AMOSKEAG BRIDGE PIPELINE STRUCTURAL SUPPORT IMPROVEMENT PROJECT

DISTRIBUTION CONTRACT# FY19-804-25

Prepared for:
MANCHESTER WATER WORKS
MANCHESTER, NEW HAMPSHIRE

January 2019

Prepared by:
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AMOSKEAG BRIDGE PIPELINE
STRUCTURAL SUPPORT IMPROVEMENTS
MANCHESTER, NH
DISTRIBUTION CONTRACT # FY 19-804-25
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ADVERTISEMENT FOR BIDS

Separate sealed bids for the Amoskeag Bridge Pipeline Structural Support
Improvements, Manchester, New Hampshire, will be received from prequalified bidders by the
Board of Water Commissioners at the office of the Manchester Water Works, 281 Lincoln
Street, Manchester, New Hampshire, until three o'clock (3:00 PM) July 11, 2019 at said office
and publicly opened and read aloud.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications and
Forms of Bid Bond, Performance and Payment Bond and other contract documents may be
examined at the following:

Manchester Water Works, 281 Lincoln Street, Manchester, N.H.

The work consists structural improvements to the bridge superstructure supporting the
existing 24” diameter ductile iron casing pipe, as specified by the Engineer.

The Owner reserves the right to waive any informalities or to reject any or all bids.

Each bidder must deposit with his bid, security in the amount, form and subject to the
conditions provided in the Information for Bidders. Each bidder must have been prequalified
prior to bid submittal.

NO BIDDER MAY WITHDRAW HIS BID WITHIN SIXTY (60) DAYS AFTER THE ACTUAL
DATE OF THE OPENING THEREOF.

Guy Chabot, Deputy Director
INFORMATION FOR BIDDERS

1. Receipt and Opening of Bids

The Manchester Water Works (herein call the "Owner"), invites bids on the form attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner at the office of the Manchester Water Works, 281 Lincoln Street, Manchester, NH 03103 until three o'clock PM (3:00 PM) EST, July 11, 2019, and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to the Manchester Water Works at 281 Lincoln Street, Manchester NH, c/o Michael Adams, Distribution Operations Superintendent, and designated as Bid For Amoskeag Bridge Pipeline Structural Support Improvements.

The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof, and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 60 days after the actual date of the opening thereof.

2. Preparation of Bid

Each bid must be submitted on the prescribed form. All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures. Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his address, and the name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the bid form.

3. Subcontracts

The bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this contract must be acceptable to the Owner.

4. Telegraphic Modification

Any bidder may modify his bid by facsimile communication at any time prior to the scheduled closing time for receipt of bids, provided such facsimile communication is received by the Owner prior to the closing time, and, provided further, the Owner is satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the closing time. The facsimile communication should not reveal the bid price, but should provide the addition or subtraction or other modification so that the final price(s) or term(s) will not be known by the Owner until the sealed bid...
is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic modification.

5. **Qualifications of Bidder**

All bidders must be listed on the NHDOT "Prequalified Contractor's List" with a classification of bridge and/or bridge rehabilitation and must submit a letter from NHDOT to the Owner indicating as such prior to their receiving a bid package. The owner may make such investigations as he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

6. **Bid Security**

Each bid must be accompanied by cash, certified check of the bidder, or a bid bond prepared on the form of bid bond attached hereto, duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner, in the amount of **five percent (5%) of the bid**. Such cash, check or bid bonds will be returned to all except the three lowest bidders within five (5) days after the opening of bids, and the remaining cash, checks, or bid bonds will be returned promptly after the Owner and the accepted bidder have executed the contract, or, if no award has been made within sixty days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he has not been notified of the acceptance of his bid.

7. **Liquidated Damages for Failure to Enter Into Contract**

The successful bidder, upon failure or refusal to execute and deliver the contract and bonds required within ten days (10) after he has received notice of the acceptance of his bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the bid security deposited with his bid.

8. **Time of Completion and Liquidation Damages**

Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within 150 consecutive calendar days thereafter. Bidder must agree also to pay, as liquidated damages, the sum of $400.00 for each consecutive calendar day thereafter as hereinafter provided in the General Conditions.

9. **Conditions of Work**

Each bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligations to furnish all material and labor necessary to carry out the provisions of his contract. Insofar as possible, the contractor in carrying out his work must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.
10. **Addenda and Interpretations**

No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to: **Manchester Water Works, 281 Lincoln Street, Manchester, 03103, Attn: Michael Adams**, and to be given consideration must be received at least five (5) days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be mailed by certified mail with return receipt requested to all prospective bidders (at the respective addresses furnished for such purposes), not later than three (3) days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.

11. **Security for Faithful Performance**

Simultaneously with his delivery of the executed contract, the Contractor shall furnish surety bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bonds shall be a duly authorized surety company satisfactory to the Owner.

12. **Power of Attorney**

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

13. **Notice of Special Conditions**

Attention is particularly called to those parts of the contract documents and specifications, which deal with the following:

A) The Contractor shall create a traffic control plan and obtain an Encumbrance Permit to insure compliance with the City of Manchester Public Works Department.

14. **Laws and Regulations**

The bidder’s attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

15. **Method of Award - Lowest Qualified Bidder**

If, at the time this contract is to be awarded, the lowest base bid submitted by a responsible bidder does not exceed the amount of funds then estimated by the Owner as available to finance the contract, the contract will be awarded on the base bid only. If such bid exceeds such amount, the Owner may reject all bids.
16. **Obligation of Bidder**

At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect of his bid.

17. **Material by Contractor**

All structural support materials for this project shall be furnished by the Contractor as required to proceed with the timely completion of the project.

The Owner shall not be responsible for delays in material delivery.

18. **Emergency Response**

The Contractor shall be required to designate at least one individual who shall be responsible to receive and respond to all emergency calls during the life of the contract. The individual(s) shall be available seven (7) days a week, twenty-four (24) hours a day and shall be onsite within one-half hour of being notified.
BID

Bid of _____________________________, hereinafter called "Bidder"), organized and existing under the laws of the State of ________________________, a * ____________________________ doing business as _____________________________.

To the Board of Water Commissioners of the Manchester Water Works, (hereinafter called "Owner"):

The Bidder, in compliance with your invitation for bids for Distribution Contract #FY19-804-02, having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the project in accordance with the contract documents, within the time set forth therein, and at the prices stated. These prices are to cover all expenses incurred in performing the work required under the contract documents of which this bid is a part.

The Bidder hereby agrees to commence work under this contract on or before a date to be specified in the "Notice to Proceed" of the Owner and to substantially complete the assignment within 150 consecutive calendar days thereafter as stipulated in the specifications. Bidder further agrees to pay as liquidated damages the sum of $400 for each consecutive day thereafter as hereinafter provided in paragraph 19 of the General Conditions.

The Bidder acknowledges receipt of the following ADDENDUM:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Bidder agrees to perform all the work described in the specifications and shown on the plans for the lump sum prices shown in the Bid Schedule and totaled as follows:

*Insert "corporation", "partnership", or "individual" as applicable.
BID SCHEDULE

<table>
<thead>
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<th>ITEM NO.</th>
<th>ITEM DESCRIPTION AND LUMP SUM BID</th>
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<tr>
<td>1</td>
<td>Perform repairs to existing 24&quot; DI pipeline pipe supports and related structural repairs, complete, at the lump sum price of:</td>
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Dollars and Cents (words)

($______________)

(numbers)

The total bid consisting of Bid Item 1 is:

(In Words)

$________________________

(Numbers)

In case of discrepancy, the amount shown in words shall govern.

Each bid price shall include all labor, materials, overhead, profit, insurance, etc. to cover the finished work of the several kinds called for.

Bidder understands that the Owner reserves the right to reject all bids or to waive any informalities in the bidding.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of sixty (60) calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of this acceptance of this bid, Bidder will execute the formal contract attached within ten (10) days and deliver a Surety Bond(s) as required by Section 7paragraph 29 of the General Conditions. The bid security attached in the sum of________________________ ($________________) is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth as liquidated damages for the delay and additional expense to the Owner caused thereby.
Respectfully Submitted,

By __________________________________________

(Signature)

____________________________________________

(Printed Name and Title)

____________________________________________

(Company)

____________________________________________

(Business Address and Zip Code)

SEAL - If bid is by a corporation.
KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,
_____________________________ as Principal, and_____________________________ as Surety, are
hereby held and firmly bound unto the Manchester Water Works as Owner in the penal sum of
_____________________________ the payment of which, well and truly to be made, we hereby jointly
and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed, this ___ day of____________________, 2019.

The condition of the above obligation is such that whereas the Principal has submitted
to______________________________, a certain Bid attached hereto and hereby made a
part hereof to enter into a contract in writing for the Distribution Contract # FY19-804-25 -
Amoskeag Bridge Pipeline Structural Support Improvements.

NOW THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in
the form of Contract attached hereto (properly completed in accordance with said Bid)
and shall furnish a bond for his faithful performance of said contract, and for the payment
of all persons performing labor or furnishing materials in connections therewith, and shall
in all other respects perform the agreement created by the acceptance of said Bid, then
this obligation shall be void, otherwise the same shall remain in force and effect; it being
expressly understood and agreed that the liability of the Surety for any and all claims
hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said
Surety and its bond shall be in no way impaired or affected by any extension of the time
within which the Owner may accept such Bid; and said Surety does hereby waive notice
of any such extension.
IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

______________________________ (L.S.)
Principal

______________________________
Surety

BY: ____________________________

SEAL
Amoskeag Bridge Pipeline Structural Support
Improvements Project

Manchester Water Works
Manchester, NH

CONTRACT

THIS AGREEMENT, made this____day of_____________, 2019, by and between the MANCHESTER WATER WORKS, herein called "Owner", acting herein through its BOARD OF WATER COMMISSIONERS, and _________________________ doing business as a *____________________________, of____________________, County of___________________and State of____________________, hereinafter called "Contractor".

WITNESSETH: That for and in consideration of the payment(s) and agreement(s) hereinafter mentioned, to be made and performed by the Owner, the Contractor hereby agrees with the Owner to commence and complete the construction described as follows:

FY19-804-25
AMOSKEAG BRIDGE PIPELINE STRUCTURAL SUPPORT IMPROVEMENTS
hereinafter called the project, for the sum of ____________________________ Dollars (__________) and all extra work in connection therewith, under the terms as stated in the General and Special Conditions of the Contract; and at his (its or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Bid, the General Conditions, Supplemental General Conditions and Special Conditions of the Contract, the plans, which include all maps, plats, blue prints, and other drawings and printed or written explanatory matter thereof, the specifications and contract documents, therefore, as prepared by Manchester Water Works, and as enumerated in paragraph 1 of the Supplemental General Conditions, all of which are made a part hereof and collectively evidence and constitute the contract.

The Contractor hereby agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed" by the Owner, and to fully complete each assignment within 150 consecutive calendar days thereafter. The Contractor further agrees to pay as liquidated damages the sum of $400 for each consecutive calendar day thereafter.

*Insert "corporation", "partnership", "individual", as applicable.
The Owner agrees to pay the Contractor in current funds for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the Contract, and to make payments on account thereof as provided in Section 32, "Payment to Contractor", of the General Conditions.

IN WITNESS WHEREOF, the parties to these presents have executed the contract in three (3) counterparts, each of which shall be deemed an original, in the year and day first above-mentioned.

(Seal)

ATTEST:

MANCHESTER WATER WORKS
(Owner)

By: _______________________, President
Board of Water Commissioners

__________________________
(Secretary)

__________________________
(Witness)

(Seal)

__________________________
(Contractor)

By: _______________________

__________________________
(Secretary)

__________________________
(Witness)

__________________________
(Title)

__________________________
(Address and Zip Code)

NOTE: Secretary of the Owner should attest. If Contractor is a corporation, Secretary should attest.
Amoskeag Bridge Pipeline Structural Support
Improvements Project
Manchester Water Works
Manchester, NH

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we ________________________________
(Name of Contractor)
_____________________________ a ________________________________
(Corporation, Partnership or Individual)
hereinafter called "Principal", and ________________________________
(Surety)
of, State of ________________________________
hereinafter called the "Surety", are held and firmly bound unto the Manchester Water Works
of Manchester, New Hampshire, hereinafter called "Owner", in the penal sum of
______________________________ Dollars ($________________________)
in lawful money of the United States, for payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with the Owner, dated the _______ day of __________, 2019, a copy of which is hereto attached and made a part hereof for the construction of:

Distribution Contract #_FY19-804-25
AMOSKEAG BRIDGE PIPELINE STRUCTURAL SUPPORT IMPROVEMENTS

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor
shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this_____day of________________________, 2019.

ATTEST:

__________________________________________
(Principal) Secretary

__________________________________________
(Principal)

By_______________________________________

__________________________________________
Address-Zip Code

__________________________________________
Witness as to Principal

__________________________________________
(Address-Zip Code)

By_______________________________________

__________________________________________
(Surety)

ATTEST:

__________________________________________
(Surety) Secretary

__________________________________________
By_______________________________________

__________________________________________
Address-Zip Code

__________________________________________
Witness as to Surety

__________________________________________
(Address-Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute bond.
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we ____________________________
(Name of Contractor)

______________________________ a ____________________________
(Corporation, Partnership or Individual)

hereinafter called the "Surety", are held and firmly bound unto the Manchester Water Works
of Manchester, New Hampshire, hereinafter called "Owner", in the penal sum of__________
__________________________________________________________ Dollars
($______________) in lawful money of the United States, for the payment of which sum well
and truly to be made, we bind ourselves, our heirs, executors, administrators and successors,
jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered
into a certain contract with the Owner, dated the_______ day of____________________, 2019,
a copy of which is hereto attached and made a part hereof for the construction of:

DISTRIBUTION CONTRACT #FY19-804-25
AMOSKEAG BRIDGE PIPELINE STRUCTURAL SUPPORT IMPROVEMENTS

NOW, THEREFORE, if the principal shall promptly make payment to all persons, firms,
subcontractors, and corporations furnishing materials for or performing labor in the prosecution
of the work provided for in such contract, and any authorized extension or modification thereof,
including all amounts due for materials, lubricants, oil, gasoline, repairs on machinery,
equipment and tools, consumed or used in connection with the construction of such work, and
all insurance premiums on said work, and for all labor, performed in such work whether by
subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force
and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and
agrees that no change, extension of time, alteration or addition to the terms of the contract or to
the work to be performed thereunder or the specifications accompanying the same shall in any
way affect its obligation on this bond, and it does hereby waive notice of any such change,
extension of time, alteration or addition to the terms of the contract, or to the work or to the
specifications.
Provided, further, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

In witness whereof, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this ______ day of ________________________, 2019.

Attest:

__________________________________________
Principal

__________________________________________
Principal Secretary

By _________________________________________

__________________________________________
(Address-Zip Code)

Witness as to Principal

__________________________________________
(Address-Zip Code)

By _________________________________________

__________________________________________
(Surety)

Attest:

__________________________________________
(Surety) Secretary

By _________________________________________

__________________________________________
(Address-Zip Code)

Witness as to Surety

__________________________________________
(Address-Zip Code)
GENERAL CONDITIONS

1. Enumeration of Plans, Specifications and Addenda
2. Stated Allowances
3. Special Hazards
4. Contractor’s and Subcontractor’s Public Liability, Vehicle Liability and Property Damage Insurance
5. Time for Completion and Liquidation Damages
6. Employment of Labor
7. Contract Security
8. Engineer to Decide
9. Time and Manner of Performing the Work
10. Plans and Specifications: Interpretations
12. Laws and Regulations
13. Maintain Streets Passable
14. Use of Highways
15. Permits
16. Barricades: Danger, Warning and Detour Signs
17. Access to Work
19. Site Management, Dust Control, Etc.
20. Lines and Grades
21. All Work to be Inspected
22. Night or Weekend Work
23. Cleaning Up or Restoration Work
24. Engineer May Notify Contractor to Make Repairs, Etc.
25. Emergency Repairs
26. Act or Failure to Act on Part of Engineer Does Not Reduce Liability of Contractor
27. Plant
28. Connections and Water Flow
29. Inspection, Handling and Distribution of Materials
30. Bypassing
31. Retainage
32. Payment to Contractor
33. OSHA Regulations
34. Parts of Contract
35. Not to Sublet or Assign
36. Responsibility of Work
37. Competent Personnel to be Employed
38. Sanitary Precautions
39. Completion of the Work if Contract is not Fulfilled
40. Damages to be Paid Owner
41. Errors or Omissions
42. Maintenance Bond
43. Materials from Manchester Water Works
44. Contractor to Maintain Backfilled Trenches and Surfacing
45. Contractor to Inspect During Maintenance Period

GC-1
1. ENUMERATION OF PLANS, SPECIFICATIONS AND ADDENDA

Following are the Plans, Specifications and Addenda which form a part of this contract, as set forth in paragraph 1 of the General Conditions, “Contract and Contract Documents”:

**DRAWINGS**

- Title Sheet
- G-0.1 General Notes, Contacts & Abbreviations
- S-1.1 Frame Repair Plan (1 of 2)
- S-1.2 Frame Repair Plan (2 of 2)
- S-1.3 Water Main Support Details (1 of 2)
- S-1.4 Water Main Support Details (2 of 2)

**SPECIFICATIONS**

**DIVISION 1 – GENERAL REQUIREMENTS**

- 01010 Summary of Work
- 01015 Coordination
- 01025 Measurement and Payment
- 01300 Submittals
- 01310 Construction Schedules
- 01370 Schedule of Values
- 01400 Quality Control
- 01500 Temporary and Construction Facilities
- 01560 Dust Control
- 01620 Storage and Protection
- 01700 Project Closeout
- 01720 Project Record Documents
- 01900 Permits

**DIVISION 2 – SITE WORK**

- 02660 Water Main, Fittings and Appurtenances

**DIVISION 5 – MISCELLANEOUS METALS**

- 05501 Water Main Supports and Repairs

**ADDENDA**

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2. **STATED ALLOWANCES**

   N/A

3. **SPECIAL HAZARDS**

   The Contractor's and his subcontractor's public liability and property damage insurance shall provide adequate protection against the following special hazards:

   A. Protect and maintain existing live gas main (owned by Liberty Utilities) throughout the project.

4. **CONTRACTOR’S AND SUBCONTRACTOR’S PUBLIC LIABILITY, VEHICLE LIABILITY AND PROPERTY DAMAGE INSURANCE**

   A. The Contractor shall carry Comprehensive General Liability Insurance written on occurrence form, liability coverage and liability coverage insuring the agreements contained herein. The minimum limits of liability carried on such insurance shall be $1,000,000 on each occurrence and, where applicable, in the aggregate combined single limit for bodily injury and property damage liability; $1,000,000 annual aggregate personal injury liability.

   B. Automobile Liability insurance for owned, non-owned and hired vehicles. The minimum limit of liability carried on such insurance shall be $1,000,000 each accident, combined single limit for bodily injury and property damage.

   C. Worker's Compensation insurance providing statutory coverage and including employer's liability insurance with limits of liability of at least $100,000 for each accidental injury and, with respect to bodily injury by disease, $100,000 each employee and $500,000 per policy year.

   D. X,C,U Hazards covering collapse of buildings, blasting, and damage to underground property. Insurance similar to that required of the Contractor shall be provided by or on behalf of all subcontractors to cover their operations performed under this agreement. The Contractor shall be held responsible for any modifications in these insurance requirements as they apply to subcontractors.

   E. The Customer agrees to furnish certificates of the above mentioned insurance to the Manchester Water Works-City of Manchester within fourteen (14) days from the date of this agreement and, with respect to the renewals of the current insurance policies, at least thirty (30) days in advance of each renewal date. Such certificates shall state that in the event of cancellation or material change, written notice shall be given to the Manchester Water Works Distribution Engineer, 281 Lincoln Street, Manchester, NH 03103-5093 at least thirty (30) days in advance of such cancellation or change.

   F. The Contractor agrees to indemnify and hold harmless the Manchester Water Works, the City of Manchester, and Hoyle, Tanner and Associates, Inc. from any claims on account of the acts or omissions of the Contractor and shall name the above as additional insured.
G. Insurance companies utilized must be admitted to do business in New Hampshire or be on the Insurance Commissioners list of approved non-admitted companies and shall have a rating of (A) or better in the current edition of Best's Key Rating Guide.

5. TIME FOR COMPLETION AND LIQUIDATION DAMAGES

It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning, and the time for completion, as specified in the contract of the work to be done hereunder, are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the “Notice to Proceed”.

The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will ensure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for completion of the work described herein is a reasonable time for the completion of the work, taking in consideration the average climatic range and usual industrial conditions prevailing in this locality.

If the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this contract, to pay to the Owner the amount specified in the contract, not as a penalty, but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default, after the time stipulated in the contract, for completing the work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such an event sustain, and said amount is agreed to be the amount of damages, which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodic estimates.

It is further agreed that time is of the essence of each and every portion of this contract, and of the specifications wherein a definite and certain length of time if fixed for performance of any act whatsoever, and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. PROVIDED, that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor’s reasons for the time extension are acceptable to the liquidated damages, or any excess cost when the delay in completion of the work is due:

1. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including but not restricted to: Acts of nature, or of the public enemy, acts of the Owner, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight, embargoes, and severe weather; and

2. To any delays of subcontractors or suppliers occasioned by any of the causes specified in subsection A of this article:

PROVIDING FURTHER, that the Contractor shall within ten (10) days from the beginning of such delay, unless the Owner shall grant a further period of time prior to the date of final settlement of the contract, notify the Owner, in writing, of the causes of the delay, who shall ascertain the facts
and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

6. EMPLOYMENT OF LABOR

The Contractor shall preview and abide by the Rules and Regulations in effect at the time of this Contract.

The Contractor shall, in the employment of labor, comply with the applicable laws of the State of New Hampshire: Revised Statutes Annotated Chapter 275; Chapter 279 Revised Laws, Minimum Wage Law; and Chapter 280 Revised Laws, Minimum Wages of Employees in Public Works.

The Contractor agrees to comply with Executive Order 11246 of September 24, 1965 entitled, “Equal Employment Opportunity”, as amended by Executive Order 11375 October 13, 1967 and as supplemented in Department of Labor regulations (41 CFR Chapter 60). (All construction contracts awarded in excess of $10,000 by loanees and their contractors).

The Contractor agrees to take out and maintain, at his own expense, insurance against damages arising from injury to his employees, in accordance with Chapter 281 Revised Statutes Annotated.

7. CONTRACT SECURITY

The Contractor shall furnish a performance bond in the amount of at least equal to 100% of the contract, and also a payment bond in an amount not less than 100% of the contract price or in a penal sum not less than that prescribed by State, territorial or local, Law as security for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract. The performance bond and the payment bond may be in one or in separate instruments in accordance with local law.

8. ENGINEER TO DECIDE

The Engineer shall decide all questions which may arise as to the performance, quality and acceptability of work to be done and all materials to be furnished under this Contract and shall decide all questions which may arise as to the interpretation of Plans and Specifications used and as to the fulfillment of this contract on the part of the Contractor and as to defects in the Contractor's work. The order, progress and methods of construction shall, at all times, be satisfactory to the Engineer. The Contractor shall give his/her attention constantly to the faithful performance of the work, and shall keep the same under his/her personal control.

9. TIME AND MANNER OF PERFORMING THE WORK

Before any work is begun, the Contractor shall discuss fully with the Engineer the order and manner of performing the work and the operating procedure shall at all times comply with the requirements of the Engineer. Care should be taken to keep private and commercial entrance (service roads and walkways) interruptions to a minimum and
advance notice should be given the occupant when such interruptions are anticipated.

10. PLANS AND SPECIFICATIONS: INTERPRETATIONS

All Plans and Specifications are to be considered together so that any work shown on the Plans, though not mentioned in the Specifications, and any work mentioned in the Specifications, though not shown on the Plans, is to be executed by the Contractor as a part of the performance on his/her contract. In case of any conflict or inconsistency, such conflict or inconsistency shall be submitted by the Contractor to the Engineer, whose decision thereon shall be conclusive.

11. GENERAL PROVISIONS

Whenever the Contractor is not present on any part of the work where it may be desired to give direction(s), orders may be given by the Engineer and shall be received and obeyed by the superintendent or foreman, who may have charge of the particular work in reference to which orders are given.

12. LAWS AND REGULATIONS

The Contractor shall keep himself fully informed of all state and federal laws and municipal ordinances and regulations in any manner affecting those engaged or employed in the work, or the materials used in the work, or in any way affecting the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. If any discrepancy or inconsistency is discovered in the Plans, Drawings, Specifications or contract for the same to the Engineer in writing. He shall, at all times, himself, observe and comply with and shall work in relation to any such laws, ordinances, regulations, etc., he/she shall forthwith report the cause all his agents and employees to observe and comply with such laws, ordinances, regulations, and decrees; and shall protect and indemnify the Owner and its officers, agents and servants against any claim or liability arising from or based on the violation of any such laws, ordinances, regulations, order or decrees, whether by himself or his employees or subcontractors.

13. MAINTAIN STREETS PASSABLE

Contractor shall comply with the requirements of the City of Manchester Public Works Department Encumbrance Permit and shall implement the Traffic Control Plan.

14. USE OF HIGHWAYS

The use of state, city and town highways for hauling construction equipment or materials involved in the work will be subject to the rules and regulations of the State Highway Department, and City of Manchester governing such use by contractors and the Contractor shall comply with such rules and regulations.

15. PERMITS

The Contractor shall secure all necessary permits from the State, City or Town authorities having jurisdiction for the streets or highways and all other necessary building and construction operations requiring permits, and he will be required to repair any damage
caused by his operations to any street, highway or existing structure either above or below ground surface.

16. **BARRICADES: DANGER, WARNING AND DETOUR SIGNS**

As per the Traffic Control Plan prepared by the contractor.

17. **ACCESS TO WORK**

Authorized engineers, agents and employees of the Water Works may, at any time and for any purpose, enter upon the work and premises used by the Contractor, and the Contractor shall provide safe and proper facilities therefor. Other contractors of the Water Works, federal and City officials, and land owners may also, for all the purposes which may be required by their agreements and contracts, enter upon the work and premises used by the Contractor. Any differences or conflicts which may arise between the Contractor and other contractors of the Water Works, state or land owners, in regard to their work, shall be adjusted and determined by the Engineer.

18. **UNDERGROUND STRUCTURES, SOILS, ETC.**

If any drawing or similar source of information furnished to prospective contractors purports to show underground objects or conditions, pipes, ducts, or similar structures or observations or indications of soils, rock, ground water, etc. made from borings, test pits or prior excavations, such information must be considered as only approximately correct and complete, having been obtained, made and plotted for the information of the Engineer. Contractors must recognize that, by reason of the methods commonly used for obtaining and expressing such data, this information and data may be limited and subject to error or misunderstanding. The terms used to describe soils, ground water, etc., are subject to local usage and to the individual opinion of the person making the records. Ground water conditions vary from time to time. The locations, sizes, depths, etc., of underground utilities, ducts and structures are usually obtained from records of others and such data, when shown on Plans of the Water Works, are subject to possible errors in the source of the information and also errors in transcription. The Water Works, together with its agents, does not warrant or represent that the indications on drawings or other documents on underground conditions, objects, etc., as described above, are either approximately correct or complete, and any party making use of such indications or basing estimates or proposals thereon, must agree that he or it shall have no claim or right of action against either the Water Works or any person or party acting for or under it for the consequences, delays, expenses or losses which may occur or have occurred in the event that such indications shall be found to have been incomplete, incorrect or misleading. Contractors must make such investigations as they deem necessary and form their own opinions of the materials, conditions, and difficulties or obstacles likely to be encountered.

Contractors are hereby specifically cautioned that, in general, individual underground water, gas, electric, telephone, or similar service pipes or lines shown on the drawings are approximate only, and are subject to frequent revisions and/or additions by others.

Whenever the work of the contract crosses under or is located adjacent to gas mains, water mains, sewers, underdrains, electric conduits or poles or telephone ducts or poles, the Contractor shall take special care to avoid damage to these underground structures and shall be liable for any damage that may be caused by any act, omission or neglect on
his part and shall pay all expenses of every kind incidental to this work.

19. SITE MANAGEMENT, DUST CONTROL, ETC.

The Contractor shall maintain the site of the work in a reasonable condition, shall avoid or promptly remove accumulations of dirt, debris, etc., from highways and storage areas, shall control the creation of a dust nuisance by sprinkling or chloride treatment, shall limit noise and vibration and take such other measures as may be reasonable or proper to avoid undue nuisance to surrounding property owners.

20. LINES AND GRADES

N/A

21. ALL WORK TO BE INSPECTED

Proper notice shall be given the Engineer by the Contractor of the times and places he/she intends to do work. All work is subject to inspection by the Engineer. Any work which is done contrary to the direction of the Engineer shall be considered unauthorized. If such unauthorized work is not accepted by the Engineer, the Contractor shall agree to remove and replace such unauthorized work at his/her own expense to the satisfaction of the Engineer when directed to do so.

22. NIGHT OR WEEKEND WORK

If, at any time, the Owner or Engineer shall deem it necessary for the proper progress of the work, the Contractor may be required to perform the work at night or on the weekend, and he/she shall promptly comply with any such requirements. The Contractor may be permitted to work at night or on the weekend if he/she shall satisfy the Engineer of the need therefor, in order to maintain the required progress or protect the work from the elements. If ordered or permitted to work nights or weekends, the Contractor shall provide sufficient and satisfactory lighting and other facilities therefor. The Contractor will be compensated for night or weekend work as part of the Lump Sum Price per the relevant Pay Item. There will be no additional compensation for night or weekend work.

23. CLEANING UP OR RESTORATION WORK

The Contractor shall, at all times, keep the premises free from accumulations of waste materials or rubbish caused by his/her employees or work, or the employees or work of any of his/her subcontractors.

24. ENGINEER MAY NOTIFY CONTRACTOR TO MAKE REPAIRS, ETC.

The Engineer may, from time to time, during construction and/or prior to the end of the maintenance period, notify the Contractor that defects exist which should be corrected, and that roadways, drives, walks, etc., are unsafe or inadequately protected by barricades, lights or other means. Upon receipt of such notice from the Engineer, the Contractor shall immediately proceed to correct the defect, make safe the road, walk or whatever needs attention, if such work is within the obligations of the Contractor under this contract.
25. EMERGENCY REPAIRS

If, in the opinion of the Engineer, at any time while the Contractor is responsible for the work or maintenance thereof, an emergency exists because there are not adequate barricades, lights, signs, etc., to warn and protect the public and/or persons or property in the vicinity of the work, or that the work under construction, or other adjacent streets, grounds or structures are in acute danger of damage or injury by reason of inadequate shoring, sheeting, bracing, drainage protection or other proper precautions, which is the duty of the Contractor to provide or to have provided; or that a street, road, walk or other premises are unsafe be reason of any settlement of any filling placed by the Contractor, the Engineer may direct the Contractor or his/her representative to remedy the difficulty immediately; to furnish and erect the needed barricades, lights or signs, to furnish and set adequate sheeting, shoring and bracing, to provide adequate pumps and drainage facilities; streets, walks or grounds; or to perform similar urgently needed services. If the Contractor or his/her representative is not present or is not immediately available or able to receive such orders as to perform the emergency services needed, or fails to act following such notice, the Engineer acting for the Manchester Water Works may take such measures and means as he deems proper and as are available, to protect the public, the work, and adjacent persons and property from acute danger of immediate loss, injury or damage. The Contractor shall reimburse the Manchester Water Works for the expense of any and all such emergency protective measures and the Water Works may deduct from any sum(s) due or to become due the Contractor such sum(s) as may be sufficient to reimburse the Manchester Water Works for its expense for such emergency work.

26. ACT OR FAILURE TO ACT ON PART OF ENGINEER DOES NOT REDUCE LIABILITY OF CONTRACTOR

Give notice, or failure to give notice; or acting as authorized in the preceding sections, or failure to so act on the part of the Engineer, or any question as to the adequacy of the Notice by the Engineer, or his acts or those of the Owner, as provided in those sections, shall not, in any way, relieve the Contractor from any part of his/her responsibility or liability for performing any and all of the acts and assuming any and all of the risks, duties and liabilities which the Contractor is obligated to perform or assume.

27. PLANT

The Contractor shall furnish plant and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress. If, at any time, such plant appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required, or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character of or increase the plant equipment and the Contractor shall conform to such order, but the failure of the Engineer to give such order shall not relieve the Contractor from his obligations to secure the quality of work and rate of progress herein provided for.

28. CONNECTIONS AND WATER FLOW

The existing 24” DI casing pipe contains a live 14” PVC water main.

29. INSPECTION, HANDLING AND DISTRIBUTION OF MATERIALS

All materials furnished by the Contractor and work done by the Contractor shall be
inspected by the Engineer and rejected materials shall be removed from the site of the work and defective work repaired as directed. The Contractor shall furnish all necessary assistance to the Engineer for all inspecting of materials and work.

The Contractor shall, at his own expense, handle, haul and distribute all materials and all surplus materials on the different portions of the work as required.

30. **BYPASSING**

N/A

31. **RETAINAGE**

The Owner will retain 10% of the total contract price until the contract is successfully completed.

32. **PAYMENT TO CONTRACTOR**

The Contractor shall submit a periodic estimate for payment in three (3) copies to the Manchester Water Works on or before the 25th day of each month. The Engineer shall review this estimate and sign and forward to the Director of the Manchester Water Works for his review and signature. Payment shall be made on or about the 15th of the month, following submittal of the periodic estimate.

33. **OSHA REGULATIONS**

The Contractor shall follow and shall maintain all safety standards as prescribed by OSHA without exception. The Engineer shall require strict adherence to all safety rules and regulations. The Federal Register Number for Contractor reference is Vol. 37, Part 202. The Federal Register Number for construction work for reference is Vol. 37, Part 243.

34. **PARTS OF CONTRACT**

The information for Bidders, the Proposal submitted by the Contractor, the Specifications and the Contract Drawings are part of this Contract.

35. **NOT TO SUBLET OR ASSIGN**

The Contractor shall give his attention constantly to the faithful performance of the work; shall keep the same under his personal control, and shall not sublet the work or any part, thereof, without previous written consent of the Owner and shall not either legally or equitably assign any of the monies payable under this contract or his claim thereto unless by and with the written consent of the Owner.

36. **RESPONSIBILITY OF WORK**

The Contractor shall take all responsibility for the work, and take all precautions for preventing injuries to persons and property in or about the work, shall bear all losses resulting to him on account of the amount or character of the work, or because the nature of the land in or on which the work is different from what was estimated or expected, or on account of the weather, elements or other cause.

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The Contractor shall pay all debts for labor and materials contracted for or by him on account of work herein contemplated. The Contractor shall assume the defense of, and indemnify and save harmless, the Owner and its officers and agents, from all claims relating to labor and materials furnished for the work, to infringement or alleged infringement of inventions, patents and patent rights used in, or in connection with the work or however originating from any of the work under this contract or from conditions created thereby, to injuries to any person or corporation or to damages to any property caused by the acts or negligence of the Contractor or any of his agents or employees, or of any subcontractor or any of his agents or employees, or any of the work, or in consequence of any improper materials, implements or labor used therein; and shall fully reimburse and repay to the Owner all outlay and expenses which the Owner may incur by reason of his failure to do so. The Contractor shall satisfy all suits and claims against the Owner, or its Engineer, arising from the violation of any law, ordinance, regulation, order or decree on the part of the Contractor or any of his agents or employees, or any subcontractor, shall indemnify and save harmless the Owner, or its agents, may suffer by reason of his failure to do so; and shall fully reimburse and repay to the Owner all outlay and expense which the Owner may incur in making off any such default. The Contractor shall fully complete the work required to be done under this contract, free from all liens and claims of any kind whatsoever, and in all other particulars shall faithfully and fully perform the contract on his part according to all the provisions, terms, covenants and conditions hereof and within the time specified herein.

The work shall be entirely at the Contractor's risk until the same is fully completed and accepted, and he will be held liable to any amount not less than the Owner's interest in the same as shown by payment on account.

All the provisions, terms and covenants and conditions of this contract are to be interpreted according to the laws of the State of New Hampshire.

37. COMPETENT PERSONNEL TO BE EMPLOYED

The Contractor shall employ only competent personnel to do the work and whenever the Engineer shall notify the Contractor in writing that any employee on the job is, in his opinion, incompetent, unfaithful, disorderly or otherwise unsatisfactory, such employee(s) shall be discharged from the work and shall not again be employed on it except with the consent of the Engineer.

38. SANITARY PRECAUTIONS

The Contractor shall provide suitable sanitary conveniences or shall make such other arrangements as will positively insure against the occurrence of any nuisance being committed by the employees of the Contractor. The Contractor shall prohibit the committing of nuisances at any point on or adjacent to the site of the work.

39. COMPLETION OF THE WORK IF CONTRACT IS NOT FULFILLED

If the Contractor shall be adjudged bankrupt or if he shall make a general assignment for the benefit of his creditors or if a receiver shall be appointed of his property, or if the work to be done under this contract shall be abandoned, or if this contract or any part thereof shall be sublet, without the previous written consent of the Owner, or if the contract or any claim thereunder shall be assigned by the Contractor otherwise then as herein specified,
or at any time the Engineer shall certify in writing to the Owner that the rate of progress of the work or any part thereof is unsatisfactory, or that the work or any part thereof is unnecessarily or unreasonably delayed, or that the Contractor had violated any of the provisions of his contract, the Owner may notify the Contractor to discontinue all work, or any part thereof, and thereupon, the Contractor shall discontinue such work or part thereof, as the Owner may designate and the Owner may thereupon, by contract or otherwise, as it may determine, complete the work or such part thereof, and charge the entire expense of so completing the work or such part thereof to the Contractor, and for such completion, the Owner for itself or its contractors may take possession of and use or cause to be used in the completion of the work or part thereof any of such materials, machinery, implements and tools of every description as may be found upon the site of the Contractor's operations.

All expense charged under this article shall be deducted and paid by the Owner out of any money then due or to become due the Contractor under this contract or any part thereof, and in such accounting the Owner shall not be held to obtain the lowest figures for the work of completing the contract or any part thereof, or for insuring its proper completion, but all sums actually paid thereafter shall be charged to the Contractor. Incase the expenses so charged are less than the sum which would have been payable under this contract if the same had been completed by the Contractor, the Contractor shall be entitled to receive the difference; and in case such expenses shall exceed the said sum, the Contractor shall pay the amount of the excess to the Owner upon completion of the work, without further demand being made thereof.

40. DAMAGES TO BE PAID OWNER

The Contractor shall pay the Owner all expenses, losses and damages as determined by the Engineer, incurred in consequence of any defect, omission or mistake of the Contractor or his employees or the making good therefore.

41. ERRORS OR OMISSIONS

The Contractor shall be and is required to check all dimensions and quantities of the Contract Drawings and all statements in the Information for Bidders and Specifications before undertaking any portion of the work and shall notify the Engineer of all errors or omissions therein, which he may discover by such examination and checking. The Contractor will not be allowed to take advantage of any error or omission in these Specifications or in the Contract Drawings or in the Information for Bidders. Full instructions will be issued by the Engineer should such error or omission be discovered, and the Contractor shall carry out such instructions as if originally specified.

42. MAINTENANCE BOND

The Contractor shall furnish an acceptable maintenance bond to the Manchester Water Works equal to five percent (5%) of the total estimate of the project. The bond is for maintenance of the project sites and will be in effect for one (1) year after the completion of the contract.
43. MATERIALS FROM MANCHESTER WATER WORKS
   N/A

44. CONTRACTOR TO MAINTAIN BACKFILLED TRENCHES AND SURFACING
   N/A

45. CONTRACTOR TO INSPECT DURING MAINTENANCE PERIOD
   N/A
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for

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PART I GENERAL

1. CONTRACT DOCUMENTS

A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. The Contract Documents shall govern the work covered in all parts of these specifications.

2. SPECIFICATION ARRANGEMENT

A. Titles to and arrangements of sections and paragraphs in these specifications are used merely for convenience and shall not be taken as a correct or complete segregation of the several categories of materials, equipment, and labor, nor as an attempt to outline or define jurisdictional procedures. It is the intent of these specifications which shall be considered correct, and not necessarily the formatting or organization of these specifications.

3. INTENT

A. The entire work provided for in these technical specifications and on the drawings shall be constructed and finished in every respect in a good workmanlike and substantial manner. All parts necessary for the proper and complete execution of the work, whether the same may have been specifically mentioned or not or indicated on the drawings, shall be done and furnished and installed in a manner corresponding with the rest of the work as if the same were particularly described and specifically provided for herein. It is not intended that the drawings shall show every detailed piece of material or equipment, but such parts and pieces as may be necessary to satisfactorily complete any system in accordance with the best practices and regulatory requirements, even though not shown, shall be furnished and installed. All materials and equipment shall be new unless specifically stated otherwise in these Contract Documents.

4. SCOPE

A. The work required by these specifications shall include furnishing all labor, skill, supervision, tools, construction plant, equipment and materials and performing all operations necessary for the properly completed contract work as shown on the drawings, as mentioned in these specifications, and as evidently required with all incidental work necessary and customarily done to the complete satisfaction of the Owner and their authorized representative.
1. General Description of Work:
   a. **Hanger Replacement**: This work consists of the furnishing of labor, equipment and materials for the replacement of steel hangers and related structural components supporting the existing DI water main on the underside of the bridge. It also includes replacing several existing 24” dresser couplings with Victaulic style 230 flexible couplings.

5. CONTRACTOR USE OF PREMISES

A. The Contractor expressly undertakes at his own expense:

   1. To take every precaution against injuries to persons or damage to property;

   2. To store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or the work of any other contractors.

   3. To place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work.

   4. To clean up frequently and promptly, and, at minimum, when instructed by the OWNER or the ENGINEER, all refuse, rubbish, scrap materials, and debris caused by this operation, to the end that at all times the site and the work shall present a neat, orderly and workmanlike appearance.

   5. Before final payment, to remove all surplus material, false-work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations, and to put the site in a neat, orderly condition.

   6. To affect all cutting, fitting or patching of his work required to make the same to conform to the plans and specifications and, except with the consent of the Engineer, not to cut or otherwise alter the work of any other Contractor.

   7. To dispose of all waste or excess material.

B. The Contractor shall not, except after written consent from the proper parties, enter or occupy with people, tools, materials, or equipment, any land outside the rights-of-way or property of the Owner. A copy of the written consent shall be given to the Engineer.

C. The CONTRACTOR shall safeguard all existing structures, utilities and appurtenances not scheduled for removal and shall restore any such items damaged by his operations.
6. LIMITS OF WORK AREA

A. The Contractor shall confine his construction operations within the Contract Limits shown on the Drawings and/or described in the Special Requirements. Storage of equipment and materials, or erection and use of sheds outside of the Contract Limits, if such areas are the property of the Owner, shall be used only with the Owner's approval. The Contractor has the option to negotiate with private entities regarding storage and temporary structures.

7. CONSTRUCTION PERMITS AND EASEMENTS

A. The Owner has applied for a Shoreland Permit by Notification. General Permit requirements are listed in Section 01900 Permits.

B. The Contractor shall be responsible for obtaining all City of Manchester permits required of his equipment, work force, or particular operations (such as local street opening permits and/or electrical work permits) in the performance of the contract.

1. When construction permits are accompanied by regulations or requirements issued by a particular authority or agency, it shall be the Contractor's responsibility to familiarize himself and comply with such regulations or requirements as they apply to his operations on this project.

8. GRADES, LINES AND LEVELS

A. The Contractor shall be responsible for establishing certain reference points and benchmarks in the immediate vicinity of the work areas. The Contractor shall be responsible for layout of all lines and grades for piping, resetting curbing, structures, and otherwise do all layout and measurement necessary for the proper completion of the work.

B. All lines and grades so established shall be carefully prepared and protected. Stakes, monuments, benchmarks, etc. lost or destroyed through the Contractor's negligence or carelessness will be replaced by the Engineer who shall be reimbursed for such work by the Contractor.

C. The Contractor shall furnish assistance to the Engineer as requested to check the layout or otherwise control the work. Such assistance shall be understood to include the provision of suitable manpower to assist the Engineer in taping measurements, holding a survey rod for checking grades and the like.

D. The Engineer reserves the right to inspect or check any of this work, and the Contractor shall not claim added compensation for any delay occasioned by the Engineer exercising this right, nor for any corrective work which is required as a result of the Engineer's inspections. The Contractor shall be responsible for preserving the control points provided by the Engineer throughout the life of the work.
project, and shall accurately replace any such point, which is damaged or moved, at his own expense.

9. COMPUTATION OF QUANTITY

A. Wherever the estimated quantities of work to be done and materials to be furnished under this contract are shown in any of the documents including the bid form, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated by this contract, and such increase or diminution shall in no way vitiate this contract, nor shall any such increase or diminution give cause for claims or liability for damage.

10. LAYOUT OF WORK

A. The Contractor shall do all layout from Contractor’s established reference points, to properly complete the contract work.

11. OSHA REQUIREMENTS

A. The Contractor is obligated to meet all OSHA requirements for work on this project. The Contractor is hereby referred to the latest revised OSHA standards as published in Title 29 of the Code of Federal Regulations (29 CFR), Part 1926 and as published in the Federal Register on Tuesday, October 31, 1989. The Contractor shall be solely responsible for compliance with these latest OSHA standards for work on this project.

12. RECORD DOCUMENTS

A. A complete set of Contract Documents shall be maintained at the work site by the Contractor.

B. The Contractor shall record all changes and/or deviations from the original Contract Documents on Record ("As-Built") Documents.

C. Refer to Specification Section 01720 for Project Record Document requirements.

END OF SECTION
SECTION 01015

COORDINATION

PART I  GENERAL

1. SECTION INCLUDES

A. Should the Contractor damage any utilities, the Contractor shall immediately notify the Owner of the utility and the Engineer. Any repairs or modifications to existing utilities shall be made with the approval of the utility owner and shall be inspected by the utility owner prior to backfill.

B. The Contractor shall be fully responsible for coordination with the following utilities or entities during the entire contract period:

1. Manchester Water Works, 603-624-6494
   a. Deputy Director – Distribution, Guy Chabot

2. Manchester Fire Department 603-669-2256 - Emergency, 911

3. Manchester Police Department, 603-668-8711 - Emergency, 911

4. Manchester Department of Public Works, 603-624-6444
   a. Director, Kevin Shepard


6. Telephone and Data – Consolidated Communication – Customer Service 844-968-7224


8. New Hampshire State Police, Concord, (603) 223-4381 - Emergency, 911

2. CITY OF MANCHESTER

   A. Public Works Department

1. Meet with representatives of the Public Works Department to determine location of facilities and protection required during construction, construction activities and schedule. This department is responsible for maintenance and repair of City roads.
2. Contractor shall repair any City-owned infrastructure damaged by the Contractor’s operations. The Engineer and City representative shall observe all repairs and the repair shall not be considered complete until it is accepted by the Owner, City, and Engineer. Cost for all repairs shall not be included in the lump sum price and shall be completed at no additional cost to the Owner.

3. The Contractor shall be responsible for temporary removal, relocation or replacement of utilities or structures that conflict with construction. Cost for this work shall be included in the lump sum price.

B. Manchester Fire Department

1. Report to the Fire Department on street closings and emergency vehicle access at the start of Construction and upon any changes to the original plans.

C. Manchester Police Department

1. Meet with representatives of Police Department to discuss construction activities and schedule, emergency vehicle access and any proposed street closings or traffic control.

2. Keep Police Department informed of construction activities, progress schedule, emergency vehicle access, proposed street closings, traffic control, and changes thereto.

3. Provide Police Department with the name(s) and phone number(s) of Contractor personnel who can be called in during non-working hours to respond to problems or emergencies in the access and construction areas.

3. LIBERTY UTILITIES

A. Contact Person : Bradford Marx, Senior Engineer, 855-327-7758

B. Meet with representatives of Liberty Utilities to determine location of facilities and protection required during construction, construction activities and schedule.

C. Immediately inform Liberty Utilities of damage to systems. Liberty Utilities systems damaged by the Contractor's operations shall be repaired by Liberty Utilities at the Contractor's expense.

4. EMERGENCY SERVICES

A. Owner will provide Contractor with a list of organizations, departments and agencies offering emergency services.
B. Provide organizations, departments and agencies with up-to-date schedules of construction as construction progresses.

C. Cooperate with organizations, departments and agencies offering emergency services in the event of an emergency on or about the work.

END OF SECTION
1. CONTRACT DOCUMENTS
   A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. This division of these specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other parts of these specifications.

2. GENERAL
   A. Payments to the CONTRACTOR will be made in accordance with the General Conditions of this specification.

   B. Periodic payments for work on lump sum contracts will only be made according to an accepted schedule of values.

      1. Terms of such payment shall be as stated in Sections 31 and 32 of the General Conditions.

   C. Payment for "extra work", authorized in writing by the ENGINEER shall be made upon completion of the "extra work" to the satisfaction of the ENGINEER and in the amount agreed upon at the time of authorization.

      1. Terms of such payment shall be as stated in Sections 31 and 32 of the General Conditions.

   D. No separate payment shall be made for any of the work outlined under Division 1 except for certain items as noted below.

3. 24” DI PIPELINE SUPPORT REPAIRS ON BRIDGE
   A. The Contractor shall be paid the lump-sum bid price for the successful completion of removal and replacement of designated pipe couplings, removal, repairs and/or replacements of pipe supports, fittings and related structural components on the 24” DI casing pipeline under the Amoskeag Bridge as shown on the Contract Drawings and specified herein.

   B. The work is subject to the common provisions of the Specifications and as specifically described in Specification Section 05501, New Hampshire Department of Transportation Standard Specifications for Road and Bridge Construction, 2016, Sections 550 and 708 and Drawings S-1.1, S-1.2, S-1.3 and S-1.4.
C. Periodic payments for lump sum items shall be made on a percentage of completion basis according to the approved schedule of values.

END OF SECTION
PART I    GENERAL

1. SECTION INCLUDES
   
   A. Requirements for submitting product data, shop drawings and samples, construction schedules, requests for information (RFIs), performance affidavits and operation and maintenance (O&M manuals).

   B. A detailed schedule of values (see Specification 01370) shall be submitted for each lump sum item in the bid. The schedule of values must be submitted and approved by the Engineer prior to approval of any progress payments for lump sum items. The schedule shall be broken down by specification section and by subject.

2. CONSTRUCTION SCHEDULES AND PROGRESS REPORTS

   A. Planning and progress schedules shall be prepared as specified in Section 01310, Construction Schedules, of these specifications and shall be submitted to the Engineer by the Contractor prior to the start of work.

3. SHOP DRAWINGS, PRODUCT DATA & SAMPLES

   A. Attention shall be directed to the applicable articles of the General Conditions concerning shop drawings and samples. Special requirements for shop drawings and samples for various types of work are specified in the technical specifications in those sections for the various types of work.

   B. Before submittal to the Engineer, the Contractor shall check all shop drawings or samples for conformance with the Contract Documents including the plans and specifications, for suitability for satisfactory incorporation in the completed contract work, and for correct dimensions, ratings and assembly, and shall note legibly on the drawings or samples that they have verified its acceptability and that they approve it. If there are any deviations in the shop drawings or samples from the plans and specifications, the Contractor shall so note legibly on the shop drawings or samples and also inform the Engineer separately in writing of any such deviation. If deviations are found by the Engineer during review of the shop drawing, and said deviations were not noted by the Contractor, this shall be grounds for ceasing Engineer’s review and returning the submittal marked “Incomplete”.

   C. The Contractor shall submit shop drawings and samples in orderly sequence matched to the construction work, with sufficient completeness to enable review, with reasonable promptness, and allowing sufficient time for the Engineer to review them. All shop drawings and samples shall be properly identified as to their location and
application in the contract work and as to their association with various parts of the plans and specifications. The Contractor shall not commence work on any portion of contract work requiring shop drawings or samples until the submitted shop drawings or samples have been reviewed and approved by the Engineer.

D. Shop drawings may include general, assembly and detail drawings, diagrams, illustrations, material and equipment schedules with manufacturer's name and catalog numbers and description, performance charts, catalog cuts, brochures and such other information and data as is necessary and required by the Engineer.

E. The Contractor shall submit to the Engineer a minimum of six (6) hard copies and an electronic copy in Portable Document Format (pdf) of all final and approved shop drawings and information submittals required for the work. The Engineer reserves the right to request hard copies of all submittals as the Engineer deems necessary. All drawings and information shall contain sufficient and accurate data to ascertain item-by-item compliance with the Contract Documents. Incomplete, inadequate or unidentified submittals will be rejected. The Engineer will examine submittals only after they have been properly identified, as specified herein, and signed by the Contractor to indicate that he has reviewed and endorsed them.

F. The Engineer will review the shop drawings and samples with reasonable promptness. The Contractor shall allow ten (10) days for review by the Engineer after receipt of shop drawings and samples. The Engineer's review and approval shall be only for conformance with the design concept of the contract work and with information given in the plans and specifications. The Engineer's approval of a separate item shall not indicate approval of an assembly in which the item functions. The Engineer's approval shall not relieve the Contractor of responsibility for conforming to the plans and specifications. The Contractor is responsible for confirming and correlating all quantities, dimensions, fabrication details and techniques, installation methods and performance of the work. The Contractor shall check and verify all field measurements.

G. Preliminary information for such items as finish hardware and electrical items and for any other items as called for in the technical sections of these specifications shall be submitted.

H. As soon as practicable and not later than thirty (30) days after the date of notice of award of the contract, but sufficiently in advance of commencement of installation of materials and equipment to allow for approval of the regular submission, the Contractor shall submit preliminary shop drawings in the form of material and equipment schedules which shall contain a complete list of materials, fixtures and equipment to be incorporated in the work. No consideration will be given to partial lists submitted at different times. If any items in the list submitted differ from the item specified in the specifications and plans, the Contractor shall state that the substituted item is of the proper size for the allotted space and will meet the performance requirements of the original item. After approval of the material and
equipment schedules, by the Engineer, the Contractor shall submit the regular submission of shop drawings.

I. The Contractor shall furnish the regular submission of shop drawings after the approval by the Engineer of the preliminary submission if such preliminary submission is required; otherwise, the regular submission of shop drawings shall be submitted to the Engineer with sufficient lead time to allow his review and return of the shop drawings to the Contractor before work is commenced on that portion of the project covered by the shop drawings.

J. If the shop drawings are not approved by the Engineer, the Contractor shall correct or make changes as noted and shall resubmit revised shop drawings until approved by the Engineer. Work completed by the Contractor pertaining to shop drawings that are not approved will be corrected by the Contractor at no additional cost to the Owner.

K. Refer to individual specification sections for required submittals. Additions or deletions may be made by the Engineer or the Owner's representative as may be necessary during the life of the project.

4. SUBMITTAL RESPONSIBILITIES OF THE CONTRACTOR

A. Submittal Transmittal Form:

1. Each Submittal shall include a Transmittal Form that shall identify the Project Name, Location, Contractor, subcontractor, name of item submitted as specified in the Contract Technical Specifications or Drawings, supplier, manufacturer, pertinent Contract Drawing No.(s), Detail Number(s) and applicable Technical Specification Section numbers.

5. ELECTRONIC MAIL (EMAIL) SUBMITTALS BY CONTRACTOR

A. Email Subject shall include the Project Name and the Submittal ID using the following format: Wastewater Pump Stations and Transmission Force Mains - Submittal SSSSS-NN.T – Name of Item Submitted.

B. The Name of Item Submitted shall be identified as specified in the Contract Technical Specifications or Drawings.

C. Email Submittals shall contain one Submittal only.

D. Email Submittals shall contain one attachment only.

E. Email Submittal attachment file name shall be the Submittal ID as defined herein.

F. There shall be no text in the Email body.
G. The Email attachment shall be a word searchable .pdf file format.
H. The first page of the Email attachment shall be the Submittal Transmittal Form.

I. The Submittal content shall be located after the Submittal Transmittal Form.

J. Submittal content within the .pdf shall be oriented to be read without having to rotate pages.

K. Email Submittals shall contain attachments less than 25 MB in size.

L. Submittals that contain Drawings drawn to Scale on paper larger than 11”x17” size, shall be submitted by hardcopy.

6. REQUESTS FOR INFORMATION (RFI’s) BY THE CONTRACTOR

A. The Contractor shall be responsible for coordinating and submitting to the Engineer Written Requests for Information (RFI’s) on an RFI Form approved by the Engineer prior to submittal of the first RFI.

B. The RFI shall identify in writing the aspects of the Contract Documents for which clarification is requested by the Contractor.

C. The RFI shall reference the Contract Drawing Number, Detail Number or Technical Specification Section and Subsection that is the subject of the RFI.

D. The RFI shall include a description of the desired clarification and a proposed solution. The RFI shall indicate and quantify the schedule or cost impact, if any. Each RFI shall be sequentially numbered in sequence.

E. RFI’s shall be submitted to the Engineer by Email as specified below:

1. The RFI shall be submitted as a .pdf file attachment to an email.

2. The email Subject Line shall include the Project Name, RFI # and RFI Subject using the following format: Wastewater Pump Stations and Transmission Force Mains – RFI-NNN – RFI Subject. Example RFI Email Subject Line:

   a. Wastewater Pump Stations and Transmission Force Mains – RFI-001 – Pipe Alignment Clarification

3. The RFI subject description shall be identified as specified in the Contract Technical Specifications or Drawings.

4. Emailed RFI’s shall contain one RFI only.

5. Emailed RFI’s shall contain one attachment only.
6. Emailed RFI attachment file name shall be the RFI # and subject using the following format RFI-NNN – RFI Subject. Example:

   a. RFI-001 – Pipe Alignment Clarification
   b. In this example the RFI is the first RFI submitted on the project.

F. There shall be no text in the Email body.

G. Contractor shall include clarifying sketches or other information in the attached RFI .pdf file, located after the RFI Form.

H. Submittal content within the .pdf file shall be oriented to be read without having to rotate pages.

I. Emailed RFI .pdf files shall be less than 25 MB in size.

7. CONTACT INFORMATION

A. The contractor shall submit a listing of contact names and phone numbers of personnel to be contacted in emergency situations.

B. The contractor shall provide a listing of contact names, addresses and phone numbers of all major subcontractors and suppliers. Contacts shall be cross referenced by specification sections.

C. The contractor shall designate an individual who shall be responsible for job safety.

END OF SECTION
PART I GENERAL

1. DESCRIPTION:

A. Work included: To assure adequate planning and execution of the Work so that the Work is completed within the number of calendar days allowed in the Contract, and to assist the Engineer in appraising the reasonableness of the proposed schedule and in evaluating progress of the Work, prepare and maintain the schedules and reports described in the Section.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Requirements for progress schedule: General Conditions and as included herein
3. Construction period: As per Notice to Proceed

C. Definitions

1. Day, as used throughout the Contract unless otherwise stated, means "calendar day".

D. The Contractor shall, within fourteen (14) calendar days of the award of the contract, work out in detail a schedule, covering all parts of the work. The progress schedule shall provide for the work to be done in an orderly progression, shall forecast the dates for carrying out each portion of the work, and shall account for any special conditions or requirements involved in the project. The schedule shall be designed to show estimated percentage completed and cash flow amount each month.

2. SUBMITTALS:

A. Comply with pertinent provisions of Section01300.

B. Preliminary schedule: Within fourteen (14) calendar days after the Contractor has received the Notice of Award of the General Contract, submit one reproducible copy and four prints of a preliminary construction schedule prepared in accordance with the balance of this Section. The preliminary schedule shall contain a listing of all the activities and the duration of each activity and shall identify the critical path for project completion.
C. Periodic Reports: On the first working day of each month submit one reproducible copy of the construction schedule updated to reflect any changes to the preliminary project schedule submitted within 14 days of Notice of Award.

END OF SECTION
SECTION 1370

SCHEDULE OF VALUES

PART I GENERAL

1. DESCRIPTION:

   A. Work included: Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.

   B. Related Work:

      1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
      2. Schedule of values is required in accordance with the General Conditions.
      3. Breakdown shall be made using the Construction Specifications Institute Index.

2. QUALITY ASSURANCE:

   A. Use required means to assure arithmetical accuracy of the sums described.

   B. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer, substantiating the sums described.

3. SUBMITTALS:

   A. Prior to first application for payment, submit a proposed schedule of values to the Engineer.

      1. Meet with the Engineer and determine additional data, if any, required to be submitted.
      2. Submit Purchase Orders from vendors for all proprietary equipment.
      3. Secure the Engineer's approval of the schedule of values prior to submitting first application for payment.
      4. Submit schedule of values with each pay request indicating the percentage of work completed.

PART II PRODUCTS (NOT USED)

PART III EXECUTION (NOT USED)

END OF SECTION

SCHEDULE OF VALUES 01370-1
QUALITY CONTROL

PART I GENERAL

1. INSPECTION AND TESTING

A. All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be approved by the Owner.

B. Materials of construction, particularly those upon which the strength and durability of the structure may depend, shall be subject to inspection and testing to establish conformance with specifications and suitability for uses intended.

C. The Contractor shall allow the Engineer ample time and opportunity for testing materials and equipment to be used in the work. He shall advise the Engineer promptly upon placing orders for materials and equipment so that arrangements may be made, if desired, for inspection before shipment from the place of manufacture. The Contractor shall at all times furnish the Engineer and his representatives, facilities including labor, and allow proper time for inspecting and testing materials, equipment and workmanship. The Contractor must anticipate that possible delays may be caused in the execution of this work due to the necessity of materials and equipment being inspected and accepted for use. The Contractor shall furnish, at the Contractor’s own expense, all samples of materials required by the Engineer for testing, and shall make their own arrangements for providing water, electric power, or fuel for the various inspections and tests of structures and equipment.

D. The Contractor shall furnish the services of representatives of the manufacturers of certain equipment, as prescribed in other sections of these specifications. The Contractor shall also place orders for such equipment on the basis that, after the equipment has been tested prior to final acceptance of the work, the manufacturer will furnish the Owner with certified statements that the equipment has been installed properly and is ready to be placed in functional operation. Tests and analyses required of materials, installed or otherwise, shall be paid for by the Contractor, unless specified otherwise in the section which covers a particular piece of equipment.

E. Where other tests or analyses are specifically required in other sections of these specifications, the cost thereof shall be borne by the Contractor as designated in such sections. The Owner will bear the cost of all tests, inspections, or investigations undertaken by order of the Engineer for the purpose of determining conformance with the Contract Documents if such tests, inspections, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the Engineer as a result of such
tests, inspections or investigations, the Contractor shall bear the full cost thereof or shall reimburse the Owner for said cost. In this connection, the cost of any additional tests and investigations, which are ordered by the Engineer to ascertain subsequent conformance with the Contract Documents, shall be borne by the Contractor.

F. The expense of any retesting, necessary in the opinion of the Engineer, due to previous tests of materials, equipment or construction not meeting the requirements of the specifications and drawings, shall be borne by the Contractor.

G. The contract work shall at all times be subject to the observation of the Owner's Representative and the Engineer. Observation or non-observation by the Owner's Representative and the Engineer shall not relieve the Contractor from his contractual obligation to furnish work and material as required, and properly complete the contract work in accordance with these Contract Documents. If the Owner's Representative and the Engineer considers that the contract work is not being properly accomplished they may condemn or reject all or any part of the work and any materials or equipment incorporated in it. If any material, equipment, or work is condemned or rejected by the Owner's Representative and the Engineer, the Contractor shall bear all expenses for removal and proper replacement of such material, equipment or work required to be provided by these Contract Documents. The expense of replacing any work done by Others which is adversely effected by removal and proper replacement of improper work done by the Contractor shall be borne by the Contractor.

H. The authorized representatives and agents of the Owner and concerned State and Federal Agencies shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

I. If work to be done away from the construction site is to be observed on behalf of the Owner during its fabrication, manufacture, testing, or shipping, such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the observation can be made.

J. The Contractor shall give proper notice to governing departments and inspectors having jurisdiction and shall have all parts of the work inspected and approved by them as may be required.

2. IMPERFECT WORK, EQUIPMENT, OR MATERIALS

A. The Engineer may order tests of imperfect or damaged work, equipment or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the Contractor and the nature, tester, extent and supervision of the tests will be as determined by the Engineer. If the results of the tests indicate that the required functional capability of the work, equipment or material was not impaired, consistent with the final general appearance of same, the work, equipment or materials may be deemed acceptable. If
the results of such tests reveal that the required functional capability of the questionable work, equipment or materials has been impaired, then such work, equipment or materials shall be deemed imperfect and shall be replaced. The Contractor may elect to replace the imperfect work, equipment or material in lieu of performing the tests.

3. STANDARDS OF TESTING, MATERIALS AND DESIGN

A. Other sections of these specifications frequently require that the quality of materials, dimensions, workmanship, testing and methods of design, fabrication and installation of various items and materials be in accordance with recognized standards, specifications or practices of others. Wherever reference is made to such other standards, they shall be considered to be incorporated in these specifications, and the Contractor shall comply fully with the provisions or latest revisions or issue of such standards which existed at the time of the bid opening, unless specifically modified in other sections of these Specifications. Below is a partial list of those standards which are most frequently utilized in these Specifications, together with their commonly used abbreviations:

AA - Aluminum Association
AASHTO - American Association of State Highway and Transportation Officials
AGMA - American Gear Manufacturers Association
AIA - American Institute of Architects
ASTM - American Society for Testing and Materials
AWWA - American Water Works Association
ANSI - American National Standards Institute (formerly USA Standards)
ASCE - American Society of Civil Engineers
ASME - American Society of Mechanical Engineers
AIEE - American Institute of Electrical Engineers
ACI - American Concrete Institute
AISC - American Institute of Steel Construction
AISI - American Iron and Steel Institute
AMCA - Air Moving and Conditioning Association, Inc.
API - American Petroleum Institute
AREA - American Railway Engineering Association
ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
AGA - American Gas Association
AWS - American Welding Society
BOCA - Building Officials and Code Administrators International
EPA - U.S. Environmental Protection Agency
CRSI - Concrete Reinforcing Steel Institute
FAA – Federal Aviation Association
FmHA - Farmer's Home Administration, U.S. Dept. of Agriculture
NBFU - National Board of Fire Underwriters
END OF SECTION
PART I GENERAL

1. CONTRACT DOCUMENTS

A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. This division of these specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other parts of these specifications.

2. GENERAL

A. All temporary and construction facilities required by the CONTRACTOR shall be furnished by the Contractor and shall meet all local codes and requirements for such temporary installations. All temporary facilities shall be entirely removed upon completion of the work and the site shall be left in a satisfactory condition.

B. All temporary and construction facilities shall be provided and maintained so as not to create fire or safety hazards.

3. TEMPORARY SANITARY

A. Temporary sanitary facilities shall be provided by the CONTRACTOR, at each site, for the use of his personnel and the personnel of his subcontractors until the finish of the contract work. Temporary sanitary conveniences shall be supplied by the CONTRACTOR in sufficient numbers for the use of all persons employed on the Contract work, shall be properly screened from public observation, and shall be properly maintained by the CONTRACTOR. The temporary sanitary conveniences shall be finally removed from the project site, by the CONTRACTOR, when they are no longer needed.

1. During the life of this contract, the CONTRACTOR shall strictly comply with all applicable requirements of the State sanitary code. Particular attention shall be taken of requirements concerning disposal of sanitary sewage in unsewered areas and concerning providing sanitary conveniences.

4. TEMPORARY ENCLOSURES

A. The CONTRACTOR shall provide all temporary roof, wall, door, and window closures, as necessary, in the facilities under construction to keep out weather or intruders. The CONTRACTOR shall take all necessary precautions so that the work may be properly completed.
and satisfactorily done during adverse weather conditions and to guard against the possible effects of adverse weather.

Temporary enclosures shall be sufficiently strong to withstand wind and inclement weather and shall be maintained in a secure and weather-tight manner. After permanent windows and doors are installed and glazed, all temporary enclosures shall be removed

END OF SECTION
PART I  GENERAL

1. REQUIREMENTS INCLUDED

   A. Provide secure storage and protection for products to be incorporated into the work and maintenance and protection for products after installation and until completion of work.

2. RELATED REQUIREMENTS

   A. Section 01600: Material and Equipment
   
   B. The respective Section of Specifications: Special requirements for specific products.

3. STORAGE

   A. Store products immediately on delivery and protect until installed in the work.

      1. Store in accordance with manufacturer’s instructions, with seals and labels intact and legible.

   B. Store products subject to damage by elements in substantial weathertight enclosures.

      1. Maintain temperatures within ranges required by manufacturer’s instructions.
      
      2. Provide humidity control for sensitive products, as required by manufacturer’s instructions.
      
      3. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.

   C. Exterior Storage: Provide substantial platform, blocking or skids to support fabricated products above ground; prevent soiling or staining.

      1. Cover products, especially PVC, HDPE and polybutylene pipe, which are subject to discoloration or deterioration from exposure to the elements, with impervious opaque sheet coverings. Clear plastic (“Visqueen”) will not be allowed. Provide adequate ventilation to avoid condensation.
      
      2. Prevent mixing of refuse or chemically injurious materials or liquids.

   D. Arrange storage in manner to provide easy access for inspection.
E. Coordinate with Owner if Owner’s building or facilities are to be used for storage of Contractor equipment or materials. Contractor’s use of Owner’s buildings or facilities for storage, if allowed by the Owner, shall in no way hinder the Owner’s operations or maintenance procedures.

4. MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions as stated above and as required by the manufacturer.

2. Required environmental conditions are maintained on continuing basis.

3. Surfaces of products exposed to elements are not adversely affected.
   a. Any weathering of products, coatings and finishes is not acceptable under requirements of these Contract Documents.

A. Mechanical and electrical equipment, which requires servicing during long-term storage, shall have complete manufacturer’s instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1. Equipment shall not be shipped until approved by the Engineer. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer.

2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the Engineer until such time as the equipment is to be installed.

3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.

4. Manufacturer’s storage instructions shall be carefully studied by the Contractor and reviewed with the Engineer. These instructions shall be carefully followed.

5. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal “welding”. Upon installation of the equipment, the Contractor shall start the equipment at least half load once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.

6. Moving parts shall be rotated and Lubricants shall be changed upon completion of installation and as frequently as required, thereafter during the period between installation and acceptance.
7. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor’s expense.

5. PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces

B. Provide coverings to protect finished surfaces from damage.

C. Materials or equipment damaged after installation shall be replaced by the Contractor at no additional expense to the Owner.

END OF SECTION
PART I  GENERAL

1. CONTRACT DOCUMENTS

A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. This division of these specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other parts of these specifications.

2. FINAL CLEAN-UP/SITE RESTORATION

A. At all times, the Contractor (and his subcontractors) shall keep the contract work area free from the accumulation of waste materials or rubbish caused by construction operations. At the completion of the contract work, the Contractor shall remove all waste materials and rubbish from the Owner's property as well as all tools, construction equipment, machinery and surplus materials and shall leave the contract work area "broom clean". The Contractor shall leave surfaces of the contract work free from foreign matter. The exterior and interior of all equipment and systems shall be kept clean at all times.

B. Equipment delivered to the job site with temporary protective coating shall have these removed and the equipment cleaned up satisfactorily. If a dispute arises between the Contractor and Others as to the responsibility for cleaning up, the Owner's Representative shall determine who shall be responsible. If the Contractor fails to clean up, the Owner may do so, and the cost thereof shall be paid by the Contractor.

C. Before finally leaving the site, the General Contractor shall wash and clean all exposed surfaces which have become soiled or marked. Each contractor shall remove from the site of the work all accumulated debris and surplus materials of any kind which result from his operations, including construction equipment, tools, sheds, sanitary enclosures, etc. Each Contractor shall leave all equipment, fixtures, and work, which he has installed, in a clean condition. The completed project shall be turned over to the Owner in a neat and orderly condition.

D. Before completion of the contract work, ruts and scars caused by construction operations under this contract shall be removed and smoothly re-graded to the surrounding area. Damage to features of the land resulting from the Contractor's operations shall be corrected and the land and its features restored as nearly as practicable to its original condition or to any approved changes indicated on the drawings, before final acceptance of the work. Any hazardous conditions that could endanger or hinder the Owner's or user's utilization of the land shall be corrected immediately. Any drainage ditches or
pipes plugged due to the Contractor's operations shall be restored to allow free flow and removal of surface water. The Contractor shall be entirely responsible for any unnecessary or excessive damages to lands resulting from his operations.

3. INSPECTIONS

A. The Contractor shall inform the Engineer when he believes that the constructed facilities are Substantially Complete and shall request an Engineer’s inspection. Prior to the Engineer scheduling their inspection, the Contractor shall furnish to the Engineer the Contractor’s “punch-list” of known work remaining to be completed. The Engineer will review the Contractor’s “punch-list” and determine if an inspection is warranted. The Engineer shall not perform the inspection until the conditions of Section 5.B. below have been met in full.

1. If the Contractor prematurely requests the Engineer’s inspection, and the facilities are found to be inadequately installed or not Substantially Complete for whatever reason, as required by Section 5.B. below, the Contractor shall be responsible for reparations made to the Owner to cover the cost of Engineer’s inspection.

B. The Engineer will make his final inspection of the work during the progress of final cleaning and repairing, and any portion of the work finally inspected and accepted by the Engineer shall be kept clean by the Contractor, until the final acceptance of the entire work. Final cleaning and repairing shall be so arranged as to be finished upon completion of the construction work.

C. When the Contractor has finally cleaned, and repaired the whole, or any portion of the work, he shall notify the Engineer that he is ready for final inspection of the whole or a portion of the work, and the Engineer will thereupon inspect the work. If the work is not found satisfactory, the Engineer will order further cleaning, repairs or replacement.

D. When such further cleaning or repairing is completed, the Engineer, upon further notice, will again inspect the work. The "Final Payment" will not be processed until the Contractor has complied with the requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

4. PROJECT CLOSE-OUT

A. As construction of the project enters the final stages of completion, the Contractor shall, in conjunction with accomplishing the requirements set forth in the Contract Documents, attend to or have already completed the following items as they apply to his contract:

1. Scheduling equipment manufacturers’ visits to site.
2. Required testing of project components.
3. Scheduling start-up and initial operation.
4. Scheduling and furnishing skilled personnel during initial operation.
5. Correcting or replacing defective work, including completion of items previously overlooked or work which remains incomplete, all as evidenced by the Engineer's "Punch" Lists.
6. Attend to any other items listed in the Special Requirements or brought to the Contractor's attention by the Engineer.

B. Prior to issuance of the Engineer's Certificate of Substantial Completion, the Contractor shall submit to the Engineer all required records, certifications, etc., as specified in other sections of the Contract Documents. Missing, incomplete, or unacceptable items, as determined by the Engineer or the Owner, shall constitute grounds for withholding of payment to the Contractor. A partial listing of such items appears below, but it shall be the Contractor's responsibility to ensure that any and all other such items which are required as specified in the Contract Documents are submitted.

1. Acceptable Equipment Operation & Maintenance Manuals have been submitted and accepted by the Owner.
2. Operator training by qualified manufacturer representatives has been completed and accepted by the Owner.
3. Automated controls are complete, functioning and tested. Electrical panels, including PLCs, have all wires and cables labeled and color coded as required by these specifications. Electrical panel as-built drawings have been submitted and accepted by the Owner. Electrical panels have been cleaned and are ready for Owner use.
4. Acceptable manufacturer field test reports, performance affidavits and certification that the equipment has been installed, inspected, tested and is ready for permanent operation by the Owner with no warranty exceptions.
5. All equipment safeguards completed.
6. The Owner is receiving full beneficial use.

C. Prior to issuance of the Engineer's Certificate of Final Completion, the Contractor shall accomplish the cleaning and final adjustment of the various building components as specified in the detailed technical specifications and as follows:

1. Clean all finish hardware after adjustment for proper operation.
2. Touch up marks or defects in painted surfaces and touch up any similar defects in factory finished surfaces.
3. Remove bitumen from gravel stops, fascias and other exposed surfaces.
4. Remove all stains, marks, fingerprints, soil, spots and blemishes from all finished surfaces, tile, stone, brick and similar surfaces.
5. Clean all equipment, including electrical panels, so that they are free from dust, stains, spots and blemishes. Clean inside of electrical and control panels so that only items required by the Owner to operate the equipment is left inside (i.e. panel drawings, etc.)

D. Prior to issuance of the Engineer's Certificate of Final Completion, the Contractor shall submit the following:
1. One set of neatly marked up drawings recording all changes and additions to the work under this contract (see requirements of Specification 01720).
2. Any special guarantees, warranties or bonds, submitted to the Owner.

E. The Contractor shall make note of the fact that required certifications and information above, must actually be submitted early on in the life of the project as required in other sections of these Specifications.

END OF SECTION
PART I GENERAL

1. DESCRIPTION:

   A. Work Included:

      1. Throughout progress of the work, maintain an accurate record of changes in the Contract Documents, as described in Part 3, Section 1 below.

      2. Upon completion of the Work, transfer the recorded changes to a set of Record Documents, as described in Part 3, Section 2 below.

   B. Related Work:

      1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

      2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

2. QUALITY ASSURANCE:

   A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Engineer.

   B. Accuracy of Records:

      1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.

      2. Accuracy of records shall be such that future searches for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

     C. Make entries within 24 hours after receipt of information that the change has occurred.

3. SUBMITTALS:

   A. Comply with pertinent provisions of Section 01300.
B. The Engineer's approval of the current status Project Record Documents shall be a prerequisite to the Engineer's approval of requests for progress payment and request for Final Payment under the Contract.

1. The Contractor will provide three (3) record copies of all project record documents with the locations indicated (by cross ties or latitude/longitude, and including elevations) for all constructed facilities, above and below ground, including but not limited to pipelines, conduit, saddles, sleeves, repair clamps, valves, hydrants, air release valves, and taps made for pressure/leakage tests or for chlorination purposes for all work included in each application for payment made in accordance with Section 01025, Measurement and Payment.

C. Prior to submitting each request for progress payment, the Contractor shall secure the Engineer's approval of the current status of the Project Record Documents.

4. PRODUCT HANDLING:

A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.

B. In the event of loss of recorded data, use means necessary to again secure the data to the Engineer's approval.

1. Such means shall include, if necessary in the opinion of the Engineer, removal and replacement of concealing materials.

2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART II PRODUCTS

1. RECORD DOCUMENTS:

A. Job set: Promptly following receipt of the Owner's Notice to Proceed, secure from Owner or Engineer one complete set of all Documents comprising the Contract.

B. Final Record Documents: At a time nearing the completion of the work, Contractor shall submit three (3) complete sets of all Final Record Drawings. The Final Record Drawings shall be a complete Contract Drawing Set, including details of all items changed in the field. The Record Drawings shall be neatly prepared, with deviations from the design clearly marked on the drawings by hand. Upon Engineer’s approval of the Final Record Documents, the Contractor shall provide three hard copies and one electronic copy (.pdf format).

C. The Contractor shall certify each Record Drawing with the following statement:
1. "_______ (name of Contractor) hereby certifies that these final Record Drawings represent the actual “as-built” condition and location of all project components."

PART III EXECUTION

1. MAINTENANCE OF JOB SET:

   A. Immediately upon receipt of the job set described in Paragraph 2.01.A above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET".

   B. Preservation:

   2. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Engineer.

   3. Do not use the job set for any purpose except entry of new data and for review by the Engineer, until start of transfer of data to final Project Record Documents.

   4. Maintain the job set at the site of work as the Engineer designates that site.

C. Making Entries on Drawings:

   1. Date all entries.

   2. Call attention to the entry by a "cloud" drawn around the area or areas affected.

   3. In the event of overlapping changes, use different colors for the overlapping changes.

D. Make entries in the pertinent other Documents as approved by the Engineer.

E. Conversion of Schematic Layouts:

   1. In some cases on the Drawings, arrangements of conduits, circuits, piping, and similar items, is shown schematically and is not intended to portray precise physical layout.

      a. Final physical arrangement is determined by the Contractor, subject to the Engineer's approval.

      b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items, which are shown only schematically, on the drawings. Therefore, the record documents shall include conversion of schematic layouts to the final physical locations.
2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as those described in subparagraph 3.01.E.1.

a. Clearly identify the item by accurate note such as "process water", "drain", etc.

b. Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed", etc).

c. Make all identification sufficiently descriptive that it may be related reliably to the Specifications.

2. FINAL PROJECT RECORD DOCUMENTS:

A. The purpose of the final project Record Documents is to provide factual information regarding all aspects of the work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site measurement, investigation, and examination.

B. Review and Submittal:

1. Submit the completed set of Project Record Documents to the Engineer as described in Paragraph 1.03.C above.

2. Participate in review meetings as required.

3. Make required changes and promptly deliver the final Project Record Documents to the Engineer.

3. CHANGES SUBSEQUENT TO ACCEPTANCE:

A. The Contractor has no responsibility for recording changes in the work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION
SECTION 01900

PERMITS

PART I GENERAL

1. CONTRACT DOCUMENTS

   A. Attention shall be directed to the General Conditions for the definition of the Contract Documents. The Contract Documents shall govern the work covered in all parts of these specifications.

   B. The Contractor shall be responsible for obtaining all building and other permits required of his equipment, work force, or particular operations (such as electrical work permits) in the performance of the contract.

2. NHDES SHORELAND PERMIT BY NOTIFICATION

   A. The Contractor shall be responsible for complying with all requirements of the NHDES Shoreland Permit by Notification.

3. CITY OF MANCHESTER EXCAVATION PERMIT

   A. The Contractor shall be responsible for obtaining an Excavation Permit from the City of Manchester Highway Department prior to any proposed excavation within the City right-of-way or on City property.

4. CITY OF MANCHESTER ENCUMBRANCE PERMIT

   A. The Contractor shall be responsible for obtaining an Encumbrance Permit from the City of Manchester Highway Department for any temporary closure or narrowing of a pedestrian walkway or City street.

5. WASTE DISPOSAL

   A. The Contractor shall be responsible for complying with all applicable federal, state and local regulations regarding waste disposal from this project.

END OF SECTION
Index
for
DIVISION 2 - SITE WORK

02660  Water Mains, Fittings and Appurtenances
PART I GENERAL

1. CONTRACT DOCUMENTS

   A. Attention shall be directed to the General Conditions and Supplementary General Conditions for the definition of the Contract Documents. This section of these specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other parts of these Specifications.

2. WORK INCLUDED

   A. Extent of water mains, hydrants, appurtenances and associated work is shown on drawings and as herein specified.

   B. Included. Work under this section includes construction and/or replacement of water mains including: excavation (except rock); bedding; backfill and refill; furnishing, laying and jointing pipe; maintaining existing water mains and water service connections; connecting new water mains to existing water mains; valves; gates; hydrants; and appurtenances; inspection and testing; disinfection; and all incidental work as shown on the plans, as herein specified, and as directed by the Engineer.

3. ASSOCIATED WORK SPECIFIED ELSEWHERE

   A. The following items appurtenant to this work are a part of the contract work specified under other sections of these specifications but are mentioned here for cross reference purposes.

   None

4. APPLICABLE STANDARDS

   A. Materials and workmanship under this Section shall be in accordance with the applicable standards of the American Water Works Association (AWWA), latest revision, as specifically referenced elsewhere in this Section.
<table>
<thead>
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<th>Reference</th>
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<tr>
<td>ANSI/AWWA C104/A21.4</td>
<td>American National Standard for Cement Linings, Seal Coated Inside and Outside</td>
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<tr>
<td>ANSI/AWWA C110/A21.10</td>
<td>American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids</td>
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<tr>
<td>ANSI/AWWA C151/A21.51</td>
<td>American Standard for Ductile Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids</td>
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<tr>
<td>AWWA C605</td>
<td>Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water</td>
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<tr>
<td>AWWA C651</td>
<td>Standard for Disinfecting Water Mains</td>
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<tr>
<td>AWWA C900</td>
<td>Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100mm Through 300mm), for Water Distribution</td>
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<tr>
<td>AWWA C905</td>
<td>Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350mm Through 1200mm), for Water Distribution and Transmission</td>
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<td>ASTM C923</td>
<td>Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals</td>
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<tr>
<td>ASTM D1784</td>
<td>Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds</td>
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<td>ASTM D1785</td>
<td>Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120</td>
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<td>ASTM D2152</td>
<td>Test Method for Degree of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion</td>
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<td>ASTM D2241</td>
<td>Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)</td>
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<td>ASTM D2665</td>
<td>Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings</td>
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<tr>
<td>ASTM D3034</td>
<td>Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings</td>
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<tr>
<td>ASTM F477</td>
<td>Elastomeric Seals (Gaskets) for Joining Plastic Pipe</td>
</tr>
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</table>
Reference | Title
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ASTM F679 | Standard Specification for Poly(Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F1057 | Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique
ASTM F1417 | Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
UNI-B-6 | Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe
UNI-PUB-08 | Tapping Guide for PVC Pressure Pipe
NSF-14 | Plastics Piping System Components and Related Materials
NSF-61 | Drinking Water System Components--Health Effects
PPI TR-2 | PVC Range Composition Listing of Qualified Ingredients

5. SUBMITTALS AND CERTIFICATIONS

A. Shop drawings, including specifications, catalog cuts, data sheets, drawings and other descriptive material, shall be furnished in accordance with Section 01300 for the pipe, gaskets, joints, fittings, valves, insulation, encasements, specials and other items specified under this Section.

B. Certificates of Compliance as specified in this Section shall be submitted to the Engineer in accordance with the requirements of Section 01300, Submittals.

C. PVC Pipe:

1. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:
   a. Pipe Size
   b. Dimensionality
   c. Pressure Class per applicable standard
   d. Color
   e. Recommended Minimum Bending Radius
   f. Recommended Maximum Safe Pull Force
   g. Fusion technician qualification indicating conformance with this specification

2. The following AS-RECORDED DATA is required from the contractor and/or fusion provider to the owner or pipe supplier upon request:
   a. Approved datalogger device reports
b. Fusion joint documentation containing the following information:
   i. Pipe Size and Thickness
   ii. Machine Size
   iii. Fusion Technician Identification
   iv. Job Identification
   v. Fusion Joint Number
   vi. Fusion, Heating, and Drag Pressure Settings
   vii. Heat Plate Temperature
   viii. Time Stamp
   ix. Heating and Cool Down Time of Fusion
   x. Ambient Temperature

D. Casing Spacers:
   1. Casing spacer specifications from the supplier shall be provided including the following:
      a. Spacer Material and Thickness
      b. Shell Liner Thickness
      c. Liner Hardness
      d. Riser Material and Thickness

E. Spacer End Seals:
   1. Spacer end seal specifications from the supplier shall be provided including the following:
      a. Seal Material and Thickness
      b. Band Material

PART II PRODUCTS AND MATERIALS

A. Ductile Iron Pipe

   1. All pipe, fittings, valves and appurtenances shall meet all applicable requirements stipulated herein as follows:


2. Pipe shall be ductile iron, Class 52.

3. Pipe shall have double cement lining with seal coating inside and bituminous coating outside that meets or exceeds the requirements of AWWA/ANSI Standard C104/A21.4.

4. Joints on pipe shall be of the push-on or restrained type as specified or indicated. Joints on valves and fittings shall be of the mechanical joint with retainer gland or restrained type.

5. Mechanical joint retainer glands shall be EBBA Series 1100 or approved equal.

6. Restrained type joints shall be American Cast Iron Pipe, Lok-Ring; U.S. Pipe, TR-FLEX; Clow, Super-Lock or acceptable equivalent.

7. Gasket joints shall be oil-resistant rubber gaskets meeting or exceeding the requirements of AWWA/ANSI Standard C111/A21.11. Pipe shall be furnished complete with gaskets and lubricant.

8. Sleeve couplings shall be cast or ductile iron solid sleeves with restrained joints or retainer glands.

9. Polyethylene encasement shall be installed on all buried ductile iron pipe. Polyethylene encasement shall conform to the requirements of AWWA/ANSI C105/A21.5, latest edition. Polyethylene encasement shall be fitted to the contour of the pipe to effect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack shall be provided in contouring to prevent stretching the polyethylene when bridging irregular surfaces, such as bell/spigot interfaces, bolted joints, or fittings, and to prevent damage to the polyethylene during backfilling operations. Overlaps and ends shall be secured with polyethylene-compatible adhesive tape or recommended strapping.

10. A Certificate of Compliance indicating conformance with the above specified requirements for ductile iron pipe shall be submitted to the Engineer. Certificates of Compliance shall be submitted prior to shipment of the pipe. Certificate of Compliance shall be notarized by a Notary Public or Justice of the Peace.
B. PVC Pipe

1. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

2. Fusible polyvinylchloride pipe shall be used as manufactured under the trade names Fusible C-900®, Fusible C-905®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679-9551. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051. Owner and engineer are aware of no other supplier of fusible polyvinylchloride pipe that is an equal to this specified pipe supplier and products.

3. Fusible polyvinylchloride pipe shall conform to AWWA C900, AWWA C905, ASTM D2241 or ASTM D1785 for standard dimensions, as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types.

4. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

5. Fusible polyvinylchloride pipe shall be manufactured in a standard 40’ nominal length, or custom lengths as specified.

6. Fusible polyvinylchloride pipe shall be blue in color for potable water use.

7. Pipe shall be marked as follows:
   a. Nominal pipe size
   b. PVC
   c. Dimension Ratio, Standard Dimension Ratio, or Schedule
   d. AWWA pressure class, or standard pressure rating for non-AWWA pipe, as applicable
   e. AWWA standard designation number, or pipe type for non-AWWA pipe, as applicable
   f. NSF-61 mark verifying suitability for potable water service
   g. Extrusion production-record code
   h. Trademark or trade name
   i. Cell Classification 12454 and/or PVC material code 1120 may also be included

8. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

C. Fusion Joints

1. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be
assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier’s written guidelines for this procedure. All fusion joints shall be completed as described in this specification.

D. Casing Spacers

1. Casing spacer shall be a two-piece shell per carrier pipe and made from T304 stainless steel of a minimum 14 gauge thickness.

2. Each shell section shall be lined with a 0.090” thick, ribbed PVC extrusion with a retaining section that overlaps the edges of the shell and prevents slippage.

3. PVC Liner shall have a hardness of 85-90 durometer.

4. Bearing surfaces (runners) shall be ultra-high molecular weight polyethylene (UHMW) to provide abrasion resistance and a low coefficient of friction (0.12). The runners shall be attached to support structures (risers) at appropriate positions to properly support the carrier pipe(s) within the casing pipe and to ease installation. The runners shall be mechanically bolted to the spacer.

5. Risers shall be MIG welded to the shell, where applicable. Risers shall be made of T304 stainless steel of a maximum 10 gauge with bolt heads welded to the inside of the risers for strength. Bottom risers 6” and over in height shall be reinforced. All reinforcing plates shall be 10 gauge T304 stainless steel and shall be MIG welded to mating parts.

6. STANDARD (STD) positioning within the casing pipe shall be sized such that the carrier rests near the bottom of the casing pipe and the height of the risers and runners are to provide a bottom clearance not less than one-half inch between the casing pipe and the extreme outside diameter of the joint (bell, seam weld, joint clamp, …) of the carrier pipe.

7. CENTERED (CTD) & restrained positioning within the casing pipe shall be sized such that the height of the risers and runners are to center the carrier pipe in the casing pipe with a top clearance of three-fourths inch minimum.

8. RESTRAINED (RES) positioning within the casing pipe shall be sized such that the carrier rests near the bottom of the casing pipe and the height of the risers and runners are to provide a bottom clearance not less than one half inch between the casing pipe and the extreme outside diameter of the joint (bell, seam weld, joint clamp, …) of the carrier pipe and a top clearance of three-fourths inch minimum.

9. Special reinforcing plates may be required to stabilize and support structure. All weldments shall be fully chemically passivated in accordance with ASTMA380.
10. Casing spacers shall be Model CCS-08 as manufactured by Cascade Waterworks Mfg. Co. of Yorkville, IL or approved equal.

E. **Casing Spacers End Seals**

1. Casing spacer end seals shall be a pull-over type construction and made from 0.090” (3/32”) thick Neoprene with T304 stainless steel bands for securing the ends of the end seal to the casing pipe and carrier pipe.

2. Casing spacer end seals shall be Model CCES as manufactured by Cascade Waterworks Mfg. Co. of Yorkville, IL or approved equal.

F. **Fittings and Valves**

1. Fittings shall be mechanical joint and shall meet or exceed the requirements of ANSI A21.53, Class 350 Ductile Iron, cement lined and seal coated inside and out. Cement lining thickness shall be double the standard thickness (3”-12” minimum 1/8” – for pipe 14”-24” minimum 3/16”)

2. All fittings and valves shall be mechanical joint meeting or exceeding ANSI A21.11 with ductile iron glands, ductile iron bolts and nuts and plain rubber gaskets, unless otherwise specified.

3. Brass compression fittings and ball valves shall be products of one of the following: Ford, Mueller, McDonald or Hays. Stop and waste type valves shall not be acceptable.

G. **Retainer Glands**

1. Retainer glands shall be used on all mechanical joint connections.

2. Retainer glands shall be EBAA Iron Sales, Inc., Megalug, Ford Co.-1400 series, or approved equal.

H. **Expansion Joints**

1. Expansion joints shall be manufactured of ductile iron conforming to the material properties of ANSI/AWWA C153/A21.53.

2. All expansion joints shall be capable of **16” expansion capacity**.

3. Separation beyond the maximum extension of the expansion joint shall be prevented without the use of external tie rods. Each expansion joint shall be pressure tested against its own restraint to a minimum of 350 psi.
4. Megalug joint restraint, or approved equal, shall be provided with each mechanical joint connection.

5. All pressure containing parts shall be lined with a minimum of 15 mils of fusion bonded epoxy, conforming to the applicable requirements of ANSI/AWWA C213, and shall be tested with a 1500 volt spark test conforming to stated specification.

6. All expansion joints shall be EX-TEND 200, as manufactured by EBAA Iron, Inc., or approved equal.

I. Valve Boxes

1. Valve boxes shall be installed on all buried valves. Valve boxes shall be cast or ductile iron, 5¼ inch inside diameter, two-piece, and shall be the slide type. Screw type valve boxes shall not be acceptable. Base section shall have a bell type base and shall be a minimum of 36 inches in length. Stacking of base sections shall not be allowed. The top section shall be a minimum of 26 inches in length and shall include a top flange.

2. Valve box covers shall be marked "water".

J. Hydrants

1. Hydrants shall be installed as shown on the drawings.

2. Hydrants shall be manufactured in the U.S.A. and shall be Clow Eddy, U.S. Pipe, or approved equal.

K. Stone Bedding

1. Stone bedding for water mains and services shall be hand compacted in 6-inch lifts to the spring line of the pipe. Stone bedding shall conform to ASTM Designation C33, Gradation No. 67 (¼” to No. 4) as shown below:

   100% passing  1 inch screen
   90-100% passing  ¾ inch screen
   20-55% passing  ⅜ inch screen
   0-10% passing  #4 sieve
   0-5% passing  #8 sieve

2. Stone bedding shall be enveloped in non-woven geotextile fabric. The geotextile fabric enveloping the stone bedding shall meet the following criteria:
Fabric should be needle-punched non-woven material. Seams should be overlapped a minimum of 12 inches.

L. **Sand Bedding.** Sand bedding for water mains and services shall be hand compacted in 6 inch lifts to the spring line of the pipe. Sand for bedding shall be clean sand that is free of peat, clay and organic matter and graded from fine to coarse such that 100 percent passes a 1/2-inch sieve and no more than 5 percent, by weight, is retained on a No. 4 sieve.

M. **Sand Blanket.** Sand blanket shall consist of clean sand that is free from organic matter and so graded that 90-100% passes a ½-inch sieve and not more than 15% will pass a #200 sieve.

N. **Suitable Material** for trench backfill shall be the natural material excavated during the course of construction, but shall exclude debris, pieces of pavement, organic matter, top soil, all wet or soft muck, peat or clay, all excavated ledge material and all rocks over six (6) inches in largest dimension, or any material which, as determined by the Engineer, will not provide sufficient support or maintain the completed construction in a stable condition.

O. **Insulation**

1. All piping under roadways with 6’-0” or less soil cover shall be insulated with 2” rigid foam board insulation.

2. All piping under cross-country routes with 5’-6” or less soil cover shall be insulated with 2” rigid foam board insulation.

3. Heat Tracer and/or Pipe Insulation shall be installed where shown on the Contract Drawings and where ordered by the ENGINEER.

4. Pipe Insulation for exposed pipe shall be 2-inch preformed cellular glass insulation conforming to the requirements of ASTM C 552. The insulation shall have an average compressive strength of 100 psi and a unit weight of 8.0 PCF. Insulation shall be 100 percent impervious to moisture with a permeability rating of 0.000. Insulation shall be acid resistant, noncombustible and shall have a maximum use temperature rating of not less than 800°F. The insulation shall be protected within a metal jacket. The metal jacket shall be 0.016” minimum aluminum or stainless steel.
with moisture barrier, secured in accordance with the jacket manufacturer’s recommendations. Joints shall be applied so they will shed water and shall be sealed completely.

5. Insulation shall meet Underwriters' Laboratories Standards, E84 requirements and shall have the following surface burning characteristics:

Flame Spread 5
Smoke Developed 0

6. Pipe Insulation shall be suitable for exposed service piping. Insulation and jacketing shall be, as manufactured by Pittsburgh Corning Corporation, Pittsburgh, PA. or equal.

7. All insulation materials shall be stored in an area protected from the weather and kept dry before and during application. Application of the insulation to the pipe shall be done in strict accordance with the manufacturer's instructions and recommendations after all testing of the piping system is completed.

P. Concrete for Thrust Blocks

1. Concrete shall be Portland Cement concrete of 4000 psi minimum 28-day compressive strength. ASTM C-94 specification for transit mixed concrete shall control the concrete quality. A maximum water cement ratio of 6 gallons per sack and a maximum slump of 4 inches will be allowed.

2. Concrete shall be clean and not mixed with other material, including previously prepared concrete products.

3. Thrust blocks shall be installed on caps, tees, hydrants and bends of 22.5 degrees and greater.

4. Blocking shall be placed on all sides of each fitting in the direction of thrust and not underneath for use as a foundation or support.

5. All other bends less than 22.5 degrees shall be restrained by use of retainer glands on each end of each bend.

6. All fittings shall be poly-wrapped prior to pouring any concrete. Concrete shall not overlap any joints and/or glands, hence restricting future access to nuts and bolts. Adequate form work shall be employed to prevent such overlap.
Q. **Miscellaneous**

1. Hymax, or Smith Blair “Top Bolt” flexible couplings shall be provided where indicated on the Drawings. All piping passing through exterior walls shall have a flexible coupling within 1'-0” of the outside of the wall or footing unless indicated otherwise. Couplings for connecting pipe shall be Hymax or Smith Blair “Top Bolt.” Coupling-type flange adapters shall be used to join process piping to all pumps where shown on the Contract Drawings. Adapters shall be restrained to process piping by the use of tie rods. Adapters shall be Dresser Style 127, Rockwell 913, or approved equal.

R. All pipe, fittings, hydrants and valves shall meet or exceed “Manchester Water Works, Material Specifications Sheet”.

S. All materials shall be manufactured in the U.S.A.

**PART III EXECUTION**

A. **Delivery, Handling & Storage**

1. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the owner or engineer.

2. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify owner or engineer immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color, and type.

3. Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier’s guidelines shall be followed.

4. Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

5. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

6. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

7. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or
possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer.

8. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the owner or engineer.

9. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

10. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.

11. If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

12. Pipe shall be stored and stacked per the pipe supplier’s guidelines.

B. **Sleeve Preparation**

1. All rust, tubercles, deposits, loose materials and all other foreign materials shall be removed from the interior of the pipe lines by use of mechanical scraping cleaning devices or other approved methods. The Contractor shall pass the machine through the mains as many times as may be necessary and to employ such other supplementary means as may be required to clean the pipe surfaces and to remove all foreign matter, rust and dust from the pipe surfaces. It shall be the responsibility of the Contractor to employ approved methods and to do all work necessary to obtain clean pipe surfaces. The Contractor shall be responsible for locating and restarting the cleaning unit if it should become lodged in the pipe.

2. After the cleaning operations, the Contractor shall make an examination of the interior of the pipes, in a satisfactory manner, to determine whether the pipes have been sufficiently and properly cleaned and to verify that the PVC pipe and pipe carriers can be successfully inserted into the carrier pipe. The Contractor shall provide such facilities as may be required for inspection of pipes by the Owner. If the examination and inspection reveal that the cleaning operations have not been satisfactorily performed, the Contractor, at no additional expense to the Owner, shall
provide all other additional cleaning work as may be necessary for the proper installation of PVC pipe and pipe carriers. No defective section or part shall be approved for slilining until repairs have been made and approved by the Engineer.

C. **Fusion Process**

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier’s guidelines.

2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:
   a. **HEAT PLATE** - Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier’s guidelines.
   b. **CARRIAGE** – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.
   c. **GENERAL MACHINE** - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.
   d. **DATA LOGGING DEVICE** – An approved datalogging device with the current version of the pipe supplier’s recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

5. Other equipment specifically required for the fusion process shall include the following:
   a. Pipe rollers shall be used for support of pipe to either side of the machine
   b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and /or windy weather, per the pipe
supplier’s recommendations.

c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.
d. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.
e. Facing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

6. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of fusible polyvinyl chloride pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician’s joint report.

D. Pipe Installation

1. All water mains, valves, fittings and appurtenances shall be laid/installed in the dry and shall be installed in accordance with the manufacturer's recommendations.

2. Water mains and appurtenances shall be installed in accordance with the horizontal and vertical alignment shown on the Contract Drawings. All piping shall be installed to 6’ depth minimum. Should any deviations in the alignment be necessary due to conflicts with other utilities or other reasons, the changes must first be approved by the Engineer. Any deviations in design must be noted in the record drawings by the Contractor.

3. Water main pipe shall be continuously bedded in bedding material as specified herein. Bedding shall be installed not less than six (6) inches below the bottom of the pipe and up to the spring line (mid-point) of the pipe. Bedding shall be tamped or chinked into place after the pipe is set in place.

4. Pipe sections shall be lowered into the trench and set in place in such a manner so as to prevent damage or injury to the pipe or to any persons or property in the vicinity of the pipe. The Contractor shall use rollers to adequately support the PVC pipe as it is being drawn into the entry pit for the slip lining. The contractor shall use slings, straps, or other approved means to adequately support the DI fittings and expansions joints as they are being lifted and lowered into the trench. Pipe shall not be dropped from trucks onto the ground or into the trench. Any pipe so dropped shall be immediately rejected and removed from the job site by the Contractor.

5. Whenever pipe installation work is not in progress, the end(s) of the pipe being installed shall be satisfactorily plugged to prevent intrusion of soil, stones, water, debris, animals, or other such materials into the pipe. When pipe laying operations resume, the end(s) of the pipe shall be thoroughly cleaned and the temporary plugs
E. Installation of Casing Spacers, End Seals and Expansion Joints

1. Casing Spacers and End Seals shall be installed in accordance with the manufacturer’s recommendations. Casing spacers shall be installed within 2’ of the expansion joints and distance between spacers shall not exceed 6’.

2. Expansion joints shall be installed in accordance with the manufacturer’s recommendations. The expansion joints shall be partially inserted into the 24” DI casing pipe as shown on the drawings with enough exposed to make final adjustments to valve expansion setting. The “Victaulic-looking” end of the expansion fitting (valve), with the adjustable bolts, shall be the exposed end (outside the 24” DI pipe) to make the adjustment.

3. The expansion joists shall be wrapped in the polyethylene casing provided by the manufacturer. The end seals shall be installed so that the 14” end is strapped to a stationary portion of the expansion fitting (valve) so as not to interfere with the expansion and contraction valve action. If the end seals cannot be fitted to the expansion joint, a comparable field-fabricated end seal using geotextile fabric and stainless-steel clamps shall be substituted.

4. Backfill around the expansion joints shall be clean, granular pea-stone material or approved equal.

F. Thrust Blocks

1. All wyes, bends, tees, and other fittings and sleeve coupled pressurized pipelines buried in the ground shall be backed up with concrete placed against undisturbed earth where firm support can be obtained and shall be provided with retaining glands. If the soil does not provide firm support, suitable bridle rods, clamps, and accessories to brace the fitting properly shall be provided. Such bridle rods, etc., shall be coated thoroughly and heavily with Bitumastic No. 50 by Koppers Co. or approved equal after assembly or, if necessary, before assembly.

2. Concrete for blocks shall be 4,000 psi.

G. Testing

1. All water lines shall be hydrostatically pressure tested for leakage prior to acceptance.

2. During the progress of the installation, notify the authority having jurisdiction at least 5 days prior to the time such inspection must be made. Perform tests specified below in the presence of the authority unless the inspection requirement is waived by the authority.
3. All pipelines shall be thoroughly flushed prior to testing to remove any and all soil, debris and other materials that may have entered the lines during construction. Flushing shall be accomplished by partially opening and closing valves and hydrants several times under expected line pressure, with flow velocities adequate to flush deposited material(s) out of the pipes, valves and hydrants. Flushing velocities shall not be less than 3.5 to 4.0 feet per second (FPS).

4. Hydrostatic and leakage testing for piping systems that contain mechanical jointing as well as fused PVC jointing shall comply with AWWA C605.

5. Unless agreed to or otherwise designated by the owner or engineer, for a simultaneous hydrostatic and leakage test following installation, a pressure equal to 150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation shall be applied. The duration of the pressure test shall be for two (2) hours.

6. If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.

7. In preparation for pressure testing the following parameters must be followed:
   a. All air must be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by ‘flushing’ the pipeline in accordance with the parameters and procedures as described in AWWA C605.
   b. The pipeline must be fully restrained prior to pressurization. This includes complete installation of all mechanical restraints per the restraint manufacturer’s guidelines, whether permanent or temporary to the final installation. This also includes the installation and curing of any and all required thrust blocking. All appurtenances included in the pressure test, including valves, blow-offs, and air-relief valves shall be checked for proper installation and restraint prior to beginning the test.
   c. Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to minimize the amount of potentially trapped air in the pipeline.

8. Leakage Test. The leakage test shall be performed in conjunction with the pressure test. Leakage and allowable leakage shall be as defined in Section 4 of AWWA Standard C 600, latest edition.
9. Leaks and loss in test pressure constitute defects that must be repaired.

10. Results. If the section fails to pass the pressure and leakage test, the Contractor shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, or joint, all at no additional cost to the Owner and without extension of time for completion of the work. Additional tests and repairs shall be made until the section passes the specified test.

H. Testing Valves and Hydrants

1. All valves and hydrants shall be pressure tested during the main pipeline test. Hydrant gate valves shall remain open during the main pressure test. After the pipeline has been pressure tested and accepted, the hydrant gate valve shall be closed and the hydrant valve cracked open to release some pressure on the hydrant side of the gate valve. An acceptable test for each hydrant gate valve shall be no loss of pressure in the main line test pressure as each valve is closed.

2. All main line valves shall also be tested by the same procedure outlined above as far as practical. The Engineer shall decide if it is impractical to test any one particular valve location. No pressure test shall be considered acceptable until all possible control valves have been tested to ensure proper closing and water tightness.

3. The Contractor shall make any taps and furnish all necessary caps, plugs, tees, etc., as required to facilitate testing. The Contractor shall also furnish a test pump, gauges and any other equipment required in conjunction with conducting the hydrostatic tests. The Contractor shall at all times protect the water mains from damage and existing water mains from contamination.

I. Disinfection

1. After the pressure and leakage tests have been completed and all new water mains have satisfactorily passed the leakage tests, but before new water mains are placed into service, all new water mains shall be disinfected by the Contractor.

2. Prior to disinfection, all water mains shall be thoroughly flushed, as specified herein, to remove dirt and other deleterious materials.

3. Disinfection of water mains shall be carried out in strict accordance with AWWA Standard C 651, latest edition. The basic procedure to be followed for disinfecting water mains is as follows:
   a. Prevent contaminating materials from entering the water main during storage construction, or repair.
   b. Remove, by flushing or other means, those materials that may have entered the water mains.
c. Chlorinate any residual contamination that may remain and flush the chlorinated water from the main.

d. Protect the existing distribution system from backflow due to hydrostatic pressure test and disinfection procedures.

e. Determine the bacteriological quality by laboratory test after disinfection.

f. Make final connection of the approved new water main to the active distribution system.

4. During the disinfection procedure, the heavily chlorinated water shall be allowed to stand in the water main(s) for a period of not less than twenty-four (24) hours. During this retention period, all valves and hydrants in the section being disinfected shall be operated to ensure disinfection of all valves, fittings and appurtenances. At the end of the 24-hour retention period, the chlorine residual at the extremities of the pipe section being disinfected and at various points in between shall be measured. The treated water shall have a chlorine residual of not less than 10 mg/L free chlorine at all locations. At the Contractor's option, a continuous-feed method of chlorination may be utilized as specified in AWWA Standard C 651, latest edition.

5. After the retention period, heavily chlorinated water shall not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system or is acceptable for domestic use and as approved by the Engineer.

6. Chlorinated water used for disinfecting water mains shall be neutralized using a reducing agent, such as sodium bisulfite, to eliminate residual chlorine prior to disposal of the water. The method of disposal of the water shall be as approved by the New Hampshire Department of Environmental Services.

7. After final flushing of the main(s) and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new main. One set of samples shall be taken from each end of the line. All samples shall be tested for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater, and shall show the absence of coliform organisms. A standard heterotrophic plate count may be required at the option of the Engineer or the Owner.

8. Disinfection of water mains shall take place only in the presence of the Engineer and a representative from the Owner or local water department. The method(s) of disinfection to be utilized by the Contractor shall be subject to approval by the Engineer and the Owner. If satisfactory results are not achieved, as determined by laboratory testing, re-disinfection of the water main(s) shall be required at the Contractor's expense.
9. A Record of Compliance shall be submitted to the Engineer by the Contractor with a copy provided to the Owner. The record of compliance shall be the bacteriological test results certifying the water sampled from the new water main to be free of coliform bacteria contamination, and to be equal to or better than the bacteriological water quality in the existing distribution system.

END OF SECTION
Index
for

DIVISION 5 – MISCELLANEOUS METALS

05501 Water Main Support Repairs
PART I GENERAL

1. CONTRACT DOCUMENTS

   A. Attention shall be directed to the General Conditions and Supplementary General Conditions for the definition of the Contract Documents. This section of these specifications is a part of the Contract Documents as defined in the General Conditions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other parts of these Specifications.

2. WORK INCLUDED

   A. Extent of water main support repairs and associated work is shown on drawings and as herein specified.

   B. Work under this section includes:
      - Remove and replace Span 1W water main support 1-1,
      - Remove and replace Span 3W water main support 3-4,
      - Remove and replace Span 3W catwalk grate and supports between water main supports 3-3 and 3-4,
      - Install Span 3W manhole frame waterstop,
      - Repair Span 4W water main/catwalk support 4-11 connection,
      - Replace missing water main support saddle chair bolts,
      - Remove and replace water main bolted joint connections between the following supports:
         - 1-17 and 2-1, 4-4 and 4-5,
         - 2-6 and 2-7, 4-6 and 4-7,
         - 2-12 and 2-13, 4-12 and 4-13
         - 3-1 and 3-2,
      - And all incidental work as shown on the plans, as herein specified, and as directed by the Engineer.

3. ASSOCIATED WORK SPECIFIED ELSEWHERE

   A. The following items appurtenant to this work are a part of the contract work specified under other sections of these specifications but are mentioned here for cross reference purposes.
      1. WATER MAINS, FITTINGS AND APPURTEANCES - Section 02660
4. APPLICABLE STANDARDS

A. Materials and workmanship under this Section shall be in accordance with the applicable standards of the American Water Works Association (AWWA), latest revision, American AASHTO Bridge Design Specifications, Eighth Edition, and the New Hampshire Department of Transportation Standard Specifications for Road and Bridge Construction, 2016 as specifically referenced elsewhere in this Section.

5. SUBMITTALS AND CERTIFICATIONS

A. Shop drawings, including specifications, catalog cuts, data sheets, drawings and other descriptive material, shall be furnished in accordance with Section 01300 for the water main support repair and other items specified under this Section.

B. Certificates of Compliance as specified in this Section shall be submitted to the Engineer in accordance with the requirements of Section 01300, Submittals.

C. Water Main Support Repairs:

1. The following PRODUCT DATA is required from material supplier:
   a. InFlow Seal Manhole Waterstop.
   b. 24” Victaulic Style 230 Flexible Coupling.

PART II PRODUCTS AND MATERIALS

A. Water Main Supports

1. All water main supports and anchors shall be ASTM A36 Grade 36 painted and meet the following requirements:
   a. Conforming to the New Hampshire Department of Transportation Standard Specifications for Road and Bridge Construction, 2016 Section 550.
   b. All welding and fabrication shall be performed in conformance with the New Hampshire Department of Transportation Standard Specifications for Road and Bridge Construction, 2016, Section 550.
   c. All painting shall be in conformance with the New Hampshire Department of Transportation Standard Specifications for Road and Bridge Construction, 2016, Sections 550 and 708. The color shall be light green federal color number 24272.

2. A Certificate of Compliance indicating conformance with the above specified requirements for shall be submitted to the Engineer. Certificates of Compliance shall be submitted prior to installation of the water main supports. Certificate of
Compliance shall be notarized by a Notary Public or Justice of the Peace.

B. **Water Main Support Type D Roller**

1. Water main support roller Type D shall be Anvil Figure 274 or approved equal.

C. **InFlow Seal Manhole Waterstop**

1. Manhole waterstop shall be the InFlow Seal Manhole Waterstop manufactured Underground Utility Services, Inc. or approved equal.
2. InFlow Seal Manhole Waterstop shall be installed per the manufacturers recommendation.

D. **Water Main Pipe Bolted Joint Connection Removal and Replacement**

1. Water main pipe bolted joints shall be removed and replaced with 24” Victaulic Style 230 Flexible Coupling or approved equal.
2. 24” Victaulic Style 230 Flexible Coupling shall be installed per the manufacturers recommendation.

**PART III EXECUTION**

A. **Delivery, Handling, Storage, Removal and Installation**

1. All materials shall be bundled or packaged in such a manner as to provide adequate protection during transportation to the site. Any materials damaged in shipment shall be replaced as directed by the owner or engineer.
2. Shall be in accordance with manufacturer requirements and the New Hampshire Department of Transportation Standard Specifications for Road and Bridge Construction, 2016.

**END OF SECTION**
MANCHESTER WATER WORKS
MATERIAL SPECIFICATION SHEET

Ductile Iron Pipe - The Ductile Iron Pipe shall be Class 52 and shall conform to ANSI A.21.51 (AWWA C-151) for "pipe centrifugally cast in metal molds or sand lined molds for water". Cement linings shall be double the standard thickness and shall conform to ANSI A.21.4 Seal coating shall be applied inside and out. All pipe shall be push-on type joint, in accordance with ANSI A.21.11. All pipe shall be cast in U.S.A.

Polyethylene Wrap for Ductile Iron Pipe – Polyethylene wrap shall be 8 mil minimum, lineal low density, flat tube virgin polyethylene film. Polyethylene film shall prevent contact between the pipe and any potentially corrosive soils. The film shall be marked showing trademark, year of manufacture, type of resin, specification conformance, applicable pipe size and a corrosion protection warning. The polyethylene wrap shall meet or exceed the AWWA C105-10, ANSI A21.5-10, ASTM D4976 and NT 4112-10.

Requirement:
- Tensile Strength: 3600 psi, minimum - ASTM D882
- Elongation: 800%, minimum - ASTM D882
- Dielectric Strength: 800 v/mil, minimum - ASTM D149
- Impact Resistance: 600 g minimum - ASTM D1709-B
- Propagation Tear Resistance: 2550 gf. Minimum - ASTM D1922

Mechanical Joint Fittings - The Mechanical Joint Fittings shall conform to AWWA C104/ANSI A21.4, C111/A21.11 or C153/A21.53, Class 350 minimum, ductile iron compact fitting, with double cement-lining thickness and seal coated inside and out. Fittings shall be complete with accessories - tee bolts shall be either ductile iron or corten. All M.J. fittings shall be cast in U.S.A.

Bolted Sleeve-Type Couplings – The coupling shall conform to AWWA 219-11. The body and rings shall be carbon steel with a fusion bonded epoxy coating. The bolts and nuts shall be 304 stainless steel with the bolts coated with an anti-seize compound. The gasket shall be made in two layers with a removable inner layer that allows for diameter range expansion.

Gate Valves 4"-12" - Gate Valves shall be 200 psi working pressure, vertical, plain non-rising stem, nut operated, open right with mechanical joint end connections. Valves shall comply with AWWA C500 or C509. Valves shall be Resilient Seated (RS). RS valves shall meet the following requirements: Valve body and bonnet shall be of cast or ductile iron coated on all exterior and interior surfaces with a fusion bonded epoxy conforming to AWWA Standard C-550, latest revision, applied with a minimum thickness of eight (8) mils. The manufacturer shall certify that the coating is suitable for use in a potable water system, and the interior coating certified to be holiday-free. The gate shall be completely covered with
rubber over all ferrous surfaces. The rubber shall be securely bonded to the gate body.

The "O" ring stem seal shall be replaceable with the valve under pressure in the full open position.

All exterior fasteners shall be constructed of 316 stainless steel.

Valves shall be full port opening. Tapping valves shall have enlarged ports.

**Butterfly Valves 16"- 24" - All 16", 20" and 24" Butterfly Valves shall be open right with mechanical joint end connections, complete with accessories for buried service.**

Valves shall be of the tight closing rubber seat type with seat bonded or mechanically retained into the disc or valve body. Valves shall have a full uninterrupted 360 degree sealing surface and shall be bubble tight at rated pressures in both directions. Valves shall be designed for use in either throttling application or for very infrequent operation after extended periods of inactivity.

Valves shall be in full compliance with AWWA Specification C-504, with the following exceptions:

**Valve Bodies** - All valve bodies shall be of cast iron conforming to ASTM A-126, Class B with integral cast ends and shall meet the following requirements: Valve body and bonnet shall be of cast or ductile iron, coated on all exterior and interior surfaces with epoxy conforming to AWWA Standard C-550, latest revision, applied with a minimum thickness of eight (8) mils. The manufacturer shall certify that the coating is suitable for use in a potable water system, and the interior coating certified to be holiday-free.

**Valve Discs** - All valve discs shall be streamlined and present the smallest profile possible consistent with the structural requirements of the pressure class. They shall be of offset or flow through design and material composition of cast or ductile iron. Disc sealing edge shall have a continuous uninterrupted 360 degree sealing surface of 18-8 stainless steel.

**Valve Shafts** - Valve shafts shall be of 18-8 type 304 stainless steel or carbon steel with stainless steel journals. Shaft design shall be of thru or stub type construction with at least 1" shaft diameter engagement into the disc. Shaft to disc connection shall be of a rigid, non-slip type connection.

**Valve Seats** - Valve seats shall be a rubber material bonded or mechanically retained.

**Valve Bearings** - Valve bearings shall be self-lubricating and non-corrosive and shall have a significant difference in hardness from the valve shaft.

**Valve Actuators-General** - All valve actuators shall be designed as an integral part of the valve and shall meet or exceed all the requirements of AWWA C-504. Actuators shall be of rack and pinion, link and lever or traveling design. All moving parts penetrating into the actuator, and exterior fasteners shall be 316 stainless steel. All actuator types, in a given size, to be interchangeable and fastened to valves
with readily accessible external bolts. All actuators must fit on the valves they are
designed to operate in any mounted position or rotational direction without any
special prior preparation to either the valve or the actuator.

**Retainer Glands** - Retainer Glands shall be heavyweight, ductile iron, wedge-type,
designed for 70 ft-lbs of torque.

**Valve Boxes** - Valve Boxes shall be slide type cast or ductile iron standard 5'-0" bury
with the following three (3) components:

1. Gate box covers shall fit properly and seat flush in the gate valve box top
sections.
2. The top section shall be a minimum of 26" in length with top flange,
3. The belled design base section shall be a minimum of 36" in length.
4. The cover shall be marked "water". The boxes shall be 5 1/4" inside diameter.

**Hydrants** - To be Clow Corporation Eddy or U.S. Pipe & Foundry, Inc., Metropolitan. All
hydrants shall have as minimum these features: break type flange, 6" mechanical
joint inlet connections with fusion bonded epoxy coated shoe. Nozzle dimensions:
hose (2) 2 1/2", pump (1) 4 1/2", threads NST. Main valve opening 5 1/4", open
right. Operating nut shall be pentagon in shape and sized as approved by the
Manchester Water Works. Color of hydrants to be yellow. Standard trench depth
6' or as required. Hydrants shall open right.

**SERVICE MATERIAL**

All service material shall meet or exceed the requirements for AWWA C-800.

**Curb Stops** - Shall be ball type with copper compression fittings; body shall be heavy cast
with a single or double end load design. (Pak type fitting)

**Corporation** - The "inlet" side shall have AWWA tapered threads. The "outlet" side shall
have compression type fittings for copper tubing and pipe (type K soft). The
corporation shall be adaptable to the drill and tap combinations used in the Mueller
A-3, B-100 and D-5 type tapping machines, or the Reed CDTM 1000.

Curb stops and corporations are to be cast from red brass having the following
compositions: Cu - 85%, Sn - 5%, Pb - 5%, Zn - 5% with variation of 2%
allowable. All curb stops and corporations shall be tested for tightness, and have
the ability to withstand one hundred fifty (150) pounds working pressure. All
copper connections shall have compression type fittings. All threads shall be
standard and finished in a workmanlike manner, i.e., free of burrs. Nuts shall start
freely in assembly. The company trademark or identifying mark shall be stamped
on the brass service materials. All curb stops and corporations shall be pack joint
connections.

**Copper** - To be type "K" - soft. Sizes: 1 1/2" through 2" are to be 20' straight lengths.
Polyethylene (PE) Tubing (when allowed) - Tubing in sizes 1 1/2" and 2" allowed under certain circumstances. Tubing shall be Copper Tube Size (CTS) designed for 200 psi working pressure and shall conform to AWWA C901. Insert stiffeners shall be used on all compression joint connections.

Curb Boxes - For use with 3/4" and 1" curb stops. The length of curb boxes shall be 5'-6' with a 12" adjustment. The cover shall be heavy duty slotted with counter sunk pentagon solid brass plugs, coarse threaded. The rod shall be one-half inch (1/2") offset with stainless steel yoke thirty inches (30") in length. The box bottom section shall have an arch pattern. The box upper section is to be one inch (1") in diameter.

Samples of all service material shall be submitted to the Manchester Water Works Distribution Engineer prior to the commencement of work.

The following water related materials are acceptable to the MWW:

**VALVES APPROVED**
1) U.S. Pipe
2) Clow
3) Mueller
4) Kennedy
5) American Flow Control Valve

**TAPPING VALVES APPROVED**
1) U.S. Metro Seal (R.S.)
2) Clow (R.S.)

**FITTINGS (USA Made)**
1) Union/Tyler DI Fitting
2) U.S. Pipe DI Fitting

**BOLTED SLEEVE-TYPE COUPLINGS**
1) Hymax by Krausz USA
2) Top Bolt 421 by Smith Blair

**HYDRANT**
1) U.S. Metropolitan B.F.
2) Eddy BF (Clow)

**RETAINER GLANDS**
1) Ebaa Mega Lugs
2) Ford 1400
APPENDIX B
NHDES Shoreland Permit by Notification
SHORELAND PERMIT BY NOTIFICATION (PBN)

Water Division/ Shoreland Program
Land Resources Management

Check the status of your PBN: https://www.des.nh.gov/onestop/

This form requests authorization to excavate, fill, or construct new structures within the protected shoreland, which is 250 feet landward of the reference line, as regulated under RSA 483-B. Refer to the cover sheet to determine your eligibility to use this form in lieu of the standard Shoreland Permit Application. Please type or print clearly. Please note: Notification packages missing required components will be rejected and the fee will not be returned.

1. PROPERTY OWNER

LAST NAME, FIRST NAME, M.I.: City of Manchester Water Works / Guy Chabot, Deputy Director
ADDRESS: 281 Lincoln Street
PHONE: 603-624-6494
STATE: NH
ZIP CODE: 03103
EMAIL: GCHABOT@manchesternh.gov

2. PROJECT LOCATION

ADDRESS: Salmon Street Westbound (Amoskeag Bridge)
WATERBODY NAME: Merrimack River
STATE: NH
ZIP CODE: 03104
TOWN/CITY: Manchester
TAX MAP: 415 & 105
LOT NUMBER: N/A

3. CONTRACTOR OR AGENT

LAST NAME, FIRST NAME, M.I.: Hoyle, Tanner & Associates, Inc. / Kimberly R. Peace
ADDRESS: 150 Dow Street
PHONE: 603-669-5555
STATE: NH
ZIP CODE: 03101
EMAIL: kpeace@hoyletanner.com

4. PROJECT DESCRIPTION

The City of Manchester is proposing to repair a water main that is suspended from the Amoskeag Bridge (Salmon Street Westbound) over the Merrimack River. The repair work will be done on dry ground by excavating an entry point in the existing roadbed on either end of the bridge to access the existing 24" diameter water main, which is leaking in several spots. The repair will be to pull a smaller diameter PVC pipe through the existing pipe. The entry points at each end will require cutting pavement and excavating 6-7 feet deep to gain access to the main. One point will be sized approximately 25' l x 8' w x 6' d; the other will be sized approximately 75' l x 8'w x 6' d. Once the new PVC pipe is pulled through the existing water main, the new pipe will be pressure tested, connected to the existing main on both ends, then chlorinated. After all tests are successful, the pipe will be backfilled and the excavation areas filled and paved over. The work is a repair “in place” of an existing utility.

No soil disturbance will occur outside of currently paved or disturbed areas as shown on the attached plan, there will no vegetation removal, and no tree cutting associated with this project.
TOTAL SQUARE FEET OF IMPACT: 590 SF  TOTAL SQUARE FEET OF NEW IMPERVIOUS AREA: 0 SF

Total impact area is determined by the sum of all areas disturbed by excavation, filling, and construction. Examples include, but are not limited to: constructing new driveways, constructing new structures, removing or replacing structure foundations, grading, and installing a new septic system or well.

5. PBN CRITERIA: Check one of the following project type criteria.  

☐ 1. STANDARD  This project impacts less than 1,500 square feet of which no more than 900 square feet is a net increase in impervious area.

☐ 2. This project is directly related to stormwater management improvements, erosion control, or environmental restoration or enhancement. PBN Impact Limit: None / Fee: $100.

☒ 3. This project is for the maintenance, repair or improvement of public utilities, public roads, or public access facilities. PBN Impact Limit: None / Fee: Fee Exempt.

☐ 4. Per Env-Wq 1406.05, this project consists of geotechnical borings, test wells, drinking water wells or is a site remediation project. PBN Impact Limit: None / Fee: Capped at $250.

6. FEE

The PBN fee is the standard permit application fee of $100 plus $0.10 per square foot of the total impact area in Section 4. For example, 500 square feet of impact equals a fee of $150. Projects solely funded by municipal, county, state or federal entities are fee exempt, and the special project types in Section 5 have alternate fee schedules as listed above.

Checks and money orders payable to “Treasurer - State of NH”.  TOTAL FEE: $N/A

7. PHOTOS

Required for all projects.  Dated photographs of each area proposed to be impacted.  See attached.

8. PLAN REQUIREMENTS: Check Yes or No to all statements, and review the applicable plan requirements. If your plans do not include the information that is required, your notification will be rejected.

Required for all projects.

☐ Yes ☐ No  

This project proposes an increase in impervious (i.e. non-permeable) area. Plans must include the dimensions and locations of all existing and proposed impervious surfaces within 250 feet of the reference line. Decks are typically considered impervious.

☐ Yes  ☐ No  

< 20%  This project proposes an increase in impervious area, and the total post-construction impervious area within 250 feet of the reference line will not exceed 20%.

☐ Yes  ☐ No  

20 – 30%  This project proposes an increase in impervious area such that the total impervious area within 250 feet of the reference line will be greater than 20% but less than 30%. Plans must include a stormwater management system that will infiltrate increased stormwater runoff from development per RSA 483-8:9, Vg(1) and in accordance with Env-Wq 1500.

irm@des.nh.gov or (603) 271-2147  
NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095  
www.des.nh.gov  
Shoreland Permit by Notification – Valid Until 01/2019  
Page 2 of 4
<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
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<tbody>
<tr>
<td><strong>&gt; 30%</strong></td>
<td>This project proposes an increase in impervious area such that the total impervious area within 250 feet of the reference line will be greater than 30%. Plans must include a stormwater management system designed and certified by a professional engineer to account for all new development, and plans must demonstrate how the vegetation point score is met as per RSA 483-B:9, V(g)(1,3).</td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>This project proposes impacts within 50 feet of the reference line. Plans and photos must show each area of the Waterfront Buffer that will be impacted, including groundcover, and calculate the tree point scores in accordance with the Vegetation Management Fact Sheet.</td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>This project proposes impacts between 50 and 150 feet of the reference line. Plans must depict the 25% area of the Woodland Buffer to be designated and maintained as natural woodland. See the Vegetation Management Fact Sheet.</td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>This project proposes to install or expand an accessory structure, such as a patio or shed, within 50 feet of the reference line. Plans must demonstrate that the limits and setbacks for accessory structures will be met. Review these requirements at the link above or in Env-Wq 1405.</td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>The shoreline frontage on this lot is: ______ linear feet. □ N/A – There is no direct frontage on this lot.</td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>This project proposes a pervious (i.e. permeable) surface technology. Plans must include the location and type of the surface and a cross-section depicting the construction method, materials and specifications as to how this surface will be maintained as a pervious technology.</td>
<td></td>
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**9. CONDITIONS:** Initial each of the required conditions below. (Env-Wq 1406.20)

1. Erosion and siltation control measures shall: be installed prior to the start of work; be maintained throughout the project; and remain in place until all disturbed surfaces are stabilized.

2. Erosion and siltation controls shall be appropriate to the size and nature of the project and to the physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to wetlands or surface waters.

3. No person undertaking any activity in the protected shoreland shall cause or contribute to, or allow the activity to cause or contribute to, any violations of the surface water quality standards established in Env-Ws 1700 or successor rules in Env-Wq 1700.

4. Any fill used shall be clean sand, gravel, rock, or other suitable material.

5. For any project where mechanized equipment will be used, orange construction fence shall: be installed prior to the start of work at the limits of the temporary impact area as shown on the plans approved as part of a permit or accepted as part of the permit by notification; be maintained throughout the project; and remain in place until all mechanized equipment has been removed from the site.
10. CERTIFICATIONS: Initial each of the required certifications below.

10.1. The property owner shall sign the notification form.

10.2. The signature(s) shall constitute certification that: the information provided is true, complete, and not misleading to the knowledge and belief of the signer; the signer understands that any permit by notification obtained based on false, incomplete, or misleading information is not valid; the project as proposed complies with the minimum standards established in RSA 483-B:9, V and will be constructed in strict accordance with the proposal; the signer accepts the responsibility for understanding and maintaining compliance with RSA 483-B and these rules; the signer understands that an accepted shoreland permit by notification shall not exempt the work proposed from other state, local, or federal approvals; and the signer understands that incomplete notifications shall be rejected and the notification fee shall not be returned. The signer is subject to the applicable penalties in RSA 641, Falsification In Official Matters.

11. SIGNATURE OF OWNER

OWNER SIGNATURE: [Signature]
PRINT NAME LEGIBLY: Guy Chabot
DATE: 7/30/18
APPENDIX C
 Structural Inspection Report
May 4, 2018

Mr. Guy Chabot, Deputy Director  
Manchester Water Works  
281 Lincoln Street  
Manchester, NH 03103

Re: Inspection and Report  
Amoskeag WB Bridge Water Main Supports, Manchester, NH  
Hoyle, Tanner Project No. 093150.00

Hoyle, Tanner and Associates, Inc. (Hoyle, Tanner) herein submits this letter report summarizing our Amoskeag Bridge (Westbound) water main support inspection findings for the City of Manchester Water Works Department. This summary letter documents the water main support existing conditions and provides recommendations for repair and maintenance.

The Amoskeag Bridge (Westbound), constructed in 1970 and rehabilitated in 1999, carries Salmon Street (Westbound) over Canal Street, the PanAm Railroad and the Merrimack River in the City of Manchester, New Hampshire. The bridge is comprised of seven spans and has an overall length of 858 feet. The western most span (Span 7) is comprised of seven steel girders while the remaining spans have five steel girders of varying dimensions. The bridge has a reinforced concrete deck which carries two lanes of traffic and one sidewalk on the upriver side. Refer to the attached framing plans for span and utility support designations.

Edward Weingartner, PE, NBIS and Ryan McMullen, E.I.T., NBIS performed a hands-on inspection of the water main supports on April 24, 2018. Access to the water main supports was made using an A-62 under bridge inspection vehicle provided by New England Bridge Contractors and operated from the bridge deck. Traffic control during the inspection consisted of closing Salmon Street westbound and establishing a temporary detour using Elm, West Penacook and Canal Streets. One lane of Canal Street/River Road was closed when inspection in span 7 occurred. American Flagging and Traffic Control provided the detour sign packaged and managed the lane closure of the upriver lane of traffic during the inspection. A detail was also provided by the City of Manchester Police Department to aid in traffic management. Salmon Street westbound was reopened to traffic once the inspection progressed onto Span 4.

Water main supports 1-1 to 1-3 were inspected on May 2, 2018. Access to the supports was by ladder and the catwalk. Water main supports 5-1 to 5-9 are located in the span over the PanAm railroad and were not inspected. Additionally, trees prevented up close inspection of water main supports 6-1 to 6-3.

The water main supports are generally considered to be in good condition. The following observations were made during this inspection with corresponding recommendations in the next section:

O-1. The saddle/chair for water main supports 1-11, 1-17, 5-4, 7-1, 7-2 and 7-3 is not fully in contact with the support channels and is supported by the leveling bolts as shown in photo 1.

O-2. Numerous water main supports exhibit light to moderate rusting with some minor corrosion.
O-3. Numerous water main supports have missing saddle chair bolts. Refer to photo 2 and the Type C chair detail shown on the attached water main support details.

O-4. The water main bolted joints located between supports 1-17 and 2-1 (photo 3), 2-6 and 2-7 (photo 4), 2-12 and 2-13 (Photo 5), and 4-6 and 4-7 (photo 6) exhibit heavy rusting and significant laminar corrosion and section loss. The diameter of the bolts and heads for the joint located between supports 2-12 and 2-13 was observed to have approximately 50% section loss and approximately 70% to 90% section loss, respectively.

O-5. The weld connecting the catwalk to support 4-11 is in poor condition due to field relocation and welding as shown in photos 7 and 8. The weld was marked in the field for future identification.

O-6. Support 3-4 exhibits heavy rusting with significant corrosion and section loss throughout as shown in photos 9-13. This support is located directly under a manhole where salt laden water leakage has resulted in its current condition. The section loss is estimated to be 50%-100% in the channel flanges with additional section loss in the webs as well. Additionally, significant section loss, up to 100%, was observed in the catwalk members and connections attached to this support. The plates connecting the water main support to the webs of the girders were in good condition.

O-7. Support 1-1 is considered to be in fair condition and exhibits heavy rusting corrosion and section loss as shown in photos 14 and 15. This support is located directly under a deck drain scupper where salt laden water leakage has resulted in its current condition. Refer to photo 16 for the scupper condition. The channel flanges exhibit a varying degree of section loss of approximately 10% to 50%. The plates connecting the water main support to the girders are in good condition.

O-8. Water main support 1-1 roller chair exhibits heavy rusting with corrosion as shown in photo 17. The roller support may be frozen due to the level of rusting and rotation observed as shown in photo 17.

Hoyle, Tanner recommends the following water main support monitoring and maintenance measures:

R-1. The issue of the water main saddle/chair not fully in contact with the channel supports is not an immediate concern. These locations should be monitored at regular intervals to confirm that the leveling bolts continue to remain in contact with the steel channels.


R-3. Replace missing Type C chair detail bolts. This work does not require immediate action, but should be considered for the long-term performance of the water main supports.

R-4. All water main pipe joints noted (see O-4 and O-6) above should be evaluated prior to performing the water main leak repairs.

R-5. The catwalk support bracket poor quality weld at water main support 4-11 should be repaired.

R-6. Water main support 3-4 and the two adjacent catwalk and grating sections connected to this support should be replaced due to the level of corrosion and section loss. An in-kind replacement is recommended with Support W1 and a type “C” chair shown in the water main support details sheet attached. Since the steel plates that are connected to the girders are still in good condition, the replaced support can be bolted to these existing plates. The manhole above this support should be inspected as well and a watertight seal should be installed to prevent salt laden water from dripping on this support in the future.
R-7. Water main support 1-1 should be monitored during routine bridge inspections to document condition and determine if it is worsening. The bridge deck scupper should be inspected as well and repaired as necessary to prevent salt laden water from dripping on the support in the future.

R-8. Support 1-1 roller chair should be replaced as part of the water main leak repair project to ensure proper expansion and contraction function.

We trust that this letter report and recommendations meet your expectations. Please feel free to contact me at 603-669-5555 ext. 164 or sjames@hoyletanner.com should you have any questions or if you need any additional information.

Sincerely,

Hoyle, Tanner & Associates, Inc.

Sean T. James, PE
Vice President

Enclosures
| PHOTO NO. 1 | LOCATION: Middle of Span 7, Looking West |
| Description: Saddle/chair for water main supports supported by leveling bolts. |

<p>| PHOTO NO. 2 | LOCATION: Middle of Span 2, Looking West |
| Description: Water main supports missing saddle chair bolts. |</p>
<table>
<thead>
<tr>
<th>PHOTO NO. 3</th>
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<tbody>
<tr>
<td><strong>Location:</strong></td>
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| Beginning of Span 2  
Looking West |  |
| **Description:** |  |
| Water main bolts with heavy rusting, supports 1-17 and 2-1. |  |

<table>
<thead>
<tr>
<th>PHOTO NO. 4</th>
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<td><strong>Location:</strong></td>
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</table>
| Middle of Span 2  
Looking West |  |
<p>| <strong>Description:</strong> |  |
| Water main bolts with heavy rusting, supports 2-6 and 2-7. |  |</p>
<table>
<thead>
<tr>
<th>PHOTO NO. 5</th>
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</table>
| **Location:** | Middle of Span 2  
Looking East |
| **Description:** | Water main bolts with heavy rusting,  
bolt diameter and head section loss,  
supports 2-12 and 2-13. |

<table>
<thead>
<tr>
<th>PHOTO NO. 6</th>
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</table>
| **Location:** | Middle of Span 4  
Looking West |
| **Description:** | Water main bolts with heavy rusting,  
supports 4-6 and 4-7. |
<table>
<thead>
<tr>
<th>PHOTO NO. 7</th>
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</table>
| **Location:** | Middle of Span 4  
Looking West |
| **Description:** | Weld connecting the catwalk to support 4-11. |

<table>
<thead>
<tr>
<th>PHOTO NO. 8</th>
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</table>
| **Location:** | Middle of Span 4  
Looking East |
<p>| <strong>Description:</strong> | Weld connecting the catwalk to support 4-11. |</p>
<table>
<thead>
<tr>
<th>PHOTO NO. 9</th>
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<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>Middle of Span 3 Looking West</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Support 3-4, heavy rusting, significant corrosion and section loss.</td>
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<thead>
<tr>
<th>PHOTO NO. 10</th>
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<tr>
<td><strong>Location:</strong></td>
<td>Middle of Span 3 Looking West</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Support 3-4, heavy rusting, significant corrosion and section loss.</td>
</tr>
<tr>
<td>PHOTO NO. 11</td>
<td>PHOTO NO. 12</td>
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<tr>
<td><strong>Location:</strong></td>
<td><strong>Location:</strong></td>
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<tr>
<td>Middle of Span 3</td>
<td>Middle of Span 3</td>
</tr>
<tr>
<td>Looking North</td>
<td>Looking South</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td><strong>Description:</strong></td>
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<tr>
<td>Support 3-4, heavy rusting, significant corrosion and section loss.</td>
<td>Support 3-4, heavy rusting, significant corrosion and section loss.</td>
</tr>
<tr>
<td>PHOTO NO. 13</td>
<td></td>
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<tr>
<td><strong>Location:</strong></td>
<td>Middle of Span 3 Looking South</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Support 3-4, heavy rusting, significant corrosion and section loss.</td>
</tr>
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<tr>
<th>PHOTO NO. 14</th>
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<tr>
<td><strong>Location:</strong></td>
<td>Beginning of Span 1</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Looking up at support 1-1 and adjacent scupper.</td>
</tr>
<tr>
<td>PHOTO NO. 15</td>
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</tr>
<tr>
<td><strong>Location:</strong></td>
<td>Beginning of Span 1</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Looking West at Support 1-1 showing heavy corrosion of the top and bottom flange.</td>
</tr>
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<thead>
<tr>
<th>PHOTO NO. 16</th>
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<tr>
<td><strong>Location:</strong></td>
<td>Beginning of Span 1</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Looking east at scupper above support 1-1, heavy corrosion and evidence of leaking.</td>
</tr>
<tr>
<td>PHOTO NO. 17</td>
<td></td>
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<td>-------------</td>
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<tr>
<td><strong>Location:</strong></td>
<td>Beginning of Span 1</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Looking east at roller chair of support 1-1 showing heavy corrosion, rotation of chair and laminar corrosion in the top flange of support 1-1.</td>
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<table>
<thead>
<tr>
<th>PHOTO NO.</th>
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<td><strong>Location:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong></td>
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</table>
MEMBER ACCORDING TO W1

PLATES TO ACCOMMODATE HOLES IN CONNECTION

CLEAN AND DRILL NEW PLATES EXISTING WELDS, C5x9 TO CONNECTION ROLLER IN-KIND. REMOVE SUPPORT AND TYPE D REPLACE W1 WATER MAIN X-X, A, B, C, D

NOTE:All drawings are considered not to scale unless noted otherwise.

SCALE: 1-1
DATE: 01/2019
CHECKED BY:
DESIGNED BY:
DRAWN BY:
FRAME REPAIR PLAN (2 OF 2)

SPAN 3 (WEST)

SPAN 4 (WEST)

REPAIR CATWALK SUPPORT INCLUDED: CONNECTION (SEE SUPPORT DETAILS ON SHEET S-1.4)

LEGEND

NOTE: All drawings are considered not to scale unless noted otherwise.
STANDARD CATWALK SUPPORT DETAILS

NOTE
ALL DRAWINGS ARE CONSIDERED NOT TO SCALE UNLESS NOTED OTHERWISE.
EXISTING CATWALK SUPPORT DETAIL

SECTION A-A

NOTE

SCALE: 3" = 1'-0"

TO BE REMOVED AND WELD MATERIAL EXISTING BRACKET TO BACK (TO REMAIN)

EXISTING C 5x9 BACK PLATE (TO REMAIN)

EXISTING 7½"x¾" KICK PLATE (TO REMAIN)

EXISTING C 5x9 (TO REMAIN) (TYP)

NEW 8"x8"x5/8" CATWALK SUPPORT TO BE WELDED TO EXISTING New 8"x8"x5/8" TO BE WELDED TO EXISTING

CHANNEL SUPPORT

FIELD DRILL 1½" holes in New 8"x8"x5/8"

SECTION B-B

SCALE: 3" = 1'-0"

NEW 8"x8"x5/8" TO BE WELDED TO EXISTING CHANNEL SUPPORT

Existing 8"x8"x5/8" TO BE REMOVED

EXISTING 8"x8"x5/8" CATWALK SUPPORT (TO REMOVAL)

EXISTING 8"x8"x5/8" TO BE REMOVED

CLEAN SURFACE AND WELD NEW 8"x8"x5/8" TO EXISTING 8"x8"x5/8" CATWALK SUPPORT. REPAIR CONNECTION AFTER WELDING AND BOLTING. SEE WATER MAIN SUPPORT REPAIR NOTE 16.

CATWALK SUPPORT REPAIR DETAIL

SCALE: 3" = 1'-0"

NOTE

NEW 8"x8"x5/8" TO BE REMOVED

EXISTING 8"x8"x5/8" TO BE REMOVED

NEW 8"x8"x5/8" TO BE WELDED TO EXISTING CHANNEL SUPPORT

EXISTING 8"x8"x5/8" CATWALK SUPPORT (TO REMOVAL)

EXISTING 8"x8"x5/8" CATWALK SUPPORT (TO REMOVAL)

EXISTING 8"x8"x5/8" CATWALK SUPPORT (TO REMOVAL)