

- A. CAT5e Cable: In locations where the plans indicate CAT5e cable is required as the primary communications link, this cable shall be burial grade as well as suitable for above ground applications.

All connection cables shall be continuous from the VIVDS processor to the camera connector.

Install lightning and transient surge suppression devices on the processor side of the field communications link to protect the peripheral devices. The suppression devices shall be all solid state. The devices must present high impedance to, and must not interfere with, the communications lines during normal operation. The suppression devices must not allow the peak voltage on any line to exceed 300% of the normal operating peak voltage at any time. The response time of the devices must not exceed 5 nanoseconds.

VIVDS Processor and Software

A. Cabinet Mounting. The VIVDS Processor shall be shelf mountable.

B. Functional Capabilities:

1. The VIVDS Processor shall be either NEMA TS 2 TYPE 1 or TYPE 2. TYPE 2 must have RS 485 SDLC. The VIVDS Processor shall have at least four (4) processing cores of 2.8GHz or greater, a minimum of 3GB random access memory (RAM), and at least 32GB of onboard storage.
2. The system software shall be able to detect either approaching or departing vehicles in multiple traffic lanes. A minimum of 24 detector outputs per VIVDS Processor. Each zone and output shall be user definable through interactive graphics by drawing arbitrarily shaped polygons using the Field Setup Computer or Central Control. The user must be able to redefine previously defined detection zones.
3. The VIVDS Processor shall provide real time vehicle detection (within 500 milliseconds (ms) of vehicle arrival).
4. The system shall be able to detect the presence of vehicles in up to 64 detection zones per camera.
5. Detection zones shall be sensitive to the direction of vehicle travel. The direction to be detected by each detection zone must be user programmable.
6. The VIVDS Processor unit shall compensate for minor camera movement (up to 2% of the field of view at 400 ft.) without falsely detecting vehicles. The camera movement shall be measured on the unprocessed video input to the VIVDS Processor.
7. The camera shall operate while directly connected to VIVDS Processor Unit.
8. Once the detector configuration has been downloaded or saved into the VIVDS Processor, the video detection system shall operate with the monitoring equipment (monitor and/or laptop) disconnected or on-line.
9. When the monitoring equipment is directly connected to the VIVDS Processor, it must be possible to view vehicle detections in real time as they occur on the field setup computer's color VGA display or the video monitor.

10. The VIVDS Processor shall support 1 or 2 omnidirectional view cameras. If equipped with 1 omnidirectional view camera, the VIVDS processor shall also be capable of simultaneously supporting up to four (4) more traditional view cameras for detection.
11. Detection zone data shall be stored in non-volatile memory so that after recovery from power interruption, all parameters are returned to a saved setting.
12. The unit software and the supervisor software shall include diagnostic software to allow testing the VIVDS functions. This shall include the capability to set and clear individual detector outputs and display the status of inputs to enable setup and troubleshooting in the field.
13. The central control shall transmit and receive all information needed for detector setup, monitor the vehicle detection, view the vehicle traffic flow and interrogate all required stored data. The remote communications link between the VIVDS Processor and Central Control may be dial-up (telephone or ISDN lines) or dedicated twisted wire pair communications cable which may be accompanied with coaxial cable or fiber-optic cable, as shown on the plans. Communications with the Central Control must not interfere with the on-street detection of the VIVDS Processor.

14. Vehicle Detection

- a. **Detection Zone Placement:** The video detection system shall provide flexible detection zone placement anywhere within the combined field of view of the image sensors. Preferred presence detector configurations shall be arbitrarily shaped polygons, including simple boxes, drawn across lanes of traffic or placed in line with lanes of traffic. A single detector shall be able to replace one or more conventional detector loops.
- b. **Detection Zone Programming:** Placement of detection zones must be by means of a graphical interface using the video image of the roadway. The monitor must show images of the detection zones superimposed on the video image of traffic while the VIVDS Processor is running. The displayed zones, when operating, must be able to be displayed outlined or filled, with a visible change indicating detection.

The detection zones shall be created by using the mouse or keypad to draw detection zones on the monitor. The detection zones shall be capable of being sized and shaped to provide optimal road coverage and detection. It must be possible to upload detector configurations to the VIVDS Processor and to retrieve the detector configuration that is currently running in the VIVDS Processor.

The mouse or keypad may be used to edit previously defined detector configurations so as to fine tune the detection zone placement size and shape. Once a detection configuration has been created, the system shall provide a graphic display of the new configuration on the monitor. While this fine-tuning is being done, the detection shall continue to operate from the detector configuration that is currently identified.

When a vehicle occupies a detection zone, the detection zone on the live video shall indicate the presence of a vehicle, thereby verifying proper operation of the detection system. With the absence of video, the VIVDS Processor shall have a display that will indicate proper operation of the detection zones.

Detection zones shall be provided that are sensitive to the direction of vehicle travel. The direction to be detected by each detection zone must be user programmable. The vehicle detection zone shall not activate if a vehicle traveling any direction other than the one specified for detection occupies the detection zone. Cross-street and wrong way traffic shall not cause a detection.

Detection zones shall have the option for the user to define that calls can be made with a side entrance (90° or less angled entrance).

The application software shall maintain an historical log of all configurations when a site is modified.

The application software shall be freely available for installation on any number of computers used to manage the VIVDS.

The application software shall support the assignment of a detector output(s) to each zone. These assignments can be modified at any time through the software.

The application software shall support the import and export of configurations and zone plans. These configuration files may be transferred using a USB drive or remote connection.

The application software shall change the color of the zone within the graphical user interface as vehicles enter or exit a detection zone, changing its occupancy status. This will be required for real-time or historical monitoring, and may be turned on or off by the user at any time.

The application software shall provide visual indication of the light state for each zone within the graphical user interface.

The application software shall feature the ability to digitally pan, tilt, and zoom within the camera's field of view without movement of the camera.

The application software shall feature the ability to mask objects that occlude the camera field of view and/or disrupt the camera automatic gain and exposure control.

The application software shall allow for remote display of site/camera status for all connected sites.

- c. Design Field of View: The VIVDS shall reliably detect vehicle presence in the design field of view. The design field of view is defined as the sensor view when the image sensor mounted on the camera mounting bracket and/or extension bracket above or adjacent to the roadway. Within the design field of view, the VIVDS

Processor unit shall be capable of setting up a single detection zone for point detection (equivalent to the operation of a 6 ft. by 6 ft. inductive loop). A single camera, placed at the proper mounting height, shall be able to monitor up to and including 5 traffic lanes simultaneously. A single omnidirectional camera, placed at the proper mounting height, shall be able to monitor detection zones for all intersection approaches.

- d. Detection Performance. Detection accuracy of the VIVDS shall be comparable to properly operating inductive loops. Detection accuracy shall include the presence of any vehicle in the defined detection zone regardless of the lane, which the vehicle is occupying. Occlusion produced by vehicles in the same or adjacent lanes shall not be considered a failure of the VIVDS Processor, but a limitation of the camera placement. Detection accuracy (a minimum of 95%) shall be enforced for the entire design field of view on a lane by lane and on a time period basis. Furnish a minimum 24 continuous hours of recorded video of all installed intersection cameras within the 30 day test period for verification of proper camera placement, field of view, focus, detection zone placement, processor setup and operation. The video from each camera shall show vehicle detections for all zones.

15. Equipment failure, either camera or VIVDS Processor, shall result in constant vehicle detection on affected detection zones.

16. Data Collection.

- a. The VIVDS software shall maintain a database of current and historical traffic data (vehicle, bicycle and pedestrian) and allow the user to run reports of the collected data. The data collection shall include traffic counts, turning movement counts, travel speeds, and vehicle classification.
- b. The VIVDS software shall allow for realtime traffic data reporting. The realtime reporting shall be available locally from the VIVDS processor and from a Central Control.

C. Environmental Requirements: The VIVDS Processor shall be designed to operate reliably in the adverse environment found in the typical roadside traffic cabinet. The VIVDS shall meet the environmental requirements set forth by the latest NEMA (National Electrical Manufacturers Association) TS1 and TS2 standards as well as the environmental requirements for Type 170, Type 179 and 2070 controllers. Operating temperature shall be from -30°F to +165°F at 0% to 95% relative humidity, non-condensing.

D. Electrical:

1. The VIVDS Processor shall have a modular electrical design.
2. The VIVDS Processor shall operate within a range of 89 to 135 VAC, 60 Hz single phase. Power to the VIVDS Processor shall be from the transient protected side of the AC power distribution system in the traffic control cabinet in which the VIVDS Processor is installed.
3. A camera interface panel capable of being mounted to sidewalls of a controller cabinet shall be provided for protection of the VIVDS Processor, camera CAT5e connection. The panel shall consist of, as a minimum, 2 CAT5e cable surge protection connections.
4. Communications to the field setup computer shall be through an Ethernet port. This port must be able to download the real time detection information needed to show detector actuations.
5. The VIVDS Processor shall have an Ethernet connection on the front of the unit for the connection to the 1st camera. If a second camera is installed at the intersection, the camera will connect with the VIVDS Processor through a connector mounted on the front or side of the VIVDS Processor.
6. The unit shall be equipped with at least one VGA or S-video output. This output shall be capable of displaying the operation and detections of the VIVDS Processor.
7. The change log for all Software upgrades and/or changes shall be presented on a readily assessable internet site with unencumbered public access.
8. Detection system field hardware shall meet the requirements in the Federal Communications Commission (FCC) 2005 Code of Federal Regulation (CFR) Title 47, Part 15 and does not interfere with any known equipment.

Camera Mounting Bracket

The Contractor shall furnish and install candy cane style brackets or other necessary mounting brackets, mounting and leveling hardware and brackets, clamps, straps and other miscellaneous hardware to complete the installation.

The color of the bracket shall be No. 37038, Federal Standard 595 or as determined by the Town of Trumbull Engineer. The Contractor shall submit color samples to the Town of Trumbull, Town Engineer for approval prior to fabrication.

Video Monitor and Mouse

The Contractor shall supply one outdoor rated display unit for each VIVDS System provided. Each display unit shall meet the following requirements:

- A. The video monitor shall be compact and easily accessible LCD Flat Panel Display.
- B. The video monitor shall have a diagonal screen size of approximately 9 inches.
- C. Withstand temperatures ranging from -22°F to 165°F (-30° to 74° Celsius), 90% non-condensing.
- D. Functional Capabilities:
 1. Compatible with Color or Monochrome Detection systems
 2. Compatible with male RCA inputs or male BNC connector from a minimum of one VDP.
 3. Industrial grade (grade A) video panel employing thin film transistor (TFT) technology.
 4. ANSI contrast ratio of 300:1 minimum.
 5. Minimum brightness level: 300 candelas per square meter (300 lux).
 6. Computer resolutions: 720 (horizontal) x 480 (vertical) minimum, 1024 (horizontal) x 768 (vertical) maximum.
 7. Support 16.2 million display colors.
 8. Support both NTSC and PAL video formats with auto-sensing.
 9. Pixel rise time: ≤ 2 milliseconds. Pixel fall time: ≤ 6 milliseconds.
 10. Minimum pixel pitch: 0.064 (horizontal) x 0.2025 (vertical) millimeters.
 11. Minimum viewing angle: 140 degrees horizontally, 120 degrees vertically.
 12. On-Screen Display (OSD) controls brightness, contrast, phase, clock, color as well as horizontal and vertical positioning.
 13. Compatible with VIVDS Processor output (VGA analog RGB, S-Video and composite video interfaces)
 14. Operable on 110 VAC or 220 VAC, 50 or 60 Hz.
 15. Battery operation capabilities but not to require use of any batteries(s).
 16. FCC, VCCI, EMC, and CE approved. UL listed. Energy Star efficient.
 17. MTBF Rating: 50,000 hours minimum.

The Contractor shall provide a standard Plug-and-play Mouse with USB connectivity to the VIVDS Processor unit. One mouse shall be provided for each VIVDS and remain in the controller cabinet for field adjustments to the VIVDS Processor.

Warranties, Maintenance and Support

Provide warranties and guarantees to the Town of Trumbull in accordance with Article 1.06.08 of the Standard Specifications.

The VIVDS shall be warranted free of defects in material and workmanship for at least three (3) years following installation and warranty registration. During the warranty period, the supplier shall repair with new or refurbished materials, or replace at no charge, any product containing a warranty defect. This warranty does not apply to products damaged by accident, improper operation, abuse, serviced by unauthorized personnel or unauthorized modification.

The camera shall require no aiming or focusing for a period of three (3) years, following successful installation and configuration by trained and certified installers. This excludes any changes required due to lane shifts or due to extraordinary impact or duress on the camera.

Ongoing software support by the supplier shall include updates of the VIVDS Processor and software. These updates shall be provided free of charge during the warranty period or while under an active extended warranty agreement.

The supplier must maintain a program for technical support and software updates following expiration of the warranty period.

Documentation

Provide to the Town of Trumbull three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

- a) Installation and operation procedures.
- b) Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- c) Schematic diagrams.
- d) Pictorial of component layout on circuit board.
- e) List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- f) Troubleshooting, diagnostic and maintenance procedures.

Training

The Manufacturer's representative shall supervise the installation, setup, and testing of the VIVDS system. Calibrate the system in accordance with the Drawings and the requirements contained herein.

Conduct training sessions as required for the Town of Trumbull Staff to explain the operations, calibration, maintenance, troubleshooting and software functions of the VIVDS system. Training shall be conducted by a manufacturer's certified instruction personnel at a time and location selected by the Town of Trumbull. The training session shall be a minimum of six (6) hours for up to eight (8) representatives from the City. Training shall include both in-office training and hands-on field training to provide complete and comprehensive training for the City. The training sessions shall be scheduled at a mutually agreed time and location after the installation of the VIVDS. The instructor shall provide training documentation at least one week in advance of the formal training for City review.

Construction Methods:

A site survey shall be performed with the VIVDS manufacturer's representative and representative from the Town of Trumbull at all VIVDS locations prior to ordering any equipment and installation. The purpose of the site survey is to optimize the performance from the VIVDS equipment when it is installed and insure that it will meet the accuracy requirements specified previously. The manufacturer's representative or Contractor shall submit the results of this survey to the Engineer in a report, which lists all VIVDS locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Install VIVDS equipment in accordance with the manufacturer instructions and recommendations to achieve the detection zones as shown in the plans and accuracy as described in these specifications. The location of the Camera Assembly shown on the plan may be revised as a result of the Site Survey. The VIVDS Processor, Video Monitor and peripherals are to be furnished and fully installed in an easily accessible position within the controller cabinet. Leave proper clearances surrounding video monitor to allow for accessible connections and space to utilize surrounding equipment.

The supplier of the VIVDS shall supervise the installation and testing of the system.

Installation personnel are required to be certified by the VIVDS manufacturer. The User's Guide is not an adequate substitute for practical, classroom training and formal certification by an approved agency.

Formal levels of factory authorized training are required for installers, contractors and system operators. All training must be certified by the manufacturer.

Method of Measurement:

The Camera Video Detection System will be measured for payment as the number of complete detection systems furnished, installed, operational, tested and accepted.

Basis of Payment:

The unit bid price for Camera Video Detection System includes camera assembly(ies), VIVDS Processor, field communications link, video monitor, USB mouse, power supply, all miscellaneous hardware such as, brackets used to attach the camera to a support structure, the manufacturers' site survey, unlimited number of any necessary VIVDS configuration software and license, documentation, warrantee, labor, testing, tools and equipment necessary to make the VIVDS fully operational and test the system to ensure proper operations.

If a span pole or mast arm shaft mounted Extension Bracket is required and shown on the plans, the Extension Bracket shall be paid under a separate item.

<u>Pay Item</u>	<u>Pay Unit</u>
Camera Video Detection System	EA

ITEM #1111600A – EXTENSION BRACKET

ITEM #1112286A – 360 DEGREE CAMERA ASSEMBLY

ITEM #1112287A – 360 DEGREE VIDEO DETECTION PROCESSOR

ITEM #1113725A – 23 AWG 4 TWISTED PAIR CATEGORY 6 CABLE

Description:

Furnish and install a 360 Degree Video Image Detection System (360VIDS) as shown on the plans or as directed by the Engineer. The 360VIDS consists of a 360 Degree Camera Assembly (360CA), 360 Degree Video Detection Processor (360VDP) and 23 AWG 4 Twisted Pair Category 6 Cable. The Extension Bracket will be included on a case-by-case basis.

Materials:

All hardware shall be new, corrosion resistant. All equipment shall be current production.

360 Degree Camera Assembly:

Camera:

- No-aim, no-focus camera
- Downward facing lens and camera shroud
- Single Power Over Ethernet (POE) connection for power and data collection.
- Color image camera with 360 degree point of view (POV)
- Active picture elements (pixels): 2560 (H) x 1920 (V), minimum.
- Signal to noise ratio : 55dB
- Heated camera
- IP addressable

Camera Enclosure:

- Tamper proof constructed of painted or powder coated aluminum of at least 0.25 inch (6.35-mm) thickness.
- IP66-rated camera housing.

Camera Mounting Hardware:

- Swivel bracket for dual plane adjustment for leveling
- Quick connect junction box
- Hybrid terminal junction box with surge.
- Astro-Brac banded bracket
- 34 inch to 78 inch 90 degree mounting arm pole.

Extension Bracket:

- Single arm [8' (3.0m) or less], or Truss type [8' (3.0m) or greater].
- Length shown on plan.

- Clamp-on attachment to pole shaft 1' (300mm) from top of pole.
- Designed to support minimum 30 lbs. (13.6 Kg), 2 sq. ft. (.2 sq. M) end load with minimal movement from wind.
- Schedule 40, 2" IPS galvanized pipe.
- Heavy duty galvanized finish
- Refer to detail drawing contained herein.

360 Degree Video Detection Processor:

Functional:

- Connectivity: Local Area Network (LAN), Wide Area Network (WAN), Camera interfaces.
- NEMA TS1/ TS2, Type 170 and 2070 ATC compatible
- Four (4) USB 3.0 expansion ports.
- Front panel LED indicators displays calls and light states.
- Twenty-four (24) optically isolated I/O interface.
- Two (2) camera ports – Up to two (2) 360 Degree Camera Assembly; or one (1) 360 Degree Camera Assembly and four (4) IP video detection camera assembly or thermal cameras; or eight (8) traditional or thermal cameras.
- Phase and detection display.
- Wi-Fi capable
- Power – 110/220 VAC 50/60 Hz
- Point and click zone drawing feature
- Digital flattening of image
- Omni-directional vehicle tracking
- Virtual pan-tilt-zoom
- Zone level visibility monitoring.
- Monitor phases and loops, generates calls to controllers.
- Software required to support collection of data.
- Environmental : -29F to +165F (-34C to +74C), 0-95% non-condensing
- Fail-safe in the event of loss of video from 360CA or loss of power to 360VDP.

Detection Zone Programming:

- Point and click zone drawing
- Digital flattening of image
- Virtual pan-tilt-zoom
- Configure and adjust the detection zone with the cabinet mounted Vehicle Detection Monitor (VDM).
- Detection zone data stored in non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.
- Ability to upload and download program database to notebook PC or remote desktop PC.

- Superimpose detection zone on real time video image from selected camera with time stamping capabilities.
- Ability to monitor real time video and adjust zones while 360VDP is actuating the traffic controller.
- Visual confirmation of detection by highlighting detection zone symbols.

Physical:

- Either shelf mounted, stand alone design or modular card rack design.
- Aluminum card rack frame capable of accepting four (4) 360VDP modules.
- TS1 harness cable.
- Standard Ethernet and USB connectors for video input and video output.
- Female metal shell connector with latching clamp for NEMA TS 1 detector outputs and inputs.
- LED indications to monitor all detector outputs.
- Side or rear mounted connectors and controls are not allowed on stand alone units.
- NEMA FR-4 glassepoxy or equivalent circuit boards.

Ethernet Repeater:

- Utilize Ethernet repeater if CAT6 cable distance is over 328'.

Ethernet Switch:

- Power Over Ethernet (POE) switch
- Ports for up-to four (4) traditional or thermal cameras.
- Powder coated aluminum.
- Dual purpose LED port lights.
- RJ-45 CAT6 connectivity.
- Environmental: -29F to +165F (-34C to +74C).
- NEMA TS2 compliant.

Video Encoder:

- Power Over Ethernet (POE)
- Video: H.264 (MPEG-4 Part 10/AVC) Baseline and Main Profile
- Compression: Motion JPEG
- Resolutions: 176x120 to 720x576, 176x120 to 1536x1152 for quad view.
- Frame rate:
 - H.264: 25/30 (50/60 Hz) fps,
 - 15fps in quad view in full resolution,
 - Motion JPEG: 25/30 (50/60 Hz) fps,
 - 15fps in quad view in full resolution.
- Video Streaming: Multi-stream H.264 and Motion JPEG: One H.264 and one JPEG stream on each channel (8 streams in total) in full frame rate individually configured streams in max. resolution at 25/30 fps; more streams if identical or

limited in frame rate/ resolution. Controllable frame rate and bandwidth; VBR/CBR H.264.

- Environmental: -40F to +167F (-40C to +75C), 10-95% non-condensing.
- NEMA TS2 compliant.

Ethernet Protection Module:

- Either shelf mounted or stand alone design.
- Protect 360CA, IP video detection camera assembly, thermal cameras and 360VDP in the event of a surge or lightning.

Environmental:

- Comply with NEMA TS 2, Section 2 requirements for Controller Assembly.
- Pass following NEMA TS 2 tests and applicable test procedures.
 - Vibration: Section 3.13.3, Section 3.13.8.
 - Shock: Section 3.13.4, Section 3.13.9.
 - Transients, Temperature, Voltage and Humidity: Section 3.13.7.
 - Power Interruption: Section 3.13.10.

Peripherals:

- Separable Keypad & Joystick or Computer Mouse including all necessary cables for connectivity to VDP.

23 AWG 4 Twisted Pair Category 6 Cable:

- Supply the 360CA power and return the video signal to the VDP.
- Outdoor Aerial CAT6 cable with UV insulation.
- Rated for 48VDC
- 250MHZ, shielded, gel-filled (flooded core) direct burial grade.
- Polyethylene insulation.
- Shall be installed continuous between the 360CA and 360VDP.
- Cable shall be installed according to TIA/EIA-568-B.
- Other type cable may be substituted at the request of the 360VDP manufacturer.

Documentation: (360VDP, VDM and 360CA)

Provide to the **Department of Transportation Office of Maintenance** three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

- Installation and operation procedures.
- Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- Schematic diagrams (point to point wiring).
- Pictorial of component layout on circuit board.
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- Troubleshooting, diagnostic and maintenance procedures.

Site Survey:

Perform a site survey with the 360VDP manufacturer representative at all 360VIDS locations prior to installation. The purpose of the survey is to optimize the performance from the 360VIDS equipment when it is installed and insure that it will meet the accuracy requirements specified previously. Prior to installation, submit the results of this survey to the Engineer in a report, which lists all 360VIDS locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Warranties and Guarantees: (360VDP and CA)

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 36 months following successful completion of the entire intersection acceptance test.

Construction Methods:

Install 360VIDS equipment in accordance with the manufacturer instructions and recommendations to achieve the detection zones as shown in the plans and accuracy as described in these specifications. The location of the 360CA shown on the plan may be revised as a result of the Site Survey. Peripherals are to be furnished and fully installed in an easily accessible position within the controller cabinet. Leave proper clearance(s) surrounding video monitor to allow for accessible connections and space to utilize surrounding equipment.

Method of Measurement:

The 360 degree Camera Assembly will be measured for payment as the number of 360 degree cameras furnished, installed operational and accepted.

The Extension Bracket will be measured for payment as the number of brackets furnished, installed and accepted.

The 360 degree Video Detection Processor will be measured for payment as the number of units including all additional work and materials listed in Basis of Payment, furnished, installed, operational and accepted.

Camera Cable will be measured for payment as linear feet (meters), furnished, installed and accepted.

Basis of Payment:

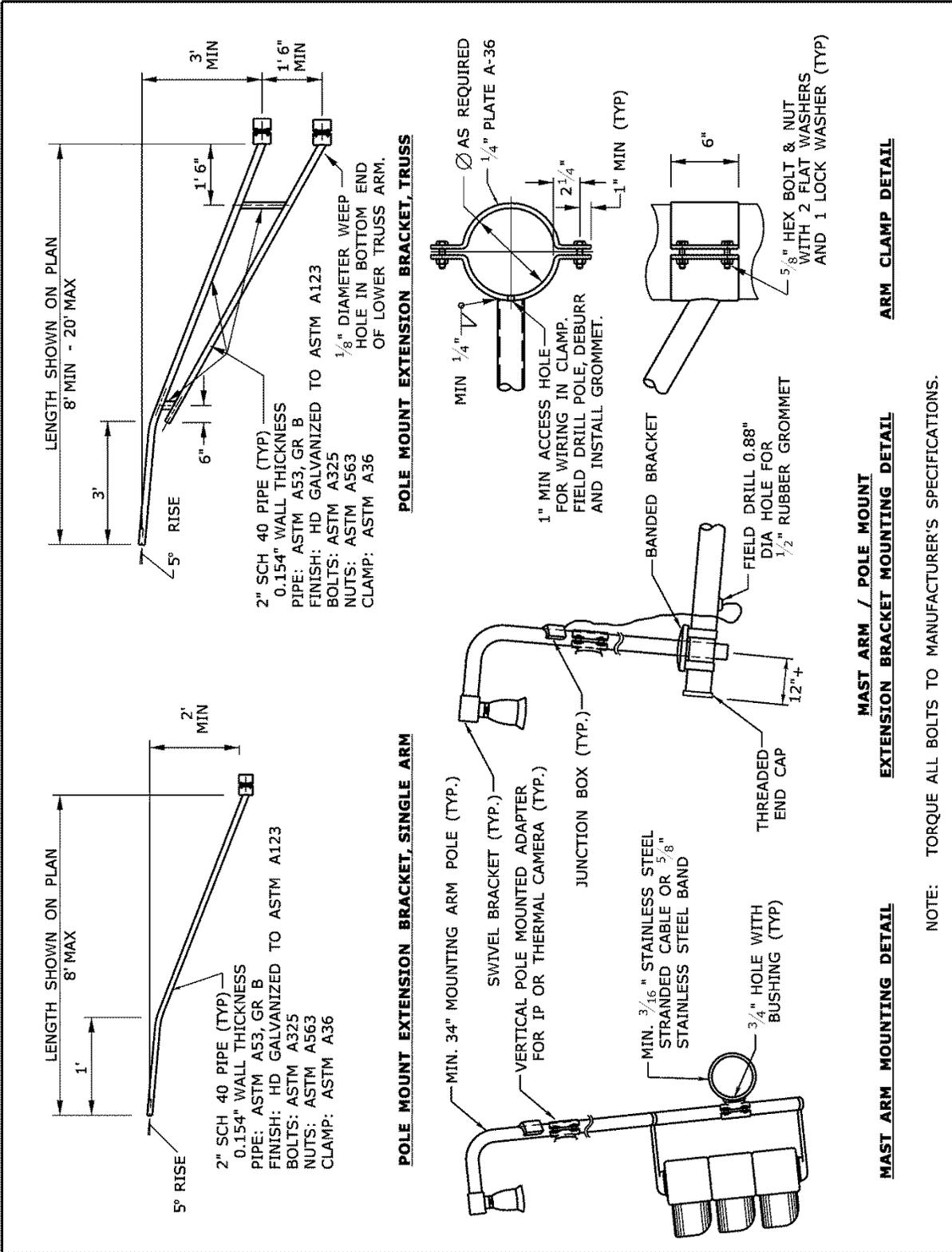
The unit bid price for 360 degree Camera Assembly includes the 360 degree camera, enclosure, brackets used to attach the 360CA to a support structure or extension bracket, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the 360VDP.

The unit bid price for Extension Bracket includes all labor, tools and equipment necessary to attach the bracket to a pole shaft.

The unit bid price for 360 degree Video Detection Processor includes the manufacturers' site survey, unlimited number of any necessary 360VIDS configuration software and license, card rack frame, power supply, all miscellaneous hardware such as PC interface cable with connectors, necessary peripherals such as Ethernet repeater, Ethernet switch, video encoder, Ethernet protection module, documentation, warrantee, labor, tools and equipment necessary to make the 360VIDS fully operational.

The unit bid price for Camera Cable includes all connectors, labor, tools and equipment necessary to install the cable between the 360CA and the 360VDP.

<u>Pay Item</u>	<u>Pay Unit</u>
360 Degree Camera Assembly	Ea.
Extension Bracket	Ea.
360 Degree Video Detection Processor	Ea.
Camera Cable	LF (M)



ITEM #1112288A – IP VIDEO DETECTION CAMERA ASSEMBLY

Description: Furnish and install an IP (Internet Protocol) Video Detection Camera Assembly (IPVDCA) as shown on the plans or as directed by the Engineer. The IPVDCA consists of an IP Video Detection Camera, lens, enclosure, mounting hardware and equipment necessary to provide the specified video signal to the video detection processor.

Materials: All hardware shall be new, corrosion resistant. All equipment shall be current production.

IP Video Detection Camera Assembly:

Camera:

- Use appropriate CS-mount lens to provide adequate detection
- Single Power Over Ethernet (POE) connection for power and data collection
- Color image camera with 360 degree point of view (POV)
- Active picture elements (pixels): 2560 (H) x 1920 (V), minimum
- Heated camera
- IP addressable

Camera Enclosure:

- Tamper proof constructed of aluminum
- IP66-rated camera housing

Camera Mounting Hardware:

- Swivel bracket for dual plane adjustment for leveling
- Hybrid terminal junction box with surge
- Astro-Brac banded bracket

Environmental:

- Comply with NEMA TS 2, Section 2 requirements for Controller Assembly
- Pass the following NEMA TS 2 tests and applicable test procedures
 - Vibration: Section 3.13.3, Section 3.13.8
 - Shock: Section 3.13.4, Section 3.13.9
 - Transients, Temperature, Voltage and Humidity: Section 3.13.7
 - Power Interruption: Section 3.13.10

Construction Methods:

Site Survey: Perform a Site Survey with the IPVDCA manufacturer's representative for all IPVDCA locations prior to installation. The purpose of the Survey is to optimize the performance of the IPVDCA equipment when it is installed and ensure that it will meet the accuracy requirements specified. Prior to installation, submit the results of the Site Survey to the Engineer in a report which lists all IPVDCA locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Install IPVDCA equipment in accordance with the manufacturer's instructions and the attached details to achieve the detection zones in the location(s) determined as a result of the Site Survey.

Documentation: (IPVDCA)

Provide to CTDOT Office of Maintenance three (3) copies of equipment manuals furnished by the manufacturer, including the following:

- Installation and operation procedures
- Performance specifications (functions, electrical, mechanical and environmental) of the unit
- Schematic diagrams (point to point wiring)
- Pictorial of component layout on circuit board
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA
- Troubleshooting, diagnostic and maintenance procedures

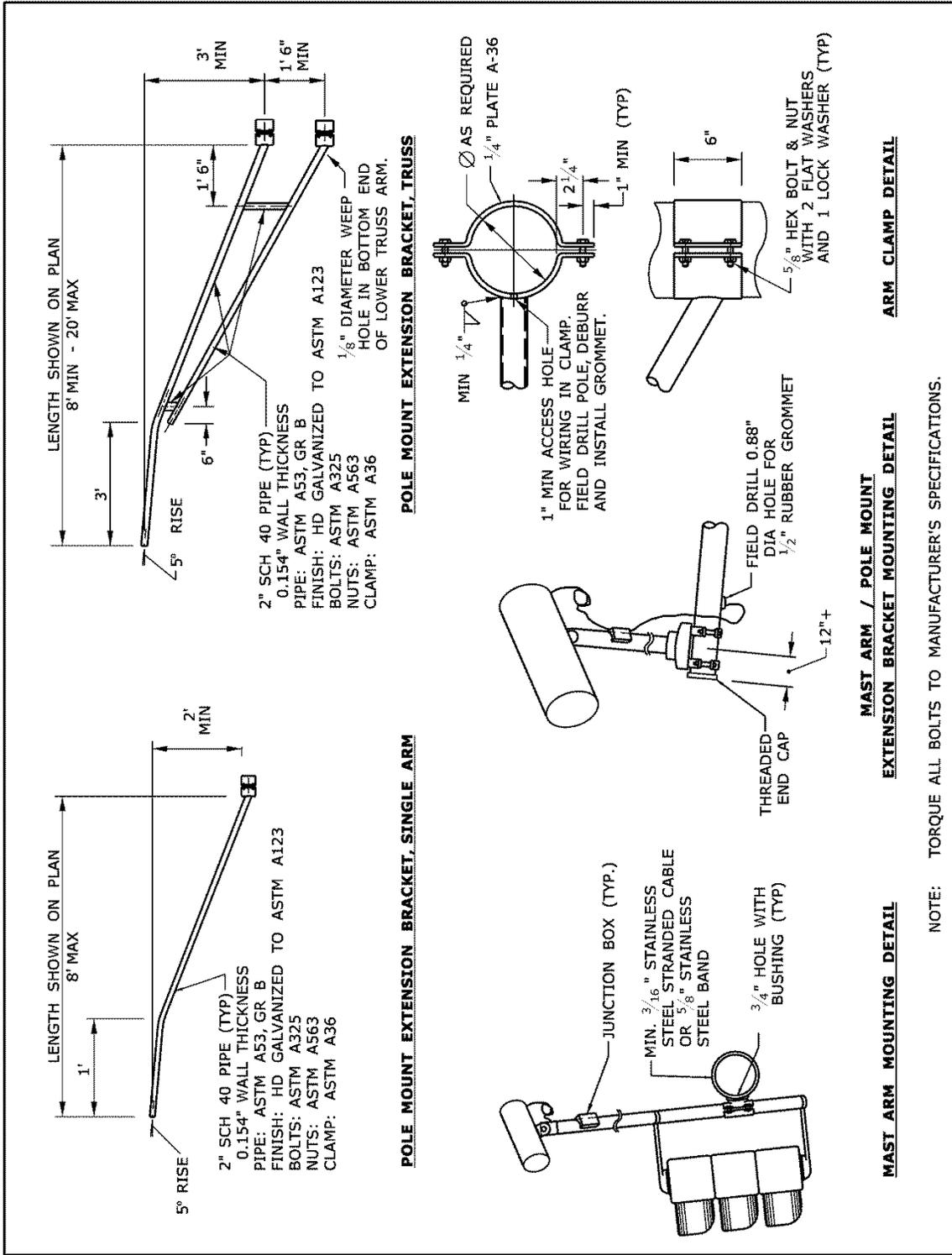
Warranties and Guarantees: (IPVDCA)

Provide warranties and guarantees to the CTDOT Office of Maintenance in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 36 months following successful completion of the entire intersection acceptance test.

Method of Measurement: The IP Video Detection Camera Assembly will be measured for payment as the number of each assembly of IP video cameras, lenses, enclosures and mounting hardware furnished, installed, operational and accepted.

Basis of Payment: This item will be paid at the Contract unit price for each “IP Video Detection Camera Assembly” complete and accepted, which price shall include the Site Survey, IP video camera, lens, enclosure, brackets used to attach the IP video camera to a support structure or extension bracket, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the video detection processor.

Pay Item	Pay Unit
IP Video Detection Camera Assembly	ea.



ITEM NO. 1118051A – TEMPORARY SIGNALIZATION (SITE NO. 1)

Description:

Provide Temporary Signalization (TS) at the intersections shown on the plans or as directed by the Engineer.

1. Existing Signalized Intersection: Keep each traffic signal completely operational at all times during construction through the use of existing signal equipment, temporary signal equipment, new signal equipment, or any combination thereof once TS has started as noted in the section labeled Duration.

2. Unsignalized Intersection: Provide TS during construction activities and convert the temporary condition to a permanent traffic signal upon project completion. Furnish, install, maintain, and relocate equipment to provide a complete temporary traffic signal, including but not limited to the necessary support structures, electrical energy, vehicle and pedestrian indications, vehicle and pedestrian detection, pavement markings, and signing.

Materials:

- Pertinent articles of the Standard Specifications
- Supplemental Specifications and Special Provisions contained in this contract

Construction Methods:

Preliminary Inspection

In the presence of the Engineer and a representative from the DOT Electrical Maintenance Office (Town representative for a Town owned signal), inspect and document the existing traffic signal's physical and operational condition prior to Temporary Signalization. Include but do not limit the inspection to the following:

- Controller Assembly (CA)
 - Controller Unit (CU)
 - Detection Equipment
 - Pre-emption Equipment
 - Coordination Equipment
- Vehicle and Pedestrian Signals
- Vehicle and Pedestrian Detectors
- Emergency Vehicle Pre-emption System (EVPS) *
- Interconnect Cable and Splice Enclosures
- Support Structures
- Handholes, Conduit and Cable

It may be necessary to repair or replace equipment that is missing, damaged, or malfunctioning. Develop a checklist of items for replacement or repair after the inspection. If authorized by the Engineer, this work will be considered "Extra Work" under Article 1.09.04.

* At a State owned signal the EVPS equipment is usually owned by the municipality. It is recommended to apprise the municipality of the inspection schedule and results.

TS Plan

At least 30 days prior to implementation of each stage, submit a 1:40 (1:500 metric) scale TS plan for each location to the Engineer for review and comment. Include but do not limit the plan to the following:

- Survey Ties
- Dimensions of Lanes, Shoulders, and Islands
- Slope Limits
- Clearing and Grubbing Limits
- Signal Phasing and Timing
- Location of Signal Appurtenances such as Supports, Signal Heads, Pedestrian Push buttons, Pedestrian Signals
- Location of Signing and Pavement Markings (stop bars, lane lines, etc.)
- Location, method, and mode of Temporary Detection

Review of the TS plan does not relieve the Contractor of ensuring the TS meets the requirements of the MUTCD. A copy of the existing traffic signal plan for State-owned traffic signals is available from the Division of Traffic Engineering upon request. Request existing traffic signal plans for Town-owned traffic signals from the Town. Do not implement the TS plan until all review comments have been addressed.

Earthwork

Perform the necessary clearing and grubbing and the grading of slopes required for the installation, maintenance, and removal of the TS equipment. After TS terminates restore the affected area to the prior condition and to the satisfaction of the Engineer.

Maintenance and Protection of Traffic

Furnish, install, maintain, relocate, and remove signal-related signing (lane-use, signal ahead, NTOR, etc.) and pavement markings as needed. Install, relocate, and/or remove equipment in a manner to cause no hazard to pedestrians, traffic or property. Maintain traffic as specified in the Special Provisions “Prosecution and Progress” and “Maintenance and Protection of Traffic.”

Electrical Service and Telephone Service at Existing Signalized Intersections

If the electrical service or the telephone service source must be changed or relocated make all arrangements with the utility company and assume all charges. The party previously responsible for the monthly payment of service shall continue to be responsible during TS.

Electrical Service at Unsignalized Intersections

Assume all charges and make all arrangements with the power company, including service requests, scheduling, and monthly bills in accordance with Section 10.00.12 and Section 10.00.13 of the Standard Specifications,. A metered service is recommended where TS equipment will be removed when no longer needed.

Temporary Signalization

Furnish, install, maintain, relocate, and remove existing, temporary, and proposed traffic signal equipment and all necessary hardware; modify or furnish a new CA; reprogram the CU

phasing and timing; as many times as necessary for each stage/phase of construction to maintain and protect traffic and pedestrian movements as shown on the plans or as directed by the Engineer.

Inspection

When requested by the Engineer, the TS will be subject to a field review by a representative of the Division of Traffic Engineering and/or the Town, which may generate additional comments requiring revisions to the temporary signal.

Detection

Provide vehicle detection on the existing, temporary, and/or new roadway alignment for all intersection approaches that have existing detection, that have detection in the final condition as shown on the signal plan, or as directed by the Engineer. Keep existing pedestrian pushbuttons accessible and operational at all times during TS. Temporary Detection is described and is paid for under Item # 11112XXA - Temporary Detection (Site No. X)

Emergency Vehicle Pre-emption System (EVPS)

Furnish, install, maintain, relocate, and remove the equipment necessary to keep the existing EVPS operational as shown on the plan. Do not disconnect or alter the EVPS without the knowledge and concurrence of the Engineer and the EVPS owner. Schedule all EVPS relocations so that the system is out of service only when the Contractor is actively working. Ensure EVPS is returned to service and is completely operational at the end of the work day. Keep the EVPS owner apprised of all changes to the EVPS.

Coordination

Furnish, install, maintain, relocate, and remove the equipment necessary to keep the intersection coordinated to adjacent signals as shown on the plan. Do not disconnect the interconnect without the approval of the Engineer.

- Closed Loop System: If it is necessary to disconnect the communication cable, notify the Engineer and the Bridgeport Operation Center (BOC) or the Newington Operation Center (NOC) prior to disconnect and also after it is reconnected.
- Time Base System: Program and synchronize all Time Clock/Time Base Coordination (TC/TBC) units as necessary.

Maintenance

Once TS is in effect, assume maintenance responsibilities of the entire installation in accordance with Section 1.07.12 of the Standard Specifications. Notify the Engineer for the project records the date that Temporary Signalization begins. Notify the following parties that maintenance responsibility has been transferred to the Contractor:

Signal Owner
CT DOT Electrical Maintenance Office or
Town Representative

Local Police Department

Provide the Engineer a list of telephone numbers of personnel who will be on-call during TS. Respond to traffic signal malfunctions by having a representative at the site within three hours from the initial contact. Within twenty-four (24) hours have the traffic signal operating according to plan.

If the Engineer determines that the nature of a malfunction requires immediate attention and/or the Contractor does not respond within three (3) hours, then an alternate maintenance service will be called to repair the signal. Expenses incurred by the alternate maintenance service for each call will be deducted from monies due to the Contractor with a minimum deduction of \$1,000. The alternate maintenance service may be the owner of the signal or another qualified electrical contractor.

Duration

Temporary Signalization shall commence when any existing signal equipment is disturbed, relocated, or altered based on the inspection checklist in any way for the TS.

For intersections with a State furnished controller, TS terminates when the inspection of the permanent signal is complete and operational and is accepted by the Engineer. For intersections with a Contractor furnished controller, Temporary Signalization terminates at the beginning of the 30 day test period for the permanent signal.

Ownership

Existing equipment, designated as salvage, remains the property of the owner. Salvable equipment will be removed and delivered to the owner upon completion of use. Temporary equipment supplied by the Contractor remains the Contractor's property unless noted otherwise.

Method of Measurement:

Temporary Signalization shall be paid only once per site on a percentage of the contract Lump Sum price. Fifty percent (50%) shall be paid when TS is operational as shown on the plan or to the satisfaction of the Engineer. Fifty percent (50%) shall be paid when TS terminates.

Basis of Payment:

This work shall be paid at the contract Lump Sum price for "Temporary Signalization (Site No.)" for each site. This price includes the preliminary inspection, TS plan for each stage/phase, furnishing, installing, maintaining, relocating and revising traffic signal equipment, controller assembly modifications, controller unit program changes such as phasing and timing, removing existing, temporary, and proposed traffic signal equipment, arrangements with utility companies, towns or cities including the fees necessary for electric and telephone service, clearing and grubbing, grading, area restoration and all necessary hardware, materials, labor, and work incidental thereto.

All material and work for signing and pavement markings is paid for under the appropriate Contract items.

All material and work necessary for vehicle and pedestrian detection for TS is paid for under item 11112XXA - Temporary Detection (Site No. X).

All Contractor supplied items that will remain the Contractor's property shall be included in the contract Lump Sum price for "Temporary Signalization."

Any items installed as part of the permanent installation are not paid for under this item but are paid for under the bid item for that work.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Signalization (Site No.)	L.S.

ITEM NO. 1206023A - REMOVAL AND RELOCATION OF EXISTING SIGNS

Section 12.06 is supplemented as follows:

Article 12.06.01 – Description is supplemented with the following:

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

Article 12.06.03 – Construction Methods is supplemented with the following:

The Contractor shall take care during the removal and relocation of existing signs, sign posts, and sign supports that are to be relocated so that they are not damaged. Any material that is damaged shall be replaced by the Contractor at no cost to the State.

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

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

Article 12.06.04 – Method of Measurement is supplemented with the following:

Payment under Removal and Relocation of Existing Signs shall be at the contract lump sum price which shall include all extruded aluminum and sheet aluminum signs, sign posts, and sign supports designated for relocation, all new sign posts and associated hardware for signs designated for relocation, all extruded aluminum signs, sheet aluminum signs, sign posts and sign supports designated for scrap, and foundations and other materials designated for removal and disposal, and all work and equipment required.

Article 12.06.05 – Basis of Payment is supplemented with the following:

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

<u>Pay Item</u>	<u>Pay Unit</u>
Removal and Relocation of Existing Signs	L.S.

**ITEM #1208931A—SIGN FACE - SHEET ALUMINUM (TYPE IX
RETROREFLECTIVE SHEETING)**

**ITEM #1208932A—SIGN FACE - SHEET ALUMINUM (TYPE IV
RETROREFLECTIVE SHEETING)**

Section 12.08 is supplemented and amended as follows:

12.08.01—Description:

Add the following:

This item shall also include field testing of metal sign base posts as directed by the Engineer.

12.08.03—Construction Methods:

Delete the last sentence and add the following:

Metal sign base posts shall be whole and uncut. Sign base post embedment and reveal lengths shall be as shown on the plans. The Contractor shall drive the metal sign base posts by hand tools, by mechanical means or by auguring holes. If an obstruction is encountered while driving or placing the metal sign base post, the Contractor shall notify the Engineer who will determine whether the obstruction shall be removed, the sign base post or posts relocated, or the base post installation in ledge detail shall apply. Backfill shall be thoroughly tamped after the posts have been set level and plumb.

Field Testing of Metal Sign Posts: When the sign installations are complete, the Contractor shall notify the Engineer the Project is ready for field testing. Based on the number of posts in the Project, the Engineer will select random sign base posts which shall be removed by the Contractor for inspection and measurement by the Engineer. After such inspection is completed at each base post location, the Contractor shall restore or replace such portions of the work to the condition required by the Contract. Refer to the table in 12.08.05 for the number of posts to be field tested.

12.08.04—Method of Measurement:

Add the following:

The work required to expose and measure sign base post length and embedment depth using field testing methods, and restoration of such work, will not be measured for payment and shall be included in the general cost of the work.

12.08.05—Basis of Payment:

Replace the entire Article with the following:

This work will be paid for at the Contract unit price per square foot for “Sign Face - Sheet Aluminum” of the type specified complete in place, adjusted by multiplying by the applicable Pay Factor listed in the table below. The price for this work shall include the completed sign, metal sign post(s), span-mounted sign brackets and mast arm-mounted brackets, mounting hardware, including reinforcing plates, field testing, restoration and replacement of defective base post(s), and all materials, equipment, and work incidental thereto.

Pay Factor Scale: Work shall be considered defective whenever the base post length or base post embedment depth is less than the specified length by more than 2 inches. If the number of defects results in rejection, the Contractor shall remove and replace all metal sign base posts on the Project, at no cost to the Department.

Number of Posts to be Tested and Pay Factors (Based on Number of Defects)

Number of Posts in Project =>	51-100	101-250	251-1000	>1000
Sample Size=>	5 Posts	10 Posts	40 Posts	60 Posts
0 Defects	1.0	1.0	1.025	1.025
1 Defect	0.9	0.95	0.975	0.983
2 Defects	Rejection	0.9	0.95	0.967
3 Defects	Rejection	Rejection	0.925	0.95
4 Defects	Rejection	Rejection	0.9	0.933
5 Defects	Rejection	Rejection	Rejection	0.917
6 Defects	Rejection	Rejection	Rejection	0.9
7 or more Defects	Rejection	Rejection	Rejection	Rejection

Note: Projects with 50 or fewer posts will not include field testing.