

CONTRACT FORM
INCLUDING SPECIFICATIONS
FOR FIELD SUBSURFACE INVESTIGATIONS
BY BORING CONTRACTORS

RETAINING WALL REPLACEMENT
I-84 ON-RAMP RETAINING WALL AT 555 ASYLUM AVENUE
STATE PROJECT NO. 63-723, HARTFORD, CONNECTICUT

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INVITATION TO BID

Proposals for the performance of subsurface explorations, including the makings of borings in soil and rock; securing samples and other work incidental thereto on and in the general vicinity of the proposed Retaining Wall Replacement, I-84 On-Ramp Retaining Wall at 555 Asylum Avenue, State Project No. 63-723, in Hartford, Connecticut, will be received by Freeman Companies, LLC on behalf of CME Associates, Inc., until Friday, August 2, 2019 at 12:00 pm (noon), Eastern Time. Deliver all bids to Freeman Companies, LLC, 36 John Street, Hartford, Connecticut, 06106, and via email to nwhetten@freemancos.com.

Plans, specifications, proposal form and form of contract are attached hereto.

Proposals must be made upon the form provided. The blank places in the form must be filled in as noted, and no change shall be made in the phraseology of the proposal or in the items mentioned herein. Proposals that contain any omissions, alternations, additions, or items not called for in the itemized proposal, or that contain irregularities of any kind, may be rejected as non-responsive.

All bids received without the following documents will be considered non-responsive:

1. Proposal Form – Completed and Signed
2. Bid Sheet – Completed and Signed
3. Bid Bond or Certified Check
4. Certificate of Insurance

A performance contract bond and payment bond, each in the sum of one hundred percent (100%) of the contract price, will be required on execution of the contract.

A Certificate of Insurance in compliance with the insurance terms set forth in the Contract Agreement for Subsurface Explorations, must be submitted with this proposal.

CME Associates, Inc. (CME) reserves the right to reject any or all bids.

PROPOSAL FOR SUBSURFACE EXPLORATIONS

AT THE SITE OF

**STATE PROJECT NO. 63-723,
RETAINING WALL REPLACEMENT
I-84 ON-RAMP RETAINING WALL AT 555 ASYLUM AVENUE
HARTFORD, CONNECTICUT**

TO: Freeman Companies, LLC on behalf of CME Associates, Inc.

In submitting this bid, the undersigned declares that he/she is the only person or persons interested in the said bid; that it is made without any connection to any person making another bid for the same contract; and that the bid is, in all respects, fair and without collusion, fraud, or mental reservation.

The undersigned also declares that he has carefully examined the plans, specifications and form of contract and that he has personally inspected the actual location of the work, together with the local sources of supply; has satisfied himself as to all the quantities and conditions; and understands that in signing this proposal, he waives all right to plead any misunderstanding regarding same.

The undersigned further understands and agrees that he is to furnish and provide for the respective unit bid price, all the necessary material, machinery, implements, tools, labor, services, etc., and to do and perform all the necessary work under the aforesaid conditions, to complete the work in accordance with the plans and specifications, which plans and specifications it is agreed are a part of this proposal. The list of bid items, together with the estimated quantities thereof, is set forth in the Bid Sheet, which accompanies and forms a part of this proposal. The undersigned further agrees that his total bid prices, which shall be evaluated in comparison with the total bid prices of other bidders, shall be completed as the summation of the products of the approximate quantities shown on the Bid Sheet multiplied by the gross sum bid. In case of discrepancy between the words and the numerals giving the unit bid prices, the words shall govern.

Furthermore, the undersigned fully understands that the quantities of the items set forth in the Bid Sheet are only approximate and agrees to accept the unit price as full compensation for the actual quantities of such items required to complete the work to the satisfaction of the Engineer, be the quantities more or less than those set forth in the Bid Sheet.

The undersigned agrees to submit a schedule of progress or time chart for the work concerned if so requested by the Engineer after the opening of the bids, and to do so within three (3) days of such request. The schedule or chart will be used in consideration of the bids and after award of the contract by the Inspector in the field as a check on the actual progress.

On acceptance of this proposal for said work, the undersigned does hereby bind himself to enter into written contract with CME Associates, Inc. within five (5) days of the date of notice of award and to comply in all respects with the terms of said contract. The undersigned agrees that this proposal shall be valid for thirty (30) calendar days from the date of this proposal.

Dated _____, 20____

Legal name of person, firm, or corporation

By _____

Bidder's Address (Not a P.O. address):

_____ Street
_____ City and State
_____ Telephone Number

If a Corporation:

Name		Address
_____	President	_____
_____	Secretary	_____
_____	Treasurer	_____

If a Firm:

Name	Address
_____	_____
_____	_____
_____	_____

PROPOSAL FOR SUBSURFACE EXPLORATIONS - BID SHEET

**STATE PROJECT NO. 63-723, HARTFORD, CONNECTICUT
RETAINING WALL REPLACEMENT EVALUATION
I-84 ON-RAMP RETAINING WALL AT 555 ASYLUM AVENUE**

Item No.	Approx. Quantities	Item Description – Pay Unit Unit Bid Price (<i>in words</i>)	Unit Bid Price dollars/cents (<i>in figures</i>)	Amount of Bid dollars/cents (<i>in figures</i>)
1	65	3½-inch diameter soil boring – Type A, _____ per linear foot		
2	15	1½-inch O.D. split-barrel samples, _____ each		
3	5	Rock Core – NX, _____ per linear foot		
4	1	Boring Hole Patching (Hot-Mix), – _____ each		
5	1	Boring Hole Patching (Cold-Mix), – _____ each		
6	4	Stand-by Time – Hours, _____ per hour		
7	LS	Mobilization and Demobilization - Land, _____ per drill rig		

TOTAL OR GROSS SUM BID, (*WRITTEN IN WORDS*):

**TOTAL OR GROSS SUM BID, *DOLLARS/CENTS (IN FIGURES)*: \$ _____

**This value will be used for comparison of Bids.

PROPOSAL FOR SUBSURFACE EXPLORATIONS - BID SHEET - Continued

**STATE PROJECT NO. 63-723, HARTFORD, CONNECTICUT
RETAINING WALL REPLACEMENT EVALUATION
I-84 ON-RAMP RETAINING WALL AT 555 ASYLUM AVENUE**

DIRECT COSTS

Item No. and Description	Estimated Duration	*Daily Rate	*Weekly Rate	*Weekend Rate	*Monthly Rate
8. Traffic Person (For uniformed traffic control on non-railroad property)	2 days	\$ _____	\$ _____	\$ _____	\$ _____

* If applicable, the Bidder should submit a rate for each category. "N/A" should be shown for non-applicable categories.

Estimated Total \$ _____

Item No. and Description	Estimated Duration	*Daily Rate (8hr/per day at job site including travel time)	*Weekly Rate (8hr/per day at job site including travel time)	*Weekend Rate (8hr/per day at job site including travel time)	*Monthly Rate (8hr/per day at job site including travel time)	*Over-time Hourly Rate (for hours beyond daily rate)
9. Traffic Control Equipment (For work obtruding onto roadways)	2 days	\$ _____	\$ _____	\$ _____	\$ _____	\$ _____ (weekday) \$ _____ (weekend)
Additional Fees	Describe:					\$ _____

* If applicable, the Bidder should submit a rate for each category. "N/A" should be shown for non-applicable categories.

Estimated Total \$ _____

Note: If the Bidder is providing Traffic Persons with their own employees and/or Traffic Control Equipment with their own equipment, then N/A should be put in all spaces in the tables above. Consequently, these costs shall be included in the Lump Sum cost for "Mobilization".

CONTRACT AGREEMENT FOR SUBSURFACE EXPLORATIONS

AT THE SITE OF

**STATE PROJECT NO. 63-723
RETAINING WALL REPLACEMENT EVALUATION
I-84 ON-RAMP RETAINING WALL AT 555 ASYLUM AVENUE
HARTFORD, CONNECTICUT**

1. GENERAL AGREEMENT

This agreement, made and entered into this _____ day of _____, 2019, by and between CME Associates, Inc., hereinafter referred to as the "Engineer" or the Party of the First Part, and _____, hereinafter referred to as the Contractor or the Party of the Second Part,

WITNESSETH:

The Contractor shall furnish all labor, materials, equipment, supplies and other facilities, and shall perform all work necessary or proper for or incidental to the making of subsurface explorations at the locations on the plans at the site for the proposed Retaining Wall Replacement Evaluation, South end of Bridge No. 01765/I-84 Eastbound On-Ramp Retaining Wall at 555 Asylum Avenue, State Project No. 63-723, in Hartford, Connecticut, in strict accordance with the Specifications found herewith and the accompanying Contract Plans, and to the satisfaction and approval of the Engineer; and shall perform all other obligations and assume all liability imposed upon him by the Contract and Specifications.

In full consideration thereof, the Engineer will pay the Contractor, at the times and in the manner hereinafter provided, an amount determined by the prices named in the Clause, hereof entitled "Contract Unit Prices," and, except as otherwise provided herein, such amounts only. The prices for items named therein include full compensation to the Contractor for all labor, materials, and other things incidental to the completion of the entire work. Such payment shall be computed upon the basis of the actual quantities in the completed work, whether such quantities be more or less than those shown in the Bid Sheet bound herewith.

2. CONTRACT UNIT PRICES

Subject to the provisions of this Contract, the Engineer will pay, and the Contractor shall accept in full consideration for the performance of the Contractor's obligation hereunder, the following unit prices:

1. For 3½ - inch diameter soil boring – Type A, \$ _____ Per Linear Foot.
2. For 1½ -inch O.D. split-barrel samples, \$ _____ Per Each.
3. For Rock Core – NX, \$ _____ Per Linear Foot.
4. For Boring Hole Patching (Hot-Mix), \$ _____ Per Each.
5. For Boring Hole Patching (Cold-Mix), \$ _____ Per Each.
6. For Stand-by Time – Hours, \$ _____ Per Hour.
7. For Mobilizations and Demobilization - Land \$ _____ Lump Sum.

DIRECT COSTS

Subject to the provisions of this Contract, the Engineer will pay, and the Contractor shall accept in full consideration for the performance of the Contractor's obligation hereunder, reimbursement as Direct Costs for the following items:

Item	Estimated Duration	Daily Rate	Weekly Rate
8. Traffic Person (For uniformed traffic control)	2 days	\$	\$

Estimated Total \$ _____

Item	Estimated Duration	Daily Rate	Weekly Rate
9. Traffic Control Equipment (For work obtruding onto roadways)	2 days	\$	\$

Estimated Total \$ _____

3. AUTHORIZED FEE LIMIT:

The value of the "Total or Gross Sum Bid" combined with the estimated value of all Direct Costs, submitted by the Contractor in the bid, will be the "Authorized Fee Limit" unless unexpected subsurface or site conditions are encountered or a change in drilling methodology is required and is approved by the Engineer. Under these circumstances adjustments to the "Authorized Fee Limit" *may* apply.

If the "Approximate Quantity", indicated on the Bid Sheet, exceeds the amount by up to ten percent (10%), authorization for additional payment by the Inspector in the field will be acceptable. If the "Estimated Duration" for Traffic Person and/or Traffic Control Equipment, indicated on the Bid Sheet, exceeds the amount by up to fifty percent (50%), authorization for additional payment by the Inspector in the field will be acceptable. If either of the authorized percentages is exceeded, authorization by the Engineer will be required.

If any item on an invoice is questioned, CME Associates, Inc may withhold payment of the amount in question, without interest, until the matter is resolved between the Parties, but shall promptly pay the amount not in question, in accordance with Payment terms of this contract.

4. EXTRA WORK

Unforeseen work made necessary by changes in plans or work necessary to complete the subsurface investigations, for which no price is provided in the contract, shall be classified as extra work and done in accordance with the requirements of the specifications and as directed by the Engineer.

The Engineer shall notify the Contractor of the necessity for extra work, stipulating its character and extent. Upon receipt of such notification, the Contractor shall notify the Engineer, in writing, of the compensation, either unit price or lump sum as requested, for which he proposes to perform the extra work required. The Engineer may accept the compensation proposed by the Contractor, or if he considers the prices submitted to be excessive, he may order the work done on a "Cost Plus" basis as specified hereinafter. In either case, the character and extent of extra work, together with the accepted basis of compensation shall be communicated to the Contractor in writing.

If the Engineer orders extra work performed on a "Cost Plus" basis, the Contractor shall perform the same and shall receive in payment therefor an amount equal to the actual net cost in money to him of the materials, wages of applied labor, other direct expense and insurance required for labor, plus 20 percent of the above items and plus such rental for plant and other equipment (other than small tool) as the Engineer deems reasonable, and that amount only. If the work is performed on a unit price basis, there is no markup.

No work shall be considered Extra Work unless it has been ordered in writing as such by the Engineer before the said work started, or unless the Contractor shall file a written claim for Extra work with the Engineer within two (2) days from the date of instructions from the Engineer or his representative to proceed with such work.

5. PAYMENT

Partial Payment(s): On or about the first day of each calendar month, the Engineer will request the Contractor to furnish information necessary to estimate the value of the work satisfactorily done up to that time. Within thirty (30) days after receipt of this information, the Engineer will request the State to pay him 100% of the value of the work thus estimated, less any previous payments made; and the Engineer, within ten (10) days after receipt of such payment from the State, will pay to the Contractor the amount thus received.

Final Payment: Upon verification of the satisfactory completion of all work whatsoever required, the Contractor shall furnish to the Engineer satisfactory evidence that all just liens, claims and demands for rental of equipment, labor and material, arising out of such work, are fully satisfied, and that all of the work is fully released from liens, claims and demands, whether just or otherwise. Within thirty (30) days after receipt of such evidence, the Engineer will request the State to pay him the total value of all work satisfactorily done, less any payments previously made, and within ten (10) days of receipt of this Final Payment from the State, the Engineer will pay to the Contractor all amounts still outstanding and due him. All prior estimates and payments shall be subject to correction in this payment, which is throughout this Contract called the Final Payment.

6. CONTRACT NOT TO BE ASSIGNED

The Contractor shall give his personal attention constantly to the faithful prosecution of the work. He shall not assign or otherwise dispose of the Contract, or his right, title or interest in or to the same or any part thereof.

7. MODIFICATION OF CONTRACT

No modification of or change in this Contract shall be valid or enforceable against either of the parties unless it is in writing and signed by the parties or their duly authorized representatives.

8. DEFAULT OF CONTRACT

When, in the opinion of the Engineer, the project or any part thereof has been abandoned, or the Contractor is willfully violating any of the covenants of this Contract, then the Engineer may declare the Contractor in default of the Contract and notify him to discontinue the project. The Engineer may then call on the Surety to complete the project.

9. TERMINATION

“CME” may terminate this “Agreement” for cause on one week’s written notice of default to “the Sub-consultant”. If the breach or default is capable of being cured within two weeks of receipt of the notice of default, “the Sub-consultant”, at “CME’s” discretion, shall be given up to two weeks to cure the default provided they make an immediate and substantive effort to cure the default. If the default, in “CME’s” view, will take longer than two weeks to cure or if the default places “CME” or “the Sub-consultant” in violation of the law or the “Contract” requirements, no opportunity to cure the default shall be required. Upon termination with cause, “the Sub-consultant” shall be due payment for the percentage of work completed by “the Sub-consultant” at the time the notice is given less the amount needed to cure the default. No other profit or compensation shall be due to “the Sub-consultant” for termination with cause.

10. COMMENCEMENT OF WORK

Subject to weather and/or safe navigation circumstances and/or delays receiving required permits, the Contractor agrees to mobilize and actually start work on the Contract within twenty-one (21) consecutive calendar days from the date of the written notice to proceed.

Failure to start the work within this timeframe will be considered a breach of this contract and may be cause for collection of the monies in the Performance and Payment bonds for completion of the work by others, unless the delayed start is authorized by the Engineer in writing.

11. PERFORMANCE CONTRACT BOND AND PAYMENT BOND

The successful Bidder, at the time of the execution of the contract, shall deposit with the Engineer, a surety company bond for the satisfactory completion of the work and a surety company bond for the payment of all debts pertaining to materials, rental of equipment, and labor used or employed in the execution of the Contract. These bonds shall each be in an amount equal to the amount of the contract award and in a form acceptable to the Engineer.

The Surety must be a corporate surety licensed to sign surety bonds in the State of Connecticut.

12. INSURANCE

The Bidder, to whom the Contract has been awarded, shall furnish to the Engineer, prior to the commencement of any work, satisfactory proof that all provisions, herewith specified, relating to the Contractor's insurance have been fully complied with.

13. WAIVER OF RESPONSIBILITY

It shall be understood that preliminary data obtained by subsurface explorations prior to this Contract and presented for examination by prospective bidders is not intended as a warranty of actual subsurface conditions to be encountered. The Engineer will bear no responsibility for the accuracy or suitability of subsurface information made available for examination and the conditions indicated by such information shall not be used by the Contractor as possible cause for subsequent revisions or waivers in the Contract.

14. NON-LIABILITY OF THE STATE AND ENGINEER'S REPRESENTATIVES

No agents or employees of the Engineer, the State of Connecticut, all officers, agents and servants of the State of Connecticut, Commissioner of Transportation and his successors, shall be charged personally by the Contractor with any liability or held liable to him, under any terms or provisions of this Contract or because of its execution or attempted execution, or because of any breach thereof.

15. CONTRACTOR'S WARRANTIES

The Contractor represents and warrants:

That he is financially solvent; that he is experienced in and competent to perform the type of work contemplated by this Contract. That he has carefully examined the specifications, plans, and the site of the work, the general and local conditions, and other matters which may in any way affect the work or its performance.

**STATE PROJECT NO. 63-723
RETAINING WALL REPLACEMENT EVALUATION
I-84 ON-RAMP RETAINING WALL AT 555 ASYLUM AVENUE
HARTFORD, CONNECTICUT**

IN WITNESS WHEREOF, the parties have caused these presents to be signed and sealed the day and year first above written.

Witness

_____	By _____
Witness Signature	Contractor Signature
_____	_____
Print Name and Title	Print Name and Title
_____	_____
Date	Date

Witness

_____	By _____
Witness Signature	Engineer Signature
_____	_____
Print Name and Title	Print Name and Title
_____	_____
Date	Date

SPECIFICATIONS FOR SUBSURFACE EXPLORATIONS

SECTION 1 – GENERAL CONDITIONS

1-1 Definitions

"Engineer" shall mean the firm of CME Associates, Inc., or their authorized representative.

"Commissioner of Transportation" shall mean the Commissioner of Transportation for the State of Connecticut, acting directly or through his duly authorized representative.

"Contractor" shall mean the person, persons, or corporation, which has executed the Contract with the Engineer for the proposed work.

"Inspector" shall mean the firm of Freeman Companies, LLC, the authorized representative of the Engineer assigned to the inspection of work and materials.

"State" and/or "Department" shall mean the State of Connecticut Department of Transportation

1-2 Authority and Duties of the Engineer

All work shall be performed to the satisfaction of the Engineer and at such times and places, by such methods and in such manner and sequence as he may require, and shall at all stages be subject to his inspection. Upon request of the Contractor, the Engineer will confirm in writing any oral order, direction or requirement.

1-3 Authority and Duties of the Inspector

The Inspector is the Engineer's representative in the field, responsible for oversight of the Contractor and ensuring that the work progresses in accordance with these Specifications. The Inspector has the authority to make decisions in the field regarding, but not limited to, boring locations and quantities of pay items. The Inspector will log the borehole and classify the soils.

1-4 Injury to Persons or Property

The Contractor shall be responsible for all injury to persons or damage to property, either directly or indirectly, that may result from his operations.

1-5 Insurance

With respect to the operations performed by the Contractor under the terms of this contract and also those performed for the Contractor by its subcontractors, the Contractor will be required to carry at its own cost and for the duration of this contract, and any supplements thereto, with the State of Connecticut, National Railroad Passenger Corporation (AMTRAK), Metro North Railroad (MNRR) (*when applicable on projects over/near Amtrak/MNRR*), CME Associates, Inc., and other 3rd Parties necessary for the successful completion of the work, being named as additional insured parties in conjunction with paragraph (A) and (B) below, the following minimum insurance coverages at no direct cost to the State or CME Associates, Inc. In the event the contractor secures excess/umbrella liability insurance to meet the minimum requirements specified in paragraphs (A) and/or (B) below, the State of Connecticut, City of Hartford, AMTRAK, MNRR, CME Associates, Inc., and other 3rd Parties necessary for successful completion of the work, shall be named as additional insured.

1-5a Insurance Provisions

The State of Connecticut, its officers, officials, employees, agents, Boards and Commissions, and CME Associates, Inc., Freeman Companies, LLC, and other 3rd Parties necessary for successful completion of the work, shall be named as additional insured. The coverage shall contain no special limitations on the scope of protection afforded to the State.

The Contractor shall assume any and all deductibles in the described insurance policies.

The Contractor's insurers shall have no right of recovery or subrogation against the State and the described insurance shall be primary coverage.

Any failure to comply with the claim reporting provisions of the policy shall not affect coverage provided to the State.

Each required insurance policy shall not be suspended, voided, cancelled or reduced except after 30 days prior written notice by certified mail has been given to the State.

"Claims Made" coverage is unacceptable, with the exception of Professional Liability.

The Contractor agrees that he/she will not use the defense of Governmental immunity in the adjustment of claims or in the defense of any suit, unless requested by the State.

A. COMMERCIAL GENERAL LIABILITY

The Contractor shall carry Commercial General Liability Insurance, including Contractual Liability Insurance, providing for a total limit of One Million Dollars (\$1,000,000) for all damages arising out of bodily injuries to or death of all persons in any one accident or occurrence, and for all damages arising out of injury to or destruction of property in any one accident or occurrence, and, subject to that limit per accident, a total (or aggregate) limit of Two Million Dollars (\$2,000,000) for all damages arising out of bodily injuries to or death of all persons in all accidents or occurrences and out of injury to or destruction of property during the policy period.

B. AUTOMOBILE LIABILITY

The operation of all motor vehicles, including those hired or borrowed, used in connection with the Agreement shall be covered by Automobile Liability Insurance providing for a total limit of One Million Dollars (\$1,000,000) for all damages arising out of bodily injuries to or death of all persons in any one accident or occurrence, and for all damages arising out of injury to or destruction of property in any one accident or occurrence. In cases where an insurance policy shows an aggregate limit as part of the automobile liability coverage, the aggregate limit must be at least Two Million Dollars (\$2,000,000).

C. RAILROAD PROTECTIVE LIABILITY (Not Applicable)

When the Agreement requires work on, over or under the right of way of any railroad company, the Contractor shall provide, with respect to the operations that it or its subcontractors perform under the Agreement, Railroad Protective Liability Insurance for and on behalf of the railroad company as named insured, and the State named as additional insured, providing for coverage limits of (1) not less than Two Million Dollars (\$2,000,000) for all damages arising out of any one accident or occurrence, in connection with bodily injury or death and/or injury to or destruction of property; and (2) subject to that limit per accident, a total (or aggregate) limit of Six Million Dollars (\$6,000,000) for all injuries to persons or property during the policy period. If such insurance is required, the Contractor shall obtain and submit the minimum coverage indicated above to the State prior to the commencement of rail related work and/or activities and shall maintain coverage until the work and/or activities is/are accepted by the State.

D. VALUABLE PAPERS AND RECORDS (When applicable)

The Contractor shall secure and maintain a Valuable Papers Insurance Policy at no direct cost to the State, until the complete design has been accepted by the State, and all original tracings, highway and bridge design computations, survey data, documents or data will have been returned to the State. This will assure the State that all records, papers, maps, statistics, survey notes, all tracings, highway and bridge design and other data or documents will be reestablished, recreated or restored if made unavailable by fire, theft, or any other cause. When survey data is furnished by the State it shall retain in its possession duplications of all survey plans and field notes. The Contractor shall retain in its possession duplications of all products of its work under this Agreement, if and when it is necessary for the originals to be removed from its possession during the time that this policy is in force. This policy shall provide coverage in the amount of Seventy-five Thousand Dollars (\$75,000) when the insured items are in its possession, and in the amount of Twenty Thousand Dollars (\$20,000) regardless of the physical location of the insured items.

E. WORKERS' COMPENSATION

With respect to all operations the Contractor performs and all those performed for the Contractor by subcontractors, the Contractor and subcontractor(s) shall carry Workers' Compensation Insurance and, as applicable, insurance required in accordance with the U.S. Longshore and Harbor Workers' Compensation Act, in accordance with the requirements of the laws of the State of Connecticut, and of the laws of the United States respectively.

Failure on the contractor to maintain insurance coverage in accordance with the terms of the agreement shall constitute a violation of the agreement and shall subject the Contractor to liquidated damages in the amount of ten percent (10%) of the total contract price, subject to the continued commercial availability of such insurance.

F. POLLUTION AND/OR ENVIRONMENTAL

The Contractor agrees to acquire and maintain pollution and environmental impairment coverage, if such insurance is applicable to the work performed by the Contractor under this agreement.

Failure of the Contractor to maintain insurance coverage in accordance with the terms of the agreement shall constitute a violation of the agreement and shall subject the Contractor to liquidated damages in the amount of ten percent (10%) of the total contract price, subject to the continued commercial availability of such insurance.

F. CERTIFICATE OF INSURANCE

In conjunction with the above, the Contractor agrees to furnish to the State a Certificate of Insurance on a form acceptable to the State, fully executed by an insurance company or companies satisfactory to the State, for the insurance policy or policies required hereinabove, which policy or policies shall be in accordance with the terms of said Certificate of Insurance.

In addition, the original Railroad Protective Liability Insurance Policy must be submitted to Amtrak prior to commencement of operations (not applicable).

The Contractor shall produce, within five (5) business days, a copy of copies of all applicable insurance policies when requested by the State. In providing said policies, the Contractor may redact provisions of the policy that are proprietary. This provision shall survive the suspension, expiration or termination of this agreement/contract.

G. PROTECTION AND INDEMNITY INSURANCE FOR MARINE OPERATIONS IN NAVIGABLE WATERS (Not applicable)

If a vessel of any nature or kind is involved, the Contractor shall obtain the following insurance coverage:

Protection and Indemnity Coverage of \$300,000 per vessel or a limit equal to the value of hull and machinery, whichever is greater.

If there is any limitation or exclusion with regard to crew or employees under the protection and indemnity form, there must be a worker's compensation policy in effect, including coverage for operations under admiralty jurisdiction with a limit of liability of \$300,000 per accident or to a limit equal to the hull and machinery, whichever is greater, or as otherwise required by statute.

H. CERTIFICATE OF INSURANCE

In conjunction with the above, the Contractor agrees to furnish to the State a Certificate of Insurance on a form acceptable to the State, fully executed by an insurance company or companies satisfactory to the State, for the insurance policy or policies required hereinabove, which policy or policies shall be in accordance with the terms of said Certificate of Insurance. In addition, the original Railroad Protective Liability Insurance Policy must be submitted to Amtrak prior to commencement of operations (not applicable).

The Contractor shall produce, within five (5) business days, a copy of copies of all applicable insurance policies when requested by the State. In providing said policies, the Contractor may redact provisions of the policy that are proprietary. This provision shall survive the suspension, expiration or termination of this agreement/contract.

1-5b – Additional Coverage

Other types of coverage may be offered by the Contractor.

(I) UMBRELLA LIABILITY:

In the event the Contractor secures excess/umbrella liability insurance to meet the minimum requirements specified in items A, B, C, D, E, F, G and H (when required), the State of Connecticut must be named as Additional Insured. The State of Connecticut must be the Named Insured if a separate umbrella policy is obtained to supplement the coverage specified for item A.

1-5c – Certificate of Insurance

The Contractor agrees to furnish to the Engineer a Certificate of Insurance in conjunction with Items A, B, C, D, E, F, G and H above, fully executed by an insurance company or companies satisfactory to the State, for the insurance policy or policies herein above, which policy or policies shall be in accordance with the terms of the Accord form. For the Workers' Compensation Insurance and, if applicable, the U.S. Longshoremen and Harbor Workers' Compensation Act coverage, the policy number (s) and term of the policy (ies) shall be indicated on the Certificate of Insurance. Each insurance policy shall state that the insurance company agrees to investigate and defend the insured against all claims for damage, even if groundless.

1-5d – Responsibility for Claims and Liability

- (a) The Contractor shall indemnify and hold harmless, National Railroad Passenger Corporation (AMTRAK), Metro North Railroad (MNRR) (*when project is over/near railroad*), CME Associates, Inc., Freeman Companies, LLC, and other 3rd Parties necessary for the successful completion of the work, the State and its officers, representatives, agents, servants, employees, successors and assigns from and against any and all (1) Claims arising directly or indirectly in connection with the Agreement, concerning the negligent acts of commission or omission (collectively, the "Acts") of the Contractor or Contractor Parties, and (2) liabilities, damages, losses, costs and expenses, including but not limited

to attorneys' and other professionals' fees, arising directly or indirectly in connection with Claims, Acts or the Agreement, to the extent of the Contractor's or Contractor Parties' negligence. The Contractor's obligations under this section to indemnify and hold harmless against Claims includes Claims concerning confidentiality of any part of or all of the Contractor's bid, proposal or any Records, any intellectual property rights, other proprietary rights of any person or entity, copyrighted or uncopyrighted compositions, secret processes, patented or unpatented inventions, article or appliances furnished or used in the performance.

- (b) The Contractor shall not be responsible for indemnifying or holding the State harmless from any liability arising due to the negligence of the State or any third party acting under the direct control or supervision of the State.
- (c) The Contractor shall reimburse the State for any and all damages to the real or personal property of the State caused by the Acts of the Contractor or any Contractor Parties. The State shall give the Contractor reasonable notice of any such Claims.
- (d) The Contractor's duties under this section shall remain fully in effect and binding in accordance with the terms and conditions of the Agreement, without being lessened or compromised in any way, even where the Contractor is alleged or is found to have merely contributed in part to the Acts giving rise to the Claims and/or where the State is alleged or is found to have contributed to the Acts giving rise to the Claims.
- (e) The Contractor shall carry and maintain at all times during the term of the Agreement, and during the time that any provisions survive the term of the Agreement, sufficient general liability insurance to satisfy its obligations under this Agreement. The Contractor shall name the State as an additional insured on the policy. The Department shall be entitled to recover under the insurance policy even if a body of competent jurisdiction determines that the Department or the State is contributorily negligent.
- (f) This section shall survive the termination of the Agreement and shall not be limited by reason of any insurance coverage. The Contractor shall not use the defense of Sovereign Immunity in the adjustment of claims or in the defense of any suit, including any suit between the State and the Contractor, unless requested to do so by the State. If this Agreement is between the State and a Municipality, the Municipality agrees that in the event of an adjustment of claims or in the defense of any suit between the State and the Municipality, the Municipality shall not use the defense of Governmental Immunity.

1-6 Laws To Be Enforced

The Contractor, at all times, shall observe and comply with all federal and state laws and local bylaws, ordinances, and regulations in any manner affecting the conduct of the work or applying to employees on the project, as well as all orders or decrees which have been promulgated or enacted, by any legal bodies or tribunals having authority or jurisdiction over the work, materials, employees for contract.

1-7 Right of Way and Damage to Property

The Contractor shall obtain all necessary permits and licenses at his own expense from the authorities having jurisdiction. – *When applicable*

The Contractor shall comply with all federal laws, state statutes and local ordinances of the city, town, or village in which the work is being done.

The Contractor shall be responsible for carrying out the work in accordance with the provisions of all permits. – *When applicable*

The Contractor may occupy during his operations only those portions of streets or public places at the boring locations for which the required permits have been obtained by him. – *When applicable*

If the Contractor desires to use additional areas outside of those required for the borings, he shall arrange for such areas at his own expense.

The Contractor shall take every precaution against injuring paving, utilities, or private properties and shall promptly repair at his own expense any damage to such paving, utilities, or private property, to the satisfaction of the Engineer. The requirement includes the filling of all drill holes and the re-sodding of any areas where the grass is damaged. Property, which is damaged as the result of the Contractor's operations, shall be repaired at the Contractor's expense, to the satisfaction of the Engineer.

The location of all stationary and mobile equipment shall be subject to the approval of the Engineer and upon the completion of the Contractor's operations at each site, he shall remove equipment therefrom and shall clear the area of all debris and restore it to the condition existing before the start of his operations. All casings shall be withdrawn from the drill holes.

The Contractor shall carry on his operations without interference or delay to traffic, including marine. He shall furnish all labor, material, watchmen, barricades, signs, and lights necessary to maintain traffic, to protect his work and the public during the operations, and to comply with all orders of the Engineer, of the Corps of Engineers, U. S. Army, and of the U. S. Coast Guard pertaining to navigation, and of all other agencies having jurisdiction. - *When applicable*

The Contractor is cautioned that there shall be no entry of his equipment or personnel upon private property until the Engineer first notifies him that such entry is permissible in accordance with state statutes and state policy and until he, the Contractor, then informs the property owner that entry is being made pursuant to said notification. He shall, at all times, carry out his operations so as to inconvenience no resident at or near the working area. The Contractor shall make clear to all his personnel, the importance of proper public relations. The Engineer will not condone any rude or inconsiderate treatment of any citizens of the State by personnel employed on this project. The Engineer reserves the right to require the removal from the work of any persons or persons employed by the Contractor who has violated this section of the specifications, and such person or persons shall not be employed again thereon without the written consent of the Engineer.

1-8 Cleaning Up and Restoration

After completing the work, the Contractor shall promptly remove all plant and other materials brought by him to the site and restore the site to its original condition.

Each borehole shall be restored to the condition that it was received in. This cost will be incidental to the work.

1-9 Progress and Time of Completion

Subject to weather and/or safe navigation circumstances and/or delays receiving required permits, the field work under this Contract shall be commenced within twenty-one (21) consecutive calendar days from the date of the written notice to proceed. Once the actual field work is started, subject to weather and/or safe navigation circumstances, it shall be prosecuted continuously to completion within five (5) business days.

If the quantities stated in the proposal are increased, as hereinafter provided, the number of calendar days allowed for completion will be similarly increased, if warranted. This increase will be in the same proportion as the increase in the total payments to the Contractor above the amount of the executed Contract.

Aside from weather and/or safety navigation delays, or other delays outside of the Contractor's control, In case the Contractor shall fail to complete the work hereunder in accordance with the Contract within forty-five (45) calendar days from written Notice to Proceed, he shall pay to the Engineer the sum of \$500 for each and every calendar day that the time consumed in said completion exceeds the above-mentioned time allowed for that purpose. This sum shall not be considered as a penalty, but as the liquidated damages that the CME Associates, Inc. will suffer by reason of said delay. The Engineer shall deduct the amount of such liquidated damages from the monies, which may be due or become due to the Contractor under this Contract.

1-10 Health and Safety Plan

The Contractor shall have a General Health and Safety Plan for the work to be performed and assumes full responsibility for site safety of the Contractor's personnel. The Department or Engineer may request a copy of the health and safety plan. The purpose of this requirement is to assure proper and safe conduct of drilling operations. Items to be covered in the General Health and Safety Plan include, but are not limited to general safety practices of drill rig movement and operation:

- Protective clothing and gear
- Buried and overhead utilities
- Working over water
- Traffic Safety
- First Aid
- Inclement weather policy

1-11 Railroad Safety Training (Not applicable)

The Contractor and his/her personnel involved in the work to be performed shall coordinate and complete all required railroad safety training as set forth by Railroad requirements and assumes full responsibility for Railroad Safety Training of the Contractor's personnel. The Engineer may request a copy of the certificate of training completion and/or copy of ID passes, if any, issued by the railroad.

1-12 Work Day

Typical allowable hours for operations in the river are 7:00 AM to 5:00 PM, Monday through Friday, may be assumed for completion of this work. However, the typical allowable work hours may vary by season. This includes the time to move the barge to and from where it is stored overnight to the work site and set up any devices needed for marine traffic control.

Typical allowable work hours for operations on paved surfaces of roadways are from 9:00 a.m. to 4:00 p.m. This includes the time to set up and remove sign patterns and any other devices needed for traffic control. The Order of Conditions of the project specific Encroachment Permit may shorten or lengthen the typical allowable hours. The Contractor is required to obtain an Encroachment Permit from the District before performing any work within the State ROW. The Contractor is required to obtain a Permit from the Town before performing any work within the Town ROW or easement.

This work will be on a congested area of I-84, working hours will be restricted, and nighttime working hours shall be expected. Actual working hours will be specified in the drillers Encroachment Permit, which the driller must obtain from the District prior to the start of work. No additional premium will be paid for work required outside of the normal daytime work hours nor will Standby Time be paid for restrictions within the normal daytime work hours. No work shall be performed by the Contractor without prior approval of the Engineer.

Typically, no work is allowed during inclement weather. Work on Interstate Highways and other Limited Access Expressways may have further restrictions, one of which may be, work requiring the closure of 2 or more lanes may need to be performed at night.

Work which can be performed from outside of the paved surfaces of roadways and which does not require any traffic control on the adjacent roadway is typically allowed from 7:30 a.m. to 5:00 p.m. However, the typical allowable work hours may vary by season.

The Contractor will not be permitted to work on the following Legal Holidays; New Year's Day, Washington's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, Martin Luther King Day, Lincoln's Birthday, Columbus Day, and Veteran's Day. Also, the Contractor will not be permitted to work on the day before and the day after any of the above Legal Holidays on Interstate Highways, Limited Access Expressways, or Railroads.

The Contractor may work on the above Legal Holidays if approved by the Department. No additional premium will be paid for work required outside of the normal work hours. No work of any kind shall be performed by the Contractor without prior approval of the Engineer.

Restrictions for work on the I-84 Eastbound On-Ramp expected to be included on the Contractor's Encroachment Permit include the following:

1. No work that will interfere with the flow of traffic will be permitted between 5:00 a.m. and 10:00 a.m. and between 3:00 p.m. and 7:00 p.m., for any work on the paved surface.
2. No work will be allowed during inclement weather or weekends.
3. Holiday Restrictions: No permit work within the highway right of way will be permitted the day before a legal holiday and no work shall be resumed until 12:00 noon the day following the holiday, unless otherwise approved or indicated. Weekends shall be considered as part of the holiday when the legal holiday falls on a Friday or Monday.

SECTION 2 – TECHNICAL PROVISIONS

SECTION 2 – TECHNICAL PROVISIONS

2-1 Scope of Work

The work to be done under this contract includes the furnishing of all material, labor, equipment, water supply and all else necessary for drilling and completing borings as described herein and shown on the Contract Plans.

The work is located on **Interstate I-84 Eastbound, just southwest of the I-84 Bridge over Asylum Avenue (Bridge No. 01765), adjacent to 555 Asylum Avenue, within the limits of State Project No. 63-723, Replacement of Retaining Wall at South End of Bridge No. 01765, in Hartford, Connecticut.**

2-2 Contract Plans

The work shall conform to drawings prepared by CME Associates, Inc., and titled as follows:

Drawing Set Title: Exploration Location Plan (attached)

2-3 Supervision

The work shall be performed under the supervision and direction of the Inspector. No subsurface explorations shall be made except in the presence of the Inspector. The Inspector will check the logs of the explorations to determine that the information designated herein is being obtained, and see that all samples are properly preserved, protected against damage, boxed and stored in a suitable place or immediately turned over to the Inspector as provided hereafter.

2-4 Existing Conditions

Before any subsurface exploration is performed, the Contractor shall contact “Call Before You Dig” at (860) 922-4455 to obtain a request number in accordance with State and Federal laws. The request number expires in 30 calendar days; therefore, the Contractor is responsible for maintaining an active request number. The Contractor will supply the Engineer with the request number(s) prior to the start of work. During the progress of the work, the Contractor shall cooperate with the owners of the utilities and permit their representative access to the work to determine if their utilities are being endangered in any way. Any relocation of borings or other subsurface explorations shall be done with the approval of the Inspector. In addition to contacting “Call Before You Dig”, the Contractor is required to notify Mr. Michael Salese at (860) 258-4627, of the State of Connecticut Department of Transportation, to locate all utilities on State-owned property.

2-5 Contractor's Plant and Equipment – *When applicable*

All plant, equipment, and methods to be used by the Contractor shall be subject to approval by the Engineer and Amtrak/MNRR (*when applicable for projects over railroads*) at all times during the work; however, approval of the equipment shall not be construed as including the approval of the performance thereof. Additional equipment and methods shall be provided when ordered by the Engineer if required to perform the work satisfactorily according to the Specifications. For work on water, the barge, boat, or other float shall be securely anchored.

If drilling equipment for track level work consists of hi-rail, truck mounted drilling equipment, only one track will be shut down at a time, as such the equipment must allow a train to pass on an adjacent track. All equipment used within the Amtrak/MNRR right-of-way must be pass inspection by the Railroad prior to mobilization to the site. Access for hi-rail equipment will be as directed by the railroad company.

The Contractor shall be required at all times when the work is in progress to have a minimum of **one** (1) drilling rig with a complete crew at the site and engaged in field operations. The Contractor shall submit in writing, upon request of the Engineer, a schedule of operations for the work. The Engineer shall be notified at least 48 hours in advance of deviations from the schedule and such deviations shall be subject to the approval of the Engineer.

2-6 Schedule of Operations

The Contractor shall submit in writing, upon request of the Engineer, a schedule of operations for the work. The Engineer shall be notified at least 48 hours in advance of deviations from the schedule and such deviations shall be subject to the approval of the Engineer.

2-7 Cooperation by Contractor

The Contractor shall at all times have on the site, as his agent, a competent superintendent or foreman thoroughly experienced in the type of work being performed, who shall receive instructions from the Inspector. The superintendent shall have full authority to execute the orders or directions of the Inspector, without delay, and to supply promptly such materials, equipment, tools, labor and incidentals as may be required.

2-8 Character of Workmen

The Contractor shall employ only superintendents, foremen, and workmen as are careful and competent, and the Engineer may demand the dismissal of any person or persons employed by the Contractor in or about the work who misconduct himself or be incompetent or negligent in the due and proper performance of his or their duties, or neglects or refuses to comply with the directions given, and such person or persons shall not be employed again thereon without the written consent of the Engineer. Should the Contractor continue to employ or again employ such person or persons, the Engineer may withhold all payments, which are due or become due, or the Engineer may suspend the work until such orders are complied with.

2-9 Line and Grade

Line and grade for the entire work will be established and laid out by the Engineer or Inspector. The Contractor shall execute the work to such line and grade.

2-10 Facilities to be Furnished by the Contractor – *When applicable*

If project involves work on water, the Contractor shall provide and set a water level gauge at his own expense as directed by the Engineer, the use of a boat or float, and boatmen, laborers and material to constitute a part of the usual equipment and crew on his contract, as may be required in supervising with work. The Contractor shall construct his own access roads or trails as required. The cost of all these items shall be included in the unit bid prices.

2-11 Borings – *When applicable*

- a. Type: Borings shall be as necessary to take split-barrel samples and stationary piston samples in soil, and rock cores in underlying bedrock or boulders as directed by the Inspector.
- b. Number and Location: The approximate number and location of the borings required are shown on the Exploration Location Plans. The Inspector will establish the exact locations of borings in the field.
- c. Depth: Borings shall, in all cases, be made to such depths as directed by the Inspector.

- d. Backfilling: Borings performed within the Railroad right-of-way shall be backfilled with cement grout to the bottom of the ballast. The grout to be used shall consist of a cement grout of approximately the following proportions: one hundred (100) pounds cement, forty (40) gallons water, and five (5) pounds bentonite. The water content may be adjusted to improve pumping ability of the grout upon approval of the Engineer. The ballast shall be backfilled with crushed stone.

2-12 Submittals – *When applicable*

Contractor shall prepare a written Work Plan and submit it with this Proposal, to include the following (at minimum):

- A. Craft: A listing of the proposed watercraft to be used in support of this operation, including size and any other pertinent information.
- B. Sampling: The mechanism proposed to obtain sediment samples as required herein. Include examples of prior use of proposed sampling technique in similar conditions.
- C. Location: Proposed methods for navigating to and obtaining as-drilled location information for the borings.
- D. Launch and Storage: Proposed launch and overnight storage provisions. Also, proposed work hours.
- E. Disposal: Proposed sample facility.
- F. Any requested deviations from the Technical Provisions, including rationale for request.

2-13 General Procedure

The sequence of borings and the type or types of samples to be taken at each hole shall be as directed by the Inspector. In general, borings will be as follows:

- a. Standard Penetration Test (SPT) and split-barrel sampling of soils will be taken in accordance with ASTM D 1586/AASHTO T 206 Standard Specification. Borings will be 3½" minimum diameter holes in which 1 1/2" I.D. split-barrel samples will be taken.
- b. Diamond core drilling for determination of depth to and soundness of bedrock will be in accordance with AASHTO T 225 Standard Specification, borings will be 3½" minimum diameter holes through which rock cores no less than 2¹/₈" can be recovered.
- c. Borings designated, as Soil Borings — Type A shall be cased holes performed in accordance with the requirements of these specifications for such work.

For Soil Borings — Type B, the Contractor, at his option, may employ drilling methods involving uncased holes or use of hollow-stem augers or use of the methods required for Soil Borings — Type A or any combination of these methods, provided he can also perform split-barrel sampling and rock coring as required in the bore hole.

In boring methods using a heavy drilling fluid, the casing shall be driven to such depth below ground surface as required to maintain the top of bore holes. Thereafter, heavy drilling fluid may be used to maintain the holes. At the completion of such holes, the heavy drilling fluid shall be recovered by flushing or bailing in order that the true water level may be accurately determined.

Hollow-stem auger borings, which fail to penetrate to the specified depth, shall be continued by other methods, which may include use of the case methods described herein.

- d. No soil samples shall be obtained by driving and removing casing.

2-14 Decontamination

Prior to arrival at the boring site, all drilling equipment (watercraft, rig, appurtenant equipment, samplers etc.) brought on-site by the Contractor shall be clean and in good working order.

Prior to each sample collection, all equipment that contacts soils directly or indirectly shall be decontaminated by Hand Washing with Detergent (i.e. Alconox® or equivalent). The following procedures shall be used during decontamination activities:

1. Use appropriate Personal Protective Equipment (PPE) (i.e., gloves, glasses, coveralls, etc.).
2. Triple rinse with deionized water being careful to collect rinsate.
3. Using appropriate brush and detergent (i.e., Alconox), scrub equipment until contaminants have been broken down.
4. Triple rinse again with deionized water and inspect equipment. Repeat this process as many times as necessary until equipment is visually clean.
5. Allow to air dry or wipe dry with a clean cloth or paper towel.
6. Load pre-cleaned tubes or liners into the sampler.
7. Properly dispose of all rinsate water. Wash or appropriately discard any contaminated PPE.
8. Properly dispose of expendable items that cannot be decontaminated & other waste.

As such, the following equipment shall be available for de-contamination activities:

- a) Equipment
 - (i) Laboratory grade biodegradable detergent.
 - (ii) Clean, fresh water from a potable supply source.
 - (iii) New brushes for scrubbing equipment
 - (iv) Saw horse, rack or stands.
 - (v) Deionized water to rinse sampler, and other equipment coming into contact with soil (as applicable).
- b) Portable Decontamination Station.
 - (i) Polyethylene sheeting, 6 mil thickness.
 - (ii) Station containment frame.

Although the sample may be disturbed by the mechanics of drilling, sampling, and handling, the Contractor must not introduce unnecessary foreign substances into the borehole or sample and must make every effort to preserve the integrity of all chemicals of interest in their in-situ concentrations.

2-15 Casing - *When applicable*

a. Sinking: Casing shall be driven vertically through earth or other materials to such depth below the surface of the ground as required to maintain the sides of bore holes or as directed by the Engineer. The blows per foot required for the penetration of the casing shall be recorded and included in the Contractor's drill record. Simultaneous washing and driving of the casing will not be permitted, except by order of the Engineer, and where so permitted, the elevations between where water was used in driving the casing must be recorded.

It is the Contractor's responsibility when boulders or other obstacles are encountered to carry the drilling through or past such obstacles.

b. Size: Casing will be flush-joint and at least 2½" nominal inside diameter for boring in which 1 ½" samplers are used and 3½" nominal inside diameter pipe where 3" samplers are used.

The casing shall also be 3½" minimum nominal diameter for borings in which rock cores are taken.

- c. Weight of Hammer for Casing: The weight of hammer for driving the casing shall be 300 pounds and the drop shall be 24".
- d. Removal: The casing shall be removed on completion of the work and it shall remain the property of the Contractor. However, no casing shall be removed until measurements of the water level have been made and the Engineer has approved such removal. In addition, water level measurements shall be made at 24 hours and 48 hours after the casing has been removed, provided the hole has not collapsed and if it is safe to do so. Boreholes shall not be backfilled until the final water level measurement has been made. Casing may be removed upon completion of borings at which the Inspector directs that Observation Wells be installed.

2-16 Rock Coring—NX- When applicable

Wherever rock is encountered, the Contractor will take continuous core samples to a depth directed by the Inspector by means of a rotary method and diamond bit of such size as will yield cores no less than 2 1/8" diameter (NX), the size to be directed by the Inspector.

The diamond core bit shall be started in the hole and the rock shall be drilled until the required depth is reached. When the core is broken off, it shall be withdrawn, labeled and stored before the drilling is continued. The holes shall be carried into the rock to a depth sufficient to permit the Engineer to determine to his satisfaction the character of the rock penetrated. In general, it is expected that the depth of the core holes in rock will be 5 to 10 feet, but it may be required in some cases to penetrate the rock as much as 30 feet, or as directed by the Inspector. The maximum length of each coring run will be 5 feet. However, the Inspector reserves the right to reduce the length of the core run as necessary to effect maximum recovery.

Cores must be carefully handled to insure their proper identification and placed in the order in which they are removed from the hole, and care shall be taken to recover as large a percentage of cores as possible. The Contractor will regulate the speed of the drill and remove the core as often as necessary to insure the maximum percentage of recovery. The drilling time for each successive foot of rock drilling shall be recorded.

Should the recovered length of core be less than 50 percent of the depth cored for any run, the Contractor will adopt such measures as may be necessary to improve the percentage of recovery. These measures may include, but shall not be limited to, changes in type of diamond bit, feed rate, speed of rotation, volume of circulation, use of Series "M" core barrel, length of run per removal, and change in machine operator. In those cases where, in the opinion of the Inspector, the competency, structure, and condition of the rock are critical to the design, the Inspector reserves the right to direct that the Series "M" core barrel be used.

2-17 Abandoned Boring Holes

Should the casing or apparatus be removed from a borehole, or should the hole be abandoned without the permission of the Inspector, or should a boring be started and for any reason not be carried to the depth required by the Inspector, or should the Contractor fail to keep complete records of materials encountered, or to furnish the Inspector the required samples and cores, then the Contractor will make an additional boring at a location selected by the Inspector, and no payment will be made for either the abandoned hole or any samples or cores obtained therein. However, the Contractor will make a record of abandoned bore holes and note thereon the reasons for the abandonment.

2-18 Boring Hole Patching

Each boring hole shall be patched in accordance with the requirements of the Encroachment Permit. At the discretion of the CTDOT District that issues the Encroachment Permit or the Town, all boring holes will require either hot-mix or cold-mix patching.

Hot-Mix Patching

The Encroachment Permit, obtained for the project may require that all boring holes be patched in kind with hot-mix bituminous concrete, of the same depth as the adjacent pavement. The mix shall have an aggregate size and asphalt content similar to the ConnDOT HMA S0.5 mix or as required by the Encroachment Permit. The pavement within the boring hole will be compacted in 3 inch lifts by repeated tamping with a 3.5 inch diameter implement and substantial force. The final lift will be placed to approximately ½ inch above the adjacent pavement but shall not be thicker than 3 inches total. The final lift shall be compacted by repeated tamping with an implement which includes a flat plate, with a minimum dimension of 8 inches in any direction, and with substantial force in order to compact the top of the patching material to approximately flush with the adjacent pavement surface.

The Contractor shall make certain that hot-mix bituminous concrete is available at the time of year for which the work is to be completed.

Cold-Mix Patching

The Encroachment Permit, obtained for the project may allow for all boring holes to be patched using a high-performance cold-mix compound such as Aquaphalt®, or approved equal, of the same depth as the adjacent pavement. The cold-mix compound shall be applied per the Manufacturer recommendations and shall have the top of the patch approximately flush with the adjacent pavement surface.

2-19 Sample Storage and Disposal – *When applicable*

- a. Sediment samples: Following approval, preparation, and classification of each sediment sample by Inspector, Contractor shall discard un-used portion into a properly labeled 55-gallon drum suitable for this purpose. The watercraft used shall have sufficient onboard storage to temporarily store the discarded sediments prior to offloading and disposal.

Contractor is responsible for offloading, storing (temporarily), and disposal of recovered, un-used sediment samples in accordance with all pertinent regulations. All costs associated with sample storage and disposal shall be included in the unit price bid. Contractor shall assume for bid that analytical testing to be conducted by Engineer is suitable for disposal characterization. Any additional costs required for sample characterization shall be submitted to Engineer for pre-approval, then reimbursed to Contractor without markup.

2-20 Preserving Samples – *When applicable*

- a. Split-Barrel Samples: Representative specimens of each sample will be preserved. The containers for preserving drive samples shall be large-mouth, round, screw top, air tight, clear glass jars. Size of jars shall be 16 oz. for all drive samples. The specimens will be placed in the jars and tightly capped with gasket sealed caps as soon as taken in order to preserve the original moisture in the material. Samples which retain form upon removal from the sampling spoon shall not be jammed or forced into the jar. The jars shall be suitably boxed in cardboard boxes, marked and identified with legible labels as directed by the Inspector. These labels shall show the date, town, project name, road name, project number, station and offset, boring number, sample number, depth at which the sample was taken, the drillers' names, number of

blows for each 6" of penetration and soil classification of the sample. The samples shall be protected against freezing and the jars against breaking.

- b. **Rock Cores:** The rock cores shall be placed in new wooden boxes so partitioned that the cores from each boring will be kept separate, and the cores shall be properly placed in the order in which they were removed from the core barrel and to show where portions, if any, were lost.

Rock cores shall be suitably labeled and arranged neatly in the boxes in the sequence in which the material was removed from the hole. Adjacent runs shall be separated by means of wood blocks, on which the elevation of the top and bottom of the run shall be clearly, accurately, and permanently marked.

The core boxes shall have a cover hinged at one edge and latched at the other edge and shall be substantially made to withstand normal abuse in shipment. The boxes shall be properly labeled, showing the date the core was taken, town, project name, road name, project number, station and offset, boring number, depth of core and drillers names.

Core boxes shall be substantially constructed of dressed lumber, about five (5) feet in length, and with a capacity for about twenty (20) feet of cores in each box. Core boxes shall be completely equipped with all necessary partitions, covers, hinges, latches for holding down the cover, and suitable identification plates and tags.

All split barrel and rock core samples shall be delivered by the Contractor to Freeman Companies, LLC, 36 John Street, Hartford, CT, 06106, or where requested by the Engineer.

2-21 Test Pits Including Soil Samples- *When applicable*

Test pits shall be dug at locations as directed by the Engineer. Test pits shall be dug to minimum depth of 10 feet. Test pits shall be properly sheeted to protect the workers and shall be large enough to allow easy inspection of soil conditions and procurement of soil samples, if necessary. A detailed log of soil and water conditions shall be made for each test pit, including the elevation of the top and bottom of each pit and the elevation at each change of material therein. This item shall include the procurement of samples, which shall be preserved and submitted as directed.

When the test pit is approved and accepted by the Engineer and the necessary samples taken, it shall be backfilled.

2-22 Cone penetration Test- *When applicable*

Cone Penetration Tests (CPT) shall be conducted in accordance with ASTM D 5778. The CPT tests shall consist of the hydraulic push of an instrumented steel probe at a constant rate to obtain continuous vertical profiles of stress, pressures, and other measurements. No borehole cuttings or spoil shall be produced by this test. The CPT shall be conducted with a piezocone that measures porewater pressure. Each CPT shall include a minimum of three (3) pore pressure dissipation tests within the soft varied clay at approximately ten (10) foot intervals, with the first dissipation test conducted after the CPT has penetrated into the soft varied clay, as determined by the Engineer's Representative. Each CPT shall penetrate through fill, alluvial deposits, varied clay soils, and other materials, and terminate at refusal within dense glacial till or on bedrock.

A calibration certificate shall be provided in advance of CPT testing that shows the CPT equipment to be used has been calibrated within the past year. Upon completion of CPT testing, a report shall be prepared for each CPT that shows a graph of tip resistance, sleeve friction, pore pressure, and friction ratio, and

results of dissipation tests (ASTM D 5778, Section 14.4, Figure 5). Reports shall include units of feet, tons/ft², and percent.

2-23 Power Drill Soundings- *When applicable*

Power drill soundings shall be taken to determine the elevations of the abutment or bedrock surface in specified areas. All power drill soundings shall be performed with rotary solid-stem auger and/or percussion drilling equipment using drill rod and non-coring type bits. Equipment shall be heavy drilling machine type. This equipment shall be capable of drilling an uncased hole through overburden materials to bedrock. Holes shall be advanced until drilling resistance and/or cuttings indicate that the concrete abutment or bedrock has been encountered. If boulders or other obstacles are encountered, the Contractor shall make all reasonable efforts to drill past such obstacles. If the sounding must be abandoned before adequate information is obtained, another sounding shall be made nearby where directed by the Engineer.

Power drill soundings shall be made where, and to such depths, as shown on the plans or as directed by the Engineer. A careful log shall be made for each sounding, with elevations noted for ground surface at the sounding location and for the bottom of the sounding. Samples will not be required.

2-24 Standby Time

Certain projects may require the Contractor to curtail operations during the work day due to restricted working hours imposed by ConnDOT or the City/Town or for other reasons such as: traffic control (including air and rail traffic), unexpected weather conditions, or other conditions. When the work is on site of an active construction project, there may be instances that periodically require that the Contractor temporarily stop the boring operations. When a stoppage of work occurs for any reason, it will be determined by the Engineer as to whether or not it qualifies as Standby Time.

Standby Time will not be paid when a full scheduled work day cannot be performed due to predicted adverse weather conditions, lack of qualified laborers/operators or equipment breakdown.

Should the State or Engineer deem the equipment or workers to be unsafe, no Standby Time will be paid for the Contractor to furnish replacement workers or equipment.

Standby Time will not be paid to assemble or remove a traffic control pattern.

If more than one (1) drill rig is being used on a project this item will be paid per hour per drill rig when applicable, as determined by the Engineer.

If Traffic Control services, consisting of State Troopers or Local Police, have been scheduled and confirmed with the entity on a particular work day and a Trooper or Police Officer does not show up on site, Standby Time will only be paid from the time that the Contractor normally begins work on site to the time that the Contractor leaves the site, as directed by the Inspector. If Flagmen services have been scheduled and confirmed with the Railroad on a particular work day and the Flagmen do not show up on site, Standby Time will only be paid from the time that the Contractor normally begins work on site to the time that the Contractor leaves the site, as directed by the Inspector.

2-25 Traffic persons- *When applicable*

The Contractor shall provide the services of Traffic persons of the type and number, and for such periods, for the control and direction of vehicular traffic and pedestrians in accordance with the State of Connecticut DOT Traffic Control Manual. Railroad Flagmen are not considered to be Traffic persons.

The Contractor shall inform the Engineer of his scheduled operations and the number and type of Traffic persons requested and/or required by permit.

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

Traffic persons shall consist of the following types:

State Police Officers: State Police Officers shall be uniformed off-duty sworn Connecticut State Police Officers. Their services will also include the use of Official State Police vehicles and associated equipment.

State Police Officers will be used on all limited access highways. State Police Officers will not be used on non-limited access highways. State Police Officers with Official State Police vehicles will be used at such locations and for such periods necessary to control traffic operations and promote increased safety to motorists through the construction sites. On limited access highways, State Police Traffic persons will be utilized for regional work zone traffic safety and enforcement operations in addition to project-related work zone assignments.

Uniformed 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. Uniformed Municipal Police Officers will be used on all non-limited access highways. If the Town where work is being performed does not have a municipal police force, then State Police Officers will be used on non-limited access State Highways and in some cases on local roads as determined by the Town's traffic authority.

Uniformed Municipal Police Officers and requested Municipal Police vehicles will be used at such locations and for such periods deemed necessary to control traffic operations and promote increased safety to motorists through the work site.

Uniformed Flaggers: Uniformed Flaggers shall be persons who have successfully completed flagger training by the American Traffic Safety Services Association, National Safety Council or other programs. Services of Uniformed Flaggers shall include the following equipment: garments (including high visibility headgear) so as to be readily distinguishable as a Flagger in accordance with Standard 6E-3 of the MUTCD, and these specifications, and a STOP/SLOW paddle that is at least 18 inches in width and with letters at least 6 inches high, mounted on a handle of sufficient length so that the bottom of the sign will be 6 feet above the ground, and conforms to Standard 6E-4 of the MUTCD and catalog number 387-80-9950 of the Catalog of Signs Connecticut DOT.

Uniformed Flaggers will only be used on non-limited access highways when authorized by the Traffic Control Manual. Uniformed Flaggers will be used at such locations and for such periods necessary to control traffic operations.

Any work on Railroad property shall require the use of Railroad Flaggers and be governed by the flagging regulations as described in the Railroad Company's "Permit To Enter Upon Railroad Property".

General: Uniformed Law Enforcement Personnel being used as Traffic persons may conduct motor vehicle enforcement operations in and around work areas.

Traffic persons shall wear a high visibility safety garment that complies with OSHA, MUTCD, ASTM Standards and the following:

Uniformed Law Enforcement Personnel shall wear the high visibility safety garment provide 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 below for the Uniformed Flaggers' garment.

Uniformed Flagger – The base material for the safety garment shall be a fluorescent color of orange, yellow, or strong yellow-green. The garment shall have vertical and horizontal stripe markings of contrasting color to the base material to enhance noticeability of the wearer. These markings shall be made of retroreflective or combination of retroreflective and non-retroreflective materials. The retroreflective material shall be orange, yellow, white, silver, strong yellow-green, or a fluorescent version of one of these colors and shall have a minimum width of 5/8". A minimum area of 40 square inches of retroreflective material must be visible when the garment is viewed from either the front or back and a minimum of 12 square inches of retroreflective material must be visible from any other normal observation angle. The safety garment shall have the words "Traffic Control" clearly visible on the front and rear panels (minimum letter size 2 inches).

Worn/faded safety garments that are no longer highly visible shall not be used. The Inspector shall direct the replacement of any worn/faded garment at no additional cost to the State.

A Traffic person 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 Traffic persons to operate in a manner contrary to the Maintenance and Protection of Traffic Specification shall be authorized in writing by the Engineer.

Prior to the start of operations on the project requiring the use of Traffic persons, a meeting will be held with the Contractor, Traffic person agency, and Inspector to review the Traffic person operations, lines of responsibility, and operating guidelines which will be used on the project.

In the event of an unplanned, emergency, or short-term operation, the Inspector may approve the use of properly clothed, non-certified Traffic persons until such time as a certified Traffic person may be obtained. In no case shall this temporary use exceed 8 hours for any particular operation.

2-26 Traffic Control Equipment– *When applicable*

When the Contractor's operations obtrude onto any part of the roadway, the Contractor is to adhere to the requirements of the Department's publication "Traffic Control During Maintenance Operation" latest edition (revised 2013 included in attachments). The requirements of this publication generally include the furnishing and use of traffic control equipment such as; signs, cones, barrels and sometimes crash trucks.

2-27 Mobilization and Demobilization – Land

Land – *When applicable*

This item shall include the initial mobilization of the drill rig at the project site and the final demobilization after all borings are complete. The Contractor is required to furnish the drill rig and tools, in good condition and all other equipment necessary to carry on and complete the work properly. The Contractor may be required to mobilize and dismantle his equipment at existing highway structures, highway embankments, highway rights of way, off the traveled way, wooded areas and other difficult sites. The Contractor shall have the necessary equipment and personnel to assemble his drilling equipment at the desired locations.

The backfilling and casing, work hours, permits or any other requirements made by the City/Town or other public transportation authority shall be complied with by the Contractor and any costs shall be considered as part on the unit price of Mobilization and Demobilization – Land and no additional compensation will be allowed. No additional compensation will be made to the Contractor for preparation of the entry permit.

This item shall include full compensation for all traffic control devices, cones, signs, light plants, Traffic Attenuation Vehicle, etc. when provided by the Contractor. When the Contractor's operations obtrude onto any part of a roadway, the Contractor is to adhere to the Department's publication "Traffic Control During Maintenance Operation" latest edition.

All material or equipment furnished under this item shall remain the property of the Contractor and shall be maintained and disposed of by him. This item shall carry all charges incident to such plant setup and removal, in order that the charges need not be distributed among the more variable items of the contract.

Railroad (*applies to any explorations located within the Railroad right-of-way, or impacting the right-of-way during mobilization, possibly including borings S2-2, S2-3, and others*).

This item shall include the initial mobilization of the drill rig at the project site and the final demobilization after all borings are complete. The Contractor is required to furnish the drill rig and tools, in good condition and all other equipment necessary to carry on and complete the work properly. The Contractor may be required to mobilize and dismantle his equipment at existing railroad structures, railroad embankments, railroad rights-of-way, and other areas under railroad ownership. The Contractor shall have the necessary equipment and personnel to assemble his drilling equipment at the desired locations. The Contractor will be required to prepare and submit for approval, a Work Plan detailing how the subsurface exploration work will be performed prior to mobilization to the site. This work plan shall include equipment cut sheets, mounting details, manner of work, location or equipment, etc.

The backfilling and casing, work hours or any other requirements made by a railroad or public transportation authority for entering on their property shall be complied with by the Contractor and any costs shall be considered as part on the unit price of Mobilization and Demobilization-Railroad and no additional compensation will be allowed.

The Engineer will prepare and obtain an Entry Permit from the railroad or public transportation authority and, provided that insurance requirements have been met, grant permission to the Contractor, acting as the Engineer's Contractor, to enter the Rail Line Property to perform said work. A copy of the Railroad's Permit to Enter Upon Property shall be provided to the Contractor after selection. All the requirements, terms, and conditions outlined within the Railroad's Permit to Enter Upon Property are hereby incorporated into this Contract Agreement for Subsurface Explorations. The Contractor by submitting a bid for this project, assumes full responsibility to assure all his/her personnel involved in the work, including him/herself and anyone under the direction of the Contractor, will read the Entry Permit in its entirety before entering railroad property, and abide by the rules and regulation set forth in the Railroad's Permit to Enter Upon Property. The cost of the entry permit required by the railroad or public transportation authority will be borne by the Engineer. No compensation will be made to the Contractor for preparation or coordination of the Entry Permit. Should Railroad Flagmen and/or Groundmen be required, the Engineer will establish a Force Account with the railroad for their payment.

This item shall include full compensation for all traffic control devices, cones, signs, light plants, etc. when provided by the Contractor. When the Contractor's operations or means to access the railroad

ROW obtrude onto any part of a roadway, the Contractor is to adhere to the Department's publication "Traffic Control During Maintenance Operation" latest edition.

All material or equipment furnished under this item shall remain the property of the Contractor and shall be maintained and disposed of by him. This item shall carry all charges incident to such plant setup and removal, in order that the charges need not be distributed among the more variable items of the contract.

Water – *When applicable*

This item shall include the initial mobilization of the drill rig at the project site, the launching, positioning and moving of rafts and other equipment necessary for making borings over water and the final demobilization after all borings are complete. The contractor is required to furnish the drill rig and tools, in good condition and all other equipment necessary to carry on and complete the work properly. The Contractor shall have the necessary equipment and personnel to assemble his drilling equipment at the desired locations.

This item shall include full compensation for all traffic control devices, cones, signs, light plants, etc. when provided by the Contractor. When the Contractor's operations or means to access the water obtrude onto any part of a roadway, the Contractor is to adhere to the Department's publication "Traffic Control During Maintenance Operation" latest edition.

All material or equipment furnished under this item shall remain the property of the Contractor and shall be maintained and disposed of by him. This item shall carry all charges incident to such plant setup and removal, in order that the charges need not be distributed among the more variable items of the contract.

CPT – *When applicable*

This item shall include the initial mobilization of the testing rig at the project site and the final demobilization after all testing is complete. The Contractor is required to furnish the testing rig and tools, in good condition and all other equipment necessary to carry on and complete the work properly. The Contractor may be required to mobilize and dismantle his equipment at existing highway structures, highway embankments, highway rights of way, off the traveled way, wooded areas and other difficult sites. The Contractor shall have the necessary equipment and personnel to assemble his testing equipment at the desired locations.

The work hours, permits or any other requirements made by the Town of Hartford or other public transportation authority shall be complied with by the Contractor and any costs shall be considered as part on the unit price of Mobilization and Demobilization – CPT and no additional compensation will be allowed. No additional compensation will be made to the Contractor for preparing the application for and acquiring the entry permit and its associated fee.

This item shall also include full compensation for Traffic persons when they are employees of the Contractor and all Traffic Control Equipment (such as; traffic control devices, cones, signs, light plants, Traffic Attenuation Vehicle, etc.) when owned, provided and used by the Contractor.

All material or equipment furnished under this item shall remain the property of the Contractor and shall be maintained and disposed of by him. This item shall carry all charges incident to such plant setup and removal, in order that the charges need not be distributed among the more variable items of the contract.

2-28 Records

The Contractor shall keep complete, neat, accurate and legible daily reports. The records shall be made at the site as the work progresses and shall be furnished to the Inspector at the completion of each day. The records shall contain the following information:

General

- Name of Inspector, Contractor and Lead Driller
- Date of start and date of finish.
- Town, State Project Number, Route Number/Name, and Bridge Number when applicable
- Boring Number
- Quantities completed for each pay Item
- Field Receipts for Direct Costs

Soil Borings

- Size & type of any Casing, Sampler, and Core Barrel used
- Type of hammer used to drive sampler and casing (drop, safety, or automatic); include hammer weight and drop height
- Depth of observed ground water, elapsed time of observation after completion of drilling; a water observation must be made in the borehole prior to backfilling
- Type and Number of each sample taken (All samples shall be numbered consecutively); include sample depth from ground surface
- Number of blows required for each 6-inch penetration of split-barrel sampler and for each 12-inch penetration of casing
- Total depth penetrated by split-barrel sampler and the measured length of sample recovered from the sampler
- Material Description of samples (as shown in sample log)
- End of boring depth
- Notes regarding any other pertinent information and remarks on miscellaneous conditions encountered such as: artesian conditions, loss of wash water, obstructions encountered, odors of recovered samples

Rock Cores

- Type and size of core barrel and bit type (diamond/carbide)
- Length of core recovered for each length drilled, including number of pieces
- Depth at which rock was encountered
- Depth at each change in rock type
- End of boring depth
- Time required to core each foot
- Description of rock in accordance with the following classifications:
 - Kind:** shale, slate, limestone, sandstone, etc.
 - Condition:** broken, fissured, disintegrated, laminated, solid, etc.
 - Hardness:** Soft, medium, hard, and very hard

Test Pits:

- Full information in tabular form on the vertical arrangement, thickness and classification of the materials encountered
- Depths of bottom, type and number of each sample taken. All samples shall be numbered consecutively

- Depth of water level, if encountered, at time of excavation.

2-29 Submission of Reports and Samples

A copy of the Contractor's daily reports shall be given to the Inspector daily. The Contractor shall provide typed boring logs of all subsurface explorations, referenced to ground surface with stratum classified as described above, together with all notes, remarks and pertinent information required by this Specification. The logs shall be submitted no later than five (5) days after the completion of the subsurface exploration program. The typed logs shall be mailed to the address provided by the Consultant.

The Contractor shall maintain possession of soil and rock samples until the job is completed, unless otherwise directed by the Inspector. Borings for which soil and rock samples are not turned over by the Contractor to the Inspector will be considered as not drilled and no payment will be made by the Engineer for those borings.

All split barrel and rock core samples shall be delivered by the Contractor to Freeman Companies, LLC, 36 John Street, Hartford, CT, 06106, or where requested by the Engineer.

2-30 Measurement and Payment

a. General

The contract items include all services, labor, equipment, transportation, material and supplies for the complete work. Payment for these items shall include compensation for obtaining, packing, marking and submitting samples and recording and submitting data incidental to each item. No other payments for any specified or indicated work, nor for any work implied therefrom, shall be made. Payment will not be made for boreholes, bar soundings, pipe probing's or other subsurface explorations abandoned without authorization of the Inspector, or for such holes for which satisfactory samples and data are not submitted. The quantities stated in the proposal are approximate only and are for the specific purpose of comparing bids. The Engineer does not guarantee that these items or quantities will be performed. The Engineer and Inspector reserve the right to vary the quantities or delete items in their entirety, and the Contractor shall not be entitled to any extra payment due to such amended quantities or deleted items.

b. Soil Borings

This work will be measured for payment by the actual number of vertical linear feet bored for each accepted hole between the ground surface at the hole and the bottom of the accepted bore hole. This measurement shall include the portion(s) of the hole in boulder(s) less than two (2) feet in thickness, if any, but shall not include the portion of the hole in bedrock, if any.

c. Split-Barrel Samples

1. The amounts to be included under the respective items for split-barrel samples of the size specified shall be the number of completed samples actually taken and accepted.
2. This work will be paid for at the contract unit price each for "Split-Barrel Samples" of the size specified, which price shall include compensation for all work incidental to the samples and not covered under other contract items.

d. Rock Coring

1. This work will be measured for payment by the actual number of vertical linear feet of acceptably drilled hole in bedrock and in individual boulders two (2) feet or more in thickness.

2. This work will be paid for at the contract unit prices per linear foot for "Rock Coring—NX".

e. Test Pits

1. This work will be measured for payment by each accepted test pit.
2. This work will be paid for at the contract unit price each for "Test Pits, Including Soil Samples". This unit price shall also include the cost of obtaining satisfactory samples and all other work incidental thereto.

f. Boring Hole Patching

1. This work will be measured for payment by the total number of Each accepted boring hole, that is suitably patched with either compacted hot-mix bituminous material or cold-mix compound, as required by the Encroachment Permit.
2. This work will be paid for at the contract unit price per Each for "Boring Hole Patching" of the required material type, which price shall include compensation for all work incidental to the patching and not covered under other contract items.
3. If one type of patching material is not used, the quantity will be recorded as zero and no payment will be made for that item, nor will the Contractor be compensated for any effort required to determine the bid price not loss of profit.

g. Standby Time

1. The item Standby Time will be measured for payment by the actual number of hours each drill rig or testing rig is required by the Engineer to Standby. Standby Time will be measured to the nearest quarter of an hour interval.
2. The item will be paid at the contract unit price per Hour for "Standby Time."

h. Mobilization and Demobilization—Land

1. Method of Measurement: This item, being paid for as a Lump Sum, will not be measured for payment. This item will be due for payment at the time of final payment after removal of all materials and equipment from the project.
2. Basis for Payment: This work will be paid for at the contract Lump Sum price for "Mobilization and Demobilization—Land." This item will include full compensation for all traffic control patterns, cones, light plants, and all other materials, equipment, tools, labor and work incidental thereto that were provided and used by the Contractor.

i. Traffic persons

1. Only Traffic person services in accordance with the State of Connecticut DOT Traffic Control Manual will be measured for payment. Services of Traffic persons will be measured for payment by the actual number of hours for each person rendering services in accordance with these specifications. Services of Traffic persons utilized by the Contractor not necessary for the proper completion of the project or at locations where traffic is unnecessarily restricted by the Contractor's method of operation, will not be measured for payment.

The minimum hours of payment for each Traffic person supplied by a law enforcement agency or Traffic person subcontractor in any one day shall be four hours. No Uniformed Traffic

person shall work more than twelve hours in any one-day. In case such services are required for more than twelve hours, the Contractor may request additional Traffic persons. In cases where the Traffic person is an employee on the Contractor's payroll, payment for the Traffic person will be made only for those hours when the Contractor's employee is performing Traffic person duties.

Travel time charged by State Police Officers, up to one hour per day, will be measured for payment. No travel time will be allowed or paid for Uniformed Municipal Police Officers or Uniformed Flaggers. Safety garments and STOP/SLOW paddles will not be measured for payment.

2. 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 figure will be disregarded and the original price will be used to determine the total amount for the contract.

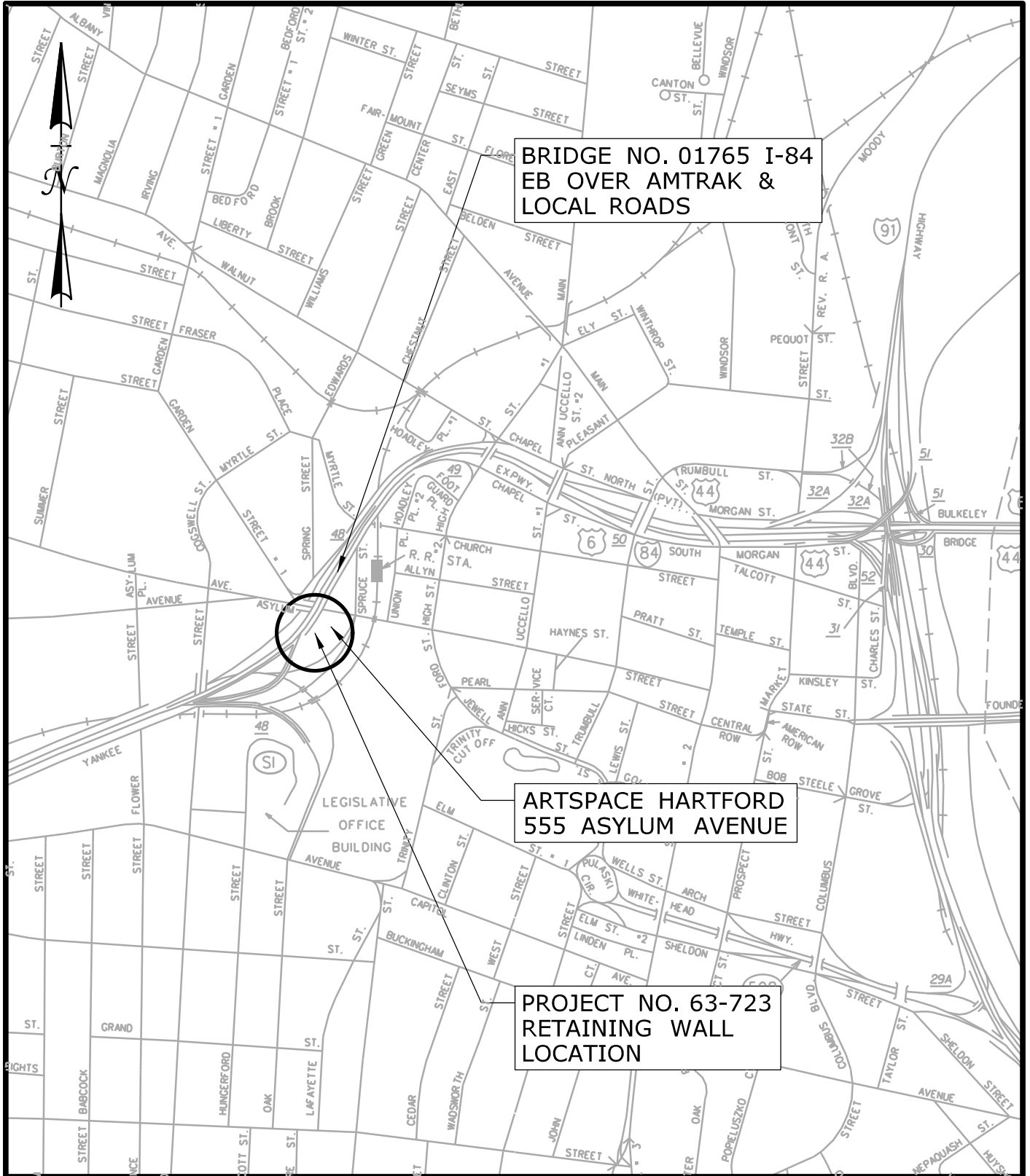
"Traffic person" will be paid for at the actual hourly rate charged for the Traffic person service (monthly statement or receipted bills) by the entity which actually provide the service plus a five percent (5%) markup. Use of a Municipal police vehicle will be paid at the actual rate charged by the Municipality plus a five percent (5%) markup. The rate charged by the Municipality for use of a Uniformed Municipal Police Officer and/or an official Municipal Police vehicle shall not be greater than the rate it normally charges others for similar services.

j. Traffic Control Equipment

1. The Estimated Total sum of money shown in the itemized proposal for this work will be used as a budget value to set aside project funds and will not be used for bid comparison. Payment will be made as described below.
2. Method of Measurement: Traffic Control Equipment, including operators, which is provided by a Subcontractor or is rented, will be measured for payment by the actual time that the equipment was in place for traffic control on the roadway. The unit of time, i.e. Days, Weeks, Months, shall be that included in the Subcontractor of Rental agreement. This item will be due for payment at the time of final payment after removal of all materials and equipment from the project.
3. Basis for Payment: Traffic Control Equipment will be paid for at the actual daily, weekly, or monthly rate billed by the sub-consultant / rental company providing the traffic control services. The sub-consultant / rental company's invoice shall be included with the Contractor's invoice as backup for direct costs. Rental equipment will be paid for at actual cost with no mark-up.

V LIST OF ATTACHMENTS

1. Retaining Wall – South of Bridge 01765 Location Map
2. Exploration Location Plan (with estimated boring depth)
3. As-Built Plan Showing Retaining Wall and Locations of Previous Borings
4. As-Built Drawing with Previous Test Boring Logs
5. Traffic Control During Maintenance Operations



SCALE IN FEET



STATE PROJECT NO.:

63-723

CITY/TOWN:

HARTFORD



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION



**RETAINING WALL- SOUTH OF
BRIDGE NO. 01765 LOCATION MAP**



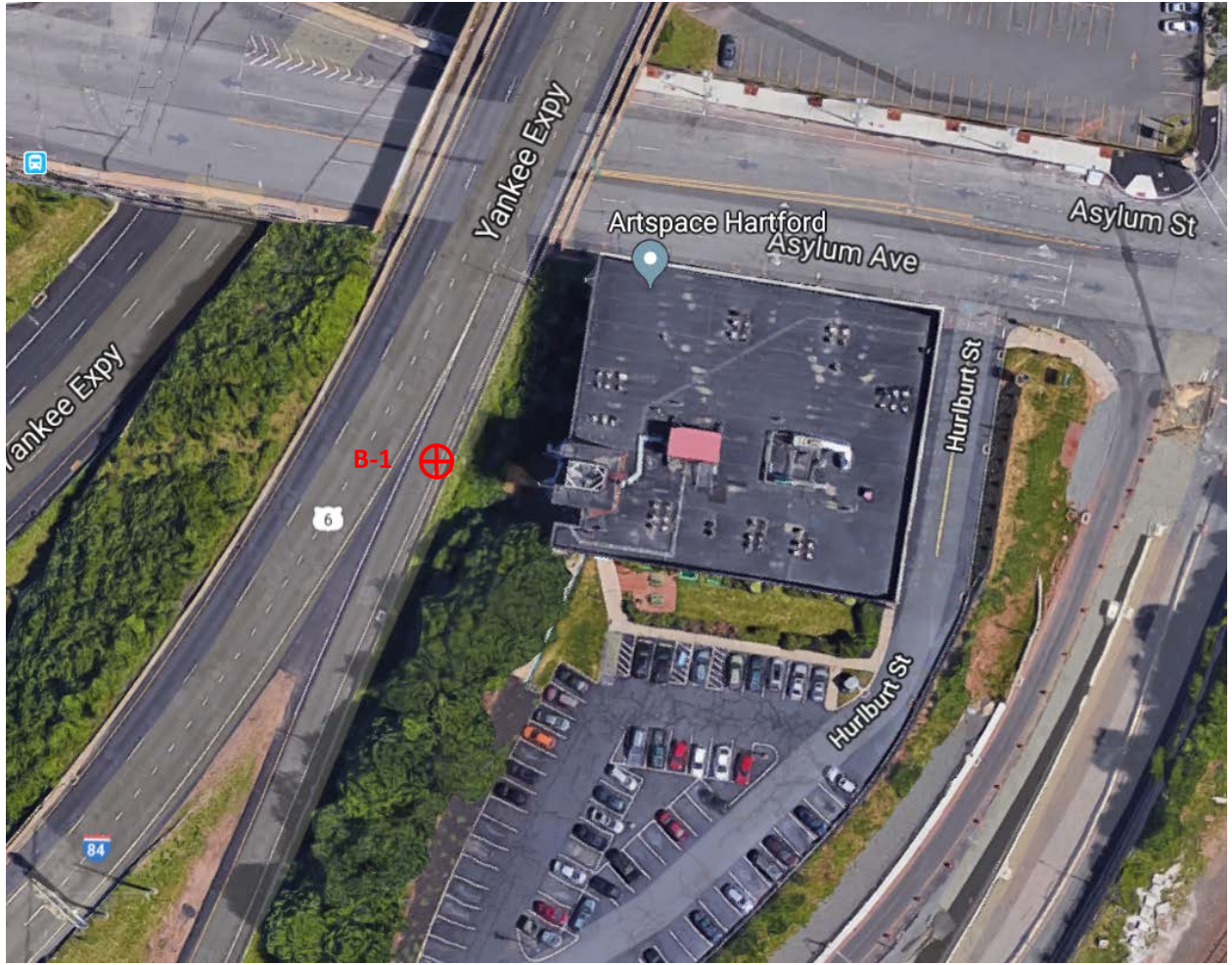
CME ASSOCIATES, INC.
33 Wilbur Cross Way, Meriden, CT 06468
101 East River Drive, East Hartford, CT 06109
1 Torr Blvd., Naugatuck, CT 06460
860-291-0227 | www.cmeengineering.com

DATE:

03/22/2019

SHEET NO.:

1 OF 1

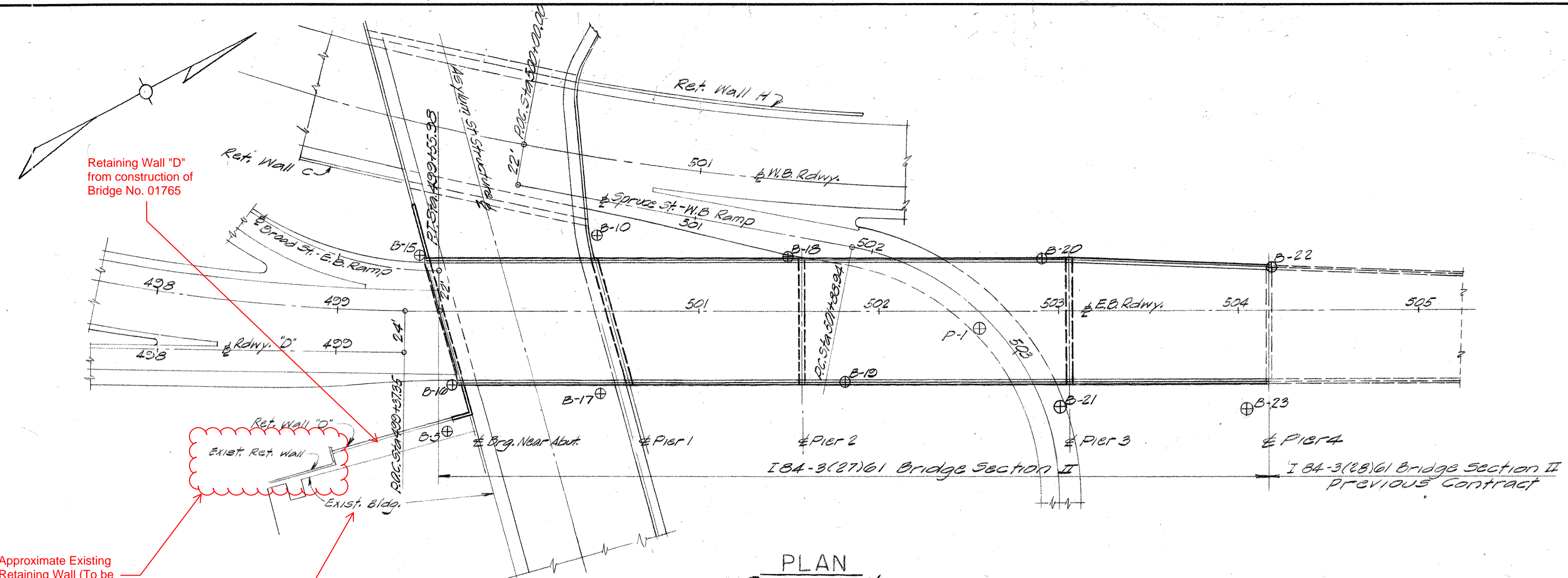


Exploration Location Plan

B-1 – Estimated depth 65 ft.

PUB. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	HARTFORD	1-84-3(27)61	63-167	1963	I-84	26	118

INTERSTATE ROUTE 84
Revised See Sheet 26A



PLAN
Scale: 1"=40'

Item	Total	Unit
Structure Excavation-Earth (Complete)	1742	C.Y.
Structure Excavation-Rock (Complete)	46	C.Y.
6" Cast Iron Pipe	350	L.F.
6" Perf. A.C.C.M. Pipe	144	L.F.
Class "A" Concrete	1088	C.Y.
Class "C" Concrete	892	C.Y.
1/2" Preformed Expansion Joint Filler For Bridges	180	S.F.
1" Preformed Expansion Joint Filler For Bridges	70	S.F.
Neoprene Plate For Bridge Expansion Joint	146	L.F.
Shear Connectors	1767	L.F.
Welded Stud (Finger Joint)	300	Ea.
Deformed Steel Bars	483,335	Lbs.
Structural Steel	1,179,335	Lbs.
Metal Bridge Rail-Type A	30	L.F.
Scupper	6	Ea.
Damproofing	304	S.Y.
Metal Bridge Rail	918	L.F.
PerVIOUS Structure Backfill	1,960	C.Y.
6"x30" Granite Stone Curbing For Bridges	320	L.F.
2" Rigid Steel Conduit in Structure	680	L.F.
18"x18"x10" Cast Iron Junction Box	15	Ea.
Gravel Fill	140	C.Y.
18"x12"x10" CAST IRON JUNCTION BOX	1	Ea.

CONCRETE DISTRIBUTION

Superstructure	892 cy.
Substructure	616 cy.
Footings	472 cy.
Total	1980 cy.

Attention is directed to the close proximity of Asylum St. to the proposed Abutment and proposed Pier No. 1, and the resultant need to take all necessary and reasonable precautions to protect Asylum St. during their construction.

Refer To
Construction Order
06F-5-7-64

GENERAL NOTES

Specifications: Connecticut State Highway Department Form 808 (Jan 1955) and Special Provisions.
 Design Specifications: Std. Spec. for Hwy. Bridges (A.A.S.H.O.-1957) except as modified by the Bureau of Public Roads "Policy on Interstate System Projects" (Aug. 1956) and as supplemented by the Conn. State Hwy. Dept. Bridge Manual July 1961.
 Composite Construction: No temporary intermediate supports shall be used during the placing and setting of the concrete deck slab. Temporary supports may be used for structural steel erection only. Live and superimposed dead loads shall be permitted when directed by the Engineer but not less than 10 days after the slab has been placed.
 Class "A" Concrete: Class A Concrete shall be used for entire substructure. See Special Provisions.
 Class "C" Concrete shall be used for bridge deck, safety walks and parapets. See Special Provisions.
 Exposed Edges: Exposed edges shall be beveled 1"x1" unless otherwise noted.
 Painting: For shop and field painting of structural steel and Metal Bridge Rail, see Special Provisions.
 Joint Seal: See Special Provisions for Class "A" and Class "C" Concrete.
 Deformed Steel Bars: For grades of deformed steel bars, see Special Provisions.
 Felt: The cost of furnishing and placing 2 layers of 15" roofing felt on top of backwalls shall be included in the item for Class "A" Concrete.
 Paraffin: The cost of furnishing and applying paraffin to the parapet joints shall be included in the item for Class "C" Concrete.
 Future Paving Allowance: 25" sq. ft.
 Slab Design: Tentative (A.A.S.H.O.) F-3 (50)
 Welding: Welding to conform to current spec. of the A.W.S. and as supplemented by Conn. State Hwy. Dept. spec. 808. For inspection of welds see special Provisions.
 Live Load: H-20-516-44 Alternate 24,000* dual axles @ 4'-0" o.c.
 Structural Steel: Flanges, webs and splice material for welded girders shall conform to A.S.T.M. A36-62T. All other parts shall conform to A.S.T.M. A36-62T unless otherwise noted. See Special Provisions.
 All shop cut welds in top and bottom flanges and web shall be radiographed. See Special Provisions. All flange to web fillet welds shall be inspected in their entirety by the "Magnetic Particle" method. See Special Provisions. Field butt welds in web and top and bottom flange will not be permitted. Any additional shop splices as requested by the contractor and radiographing of such splices shall be at no expense to the state. Field splices shall be made with High Strength Bolts. See Special Provisions.
 12" Depth gravel fill shall be installed beneath the footings if directed by the Engineer.
 Bearing and intermediate stiffeners shall be parallel and vertical after application of full dead load. Any optional field splices furnished by the Contractor shall be at no additional cost to the state. For location of optional field splices see plans.
 Top edge of girder web fits in each line of girders shall be the reference line for detailing and shall be an unbroken line at hangers and hinges.
 The portion of the finger joint attached to girders of span 4 at pier 4 has been fabricated in Project No. 63-187 and stored at a location designated by the Engineer. The contractor shall arrange to procure this item at such time as he deems necessary. See Bridge Sheet No. 12 of 21.
 The anchor bolts required for the shoes of span 4 at pier 4 shall be furnished and installed by the contractor.
 Foundation Design: The Group I loading as specified in Article 14.1 of the Standard Specifications for Highway Bridges (AASHO-1957) governs unless otherwise indicated. Where another Group (II thru IV) loading governs, both Group I and the governing load are shown.

LEGEND

⊕B-1 } Denotes location and number of
 ⊕P-1 } Test Boring.

Method	Unit	Quantity
Radiographic	in.	0
Magnetic Particle	L.F.	0

FED. AID PROJ. I-84 3(27) 61
 THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED.

CONNECTICUT
 STATE HIGHWAY DEPARTMENT
 TOWN OF HARTFORD
 INTERSTATE ROUTE 84
 EASTBOUND ROADWAY
 OVER
 ASYLUM ST. AND SPRUCE ST.-W.B. RAMP
GENERAL PLAN

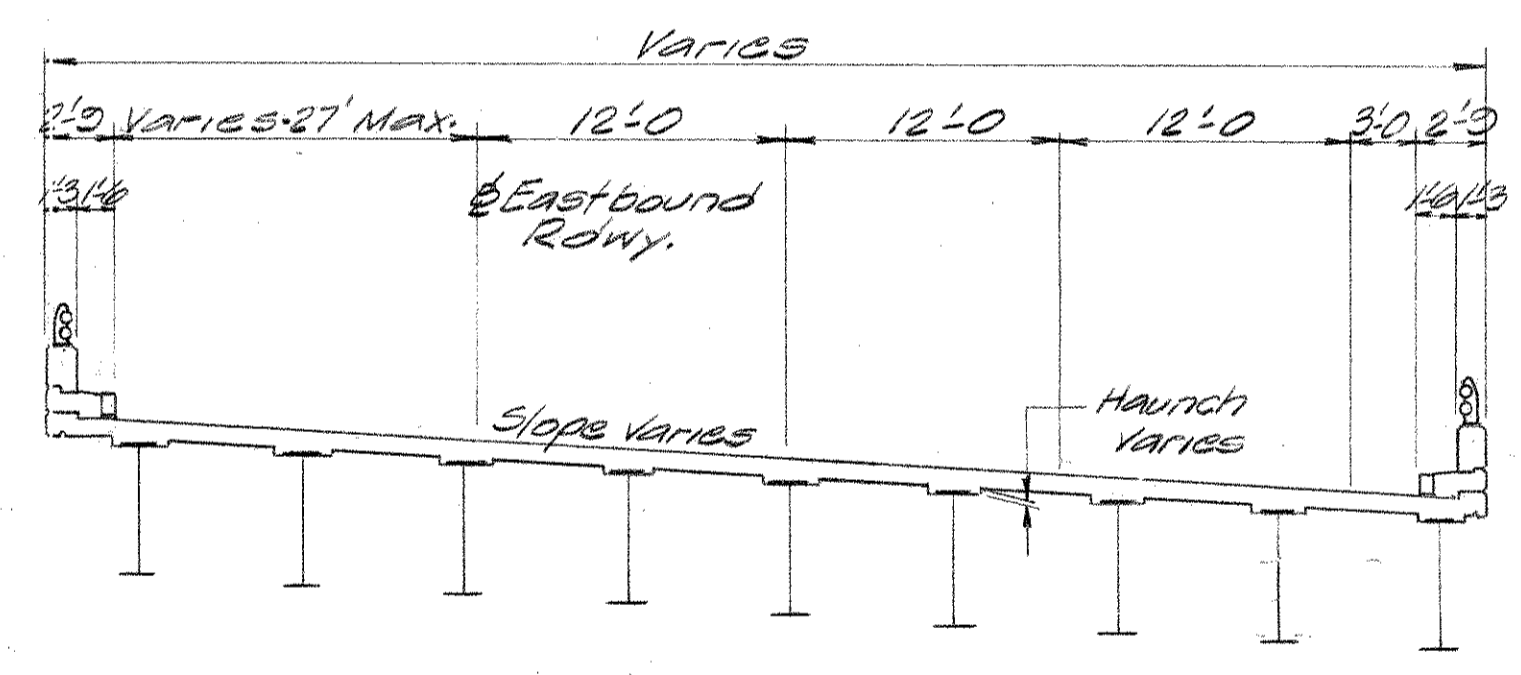
REVISIONS		
NO.	DATE	DESCRIPTION
1	4/20/64	Change quantity 18"x18"x10" Cast Iron Junction Box to 5" and Item to 18"x12"x10" Cast Iron Junction Box

DESIGNED BY YULE, STICKLEN, JORDAN & MCNEE
 SCALES As Noted
 MADE BY C.P. DATE 10/19/63
 CHECKED BY J.M. DATE 10/19/63
 APPROVED Robert B. Yule DATE 10/23/63
 PROJECT NO. 63-167
 BRIDGE SHEET NO. 1 of 21

Retaining Wall "D" from construction of Bridge No. 01765

Approximate Existing Retaining Wall (To be replaced)

Artspace Building
555 Asylum Avenue



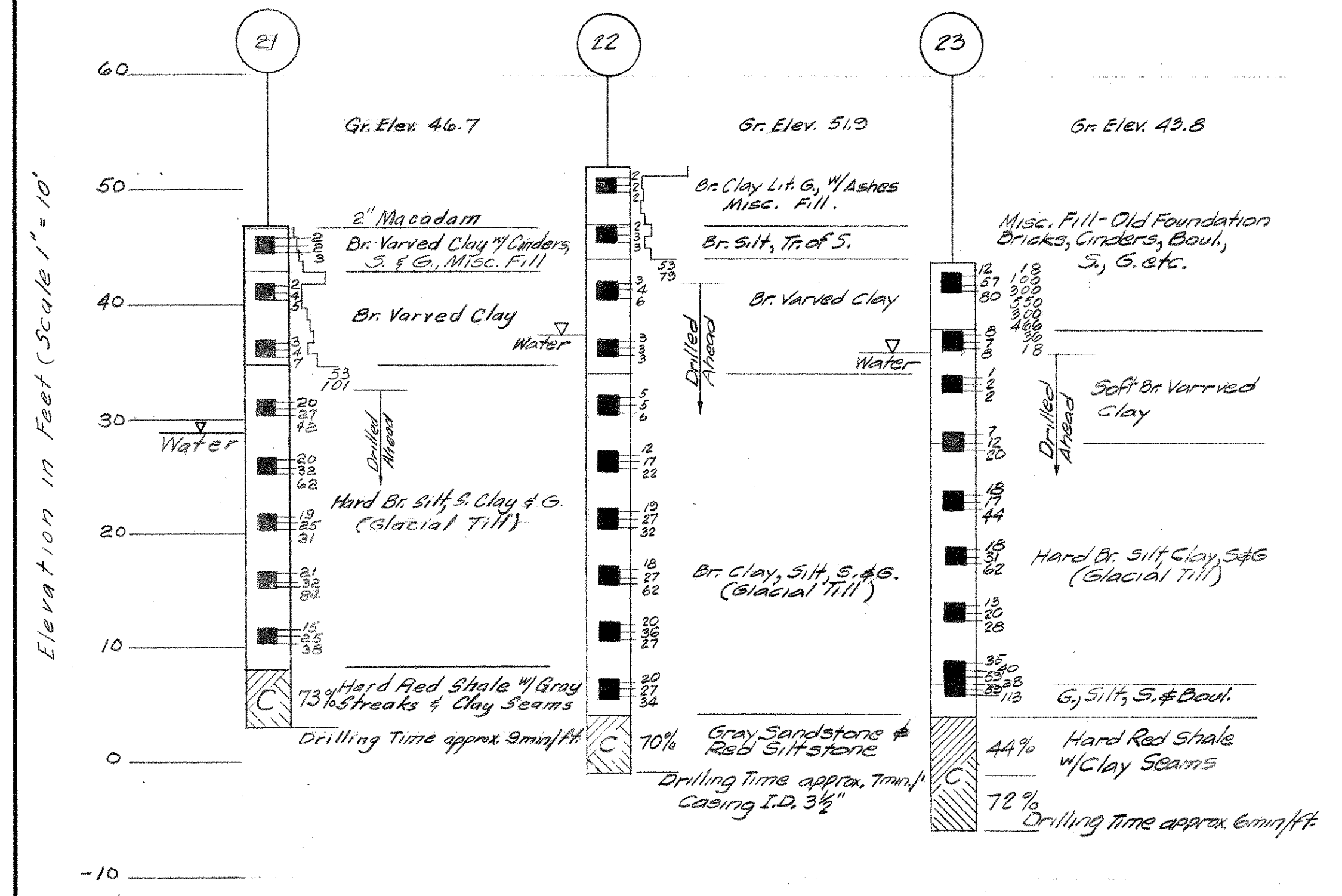
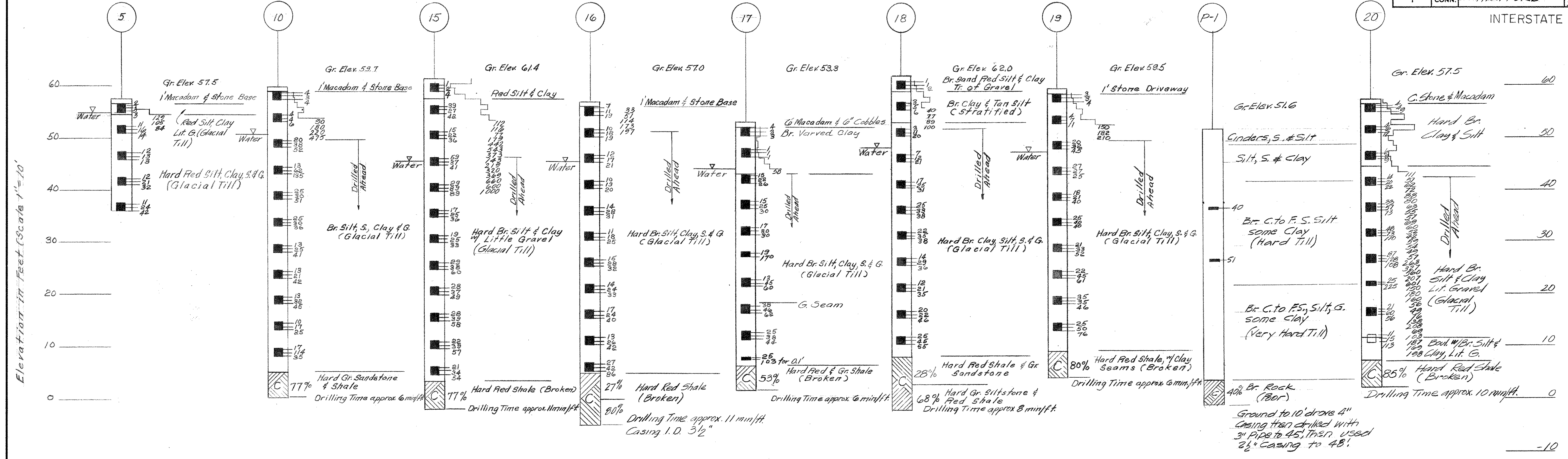
TYPICAL SECTION
Scale: 1/8"=1'-0"

LIST OF DRAWINGS

- General Plan
- Plan and Elevation
- Test Borings
- Geometry Plan
- Span-1 Details
- Span-2 Details
- Span-3 Details
- Span-4 Details
- Typical Details
- Drainage Details
- Splice and Shoe Details
- Finger Joint Details
- Bracing Details
- Hinge and Hanger Details
- Abutment Details
- Pier 1
- Pier-1 Details and Type A Rail
- Pier-2
- Pier-3
- Metal Bridge Rail
- Electrical Details

PUB. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	HARTFORD	1-54 (327)	63-167	1963	184	28	113

INTERSTATE ROUTE 84



KEY

○ BORING NUMBER

▽ WATER

□ CASING BLOWS/FT

○ SAMPLER PENETRATION WITHOUT SAMPLE RECOVERY

○ SAMPLER SPOON BLOWS FOR 6" PENETRATION

○ DRY (DRIVE) SAMPLE - SAMPLE RECOVERED

□ LIMIT OF DESCRIPTION

□ UNDISTURBED SAMPLE

□ CORE RECOVERY

□ BEDROCK

Bl. Black

Boul. Boulders

Br. Brown

C. Coarse

F. Fine

G. Gravel

Gr. Gray

Lit. Little

M. Medium

S. Sand

Tr. Trace

WATER LEVEL IN BORING AT TIME OF EXPLORATION

VERTICAL SCALE 1"=10' CASING 1"=100 BLOW/FT.

Casing I.D. 2 1/2"
 Hammer Wt. 300 lbs (Casing)
 Hammer Fall 22" (Casing)
 Sampler I.D. 1 3/8"
 Hammer Wt. 140 lbs (Spoon)
 Hammer Fall 30" (Spoon)
 Unless otherwise indicated

FED AID PROJ 1-84 3(27) 61

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED.

CONNECTICUT STATE HIGHWAY DEPARTMENT
 TOWN OF HARTFORD
 INTERSTATE ROUTE 84
 EASTBOUND ROADWAY
 OVER
 ASYLUM ST. AND SPRUCE ST.-W.B. RAMP
TEST BORINGS

REVISIONS		
NO.	DATE	DESCRIPTION
		No Changes

DESIGNED BY	YULE, STICKLEN, JORDAN & MCNEE	
SCALES	AS NOTED	PROJECT NO. 63-167
MADE BY	S.K.	DATE 6-2-60
CHECKED BY	J.D.A.	DATE 10/19/60
APPROVED	Robert Byrle	DATE 10/27/60
		BRIDGE SHEET NO. 3 OF 21

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 advance 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 advance 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) Temporary road closures using Rolling Road Blocks (RRB) may be allowed on limited access highways for operations associated with the installation and removal of temporary lane closures. RRB may be allowed for the installation and removal of lead signs and lane tapers only and shall meet the following requirements:
- RRB may not start prior to the time allowed in the contract Limitations of Operation for sign pattern installation. Sign pattern removal must be complete prior to the time indicated in the Limitations of Operation for restoring the lanes to traffic.
 - On limited access highways with 4 lanes or more, a RRB may not start until the Limitations of Operation Chart allows a 2 lane closure. In areas with good sight lines and full shoulders, opposite side lead signs should be installed in a separate operation.
 - Truck-Mounted Impact Attenuators (TMAs) equipped with arrow boards shall be used to slow traffic to implement the RRB. State Police Officers in marked vehicles may be used to support the implementation of the RRB. The RRB shall start by having all vehicles, including Truck-Mounted Impact Attenuators TMAs and police vehicles leave the shoulder or on-ramp and accelerate to a normal roadway speeds in each lane, then the vehicles will position themselves side by side and decelerate to the RRB speed on the highway.
 - An additional Truck-Mounted Impact Attenuator TMAs equipped with a Portable Changeable Message Sign shall be utilized to advise the motorists that sign pattern installation / removal is underway. The Pre-Warning Vehicle (PWV) should be initially positioned in the right shoulder ½ mile prior to the RRB operation. If a traffic queue reaches the PWV's initial location, the contractor shall slowly reverse the PWV along the shoulder to position itself prior to the new back of queue. A Pre-

Warning Vehicle, as specified elsewhere in the contract, shall be utilized to advise the motorists that sign pattern installation / removal is underway.

- The RRB duration shall not exceed 15 minutes from start of the traffic block until all lanes are opened as designated in the Limitation of Operation chart. If the RRB duration exceeds 15 minutes on 2 successive shifts, no further RRB will be allowed until the Contractor obtains approval for a revised installation procedure from the respective construction District.
 - RRB should not be utilized to expand a lane closure pattern to an additional lane during the shift. The workers and equipment required to implement the additional lane closure should be staged from within the closed lane. Attenuator trucks (and State Police if available) should be used to protect the workers installing the taper in the additional lane.
 - Exceptions to these work procedures may be submitted to the District Office for consideration. A minimum of 2 business days should be allowed for review and approval by the District.
 - The RRB procedures (including any approved exceptions) will be reviewed and discussed by the inspection team and the Contractor in advance of the work. The implementation of the agreed upon plan will be reviewed with the State Police during the Work Zone Safety meeting held before each shift involving temporary lane closures. If the State Police determine that alternative procedures should be implemented for traffic control during the work shift, the Department and Contractor will attempt to resolve any discrepancies with the duty sergeant at the Troop. If the discrepancies are unable to be resolved prior to the start of the shift, the work will proceed as recommended by the Department Trooper. Any unresolved issues will be addressed the following day.
- 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 OR TRAILER 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 “Truck-Mounted or Trailer-Mounted Impact Attenuator”. 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. If it is used as a TMA and is in the proper location as specified, then it should be paid at the specified hourly rate for “Truck-Mounted or Trailer-Mounted Impact Attenuator”. 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 is also used as a Flashing Arrow in the same day, then the unit should be paid as a “Truck-Mounted or Trailer-Mounted Impact Attenuator” for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove). If the TMA is also used as a Flashing Arrow during the same day, then the unit should be paid at the daily rate 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:

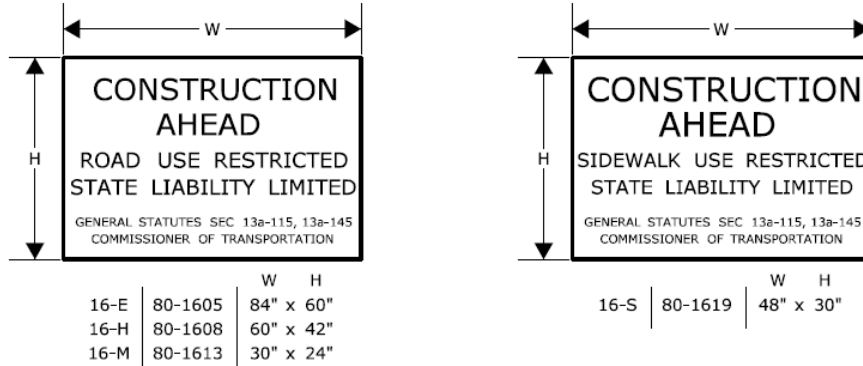
<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>	<u>Message No.</u>	<u>Frame 1</u>	<u>Frame 2</u>
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	WORKERS ON ROAD	REDUCE SPEED
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	WORKERS 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.

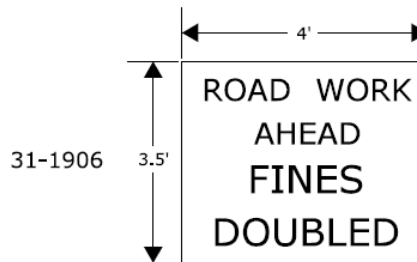
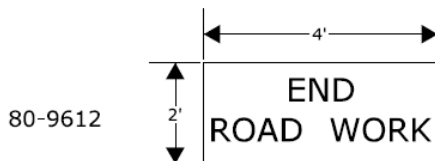
REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

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

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

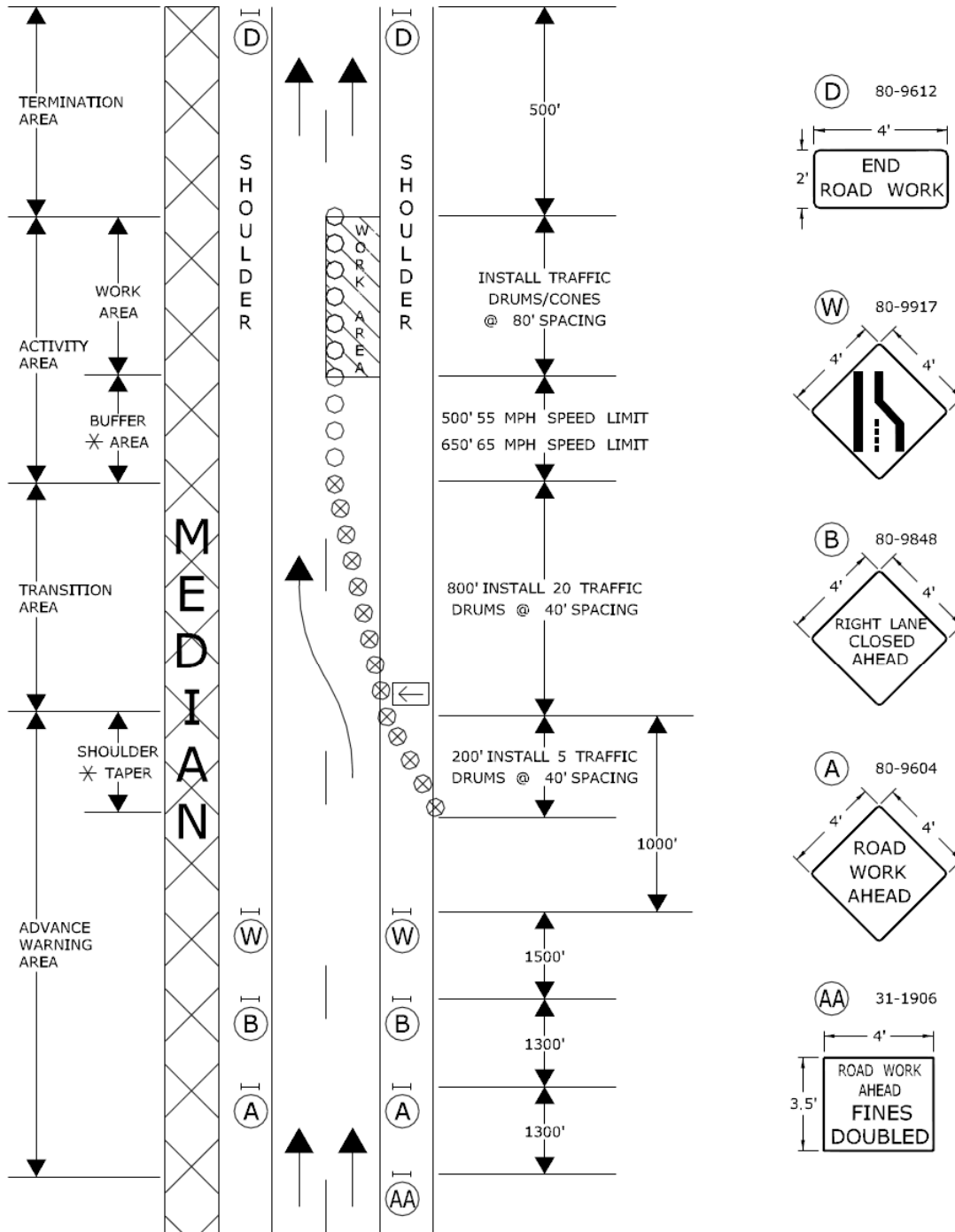


SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN NOTES

WORK IN RIGHT LANE - MULTILANE HIGHWAY

SIGN FACE
126 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ← HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

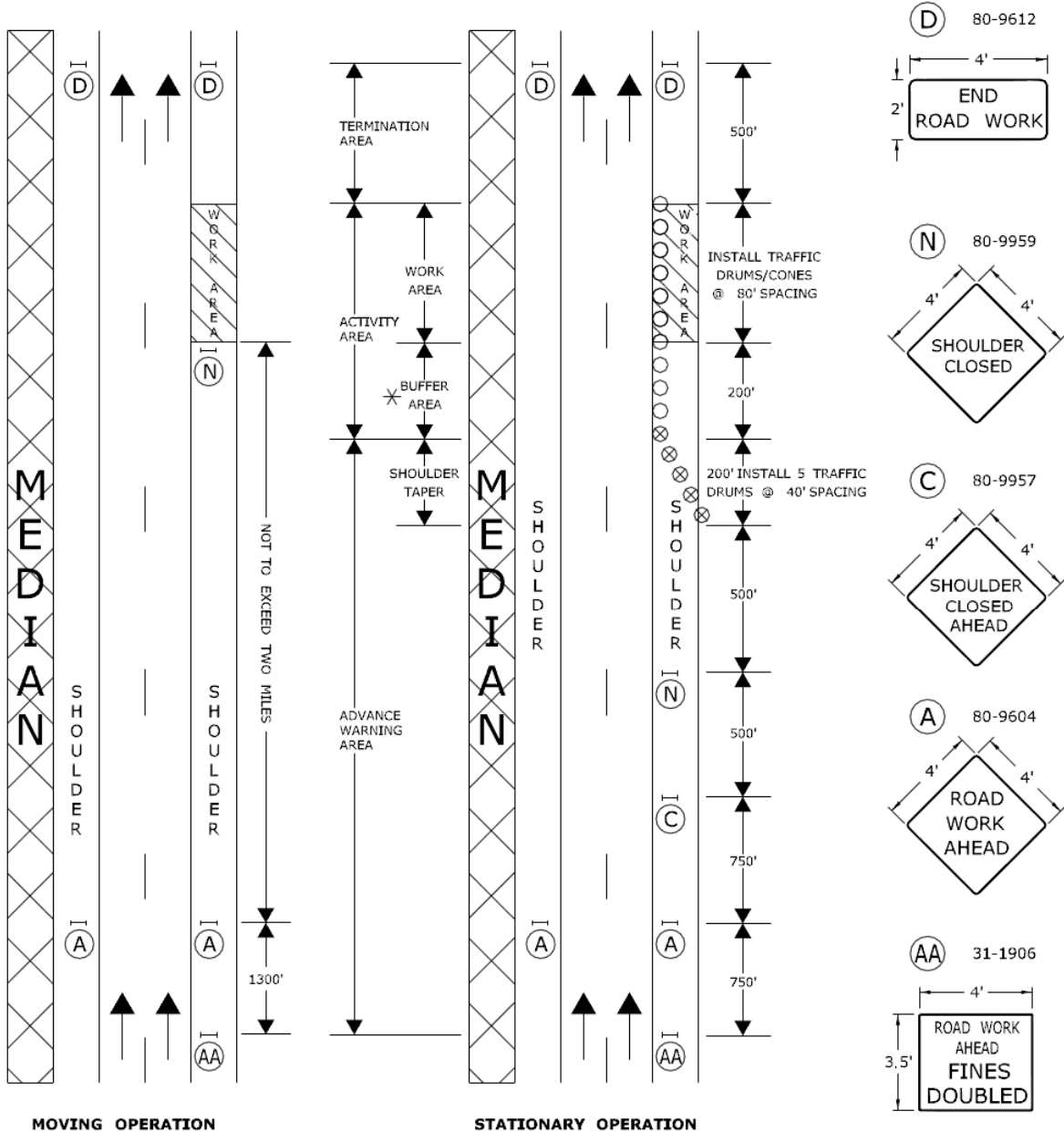
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 1
SEE NOTES 1, 2, 3, 4, 5, 6, 8, 9

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:51:00-0400

WORK IN SHOULDER AREA - MULTILANE HIGHWAY

SIGN FACE
94 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- * OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 6

SEE NOTES 1, 2, 4, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

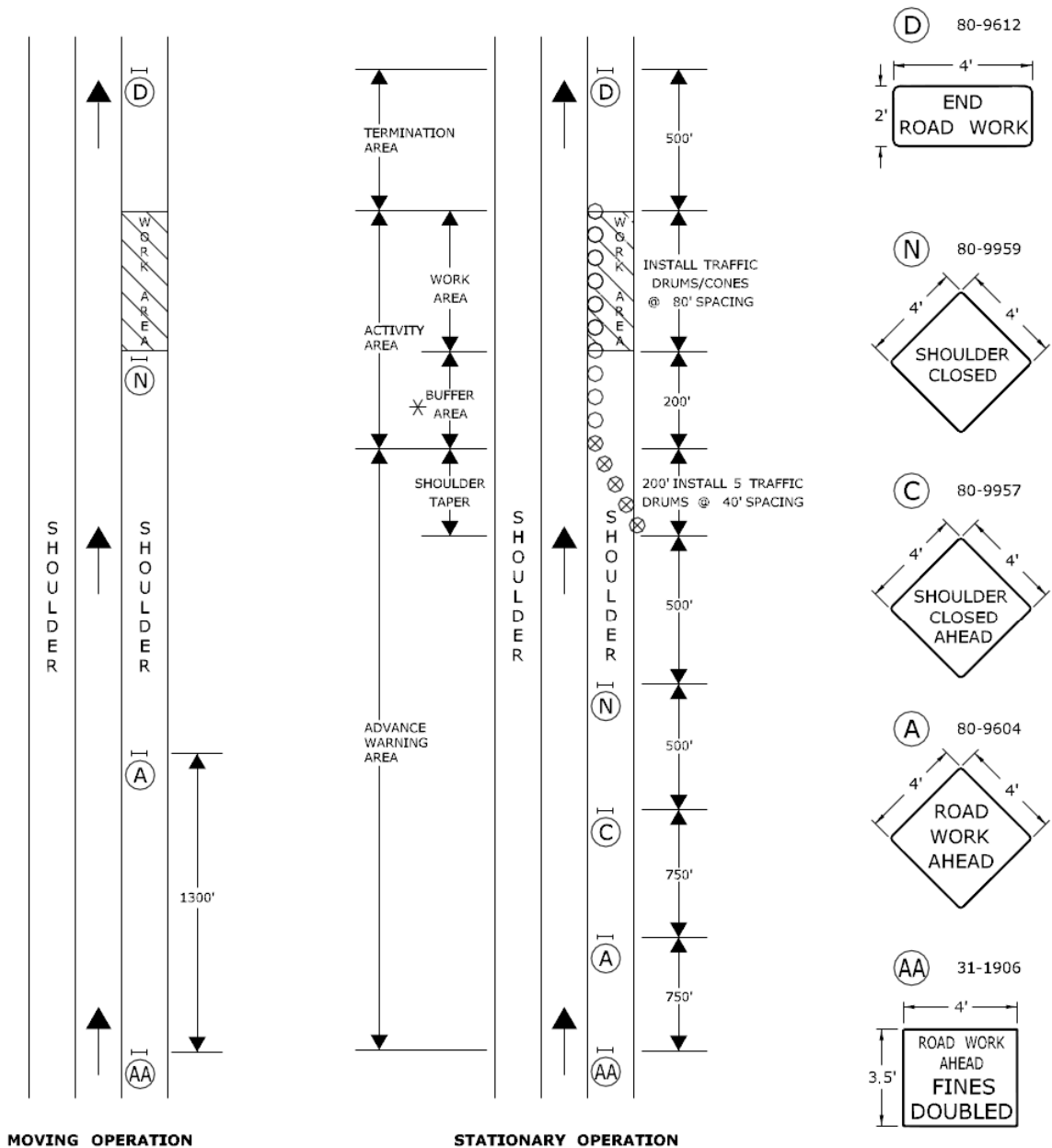
APPROVED

Charles S. Harlow
PRINCIPAL ENGINEER

Charles S. Harlow
2012.06.05 15:52:38-04'00"

WORK IN SHOULDER AREA - TURNING ROADWAYS / RAMPS

SIGN FACE
70 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- * OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 9

SEE NOTES 1, 2, 4, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

Charles S. Harlow
PRINCIPAL ENGINEER

Charles S. Harlow
2012.06.05 15:53:0400'