THE CITY OF NEW YORK

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER AND SEWER OPERATIONS

STANDARD WATER MAIN SPECIFICATIONS

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THE CITY OF NEW YORK

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER AND SEWER OPERATIONS

DIVISION I

GENERAL PROVISIONS

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SECTION 1.06
DEFINITIONS AND GENERAL PROVISIONS

1.06.1 DEFINITION OF TERMS

Whenever in the specifications and contract the following terms, words, expressions or pronouns in place of them are used, the meaning and intent shall be interpreted as follows:

Whenever it is provided that anything is "to be" or "to be done", "if" or "as" or "when" or "where approved", "required", "directed", "prescribed", "satisfactory", "permitted", "ordered", "designated", "deemed necessary", or words of like import, it shall be taken to mean and intend approved, required, prescribed, permitted, ordered, designated, deemed necessary, or satisfactory, as the case may be, by the Engineer.

Whenever "specified" is used herein, it shall mean, "specified in the contract".

Whenever the word "Addenda" is used, it shall mean written notice or notices furnished to prospective bidders prior to opening of bids and annexed to the contract.

Whenever the word "desirable", "suitable", "sufficient", "satisfactory", or others of a similar purport are used, it is hereby agreed that the desirability, suitability, sufficiency, satisfactoriness, or other denominated condition shall be as determined by the Engineer.

Whenever the term "railroad area" is used, it refers to and means that portion of the street included between the tracks, the rails of the tracks and two (2) feet in width outside, and any other portion of the street that the railway company is required by its franchise to maintain.

Whenever reference is made herein to any other specification, plan or section of these specifications, it shall mean the latest revision thereof in effect at the time of invitation to bid, unless otherwise specifically provided.

Whenever or wherever an article or any class of materials is specified by the name of any particular patentee, manufacturer or dealer, or by reference to the catalogue of any such manufacturer or dealer, it shall be taken as intending to mean and specify the article or materials described, or any other equal thereto in quality, finish and durability, and equally as serviceable for the purposes for which it is or they are intended. Nothing in these specifications shall be interpreted or taken to violate the provisions of **Chapter 13** of the New York City Charter including, without limitation, **Sections 312 and 321** thereof.

1.06.2 SEWERS, WATER MAINS, ETC., TO BE BUILT AS SHOWN ON THE CONTRACT PLANS

(1) The sewers, water mains and appurtenances will be built on the lines, at the depths, at the grades and in the manner shown on the contract plans and on any working drawings that are issued by the Engineer. Deviations to avoid boulders, rock outcrops or utilities are expressly prohibited, unless otherwise approved by the Commissioner or the Commissioner's designee.

(2) LINE MAY BE CHANGED - If the line of the sewer and/or water main is changed from the location shown on the plan(s), so that the Contractor avoids disturbing existing or additional pavements which the Contractor otherwise would have had to disturb and replace, a sum of money representing the cost of such avoided replacement will be deducted from the amount which would have been payable to the Contractor upon the completion of this contract, had the line of the sewer and/or water main not been changed. Where there are no applicable unit bid prices for temporary or final restoration of pavement and the costs are included in the unit bid prices, this cost will be computed in accordance with and at the prices specified in **Subsection 1.07.6**.

The Commissioner or the Commissioner's designee may change the line of the sewer and/or water main or the location of the receiving basins, or other sewer and/or water main appurtenances, provided such changes do not materially affect either the character or the amount of the work to be done, or the conditions under which it is to be performed, and provided that the sewer and/or water main shall be built within the limits of the streets shown on the plan(s), and the Contractor hereby agrees to make no claim for damages or extra compensation on account thereof.

1.06.2a MEANS AND METHODS OF CONSTRUCTION

Unless otherwise expressly provided in the contract drawings, specifications and addenda, the Contractor shall begin work at the outlet of the sewers to be connected thereto and proceed continuously upstream therefrom and complete it in a manner that will permit the expeditious use of the sewer to be built under the contract. For water main installations the sequence of work and shut down periods shall be determined by the Engineer and approved by the Department of Environmental Protection, agency borough distribution engineer. The means and methods of construction shall be such as the Contractor may choose; subject, however, to the Engineer's right to reject means and methods proposed by the Contractor that in the opinion of the Engineer will:

(1) Constitute or create a hazard to the work, or to persons or property; or

(2) Not produce finished work in accordance with the terms of the contract; or

(3) Cause excessive damage to existing conditions (i.e. Trees, Curbs, Sidewalks, etc.).

The Engineer's approval of the Contractor's means and methods of construction, or the Engineer's failure to exercise the Engineer's right to reject such means and methods, shall not relieve the Contractor of the Contractor's obligation to complete the work of the contract; nor shall the exercise of such right to reject create a cause of action for damages.

1.06.3 HOURS OF WORK

Working hours shall be as stipulated by the Department of Transportation's Office of Construction Mitigation and Coordination (OCMC). Generally, no work shall be done on the job before 7:00 A.M. nor after 6:00 P.M., excepting that water mains shall not be shut down before 8:30 A.M. nor after 4:30 P.M., nor shall any work be done on Saturdays, Sundays, or the following holidays, as celebrated in New York City, unless the Contractor shall have given the Engineer at least seven (7) calendar days advance notice in writing, and the Engineer shall, in turn, have given written permission for such work:

(1) New Year's Day	(3) Independence Day	(5) Thanksgiving Day
(2) Memorial Day	(4) Labor Day	(6) Christmas Day

The above hours of work shall apply except when, because of failure to shut down any water main due to any difficulty encountered, or because of any act or omission by the City, the work of connecting to existing water mains is delayed, and such delay mandates that work be performed beyond 4:30 P.M. in order to restore water service.

If the day preceding any of these holidays falls on a normal work day, then no water shutoffs will be allowed on that day preceding the holiday and the Contractor shall cease construction operations and shall restore the streets to public use by midday of that day. The Contractor may be granted permission to continue working beyond midday on the day preceding a holiday if the Contractor requests written permission at least seven (7) calendar days in advance from the Engineer and receives written approval from the Engineer prior to the holiday.

Pursuant to the provisions of §24-222 of the Noise Control Code: the permissible hours of work shall be on weekdays from 7:00 A.M. to 6:00 P.M., unless a variance therefrom is provided in the contract.

1.06.4 ADJUSTING EXISTING PAVEMENTS, SIDEWALKS, ETC.

Existing pavements, sidewalks, curbs, gutters, flaggings, and crosswalks shall be properly adjusted to the work done under this contract, as directed.

1.06.5 TREE PRESERVATION, PROTECTION AND REPLACEMENT

All trees within the construction site are covered by the regulations of the **"Department of Parks and Recreation Street Tree Preservation, Protection and Planting Standards".**

Trees along the line of work shall be protected in accordance with the **"Department of Parks and Recreation Street Tree Preservation, Protection and Planting Standards"** against injury or defacement by the Contractor. Such tree protection shall be erected prior to commencement of work in any particular street. Unless otherwise provided for, the cost for erection of such tree protection shall be deemed included in the prices bid for all items of the contract.

Trees injured or defaced which do not require replacement shall be treated by the Contractor to insure continued growth in accordance with the requirements of the Department of Parks and Recreation, and at the expense of the Contractor.

Trees injured or defaced beyond treatment, shall be replaced in accordance with the requirements of the Department of Parks and Recreation for new trees and at the expense of the Contractor. The Contractor shall obtain the latest specifications and revisions from the Department of Parks and Recreation.

The Contractor is referred to **Local Law 29** concerning tree replacement.

The Contractor shall employ all means and methods necessary to avoid removal of existing trees. If it is determined by the Engineer to be absolutely necessary to remove trees due to the installation of new sewers, water mains or pavements in the contract area, they shall be replaced within one-quarter (1/4) mile of the project site on an equivalent caliper basis and in accordance with the **"Department of Parks and Recreation Street Tree Preservation, Protection and Planting Standards"**. Should the planting of trees require saw cutting and removing of existing sidewalks, the cost of such work shall be deemed included in the prices bid for the respective Tree Planting items of the contract. New trees shall be located as directed by the Engineer. In no case shall any tree be planted less than five (5) feet from a utility pole.

In the event tree roots are damaged or destroyed during the course of construction, such trees shall be pruned and fertilized by the Contractor in accordance with the "**Department of Parks and Recreation Street Tree Preservation, Protection and Planting Standards**". The cost for all the labor and materials required to perform all pruning and fertilization shall be deemed included in the prices bid for the respective Tree Pruning items of the contract.

The Contractor shall perform no work adjacent to street trees that are determined by the Engineer or the Department of Parks and Recreation to be affected by the Contractor's construction operation until the Contractor has obtained the required permits from the Department of Parks and Recreation. Where the planting of new trees is required, the Contractor shall arrange for a joint inspection of the site with the Borough Horticulturist, who will also advise the Contractor of an acceptable tree variety for replanting.

Special attention shall be directed to the following:

(1) The Contractor shall supply the office of the Director of Forestry of the respective Borough(s) in which the work is being performed with the name and certificate of insurance of the landscape contractor should one be needed.

(2) Parks Department shall be notified by the Contractor twenty-four (24) hours in advance as to which trees are to be removed should it become necessary.

(3) Construction barriers must be located around all tree trunks whenever heavy equipment is in use around the tree.

(4) In the event of root damage, affected trees shall be pruned to compensate for root loss.

(5) In the event of tree trunk damage, affected trees shall be bark traced within three (3) days.

(6) All tree work requires a permit from the Parks Departments.

(7) Only hand excavation shall be allowed around existing trees.

(8) New house connections shall be constructed so as to prevent existing tree damage.

(9) No storage of material and/or equipment on Parks Department's property will be allowed during construction.

(10) A survey of all existing trees within the scope of the project may be available with the Director of Forestry.

(11) Unless otherwise provided for, the costs for the aforementioned work shall be deemed included in the prices bid for all items of the contract.

1.06.6 ENCUMBRANCES

All fences, gates, shrubbery, lawn areas, pipes, retaining walls, paved entrances and exits, and all other encroachments, encumbrances, or obstructions above or below ground surface, and the related foundations and appurtenances which are upon the line of work when it is begun, or thereafter placed thereon, and which are affected by the construction operation, shall be removed by the Contractor to the extent directed by the Engineer, and shall be replaced and/or rebuilt to the satisfaction of the Engineer and the property owner.

The Contractor shall take preconstruction photographs of all affected encumbrances as specified in **Subsection 1.06.31**. The Contractor shall remove and restore all affected encumbrances and/or encroachments to at least the same condition in which they were prior to the start of construction. No salvageable material will be permitted to be re-used for the restoration of encumbrances without the approval of the Engineer. The Contractor shall furnish all new materials required or necessary to perform the above work to the satisfaction of the Engineer. The cost of all labor, materials, plant, insurance and equipment necessary and required to remove, replace and/or rebuild such encumbrances shall be deemed included in the prices bid for all items of work.

1.06.7 DISPOSAL OF EXCESS EXCAVATED MATERIAL

All excess excavated material, with the exception of contaminated material, shall become the property of the Contractor and shall be properly disposed of away from the site, at the Contractor's expense. Contaminated material shall be disposed of separately in accordance with contract requirements.

1.06.8 LINES AND GRADES (CONTRACTOR'S SURVEY PARTY)

(1) A bench mark and the control lines for the alignment and levels necessary for the prosecution of the sewer and water main work, where required, shall be established by a Licensed Professional Land Surveyor retained by the Contractor. When necessary, the Land Surveyor shall obtain the required data from the Topographical Bureau, Office of the Borough President, in the respective borough in which the work is to be performed.

The Contractor shall also provide the alignment, elevation and position for all construction work between the controls. Chiefs of Party employed by the Contractor, for establishing alignment and levels between controls, shall hold a license issued by the State of New York as either a Professional Engineer or Land Surveyor.

The aforementioned shall be subject to check and correction by the Engineer. The Contractor shall keep the Engineer informed at a reasonable time in advance of the time and place the Contractor intends to do work. The Contractor, at the Contractor's own expense, shall, when required, supply all stakes, range piles, range sites, scaffolding, platforms, and staging necessary to place and maintain the controls for lines and levels. The Contractor is responsible for the accuracy of all controls, lines and grades established by the Contractor.

When ordered by the Engineer, the Contractor's survey party shall take all measurements and prepare cut sheets and sketches, indicating elevations, locations and other field data pertaining to this contract. Signed copies of such surveys and sketches with P.E. or L.S. seal affixed shall be delivered to the Engineer as required.

During the progress of sewer work, the Contractor's Survey Party will be required to check the As-Built Elevations of the completed work. Elevations shall be taken and furnished to the Engineer whenever a five hundred (500) linear foot section of sewer is completed and at every manhole.

(2) CONTRACTOR TO PROVIDE ASSISTANCE - The Contractor shall provide all necessary assistance for the Engineer for inspection, measuring, investigation, etc., when required, without charge or expense to the City.

(3) Unless otherwise noted the elevations indicated on the plans refer to the respective Borough Sewer Datum specified below in feet above mean sea level as established by the U.S.C.G.S. at Sandy Hook, New Jersey.

The Bronx	2.608	Brooklyn	1.72	Manhattan	2.75
Queens	2.725	Staten Island	3.192		

1.06.9 PRESERVATION OF POINTS, STAKES, ETC.

The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks, made or established on or near the line of the work, and the Contractor agrees to accept the responsibility for and to remedy at the Contractor’s expense any mistakes that may be caused by the unauthorized disturbance or removal of such points, stakes, grade marks, monuments and bench marks.

1.06.10 CONTRACTOR NOT TO DISTURB CITY MONUMENTS

Prior to starting any excavation work the Contractor will be required to contact the respective President of the Borough where the work is being performed to ascertain the exact locations of any City monuments within the limits of the work. A copy of the locations of these monuments shall be given to the Engineer.

Based upon these locations the Contractor shall not disturb or excavate within five (5) feet of any City monument until such time that said monument has been referenced or reset by a New York State Licensed Professional Land Surveyor. Notification must be given to the respective Borough President's Office prior to any resetting.

Upon permission from the Borough President's Office the Contractor shall take up and preserve such monument.

Upon completion of the work the Contractor will be required to reset the monument at its original location or set it at a new location as directed by the respective Borough President's Office.

A New York State Licensed Professional Land Surveyor at no cost to the City of New York shall perform all work regarding the resetting of monuments. The costs thereof shall be deemed included in the prices bid for all items of work.

1.06.11 RIGHT TO CONSTRUCT SEWERS, WATER MAINS, HOUSE CONNECTIONS, ETC.

(1) Prior to the commencement of and during the progress of the work under this contract the Commissioner shall have the right to undertake, and to grant permits for any construction, reconstruction and repairing of any pipes, water mains, sewers, basins, subway ducts and railway tracks, and any appurtenances thereof located on and adjoining the line of the work, and for any connections with and additions to such pipes, etc.; and for such purposes, the Commissioner is hereby authorized to suspend work on any part of this contract. The Contractor agrees that the Contractor will not interfere with nor place any obstruction in the way of any person or persons who may be engaged upon such work.

(2) PERMITS FOR CONNECTIONS - The Commissioner is hereby authorized, by the contract or otherwise, to connect any water mains, sewers or drains to the work built under this contract and to grant permits to any person or persons to make connection therewith at any time before it is completed. The Contractor agrees that the Contractor will not interfere with nor place obstructions in the way of such persons as may be employed in building such water mains, sewers and drains, or in making such

connections, and the flow from such sewers, drains and connections will be permitted by the Contractor to discharge into the work built under this contract and the Contractor agrees to make no claim for compensation, damages or delay on account thereof. The issuance of such permits shall not be considered as an acceptance by the City of the part of the sewer into which such connections empty or flow, nor shall the Contractor on account thereof be relieved from the cleaning of the sewer prior to the final examination of the work. No new connections or drains will be allowed made or joined to the work built under this contract unless the Commissioner has duly issued a permit. This permit shall be shown in all cases to the Engineer.

1.06.12 FLOW OF SEWERS AND DRAINS, ETC. INTERRUPTED; SEWERS TO BE KEPT CLEAN; REMOVING AND ABANDONING SEWERS, WATER MAINS, ETC.

(1) The Contractor shall provide at the Contractor's own cost for the flow of the sewers, drains and watercourses interrupted during the progress of the work, and shall immediately remove and dispose of all offensive matter. The flow throughout the entire length of such sewers and appurtenances as are to be replaced by the work to be done under this contract shall be maintained by the Contractor. The Contractor, as may be directed, shall, at the Contractor's own cost and expense, remove all bulkheads from the sewers with which the work under this contract will be connected.

Wherever the work to be built under this contract, or the trench in which it is to be constructed, follows the line and occupies the place of or intercepts any existing sewer, drain, culvert, basin connection or house connection, the Contractor shall connect the same with the sewer built under this contract.

Where the Contractor's construction operation requires the cutting of house connection drains, or where house connection drains are inadvertently cut or broken, the Contractor shall immediately restore service by installation of temporary pipe, pumping or fluming, or by permanent reconstruction as directed by the Engineer. Temporary house connection services provided in accordance with the above shall be replaced by permanent construction before the backfilling of the new sewer to which the house connection drains are to be reconnected.

The costs of providing temporary services shall be deemed included in the prices bid for all items of work.

At no time will the Contractor be permitted to use open troughs or use the trench as a flume.

Before bidding, the Contractor shall examine the route of the existing sewer seeking all necessary information (including the examining of the existing sewers for evidence of surcharging) and make the Contractor's own determinations of any and all conditions, particularly the method of the Contractor's fluming operations, which may affect the performance of the Contractor's work and the Contractor's bid prices under this contract.

Prior to starting construction, the Contractor shall submit the Contractor's method of fluming to the Engineer. The Contractor shall provide and construct flumes, temporary sewers, dams and other facilities necessary to divert or otherwise take care of and maintain the flow in the existing sewer, including all incidental work without separate payment. The cost thereof shall be deemed included in the prices bid for all items of this contract.

(2) SEWERS TO BE KEPT CLEAN - During the progress of the work, and until the completion and acceptance thereof, the sewers, drains, basins, culverts and connections built under this contract shall be kept thoroughly clean throughout, and shall be left clean. They shall be free from all defects due to poor materials or workmanship.

All existing catch basins located in the streets in which sewers are to be constructed within the limits of the contract, shall be cleaned and connections flushed. Cleaning shall be performed after final restoration is completed and prior to the final inspection.

Unless otherwise specified, the cost of cleaning the existing catch basins and connections shall be deemed included in the prices bid for all items of work.

(3) EXISTING FLOW

(A) (1) Prior to the start of any sewer work, the Contractor shall submit to the Borough Engineer a typical fluming and/or bypass-pumping diagram. This diagram shall include detailed information pertaining to the maintenance of existing sewer flow, house connection pickup, sizes of flume piping, upstream and downstream damming, pump size, hours of operation, power driven air circulating system and overflow weirs. No sewer work shall be performed before the Contractor receives written confirmation of the Engineer's approval of the detailed fluming and/or bypass-pumping diagram. The cost of all diagrams shall be deemed included in the prices bid for all items of this contract.

(2) The above referenced fluming diagram shall detail the Contractor's method to prevent debris, silt, and grease from migrating downstream during any cleaning or construction operations. The Contractor shall be required to clean the downstream sewer if debris, silt and/or grease from any cleaning and/or construction operation are not captured and removed.

(B) In accordance with the approved fluming diagram, the Contractor shall provide and construct flumes, temporary sewers, dams and other facilities necessary and required to maintain flow in existing sewers and house connections. The costs thereof shall be deemed included in the prices bid for the various contract items. No separate or additional payment will be made for this work.

(C) The Contractor shall maintain fluming, and/or bypass pumping until such time that the Engineer inspects and approves, in writing, that portion of sewer that has been completed.

(4) REMOVING AND ABANDONING SEWERS, WATER MAINS, ETC. - All sewers, water mains, drains, culverts, basins, basin connections and all portions of any watercourse in, through or across any street or easement rendered unnecessary by the construction of the work herein contemplated shall be removed or abandoned as indicated on the plans or as specified or directed.

In general, sewers, drains, culverts, basins, basin connections, etc., physically interfering with the construction, shall be removed and all others shall be abandoned, except as otherwise noted on the plans or as specified or directed.

Wherever sewers, drains, etc. twelve (12) inches or larger in their least dimension and water mains twenty-four (24) inches or larger in nominal diameter are to be abandoned they shall be completely filled hydraulically with an excavatable flowable fill in accordance with **Section 5.37 - Hydraulic Fill For Abandoned Sewers And Water Mains** or other methods submitted by the Contractor and approved by the Engineer in writing.

The cost of removing, abandoning or filling existing sewers, water mains, drains, etc., shall be at the expense of the Contractor and shall be deemed included in the prices bid for all items of work. No separate payment will be made for the removal, abandoning or filling of existing sewers, water mains, drains, etc., unless there are specific bid items for removing, abandoning or filling of existing sewers, water mains, drains, etc.

Unless otherwise specified, where sewers, drains, catch basins and basin connections are to be abandoned, manholes and catch basins shall be bulkheaded, their heads and covers shall be removed, they shall be broken down four (4) feet below final grade and they shall be satisfactorily filled in and compacted by the Contractor at the Contractor’s own expense, and the cost shall be deemed included in the prices bid for all items of work.

Unless otherwise specified, where water mains are to be abandoned, valves, hydrants, valve boxes and covers shall be removed, ends of mains shall be sealed, and valve chambers shall have heads and covers removed, shall be broken down four (4) feet below final grade and satisfactorily filled in and compacted by the Contractor at the Contractor’s own expense, and the cost shall be deemed included in the prices bid for all items of work.

1.06.13 CITY NOT RESPONSIBLE FOR ACCURACY OF SUBSURFACE RECORDS OR INFORMATION

The Contractor admits that the Contractor has carefully examined the location of the work, has made special inquiries at the offices of the companies or individuals owning, controlling or operating pipes, conduits, tunnels, tracks and other structures, and the Contractor has determined to the Contractor's satisfaction the character, size, location and length of such pipes, conduits, tunnels, tracks and other structures, and the obligations, if any, of said companies or individuals to protect and remove the same; that the Contractor has inspected the public records of the various City Departments having cognizance and control of the City's water pipes, conduits and sewers, and the Contractor has made such further personal inspection and investigation as the Contractor deemed proper to determine the correctness of the information so obtained; and the Contractor clearly understands that the City does not insure the accuracy of such records, reports or information, and agrees that the Contractor will not make any claim against the City for damages or extra work caused or occasioned by the Contractor's relying upon such records, reports or information furnished by any City Department or any companies, either as a whole or in part.

The existing elevations and existing locations shown on the plans may vary from actual field conditions. The proposed sewers shall be constructed so as to meet existing sewers at outlet and inlet conditions and as directed by the Engineer.

The proposed water mains shall be constructed so as to meet existing water mains as shown on the contract plans and as directed by the Engineer.

House connections and existing catch basin connections may not be shown on the contract plans.

The elevations and locations of underground facilities have been plotted on the plans by means of the most reliable information available, however, their accuracy is not guaranteed.

Prior to the start of construction the Contractor shall investigate all elevations and locations of all existing inlet and outlet sewers and manholes, water mains, utility facilities, etc. If the actual field locations and elevations vary from those shown on the plans the Contractor must immediately notify the Engineer in writing.

All of the aforementioned investigations must be performed prior to the start of construction and the cost thereof shall be deemed included in the prices bid for all items of work.

The Contractor's attention is directed to the fact that from time to time revisions and additions are made in the Sewer and Water Main Standard Drawings. A copy of the latest Standards may be obtained at the following location:

Department of Design and Construction
Division of Infrastructure
30-30 Thomson Avenue, 3rd Floor
Long Island City, New York 11101

All the work shown on the contract drawings shall be done in accordance with the latest Specifications and Sewer and Water Main Standards.

1.06.14 NOTICE TO UTILITY COMPANIES, ETC., TO REMOVE STRUCTURES OCCUPYING PLACE OF SEWERS, WATER MAINS OR APPURTENANCES

The Contractor shall, except as otherwise provided for in **Subsections 1.06.18 and 1.06.24**, hereof, give notice in writing to all utility and other companies or individuals owning or controlling any pipes, conduits, tunnels, tracks or other structures which shall be found, upon excavating, to occupy the place of the sewers, water mains and appurtenances thereof to be laid or built as required herein so that said companies or individuals may remove their structures at their expense and the Contractor shall not cause

any hindrance to or interference with such companies or individuals in removing their structures. However, if said utility, railroad, or other companies or individuals, within five (5) days after receipt of such notice shall fail to remove their structures, the Contractor shall, upon the written approval of the Commissioner, remove the same, it being expressly understood that the cost thereof shall not be a charge against the City, but shall be a matter for adjustment between the Contractor and the company or companies or individuals concerned.

1.06.15 NOTICE TO UTILITY COMPANIES, ETC., TO SUPPORT, PROTECT, TEMPORARILY REMOVE AND REPLACE STRUCTURES WITHIN LIMITS OF ORDERED EXCAVATION

The Contractor shall, except as otherwise provided for in **Subsections 1.06.18 and 1.06.24**, hereof, give notice in writing to all utility and other companies or individuals owning or controlling any pipes, conduits, tunnels, tracks or other structures which shall be found within one (1) foot of the limits of ordered excavation or otherwise be in interference so that said companies or individuals may protect, support, maintain or temporarily remove and replace their structures, and the Contractor shall not cause any hindrance to or interference with any such utility company or companies or individuals in protecting, supporting, maintaining or temporarily removing and replacing main and service pipes, conduits, tunnels, lampposts, lamps, tracks or other structures. The Contractor agrees that the Contractor will suffer the said company or companies or individuals to take all such measures as are requisite for the purpose aforesaid.

Contractors must comply with the provisions of 16 NYCRR Part 753 (also cited as Industrial Code 53 or Code Rule 53), including, but not limited to, the provisions of Subparts 753-3.1(a) and (b), which states that excavators shall notify the New York City One Call Center at 1-800-272-4480 at least two (2) but not more than ten (10) working days, not including the date of the call, before the commencement of excavation. Copies of which may be obtained at the following location:

Department of Labor
One Main Street
Brooklyn, New York 11201

The City shall not be liable for any costs incurred by the Contractor as a result of the compliance, noncompliance, or improper compliance by the franchised operators of underground facilities, with 16 NYCRR Part 753.

The City shall not be liable for any costs incurred by the Contractor for the support, protection, temporary removal, replacement and maintenance of underground facilities owned by franchised operators of such facilities.

1.06.16 CONTRACTOR TO MAKE OR ENTERTAIN OFFER TO PROTECT, SUPPORT, TEMPORARILY REMOVE AND REPLACE, PIPES AND OTHER STRUCTURES OF PRIVATE COMPANIES OR INDIVIDUALS

The Contractor agrees, except as otherwise provided in **Subsections 1.06.18 and 1.06.24**, hereof, to confer with and to make an offer to or entertain an offer from such private companies or individuals as own the said pipes, conduits, tunnels, tracks or other structures, and the Contractor further agrees to enter into an agreement with said utility or other companies or individuals by what terms and at what prices the support, protection, maintenance, temporary removal and replacement of the pipes, conduits, tunnels, tracks and other structures will be undertaken and accomplished and in the event of the failure to make such agreement with said companies or individuals the Contractor will not complain nor make any demand for additional compensation or pay for supporting, protecting, maintaining, temporarily removing and replacing the said pipes, conduits, tunnels, tracks or other structures.

It is expressly understood that the cost of supporting, protecting, maintaining, temporarily removing and replacing the said pipes, conduits, tunnels, tracks or other structures shall not be a charge against the City, but shall be a matter of adjustment between the Contractor and the company or companies or individuals concerned.

1.06.17 CONTRACTOR TO PROTECT GAS MAINS, CONDUITS, SUBWAYS, STEAM PIPES, ETC., OWNED BY PRIVATE COMPANIES ALONG AND OUTSIDE OF THE LINE OF ORDERED EXCAVATION

The Contractor agrees to sustain in their places and protect from injury all railroad tracks, gas mains, conduits, subways, steam pipes and pneumatic pipes and all service connections therefrom and all other property belonging to public service companies along the line of the work and outside of the line of ordered excavation from direct or indirect injury by blasting, caving, or otherwise, and the Contractor hereby assumes all expenses for direct or indirect damage which may be occasioned by injury to any of them, and the Contractor agrees to have a sufficient quantity of timber and other necessary materials and appliances on hand at all times and use the same as required for the sheeting and bracing of sides and ends of excavation and for sustaining and supporting any structures that may be undermined, weakened and endangered or threatened; and in case any damage or injury shall result to said structure through or by reason of any negligence, wilfulness, carelessness or want of skill on the part of the Contractor, the Contractor's agents or servants, the Contractor hereby agrees to pay such amount as shall be sufficient to cover the expenses and damages occasioned thereby, and that such amount shall be charged against the Contractor; and the Commissioner is hereby authorized to deduct and retain from any moneys which may be due, or which shall become due under this contract, a sum sufficient in the Commissioner's judgment to cover the cost of making good any such damages, expenses or loss, and to apply said sum so deducted and retained to the requisite repairs or renewals, or to reimburse the parties damaged or injured.

1.06.18 GAS COST SHARING WORK (EP-7)

All prospective bidders are hereby advised that, pursuant to the "Gas Facility Cost Allocation Act", ("the Act"), the City of New York has entered into an agreement ("the Agreement") with the gas companies (Con Edison and Keyspan Energy Delivery) operating in their respective areas of the City to "share" the cost of facility relocation and/or support and protection of facilities disturbed by proposed water and/or sewer and related City work specified in this contract. Therefore, bid items, specifications and estimated quantities for the incremental costs of support and protection of certain gas facilities have been included in this contract. The low bid for this contract shall be determined by examining each bid for all work to be performed under this contract including any work of support and protection of gas facilities to be performed. The Contractor shall not seek additional compensation from gas companies except as specifically set forth in its contract. **(See Addenda to the Specifications.)**

1.06.19 CONTRACTOR APPROVES DRAWINGS AND SPECIFICATIONS AS INVOLVING NO DAMAGE TO CITY PROPERTY OR TO PRIVATE BUILDINGS

The Contractor expressly admits and covenants that the drawings, specifications and other provisions of this contract, if the work be done without fault or negligence on the part of the Contractor, do not involve any danger to the fire alarm telegraph system of the City, sewers, water mains, hydrants, hydrant connections, duct lines owned, leased or operated by the City, lamps, lampposts, monuments, sewer and water service pipes, sidewalks, curbs, trees or any other city-owned properties or to the foundation walls or vault walls, stoops or other parts of abutting or adjacent private buildings. The Contractor will at the Contractor's own expense make good any direct or indirect damage that shall be done in the course of construction to any such structures or property through or by reason of the prosecution of the work.

1.06.20 CONTRACTOR TO NOTIFY CITY DEPARTMENTS

At least forty-eight (48) hours before breaking ground for the purpose of constructing the work on this contract, the Contractor agrees to give notice hereof in writing to each and every City Department owning structures within the limits of the work and obtain their written permission before the Contractor disturbs any property or structure under the jurisdiction of these Departments.

(1) FIRE DEPARTMENT - The Contractor shall exercise caution during the Contractor's operations to insure continued fire alarm service in the area. The Contractor shall support, protect, and maintain said facilities during construction. Any inadvertent interruption to Fire Alarm Service or damage to Fire Communication System equipment or facilities, due to the Contractor's operations, shall be repaired or replaced immediately by the Contractor at the Contractor's own expense, and in accordance with Fire Department standards, specifications and requirements. The Contractor shall

notify the Bureau of Fire Communications forty-eight (48) hours prior to the commencement of operations in proximity to or involving Fire Department facilities.

(2) DEPARTMENT OF PARKS AND RECREATION - The Contractor shall notify the Department of Parks and Recreation at the respective Borough Office.

1.06.21 COST OF PERMANENT REMOVAL OF CITY STRUCTURES

Existing water pipes or appurtenances owned, controlled or operated by the City, or any part of the fire alarm telegraph system of the City, or any duct line or conduit owned, leased or operated by the City, occupying the place of the sewers, water mains and appurtenances to be laid or built as required herein, will be removed and relaid or rebuilt as required by the work of the contract. The cost thereof shall be included in the prices bid for all the items for which there are contract prices unless otherwise specified.

1.06.22 CONTRACTOR AGREES TO PROTECT CITY STRUCTURES WITHIN THE LIMITS OF, ALONG, AND OUTSIDE THE LIMITS OF ORDERED EXCAVATION

The Contractor agrees to support and to properly protect from injury the City fire alarm telegraph system, all water mains and service water pipes, sewers and appurtenances and conduits or duct lines owned, controlled or operated by the City which may be affected in any manner by the work done under this contract, except as hereinbefore provided, and to protect all such water and service pipes from freezing; or, failing to do so, the Commissioner shall be and the Commissioner is hereby authorized, after two (2) days written notice to the Contractor, to relay and recaulk and repair the same immediately, in each block, as the work progresses, and the cost thereof shall be charged to the Contractor, and the City hereby is authorized to retain and deduct said cost out of the monies which may be due or become due to the Contractor. In general, existing traffic signal and street lighting conduits are not shown on the contract drawings. It is the Contractor's responsibility to determine the location of the traffic and street lighting underground distribution system. The Contractor shall make the Contractor's own field observations and research the City's records to determine the location of such facilities. The cost of all support, protection and investigation performed by the Contractor as specified above shall be included in the prices bid for all the items for which there are contract prices unless otherwise specified. Should it prove necessary to disturb existing traffic signals or street lighting equipment that is the property of the City of New York, the Contractor shall provide temporary signals and street lighting. Upon completion of the work, traffic signals, lamps, lampposts, and accessory equipment shall be restored and temporary facilities shall be removed. Such work shall be accomplished in coordination with the Department of Transportation, Division of Traffic Operations and the appropriate utility companies. All costs for connections, disconnections, supply, erection, dismantlement, storage, and restoration of existing facilities shall be included in the prices bid for all contract items, unless otherwise specified. Should the Contractor disturb, damage, or relocate any conduits, junction boxes, traffic and/or lampposts, lamps or traffic signals in the streets affected by this work, such damage or relocation shall be immediately repaired with the knowledge of and to the satisfaction of the City. The cost of such work shall be at the sole expense of the Contractor, unless otherwise specified.

1.06.23 DAMAGED WATER SERVICE PIPES TO BE REPAIRED BY A LICENSED PLUMBER

All water service pipes damaged, cut or otherwise interrupted in the performance of the work under this contract shall be repaired by a licensed plumber at the expense of the Contractor under the rules and regulations of the City of New York. The Contractor shall obtain all no-fee permits for water service repair.

All water service pipes damaged during construction and requiring repair shall be replaced with one (1) continuous piece from the water main to the farthest point of the damage utilizing a single coupling as directed by the Engineer.

1.06.24 CONTRACTOR TO CARRY OUT AGREEMENT BETWEEN CITY AND RAILROAD COMPANY OR PROPERTY OWNER(S)

If, for the purpose of performing the work or any part thereof required by the contract, the City has entered into an agreement with any railroad company, or the owner(s) of any property through or across which the work, or any part thereof, is to be constructed, the Contractor agrees to carry on such work or such part

thereof, as directed, in accordance with the terms of such agreement, a copy of which is annexed and is hereby agreed upon as forming part of this contract.

1.06.25 MATERIALS ON PRIVATE PROPERTY

The Contractor hereby agrees that no excavated material or materials of construction shall be placed by the Contractor or for the Contractor upon private property, unless by written permission of the owners or lessees thereof. Any such material placed without written permission will be removed by the Contractor, and all damages to said property remedied by the Contractor at the Contractor's own cost and expense. Unless such materials are removed and such damage remedied by the Contractor within forty-eight (48) hours after service upon the Contractor of a written notice to do so, the Contractor agrees that the Commissioner shall be and is hereby authorized to dispose of such materials, and to remedy such damage and deduct the expense thereof from the moneys due or to become due under this contract. Copies of all written permissions shall be given to the Engineer prior to the placement of any material on private property.

1.06.26 SAFE AND HEALTHFUL WORKING CONDITIONS

The Contractor shall provide working conditions that are as safe and healthful as the nature of the construction operation permits. All such safe and healthful working conditions shall be in accordance with OSHA requirements and regulations. Sewer and water main construction that require proper lighting in order to comply with OSHA shall be lighted with electric lights in sufficient number to insure proper work and inspection.

The Contractor shall keep the air in all sewers and water mains in which work is being performed in a condition suitable for the health of the men. A sufficient supply of fresh air shall be provided at all times in all places underground. Provisions shall be made for the testing and monitoring of gases and for the quick removal of gases and dust created by operations in the sewers.

Should natural ventilation prove inadequate, ventilation plants of ample capacity shall be installed and operated while the work is going on and at such other times as is required to produce conditions hereinbefore specified.

No separate payment will be made for the providing of safe and healthful working conditions. The cost for the above work shall be deemed included in the prices bid for all items of the contract.

1.06.27 SALVAGEABLE MATERIALS

No salvageable material shall be returned to the Department of Environmental Protection regardless of condition. It shall become the property of the Contractor for removal and disposal, by the Contractor, away from the site.

1.06.28 MATERIAL ON PUBLIC PROPERTY

No excavated or other material necessary to be disposed of, excepting as herein otherwise specified, shall be dumped or placed within the limits of any existing or projected public street or road, nor shall any material be excavated and removed from such locations, without the written permission of the Commissioner. In addition, no construction material or equipment shall be stored on public property without all appropriate permits and the written permission of the Engineer.

1.06.29 CONTRACTOR TO PROVIDE FOR TRAFFIC

The Contractor shall observe the laws and ordinances of the City in relation to obstructing the streets, keeping open passageways and protecting the same where they are exposed and would be dangerous to the public travel. The Contractor shall adhere to the following requirements:

(1) Unless otherwise specified in the contract documents or ordered in writing by the Engineer, there shall not be more than six hundred (600) feet of open trench in a roadway at any one time. (Trenches backfilled but not yet temporarily paved are considered open trenches.)

(2) The Contractor shall be responsible for the Maintenance and Protection of Traffic. The Contractor shall furnish, erect, install and maintain at all closures, intersections and locations required and specified herein, all necessary and required temporary advance warning signs and temporary traffic control devices. The Maintenance and Protection of Traffic (MPT) shall adhere to the specifications set forth in the "New York State Manual on Uniform Traffic Control Devices" (NYSMUTCD) and shall also be in accordance with this **Subsection 1.06.29** and as directed by the Department of Transportation (DOT), the Office of Construction Mitigation and Coordination (OCMC) and the Engineer. The Contractor shall, at all times during the life of the contract, take all necessary and required legal precautions for the protection of the work and for the safety of the public.

The Contractor shall employ sufficient watchmen at all times throughout the duration of this contract when no construction is taking place whether there are open trenches or no open trenches within the contract limits. The watchmen shall be on the job site during the hours when no construction is taking place on weekdays and around the clock on weekends and observed holidays.

At all construction locations where traffic approaches sewer and trunk water main trenches, flashing lights shall be installed and maintained on the trench fencing at five (5) foot intervals along the entire length of the construction fencing. The appropriate large left/right arrows (NYSMUTCD W1-11/W1-12) shall be installed on the approach face of the construction fencing.

In addition, at all construction locations where traffic approaches perpendicular to the sewer and trunk water main trench fencing, a Type III barricade with three (3) flashing lights shall be installed and maintained. The barricade shall also have the appropriate large left/right arrows installed.

(3) These stipulations shall become part of the NYCDOT Permit for the subject project. To be valid, such permit must be issued within three (3) months of effective day thereof, otherwise permission to proceed after this time is contingent on review.

(4) The Contractor shall notify the Office of Construction Mitigation and Coordination (OCMC), in writing, at least thirty (30) days prior to the start of construction in order that measures to control traffic flow are arranged (i.e. field meetings). The letter must include the Contract Number, Name of Contract and OCMC File Number. The Contractor shall be required to submit a Traffic Control Plan with Maintenance and Protection of Traffic Shop Drawings to be done by a New York State Licensed Professional Engineer that is a qualified Traffic Engineer Safety Work Site Inspector in accordance with the New York State Manual on Uniform Traffic Control Devices. The Traffic Control Plan (TCP) shall be submitted a minimum of twenty (20) days prior to the OCMC's preconstruction meeting for OCMC and Department of Design and Construction (NYCDDC) review and approval. The (TCP) shall include but not be limited to the following:

(A) Signing, application and removal of pavement markings, methods and devices for delineation and channelization, placement and maintenance of devices, lighting, traffic regulations, construction scheduling and surveillance and inspection. All drawings shall be done to scale and as applicable with the various street systems. The street systems shall include but is not limited to:

(a) Size, depth and location of construction (trench) as it relates to street usage.
(b) Width of roadways and sidewalks.
(c) Direction of traffic.
(d) Land use - i.e. commercial, residential, schools, churches, hospitals, etc.
(e) Bus routes, truck routes.
(f) Existing street furniture - i.e., meters, traffic signals, lampposts, etc.
(g) Traffic regulations - i.e., curbside (No Parking Anytime, etc.); regulatory (Stop Sign, etc.).

(B) The TCP shall include drawings showing all existing street and traffic conditions and proposed conditions.

(C) As the project advances, the Contractor shall be required to update and/or submit new TCP's for review and approval by the OCMC and the NYCDDC.

(D) If specified in the contract documents, the Contractor shall, prior to setting up any detour (if required by the project), have the detour roadway stabilized and paved. The Contractor will be responsible for maintaining all such stabilized and repaved detour roadways. All work shall be done in accordance with NYCDOT standards.

(E) Final pavement restoration shall commence in a reasonable and timely fashion as noted in the specifications and/or as determined by the NYCDOT, OCMC and NYCDDC.

(5) The Contractor shall submit to the OCMC a schedule of construction operations and obtain an OCMC traffic stipulation sheet.

(6) The Contractor shall notify the New York City Department of Transportation prior to the installation of temporary paving in each section. Failure to send such notification promptly may cause delay in issuance of further permits.

(7) The cost of all labor and materials required to maintain the traffic in accordance with all the requirements of the Department of Transportation, and in accordance with the specifications of the OCMC and the NYSMUTCD, or as directed by the Engineer, shall be deemed included in the price bid for the contract item labeled "MAINTENANCE AND PROTECTION OF TRAFFIC", unless otherwise specified.

(8) GENERAL NOTES

(A) The Contractor shall obliterate/remove by scarification all permanent lane markings and install all temporary lane markings, as directed. The Contractor shall remove all temporary lane markings and reinstall permanent lane markings within seven (7) days of permanent pavement restoration. All permanent markings shall be thermoplastic (unless directed otherwise by OCMC), regardless of the conditions and type of markings prior to construction. Specifications for the markings may be obtained from the NYCDOT.

(B) The Contractor shall provide, install and maintain all regulatory construction signs, as required. These signs shall conform to the specifications of the Division of Traffic Operations' Standard Sign List. All temporary regulatory construction signs provided and installed by the Contractor shall have the name of the Contractor, the name of the Agency and the Contract Number placed on the back of the sign and at a location where this information will be unobstructed by the sign supports. The letters shall be three (3) inches in height.

(C) The Contractor shall remove all temporary advance warning signs and temporary traffic control devices that pertain to a specific roadway immediately after construction has been completed on that same roadway and/or on the detour routes or locations where advisory signs may have been required.

(D) All signs shall be installed and covered with nontranslucent plastic before any excavation begins.

(E) All barrels used for the Maintenance and Protection of Traffic shall have a minimum of two (2) four (4) inch white reflective bands and two (2) four (4) inch orange reflective bands. Each barrel shall remain clean and in good condition.

(F) The Contractor is advised that the New York City Department of Transportation has developed new standards for regulatory and parking Construction Signs and that the details of these new signs and information concerning the option of purchasing them from the NYCDOT can be obtained through the OCMC Borough Coordinator.

(G) As is practicable, the Contractor shall protect and maintain from disturbance all existing traffic control devices, traffic and street name signs and sign posts, etc., throughout the project area. Where existing traffic control devices of any type are disturbed, whether by the construction operation or by Contractor's negligence, the Contractor shall restore or replace same, as soon as possible, to the satisfaction of the Engineer and in accordance with the New York State Manual on Uniform Traffic Control Devices (NYSMUTCD). The cost for all labor and materials required to

protect, maintain, restore and replace existing traffic control devices of any type shall be deemed included in the price bid for the contract item labeled "MAINTENANCE AND PROTECTION OF TRAFFIC". No additional or separate payment will be made for this work. Should a traffic signal or streetlight be damaged the Contractor shall immediately contact the Division of Traffic Operations' Signals, Street Lighting and Systems Engineering.

(H) The Contractor must contact the OCMC, local Police Precinct, Fire Department, Community Board, Borough President's Office-Chief Engineer and Emergency Medical Services, (NYCTA, MTA and LIRR when applicable) forty-eight (48) hours prior to the occurrence of any roadway closure or the setting up of any detour.

(I) When a detour route is developed as a requirement by OCMC for the Maintenance and Protection of Traffic, the route must be maintained throughout the duration of the detour. Maintenance by the Contractor shall refer to (and not be limited to) roadway repair such as potholes or depressions, and the installation, maintenance and removal of all the necessary pavement markings, detour signs, and regulatory or parking signs required for the detour. The Contractor shall be required to restore all original signs and pavement markings.

(J) When a roadway is closed to traffic or converted to one-way the Maintenance and Protection of Traffic (MPT) requires a Traffic Control Plan (TCP) that must be prepared by a New York State Licensed Professional Engineer that is a qualified Traffic Engineer Safety Work Site Inspector and the Contractor shall present the plan (via NYCDDC) to the OCMC for review and approval. The plan must be received twenty (20) days prior to any detour being implemented. The TCP must indicate all signage, timber or concrete barriers, lights required by the NYSMUTCD, all pavement markings, etc.

(K) Construction signs and markings may be added when determined by the Engineer and/or OCMC to be necessary for proper performance of the work.

(L) To permit adequate visibility at intersections, all barricades shall be placed so as not to hinder pedestrian or vehicular sight lines. Similarly, no sheeting shall extend more than twenty-four (24) inches above the existing pavement grade within eighty (80) feet of an intersection.

(M) The Contractor shall construct and maintain, as directed, suitable temporary walks and bridges for pedestrians and vehicles. Temporary walks and/or bridges must be installed across trenches at all hydrant locations, crosswalks and commercial establishments as required or specified and as directed by the Engineer.

(N) Maintain at least one pedestrian crossing at each intersection or as otherwise directed by the Engineer. Designated pedestrian crossings shall be protected from all excavation areas through the use of an approved barrier, temporary fence or other temporary devices, and in a manner approved by the Engineer. Pedestrian crossings over excavations shall be constructed with timber decking or steel plates lined with temporary fence attached to timber curbs on both sides.

(O) Excavations shall be completely enclosed with timber curbs, lighted barricades and temporary fence as shown on the Traffic Control Plan (TCP), and as directed by the Engineer.

(P) Access for local and emergency vehicular traffic is to be provided at all times. The Contractor shall be required to move and restore barricades as ordered by the Engineer for local and emergency access at no additional compensation.

(Q) Maintenance of pedestrian access to all abutting properties and pedestrian usage of the sidewalk areas, both new and existing, shall be continued at all times, or as directed by the Engineer. Commercial driveway access shall be provided unless otherwise specified by the Engineer. Unless otherwise specified in the contract documents or directed by the Engineer, the Contractor shall not provide residential driveway access. The Contractor when providing access to all abutting properties and sidewalk areas shall take into account the special construction requirements for Handicapped and Disabled Citizens as stated under law.

(R) PROVISIONS FOR BUSES AND PASSENGERS

(a) The Contractor is required to contact OCMC, and New York City Transit Authority - Transportation Planners at least five (5) weeks in advance of the projected start of construction work that results in any bus stop relocation and/or bus rerouting (detour).

(b) The Contractor shall maintain access to and egress from buses along the proposed route at all times during the execution of the work by temporarily relocating bus stops as shown in the Traffic Control Plan - Temporary Relocation Plan for Bus Stops, and as directed and approved by the Engineer.

(c) The Contractor shall not commence working in the area of any existing bus stop until the Contractor has temporarily relocated the bus stop as required and has received the approval of the Engineer.

(d) The Contractor shall keep the area to which a bus stop is relocated free from and undisturbed by any construction activity or other impediment during the period of its use as a bus stop.

(e) The Contractor shall temporarily relocate existing bus stop(s) to an adjacent block or other approved location, as shown in the Traffic Control Plan - Temporary Relocation Plan for Bus Stops, that is to be done by the Traffic Engineer Safety Work Site Inspector and as approved by OCMC and the NYCTA.

(f) The Contractor shall not work within an area in which a bus stop has been temporarily located until work within the area of the permanent bus stop (including work on its adjacent curb and/or sidewalk) has been substantially completed and until the area of the permanent bus stop has been restored for public use to the satisfaction and approval of the Engineer.

(S) In addition, the Contractor shall develop an inventory of traffic signs along the construction route by taking an adequate number of preconstruction photographs.

(T) The Contractor is advised that other contractors may be working in the general area during the term of this project. In this case, the TCP may require modifications by OCMC.

(U) All Contractor's vehicles, equipment and personnel must be kept within the designated work areas.

(V) The Contractor shall work one-half (1/2) of an intersection at a time unless otherwise noted.

(9) FIRE DEPARTMENT REQUIREMENTS

(A) Access must be maintained for emergency vehicles at all times during construction. The preferred access shall be two-way, however, a minimum of one (1) eleven (11) foot lane will be acceptable if two-way access cannot be provided.

(B) One-half (1/2) of all intersections, unless otherwise specified, shall be open to traffic at all times during construction by either decking or limiting trench construction.

(C) Hydrants shall be retained in service and accessible to the fullest extent feasible during construction. If a trench runs between the lane designated for emergency traffic and an active hydrant(s), a walkway over the trench at each hydrant location must be provided for access.

(D) The Fire Department shall be notified whenever water mains and/or hydrants are placed in and out of service, sufficiently in advance of work.

(E) If alarm boxes or alarm facilities are affected by the construction work, the Bureau of Fire Communications shall be notified sufficiently in advance of work.

(F) The Fire Department shall be consulted about any street closures or any extensive detour set ups, sufficiently in advance of work.

(10) Standard Maintenance and Protection of Traffic (MPT) Requirements for Typical Operations:

The following MPT requirements shall be in addition to those presently in the contract documents. Should any of these requirements conflict with other MPT requirements in the contract documents the Contractor will be required to follow the more stringent requirement as determined by the Engineer.

(A) General Concepts: In general the Department's Policy is to provide for a clear demarcation between the work area and the remainder of the Right-of-Way that is open to traffic. This includes sidewalk areas open to pedestrians on streets that are permitted closed except to Local and Emergency Traffic. However under no circumstances shall the Contractor discriminate against an individual with a disability, as defined in the Americans with Disabilities Act, in providing services, programs or activities pursuant to this contract.

Where the contract plans, specifications and/or directions of the Engineer call for the closing of a street (curb to curb), the Contractor shall obtain a "Street Closure Permit" from the NYCDOT - OCMC.

(1) Vehicular Traffic:

(a) Unless otherwise specified herein the minimum level of demarcation between the work area and a lane open to vehicular traffic shall be by the use of Plastic Barrels. Plastic barrel spacing shall not exceed twenty (20) feet on centers.

(b) Plastic barrels may be used for cut-and-cover operations (e.g., laying distribution water mains) or for other operations where the work area is in the same location for less than two (2) days (e.g., curb/sidewalk work).

(c) Where trenches will not be backfilled or plated at the end of the workday, timber curb or concrete barrier shall be used in lieu of barrels. Timber curb must be placed according to the specifications (either staked or overlapped). The only exception to this is where it may be physically impossible to maintain a through or local/emergency lane as per OCMC stipulations due to limited roadway width; in such cases the Contractor may be permitted to omit the timber curb or concrete barrier provided that the trench sheeting is maintained a minimum of two (2) feet above the pavement.

(d) Pedestrian Steel Barricades and Class 2 (sawhorses) Barricades are not acceptable MPT devices in the roadway, and shall never be used in the roadway. The use of cones may be permitted only for short-term routing of traffic and/or to delineate lanes, but not to divide the work area from the Right-of-Way.

(e) Motorists must be given advance notice of a lane/street closure. This notification should include the use of Type III Barricades or concrete barriers, plastic barrels, signage, lane tapers (minimum fifty (50) feet long), and flashing arrow boards as deemed appropriate by the OCMC or the Engineer.

(2) Pedestrian Traffic:

(a) Sidewalks may be occupied or closed only as provided for in the contract, or as otherwise approved by Department of Transportation (DOT).

(b) Where permission is granted to the Contractor to close a sidewalk, provisions must always be made for a clearly signed pedestrian passage on at least one side of the street, and for pedestrian crossing at each intersection.

(c) Pedestrian pathways must be divided from the work area using pedestrian steel barricades. The only exception to this is during the installation of final asphalt pavement,

where pedestrian traffic density is low, in which case plastic barrels and caution tape may be approved as a substitute. If the pedestrian pathway is moved into the street, then the pedestrian path shall be separated from traffic using timber curbing with orange plastic fence or concrete barriers.

(d) If the traffic stipulations provide for the street to be closed except for Local and Emergency (L&E) Traffic, then pedestrian steel barricades should be placed on both sides of the street (i.e., the entire street is considered to be the work area). If there are driveways, then after working hours the pedestrian fence should be removed from each driveway opening on the side of the street abutting the L&E lane.

(e) Pedestrian steel barricades must be painted Construction Orange and when placed shall be linked together and weighted down as provided in the specifications.

(f) Pedestrians must be notified of closed sidewalks by appropriate signage ("Sidewalk Closed/Use Other Side") at the corners of street intersections.

(g) Emergency access must be provided to each residence/storefront at all times. This may consist of planks for properties with residential usage (three (3) families or less) or with an aluminum pedestrian bridge for higher density residential and/or commercial frontages. If the entrance is a doublewide entrance, the Contractor shall work on half of the width of the entranceway at a time in order to provide access.

(h) Where any crosswalk is permitted closed, pedestrian steel barricades and a sign indicating "Crosswalk Closed" with an arrow pointing in the direction of the nearest open crosswalk shall be placed at the closure. In no case shall all parallel crosswalks be closed at two consecutive intersections (i.e., no pedestrian should have to walk more than one block to find an open crosswalk across the same street).

(3) Storage:

(a) Storage of equipment and materials within the Right-of-Way is a privilege granted to the Contractor, and is not a right.

(b) Storage of materials and equipment within the project limits shall be as approved by the Engineer. On-site storage is limited to materials and equipment projected for use within seven (7) calendar days, as per the Contractor's approved work schedule.

(c) Storage of materials and equipment in streets outside the project limits shall be subject to permission by DOT.

(d) Materials/equipment must be stored safely and neatly, with appropriate MPT devices separating the storage area from vehicular traffic and pedestrians. Loose materials must be properly and neatly stored.

(e) Each storage area shall have at least one sign identifying the Contractor's Name, Project ID/Name, and the Phone Number of the Engineer's Field Office.

(f) No materials or equipment may be installed in front of hydrants (working or not), and provision must be made to maintain curb-line drainage through storage areas.

(g) The Contractor must remove any stored materials/equipment from the project street(s), as directed by the Engineer, within forty-eight (48) hours notice. No payment will be made for compliance with such a directive.

(B) Typical MPT Requirements for Standard Operations: In all cases Type III Barricades and an appropriate lane taper and warning signs must be placed in advance of the work area to safely channel traffic through the work zone.

(1) Curb:

(a) The work area (generally a ten (10) foot wide parking lane) shall be separated from the portion of the street that is open to vehicular traffic by plastic barrels.

(b) Pedestrian steel barricades shall be placed along sidewalks to provide for safe passage of pedestrians.

(2) Sidewalk:

(a) Case I - Low Pedestrian Density Areas.

(1) Sidewalk May be Closed

(2) Plastic barrels shall be used to separate the work area, (generally a ten (10) foot wide parking lane and the width of the sidewalk) from the vehicular driving lanes.

(3) Pedestrian steel barricades shall be placed at each corner, with a sign indicating “Sidewalk Closed/Use Other Side”.

(4) Access shall be provided to building entrances with planks (three (3) family residences or less) or aluminum pedestrian bridges (higher density residences or commercial establishments).

(b) Case II - High Pedestrian Density Areas.

(1) Maintain Pedestrian Pathway (four (4) to five (5) foot wide) in the Street.

(2) Timber Curb shall be used to separate the vehicular lanes from the pedestrian pathway.

(3) Pedestrian steel barricades shall be used to separate the pedestrian pathway from the work area (which will be in the parking lane).

(4) Access shall be provided to building entrances with planks (three (3) family residences or less) or aluminum pedestrian bridges (higher density residences or commercial establishments).

(3) Distribution Water Mains:

(a) Barrels shall be used to separate the work area from the vehicular lanes that are open to traffic.

(b) Pedestrian steel barricades shall be placed on the sidewalk to separate the open sidewalk from the work area.

(c) If the street is closed except for Local and Emergency (L&E) traffic, then pedestrian steel barricades shall be placed on both sides of the street.

(d) These provisions shall be maintained for each water main operation including excavation, main installation, backfill, temporary paving, and installation of concrete base, but excluding final asphalt paving.

(e) For maintenance and protection of traffic in low pedestrian density areas MPT can be provided by using barrels and caution tape during laying of permanent asphaltic wearing course only, subject to approval by the Engineer.

(4) Sewers/Trunk Water Mains:

(a) Timber Curb shall be used to divide the work area from the lanes that are open to traffic. The only exception to this shall be that if it is physically impossible to maintain a through or local/emergency lane according to OCMC stipulations due to insufficient roadway width, then in such cases the Contractor may be permitted to omit the timber curb so long as the sheeting is at least two (2) feet above the pavement, and that the area outside the sheeting is properly backfilled.

(b) Pedestrian steel barricades shall be required on the sidewalk if there is no open traffic lane maintained along the curb line. If the street is closed except to Local and Emergency Traffic, then the pedestrian steel barricades shall be placed on both sides of the street.

(5) Isolated Operations (e.g., Basins, Streetlights, etc.):

(a) In general, MPT for these operations shall be as directed by the Engineer.

(b) Typical devices shall include plastic barrels in the street, and pedestrian steel barricades on the sidewalk.

(6) Road Base:

(a) Timber Curb shall be used to separate the work area from the remainder of the street.

(b) Pedestrian steel barricades shall be placed along the sidewalk abutting the work area. If the operation is in the full-width of roadway, then pedestrian steel barricades shall be placed on both sides of the street.

(7) Milling/Asphalt Paving:

(a) Plastic barrels shall be used to divide the work area from the vehicular lanes that are open to traffic.

(b) Barrels and Caution Tape shall be placed on the sidewalk abutting the work area; if the milling/paving is full-width, then the barrels and tape shall be placed on both sides of the street.

(C) Payment: All costs of all labor, materials, plant and equipment required and necessary to perform all work associated with this **Subsection 1.06.29** shall be deemed included in the lump sum price bid for the contract item labeled “MAINTENANCE AND PROTECTION OF TRAFFIC”. No additional or separate payment will be made for any of these **Subsection 1.06.29** requirements unless specific provisions are made in the contract for payment.

1.06.30 CONTRACTOR TO GIVE NOTICE TO AND COOPERATE WITH CITY DEPARTMENTS AND UTILITY COMPANIES

The Contractor shall give notice in writing, at least forty-eight (48) hours before breaking ground for the purpose of constructing the work mentioned herein, to the Department of Transportation, Fire Department, Police Department, Department of Sanitation, Transit Authority and to any bus company operating on the street(s) affected by the work. The Contractor shall cooperate with the City Departments and Agencies and utility companies affected by the work of this contract.

1.06.31 PHOTOGRAPHS

(1) The Contractor shall employ and pay for the services of a competent professional photographer who, at the direction of the Commissioner or the Commissioner’s authorized representative, shall take Preconstruction Photographs and Construction Progress Photographs and such other photographs that may be required during the period of this contract.

(2) The photographs will generally represent views of the original surface conditions of streets, curbs and walks, buildings that show evidence of damage or disrepair, emergency situations, and views of the work under construction. All photographic prints shall be 8" x 10" in size, single weight, of glossy finish and in color. The Contractor shall furnish to the Commissioner, for each view taken, two (2) 8" x 10" color prints and one (1) negative, minimum size 2-1/4" x 2-1/4" in color. Prints shall be inserted in standard weight Archival Quality clear poly sheet protectors and submitted in a hard cover three (3) ring binder. The following information shall be imprinted, or indelibly printed, on a white border measuring no more than one and one-half (1-1/2) inch at the bottom of the front of the photograph:

(A) Contract Number and Job Location
(B) Photograph Number
(C) View and Description - (Indicating the location of the camera, a general description of what the photograph represents, and whether it is a Preconstruction Photograph or a Construction Progress Photograph.)
(D) Date - (The date the photograph was taken.)
(E) Name of Photographer
(F) Department of Design and Construction Witness

Each negative shall be numbered accordingly to correspond to the photograph and shall be inserted in Archival Negative Preservers.

Photographs showing the original condition of all encumbrances and/or encroachments that may be affected by the construction of the proposed sewer, water main and related work shall be taken prior to the start of construction. These photographs shall be in addition to those required in paragraph (6) below.

(3) All photographs and negatives shall become the property of the Commissioner. All completed photographs shall be delivered to the Borough Engineer, Department of Design and Construction, within one (1) week after the photographs have been taken.

(4) The Photographer shall be available for taking the required photographs within forty-eight (48) hours after receiving notification from the Commissioner or the Commissioner's authorized representative.

(5) A minimum of four (4) views for every one hundred (100) linear feet of estimated sewer or water main length will be taken for Construction Progress Photographs.

(6) It is estimated; unless otherwise directed by the Engineer due to job size, conditions and complexity; that the average number of Preconstruction Photographs will approximate two (2) views (one (1) each side of street) for each twenty-five (25) linear feet of estimated sewer or water main length.

(7) No separate payment will be made for the expense of the Photographer or for the taking and providing of all required photographs, negatives, etc.; the cost thereof shall be deemed included in the prices bid for the various contract items.

(8) No separate payment will be made for the expense of furnishing the required binders; the cost thereof shall be deemed included in the prices bid for the various contract items.

(9) The Engineer reserves the right to reject any and all views that are not reasonably clear and definitive. No separate or additional payment will be made for any additional photographs that are required as a result of the rejecting of views. The cost shall be deemed included in the prices bid for the various contract items.

1.06.32 BORING RECORDS

For the purpose of design, borings have been taken for projects that include sewer work. If not included as part of the contract documents, the boring samples, field and office records, and the reports on subsurface conditions are available for inspection by bidders. The Contractor may obtain copies of the boring records, reports, etc. at the following location:

The Department of Design and Construction
Technical Support Division, Site Engineering Unit
30-30 Thomson Avenue
Long Island City, New York 11101

All the above-mentioned material is furnished for informative purpose only.

Projects that only involve water main work may not have boring information available.

1.06.33 USE OF WATER MAINS AND APPURTENANCES

The City shall have the right to use and place in service any of the mains and appurtenances installed as soon as the same are laid and connected. If these mains and appurtenances require testing and there is a delay of over seven (7) calendar days in conducting such tests, regardless of the reason for delay in such testing, the mains and appurtenances may be used before being tested. Such use shall not be considered as an acceptance of the work or any part thereof, nor shall it affect the maintenance period as described.

1.06.34 FIRST CLASS MATERIAL AND WORKMANSHIP

(A) The specifications are intended to assure sewer and water supply facilities of great permanence and of maximum degree of reliability of service.

(B) All materials, fixtures, fittings, supplies and equipment furnished under this contract shall be new, of standard, first grade quality, and of the best workmanship and design. No inferior or low grade, or obsolete articles will be approved or accepted, and all work of assembly, installation and construction shall be done neat, first class and workmanlike in manner. The apparent silence of the specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best practice is to prevail and that only the best material and workmanship is to be used; and interpretation of these specifications shall be made upon that basis. Should any conflict occur in or between the drawings and specifications, the Contractor shall be deemed to have estimated on the most expensive way of doing the work unless the Contractor shall have asked for and obtained a decision in writing from the Commissioner before the submission of the Contractor's bid, as to what shall govern. In asking for prices on, or placing orders for, materials, fixtures, fittings, supplies and equipment intended for use or installation under this contract, the Contractor shall provide the manufacturer or dealer with such complete information from these specifications as may in any case be necessary, and in every case the Contractor shall quote in full to each such manufacturer or dealer the text of this paragraph, as well as the text of such other portions of the specifications as are appropriate. The chemical and physical tests, including the optional tests, called for in the ASTM, Federal and other specifications cited in this contract shall be made as specified, unless otherwise approved. The following statement shall appear on the face of every purchase order issued by the Contractor for work to be incorporated in this contract and the Contractor shall instruct approved manufacturers or dealers to place this statement on purchase orders issued by them for such work:

> "This order is subject to inspection by The City of New York; and shall not be processed until inspection instructions have been issued by the Engineer."

(C) Whenever the characteristics of any required material are not particularly specified, such approved material shall be used as is customary in first class work of the nature for which the material is employed.

The Contractor shall install any proprietary articles in full compliance with all recommendations of the manufacturers of such articles.

Materials or equipment furnished for identical service or use shall be the product of one manufacturer, except as otherwise approved by the Engineer.

1.06.35 URGENT REPAIRS

The Contractor shall make all repairs to sewers, water mains, appurtenances and street surfaces labeled "URGENT REPAIRS" within eight (8) hours of notification of such by the Engineer. If the Contractor fails to make the required urgent repairs within the time specified, and because of the urgency of repairs it precludes the issuance of a notice as provided in **Article 48.2** of the Contract, the Commissioner shall have the right to have the work done by others in the same manner as provided for under **Article 51** of the Contract.

SECTION 1.07
SURFACE RESTORATION UNDER MAINTENANCE GUARANTEE

1.07.1 CONTRACTOR TO KEEP INFORMED OF CONDITION OF PAVEMENT

The Contractor must keep informed of the condition of the curbs, sidewalks, roadway pavement, gutters and headers, etc., under the maintenance guarantee period specified in **Article 24** of the Contract, and will be required to keep the same in repair without notice from the Commissioner. In case of failure or neglect on the Contractor's part to do so, then the Commissioner shall have the right to purchase such materials as deemed necessary, and to employ such person or persons as deemed proper, and to undertake and complete said repairs by contract or otherwise and to charge the expense thereof against any sum of money retained by the City, as specified in **Article 24** of the Contract. When the expense to the City is greater than the sum retained, the Contractor shall pay all such expense to which the City may have been put by reason of the Contractor's neglect to make such repairs as aforesaid.

1.07.2 CONTRACTOR TO MAKE REPAIRS

The Contractor shall immediately repair and make good to the satisfaction of the Engineer all disintegration, cracks, bunches, waves, deteriorations and defects of every nature or settlements or depressions in the pavement, pavement base, subgrade material, gutters, headers, curbs, sidewalks, etc., which shall occur at any time during the maintenance guarantee period. Prior to proceeding with repairs the Contractor must notify and obtain the approval of the Department of Design and Construction as to the Contractor's method of repairs. The City will repair all defects for which, in the opinion of the Engineer, the Contractor is not responsible.

Where a settlement, depression or defect in the pavement, pavement base, subgrade material, gutters, headers, curbs, sidewalks, etc., is a result of backfilling not placed under this contract, as certified by the Engineer; or is caused by settlement of the backfill which is not due to the failure of the Contractor to comply with the requirements of the specifications, but is due to the unstable condition of the soil underneath the backfill, (as certified by the Engineer); the Contractor shall not be responsible for the restoration of such settled pavement, pavement base, subgrade material, gutters, headers, curbs, sidewalks, etc., over such settled area to the original grade. The Contractor shall, however, immediately repair all other defects to the satisfaction of the Engineer.

On unpaved streets, if the earth has not settled level with the adjoining roadway within thirty (30) days after the backfilling of the trench, the Contractor shall bring the fill to the grade of the adjoining roadway.

1.07.3 AMOUNT DEPOSITED AS GUARANTEE TO BE USED FOR RESTORATION IF NECESSARY

The moneys deposited as specified in **Article 24** of the Contract may be used on behalf of the City by the Commissioner in replacing the curbs, sidewalks, headers, gutters, roadway pavement, pavement base or surface of unpaved streets, subgrade material, etc., and in replacing, recaulking or repairing water mains, water service pipes and appurtenances, should any settlement occur or other defect develop within the time specified in **Article 24** of the Contract, which in the opinion of the Engineer was due to improper workmanship or materials supplied by the Contractor.

1.07.4 REMEDY OF DEFECTS

Should the Contractor fail to remedy defects promptly within two (2) days after the service of notice upon the Contractor to do so, then the Commissioner shall have the right to have the work done by other parties and deduct the cost thereof from any moneys due the Contractor under this contract. Within this period no certificates given, nor payment made, shall be construed as accepting defective work or material or condoning any negligence or omission.

1.07.5 PAYMENT OF AMOUNT DEPOSITED

The payment of the moneys deposited in accordance with **Article 24** of the Contract will be contingent on the Contractor's compliance with all stipulations and requirements for surface restoration under the maintenance guarantee as certified by the Engineer. The City will pay to the Contractor the sum deposited or such parts thereof as may remain at the end of the specified period after the expense of making repairs has been paid therefrom. The City will not pay any interest on any moneys deposited.

1.07.6 DEDUCTIONS FROM PARTIAL PAYMENTS

Where there are no applicable unit bid prices for temporary or final restoration of pavement and the costs are included in the unit bid prices, deductions from partial payments for pavements, curbs, sidewalks, etc., that have been disturbed but not permanently restored will be made at the unit prices listed below for the restoration required under the contract.

Asphaltic Concrete	$ 90.00 per Ton
2" Asphaltic Concrete on Compacted Soil	10.00 per Sq. Yd.
3" Asphaltic Concrete on Compacted Soil	15.00 per Sq. Yd.
4" Asphaltic Concrete on Compacted Soil	20.00 per Sq. Yd.
2" Asphaltic Concrete on 4" Macadam Base	30.00 per Sq. Yd.
2" Asphaltic Concrete on 6" Macadam Base	40.00 per Sq. Yd.
3" Asphaltic Concrete on 6" Macadam Base	45.00 per Sq. Yd.
2" Asphaltic Concrete on 6" Concrete Base	35.00 per Sq. Yd.
3" Asphaltic Concrete on 6" Concrete Base	40.00 per Sq. Yd.
3" Asphaltic Concrete on 8" Concrete Base	48.00 per Sq. Yd.
4" Asphaltic Concrete on 6" Shoulder Stone	20.00 per Sq. Yd.
6" Concrete Base	150.00 per Cu. Yd.
Reinforced Concrete Pavement	70.00 per Sq. Yd.
2" Asphaltic Concrete on 4" Cinders (Walk)	30.00 per Sq. Yd.
Granite Block Gutter	50.00 per Sq. Yd.
Granite Block Pavement on 8" Concrete Base	85.00 per Sq. Yd.
Concrete Sidewalk	5.00 per Sq. Ft
Concrete Sidewalk in Driveways	7.00 per Sq. Ft.
Seeded Areas	1.00 per Sq. Ft.
Concrete Curb	22.00 per Lin. Ft.
Concrete Header	26.00 per Lin. Ft.
Granite Block Curb	50.00 per Lin. Ft.
Straight Granite Curb on Concrete Cradle	40.00 per Lin. Ft.
Corner Granite Curb on Concrete Cradle	100.00 per Lin. Ft.
Sod	2.50 per Sq. Ft.
Straight Steel Faced Concrete Curb	40.00 per Lin. Ft.
Corner Steel Faced Concrete Curb	53.00 per Lin. Ft.
Chain Link Fence	26.00 per Lin. Ft
Chain Link Fence Gate	70.00 per Lin. Ft.

1.07.7 UNDERGROUND FACILITIES

The Contractor shall exercise care and caution while performing the restoration work so as to insure the maintenance of continuing service to all underground facilities.

1.07.8 DATE FOR COMPLETION OF SURFACE RESTORATION FOR PROJECT

The Contractor must complete the surface restoration work within the time fixed therefor in **Article 14** of the Contract**,** or within the time to which such completion may be extended. If the date for completion should fall within the months of December through March (inclusive), and the Contractor has not finished the surface restoration work, then in that case the Contractor may be eligible for an extension of time for said months, or such part thereof as the Commissioner may determine the Contractor was precluded from performing surface restoration work due to weather.

SECTION 1.08
MISCELLANEOUS PROVISIONS

1.08.1 LABOR

(1) The Contractor shall comply with the requirements of Labor Law 220. The Contractor's attention is directed to the following five (5) requirements for full contract compliance with Labor Law 220; proper payment, posting, sign-in sheets, information cards and identification badges.

(2) Payroll records shall be provided to the Engineer together with payment requests.

(3) A copy of the Letter of Transmittal is to be sent to the Department of Design and Construction. At the time of completion, of all contract work, the Contractor shall obtain a letter from the Division of Labor Services, evaluating the Contractor's compliance with Executive Order No. 50 (E.O. 50). The Department of Design and Construction cannot process a distribution of final payment until the above is complied with.

1.08.2 VENDORS

A list of approved vendors and manufacturers is available from:

Department of Design and Construction
Division of Infrastructure
30-30 Thomson Avenue, 3rd Floor
Long Island City, New York 11101

Prior to starting work, the Contractor will submit in writing the names of all vendors and manufacturers the Contractor intends to use. The Contractor shall submit only one (1) vendor or manufacturer for each product that is to be incorporated in the contract. The use of multiple vendors or manufacturers to supply the same product will be prohibited. If a vendor or manufacturer is not on the approved list, the Contractor will submit same for approval.

1.08.3 PERMITS

The Contractor shall, at the Contractor's own cost and expense except as otherwise may be provided, make the necessary arrangements for, and obtain all permits required for the Contractor's work.

The Contractor shall furnish to the Engineer, copies of all permits and all correspondence between the Contractor and the permit-issuing agency, including copies of all routine forms that must be submitted as a condition of such permits.

1.08.4 TEMPORARY USE OF CITY WATER ON CONSTRUCTION PROJECTS

(1) It shall be the Contractor's responsibility to obtain all necessary permits from the Department of Environmental Protection.

(2) Such permits and all City water necessary to perform the work of the contract, including but not restricted to filling and testing water mains, will be furnished by the Department of Environmental Protection from the nearest City hydrant without cost to the Contractor. An approved and certified RPZ (Reduced Pressure Zone Backflow Preventer) must be connected to the hydrant while the hydrant is being used. All water shall be used as directed by the Engineer so that unnecessary waste may be avoided.

1.08.5 ROADWAY OPENINGS, USE, STORAGE, ETC.

The Contractor shall receive upon request, all necessary no fee permits required by the New York City Department of Transportation, to open, use, store equipment and conduct operations in the roadway.

1.08.6 PROCESSING OF SUBSTANTIAL OR FINAL PAYMENT

At the time of completion of all contract work, the Contractor shall obtain a letter from the Director of Contract Compliance Programs evaluating the Contractor's Compliance with Part C, Section 9 of Local Law 49 (LBE requirements) or applicable MBE/WBE requirements. The Department of Design and Construction cannot process a final payment until the above is complied with.

THE CITY OF NEW YORK

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER AND SEWER OPERATIONS

DIVISION II

MATERIALS OF CONSTRUCTION

SECTIONS 2.01 TO 2.28

NO TEXT ON THIS PAGE

NOTICE TO THE CONTRACTOR

The Contractor must acquire the following material specifications (latest revisions) for this contract from the Department of Environmental Protection, Bureau of Water and Sewer Operations, Office of the Chief of Water Main Failure Analysis, 59-17 Junction Boulevard, 3rd Floor-Low Rise, Flushing, NY 11373:

(1) Section 2.01 - Specifications For Ductile Iron Pipe And Accessories
(2) Section 2.02 - Specifications For Ductile Iron Fittings And Accessories
(3) Section 2.03 - Standard Specifications For Butterfly Valves 24-Inch To 72-Inch With Manual Actuators
(4) Section 2.04 - Standard Specifications For Pressure Reducing Valves 8-Inch Through 30-Inch Nominal Pipe Size
(5) Section 2.05 - Standard Specifications For Resilient-Seated 3-Inch Through 20-Inch Gate Valves With Various End Connections And 3-Inch Through 12-Inch Tapping Valves
(6) Section 2.06 - Standard Specifications For Double Disc 3-Inch To 20-Inch Gate Valves With Various End Connections For Water Supply System
(7) Section 2.07 - Standard Specification For Iron Castings
(8) Section 2.08 - Standard Specifications For Dry Barrel Fire Hydrants And Extension Kits
(9) Section 2.09 - Standard Specifications For Stainless Steel Tapping Sleeves With Branch Connections For Flanged Tapping Valve Or Mechanical Joint Tapping Valve
(10) Section 2.10 - Specifications For Corporation Stops And Quarter Bends
(11) Specification For Furnishing, Delivering And Laying Steel Pipe And Appurtenances
- **Part 1 - Furnishing And Delivering Steel Pipes And Appurtenances 30-Inches In Diameter And Larger**
- **Part II - Laying Steel Pipes And Appurtenances**
- **Part III - Lining And Coating Of Steel Pipe And Appurtenances In The Shop And In The Field**
- **Part IV - Corrosion Control. Cathodic Protection**
- **Part V - Furnishing And Delivering Steel Pipe Up To And Including 24-Inch Diameter**
- **Part VI - Furnishing And Delivering Cast Steel**

(12) All Other Required Water Main Work Material Specifications

SECTION 2.11
CONCRETE

2.11.1 DESCRIPTION

This section describes the concrete work required for the construction of the sewers, water main, manholes, chambers and all incidental and appurtenant work shown on the drawings or required by the specifications.

2.11.2 GENERAL REQUIREMENTS

(A) The "General Specification 11 - Concrete" and “Instructions To Architect/Engineer For Specifications For Concrete” of the Department of Environmental Protection is declared to be part of this specification, the same as if fully set forth elsewhere herein. Copies of these specifications may be obtained from the Department of Design and Construction, Division of Infrastructure, Design Services, Specifications, 3rd Floor. Concrete work shall conform to all requirements of these specifications except as modified by this detailed specification.

(B) The reference numbers in this detailed specification are keyed to the section numbers of the "General Specification 11 - Concrete" and prefixed with a "D". The detailed specifications supplement

"General Specification 11 - Concrete" unless there is conflict in which case the detailed specification shall govern.

2.11.3 MODIFICATIONS

D 1.4.1.6 For purposes of this section the Supervising Engineer for Concrete Construction shall be considered the Engineer and will be assigned by the Department. The Engineer will be responsible for all testing and inspection of concrete.

D 1.4.2 DELETE 1.4.2 of General Specification 11 - Concrete (GS11) and SUBSTITUTE the following:

The New York City Building Department does not have jurisdiction over the work of this contract. All references to the New York City Building Department, or the Commissioner thereof, shall be considered as references to the New York City Department of Design and Construction and its Commissioner.

D 1.4.3 DELETE 1.4.3 of GS11.

D 1.7 Field Reference - The references noted in "General Specification 11 - Concrete "shall be furnished on all contracts over five million ($5,000,000.00) dollars.

D 2.6.1 ADD the following to 2.6.1 of GS11:

Coarse and Fine Aggregate for concrete shall be well graded in accordance with 2.6.1.1. Size of Coarse Aggregate shall be three-quarter (3/4) inch (No. 67), unless smaller size aggregate is required due to the nature of the work.

D 2.6.1.1 DELETE 2.6.1.1 Subparagraphs (c), (d), (e), and (f) of GS11.

D 2.6.1.2 DELETE 2.6.1.2 of GS11.

D 2.6.1.3 DELETE 2.6.1.3 of GS11.

D 3.1 ADD the following to 3.1 of GS11:

The following tolerances will be permitted during the production of the concrete:

Slump ---------- + 1-Inch
Air (Air Entrained Concrete) ---------- ± 1.5%
Unit Weight ---------- ± 2%

D 3.2.1 DELETE 3.2.1 to 3.2.9 of GS11 and SUBSTITUTE the following:

The Contractor may submit for approval concrete mixes that (within two (2) years of the contract) have been previously approved and used on other jobs with any Bureau of the Department of Environmental Protection or the Department of Design and Construction. Such submittals shall contain evidence that the concrete mix was approved within two (2) years of this contract and shall show that the concrete will be produced at the same mix plant, that the cement and admixtures are the same type (though not necessarily the same brand), that the water/cement ratio is the same and that adjustments have been made in the mix for air content, specific gravity and gradation of the aggregates. Average gradation of aggregates intended for use shall be shown and computations included showing that the requirements for yield and percent (%) mortar be met. Except for high range water reducers, other liquid admixture may be omitted from computations of water/cement ratio, yield or percent (%) mortar.

If the Contractor elects to submit a concrete mix that was not previously approved, the Contractor shall submit the new concrete mix in accordance with Chapters 2 and 3 of

General Specification 11 as modified herein.

D 3.3 ADD the following:

Unless otherwise shown, specified or required by the Engineer, all concrete shall be Class 40, 4,000-psi, non-air entrained concrete. The concrete mix for all structures, except for concrete cradles and encasements, shall contain six hundred sixty (660) pounds per cubic yard of cementitious material of which eighty-five percent (85%) shall be cement (Type 2, ASTM C150) and fifteen percent (15%) an approved mineral admixture Class F (Fly Ash, ASTM C618). The concrete mix for concrete cradles and encasements shall contain six hundred sixty (660) pounds per cubic yard of cementitious material of which one hundred percent (100%) shall be cement (Type 2, ASTM C150); no Fly Ash will be permitted in concrete used for cradles and encasements. The concrete mix shall contain a water-reducing admixture or, if desired and approved by the Engineer, a high range water reducer (super-plasticizer). Other admixtures, air entraining agents, retarding or accelerating admixtures may be used if required and approved by the Engineer.

No additional payment will be made for any admixture used. The concrete mix shall be proportioned using a maximum water/cement ratio of 0.42. Design slump shall be in accordance with 3.6 of GS11. Coarse and Fine Aggregates shall be proportioned so that the percent (%) mortar is in accordance with 2.6.1.4. of GS11 and yield is in accordance with 3.9.1.1 of GS11. In computation of yield, non-air entrained concrete shall be assumed to have an entrapped air content of one (1) percent.

D 3.5.1 DELETE the first sentence of 3.5.1 and SUBSTITUTE the following:

Where specifically shown or specified normal weight concrete shall contain entrained air as indicated in Table 3.5.1.

D 3.9.2.1 DELETE the last part of Paragraph 3.9.2.1 of GS11 starting with the words "in the schedule..." and ending with the words ".... as applicable."

D 3.9.2.3 DELETE 3.9.2.3 of GS11.

D 3.9.2.4 DELETE 3.9.2.4 of GS11.

D 3.9.2.5 DELETE 3.9.2.5 of GS11.

D 4.2 All shop drawings, data and design for formwork shall be submitted to the Engineer for review.

D 4.7 Removal of Forms - ADD the following:

4.7.7 - Forms shall not be removed without the permission of the Engineer. In general, forms shall not be removed until the concrete has hardened sufficiently to safely support its own load plus any superimposed loads that might be placed thereon.

Forms shall be left in place the minimum length of time specified below, from the date of placing concrete. The Contractor shall be fully responsible for the concrete at all times, and any damage to the work, including any caused by premature removal of forms, shall be repaired or replaced by the Contractor, to the satisfaction of the Engineer and without any cost to the City of New York. However, in any event, forms shall be left in place the minimum lengths of time specified below, from the time of placing concrete:

(1) Columns ---------- 48-Hours
(2) Side Forms for Girders and Beams ---------- 48-Hours
(3) Bottom Forms of Slab:
    (a) Up to Ten (10) Feet of Clear Span ---------- 72-Hours
    (b) Over Ten (10) Feet of Clear Span ---------- 96-Hours

(4) Bottom Forms of Beams and Girders ----------120-Hours
(5) Walls ---------- 48-Hours
(6) Monolithic Concrete Pipe (Circular) ---------- 48-Hours
(7) Cradle and Encasement---------- 24-Hours

In lieu of the above minimum lengths of time for stripping of forms the Contractor may elect to use the Windsor Probe Test System or approved equal method of nondestructive testing of concrete in place as follows:

(A) If any individual test indicates a strength lower than that specified, then the concrete represented by this test shall be subject to further testing as directed by the Engineer to determine when the formwork may be removed.

If any one (1) individual probe indicates a strength below that required, two (2) additional probes shall be taken at that location. For monolithic structures with a minimum clear height of five (5) feet or more, tests shall be taken on the underside of the roof surface. All other structures shall be tested on the top surface of the roof. When tests are taken on the top surface of the structure the results shall be corrected to indicate the strength on the underside of the surface by reducing test results by ten (10) percent.

(B) No separate payment will be made for the testing of the concrete and the testing device as described above. The cost of this work shall be included in the prices bid for all water main items for which there are contract prices.

The removable portion of form ties shall be removed from the concrete immediately after removing the forms.

Care shall be taken in removing forms, wales, shoring supports and form ties to avoid spalling or marring the concrete.

Subsequent to the removal of forms, all slabs, girders and beams, subject to their own weight only, shall continue to be adequately supported by bracing and/or shoring for a minimum period of four (4) days from the date of placing concrete. Members subject to additional loads during construction shall be adequately shored, to the satisfaction of the Engineer, to support both the members own weight and such additional construction loads in such a manner as will protect the members from damage by the loads. This shoring shall not be removed until the member has acquired sufficient strength to support safely its weight and the loads upon it.

D 5.3 Unless otherwise shown or specified, steel reinforcing bars shall comply with the requirements of ASTM Designation A615, Grade 60, billet steel bars for concrete reinforcement, deformed, intermediate grade.

D 6.2 DELETE 6.2 of GS11.

D 7.3.1 After 7.3.1 of GS11, ADD the following:

For all concrete, it is the Contractor's responsibility to see that the concrete producer shall:

(a) Verify that batched weights conform to the required weights and proportions, and to the water/cement ratio established in the approved mix adjusted for moisture content, fineness modulus and gradation of aggregates.

(b) Verify that the quality and condition of the materials conform to the applicable standards.

(c) Attest, on a ticket accompanying each load, to the specified strength of the concrete, the actual weights of the batched ingredients, the gradation of the aggregates, the weight, or volume, of water charged into the mixer at the batch plant or to be added at the job site.

A statement that subparagraph (a) and (b) above have been complied with shall also be included.

(d) A copy of the computer tape recording the batched weights shall also be included.

D 8.2 DELETE 8.2 of GS11.

D 8.5 Depositing - ADD the following:

8.5.7 - All concrete shall be poured against forms unless otherwise specified in the contract documents or approved by the Engineer.

Sheeting used as forms shall be provided with approved protection placed between the concrete and the sheeting. In addition where sheeting is used as forms an additional three (3) inches of concrete shall be added to all surfaces of structures in contact with the sheeting. The cost for this additional concrete and protection shall be deemed included in the prices bid for all items of the contract. No separate or additional payment will be made for this work.

D 8.11.1 DELETE in first line of 8.11.1 the words "Section 8.9.4" and SUBSTITUTE the following words "Section 8.10.4".

D 9.2 DELETE 9.2 of GS11.

D 10.2 DELETE 10.2 of GS11.

D 11.2 DELETE 11.2 of GS11.

D 12.2 DELETE 12.2 of GS11.

D 16.3 Testing Service - ADD the following:

The Contractor shall retain the services of an independent testing laboratory to provide for all the services outlined in 16.3.1.4 to 16.3.1.11 of GS11, with the exception of those tests specified herein to be performed by the Engineer and the City Retained Laboratory.

D 16.3.1.5 -(a) 3.1.2 The Engineer shall be responsible for testing for slump.

D 16.3.1.10 From 16.3.1.10 of GS11, DELETE "by the New York City Building Code"

D 16.8 Responsibilities and Duties of Contractor - ADD the following:

The Contractor may, if the Contractor so desires, take cylinders corresponding to those taken by the Engineer for the City Retained Laboratory. However, determination of payment will be based solely on the cylinders taken by the Engineer for the City Retained Laboratory.

CONCRETE TEST CYLINDERS

The Contractor will be responsible for safe delivery of concrete cylinders to the Department of Design and Construction Laboratory. The Department of Design and Construction testing laboratory will provide the services for the curing and breaking of the test cylinders.

The Contractor shall provide empty cylinder molds and facilities for the proper care of these cylinders while on the site, and shall safeguard them against injury and protect them from the elements.

The Engineer will be responsible for the preparation, documentation and labeling of the cylinders and for notifying the Contractor, at least twenty-four (24) hours in advance, when a shipment of cylinders is ready for delivery, so that cylinders can be tested for the standard twenty-eight (28) day and seven (7) day tests. Cylinders shall be transported to the testing laboratory when directed by the Engineer.

The Contractor shall make arrangements to protect all cylinders from damage during loading, transport to, and unloading at a Department of Design and Construction designated testing laboratory, and shall obtain a receipt for delivered cylinders, which shall be submitted to the Engineer.

D 18.1.2 At the end of 18.1.2 of GS11, ADD the following:

Class 40 concrete shall be accepted without qualification if the strength of the concrete, as determined from the average cylinder strength is not less than 4,000-psi. For Class 40 concrete that tests below 4,000-psi but above 3,200-psi, the sum of 0.125-dollars per cubic yard per psi of deficiency shall be permanently retained from the payment due the Contractor. Whenever Class 40 concrete tests less than 3,200-psi it shall be rejected and removed. All other concrete shall be evaluated in accordance with the procedures outlined in Chapter 18 of GS11.

D 18.8 DELETE 18.8 in its entirety and SUBSTITUTE the following:

18.8 Retainage

For concrete that tests below 4,000-psi, permanent retainage from payment due the Contractor shall be as specified in Section D 18.1.2.

Concrete that is potentially deficient for reasons other than for strength of concrete as specified in Section D 18.1.2 and that cannot be brought into compliance and is nevertheless accepted by the Commissioner shall be subject to the following permanent retainage. For every cubic yard of concrete so placed, the sum of one hundred (100) dollars per cubic yard shall be permanently retained from the payment due the Contractor.

D 19.2 DELETE paragraph B and SUBSTITUTE the following:

B. Department of Design and Construction, Division of Infrastructure

Class 40 (7-bag) Manholes, cradles, encasements, chambers, thrust blocks, additional concrete. (1:1-1/2:3 mix)

D 19.7 DELETE 19.7 of GS11.

SECTION 2.12
STRUCTURAL, REINFORCING AND MISCELLANEOUS STEEL

2.12.1 INTENT

This section describes structural, reinforcing and miscellaneous steels such as steel I-beams, expanded metal or any other structural steel or steel shapes, bands, and other steel work required by the drawings or ordered by the Engineer.

2.12.2 STRUCTURAL STEEL

2.12.2.1 KIND

Structural steel shall be of one kind, and unless otherwise specified, shall have minimum yield strength (Fy) of thirty six thousand (36,000) pounds per square inch.

2.12.2.2 SIZE AND SHAPE

Structural steel sizes and shapes shall be as shown, specified or required.

2.12.2.3 BRAND

Test specimens and every finished piece of steel shall be stamped with melt or blow number, except that small pieces may be shipped in bundles securely wired together, with melt or blow number on a metal tag attached.

2.12.2.4 MATERIAL AND WORKMANSHIP

The requirements of ASTM A6 shall apply.

All delivered material shall be new, unused and not part of previously fabricated structures.

2.12.2.5 CHEMICAL AND PHYSICAL PROPERTIES

Structural steel shall conform to the requirements of ASTM A36. Steel for structural rivets shall comply with the requirements of ASTM A141.

2.12.2.6 METHODS OF TEST

Steel plates, shapes and bars shall be tested in accordance with the test methods proscribed by the ASTM, provided, however, any applicable method of test or examination as approved by the Engineer may be employed.

2.12.2.7 PACKING

Packing shall be in accordance with the best commercial practice.

2.12.2.8 IDENTIFICATION

Markings shall be in accordance with the requirements of ASTM A36.

2.12.3 REINFORCING STEEL FOR CONCRETE REINFORCEMENT

Reinforcement shall comply with the requirements of **General Specification 11 - Concrete, as modified in Section 2.11**.

2.12.4 MISCELLANEOUS STEELS

Steel for round stock for connecting lugs and bands shall conform to ASTM A36, Standard Specification for Carbon Structural Steel.

Unless otherwise specified, bolts and studs shall conform to ASTM A307, Grade B, and nuts shall be A563, Grade B.

2.12.5 PAINTING

Steel surfaces shall be satisfactorily cleaned and painted as follows:

(1) PRIOR TO ERECTION - All steel work, except reinforcing bars, shall be shop cleaned and given one (1) thorough shop coat of red oxide alkyd base primer.

(2) AFTER ERECTION AND PRIOR TO ENCASEMENT - All steel work, except reinforcing bars, shall be cleaned and receive another thorough coat of red oxide alkyd base primer. (Where

shop coating is damaged during shipping, handling or installation, the areas damaged shall be recleaned and receive a base coat prior to receiving this second coat.)

SECTION 2.13
MORTAR, PORTLAND CEMENT

2.13.1 INTENT

This section describes Portland Cement Mortar.

2.13.2 KIND

(A) Mortar shall comply with the requirements of **General Specification 11 - Concrete, as modified in Section 2.11.**

(B) Unless otherwise specified, mortar shall be either Non-Air Entrained Mortar (maximum 4% entrapped air) for spaces less than one (1) inch or Non-air Entrained Mortar (maximum 4% entrapped air) for spaces one (1) inch or more as specified by mortar bedding or joint requirements. (See **General Specification 11 - Concrete, as modified in Section 2.11**.)

2.13.3 CHEMICAL AND PHYSICAL REQUIREMENTS

(A) Mortar shall consist of sand mixed with Portland Cement, water and additives when required in definite proportions so as to produce a stiff mixture. Proportions shall be in accordance with **General Specification 11 - Concrete, as modified in Section 2.11.**

(B) Portland Cement shall comply with the requirements of **General Specification 11 - Concrete, as modified in Section 2.11.** Type II cement shall be used unless otherwise specified.

(C) Sand for mortar shall comply with the requirements of **General Specification 11 - Concrete, as modified in Section 2.11.**

(D) Water shall be drawn from mains owned by or supplying water to the City of New York.

2.13.4 MANUFACTURE

(A) PROPORTIONING INGREDIENTS - The materials shall be measured in accordance with **General Specification 11 - Concrete, as modified in Section 2.11.**

(B) MIXING INGREDIENTS - Mortar shall be mixed in a suitable box or on a tight platform, and never upon pavement or ground. Cement and Sand shall be thoroughly mixed dry, until the mixture has a uniform color. Clean, fresh water shall then be added and the mass worked until a mortar, which is uniform and of the required consistency, is produced. Mortar shall be mixed in no greater quantity than is required for the work in hand. Mortar that has set sufficiently to require retempering shall not be used.

When required by the Engineer, ingredient materials, after measuring, shall be mixed in an approved rotating drum type batch mixer. Mixing shall be for a period of not less than one and one-half (1-1/2) minutes at a rate of not less than fourteen (14) or more than twenty-two (22) revolutions per minute and shall be continued until a homogeneous mixture is produced. The mortar shall be kept constantly agitated until used.

2.13.5 FREEZING WEATHER

The mixing and use of mortar in freezing weather shall be subject to the same requirements as herein specified for mixing and placing concrete under similar conditions.

SECTION 2.14
GROUT, PORTLAND CEMENT

2.14.1 INTENT

This section describes Portland Cement Grout.

2.14.2 KIND

(A) Grout shall comply with the requirements of **General Specification 11 - Concrete, as modified in Section 2.11.**

(B) Unless otherwise specified grout shall be Cement Grout composed of neat cement and water.

2.14.3 CHEMICAL AND PHYSICAL REQUIREMENTS

(A) Cement Grout shall consist of neat cement and water mixed to a consistency suitable for the work on hand.

(B) Cement and Sand Grout shall consist of sand mixed with Portland Cement, water and additives when required in definite proportions so as to produce a mixture of cream like consistency. Proportions shall be in accordance with **General Specification 11 - Concrete, as modified in Section 2.11.**

(C) Portland Cement shall comply with the requirements of **General Specification 11 - Concrete, as modified in Section 2.11.** Type II cement shall be used, unless otherwise specified.

Cement for dilute grout shall be screeded, if so directed, to remove the coarser particles.

(D) Sand for grout shall comply with the requirement of **General Specification 11 - Concrete, as modified in Section 2.11.**

(E) Water shall be drawn from mains owned by or supplying water to the City of New York.

2.14.4 MANUFACTURE

(A) PROPORTIONING INGREDIENTS - The materials shall be measured in accordance with **General Specification 11 - Concrete, as modified in Section 2.11.**

(B) MIXING INGREDIENTS - Grout shall be mixed in a suitable box or on a tight platform, and never upon pavement or ground. Cement and Sand Grout shall be thoroughly mixed dry, until the mixture has a uniform color. Clean, fresh water shall then be added and the mass worked until a mixture, which is uniform and of the required consistency, is produced. Grout shall be mixed in no greater quantity than is required for the work in hand. Grout that has set sufficiently to require retempering shall not be used.

When required by the Engineer, ingredient materials, after measuring, shall be mixed in an approved rotating drum type batch mixer. Mixing shall be for a period of not less than one and one-half (1-1/2) minutes at a rate of not less than fourteen (14) or more than twenty-two (22) revolution per minute and shall be continued until a homogeneous mixture is produced. The grout shall be kept constantly agitated until used.

2.14.5 FREEZING WEATHER

The mixing and use of grout in freezing weather shall be subject to the same requirements as herein specified for mixing and placing concrete under similar conditions.

SECTION 2.15
TIMBER AND LUMBER

2.15.1 INTENT

This section describes timber and lumber.

2.15.2 KIND

All timber and lumber shall be yellow pine or Douglas fir.

2.15.3 SIZE

Timber and lumber shall be of the sizes shown, specified or required. Sizes given are nominal sizes.

2.15.4 BRAND

Each piece of wood shall be stamped with standard grade marks.

2.15.5 MATERIAL, WORKMANSHIP AND FINISH

(A) YELLOW PINE - Yellow pine timber and lumber shall be either Structural Square Edge and Sound Longleaf or Dense Structural Square Edge and Sound Shortleaf grade.

(B) DOUGLAS FIR - Douglas fir timber and lumber shall be Select Structural grade.

2.15.6 CHEMICAL AND PHYSICAL REQUIREMENTS

(A) YELLOW PINE - Yellow pine timber and lumber shall conform to the requirements of the Southern Pine Association Standard Specifications.

(B) DOUGLAS FIR - Douglas fir timber and lumber shall conform to the requirements of the West Coast Lumberman's Association Standard Grading and Dressing Rules.

SECTION 2.16
BRICK

2.16.1 INTENT

This section describes brick for use in water main installation.

2.16.2 KIND

(A) Brick shall be of the following types:

Type 1 - Manhole Brick and General Brick Masonry Use and Construction
Type 2 - Sewer and Liner Brick

(B) Unless otherwise specified, Type 1 shall be used and shall be either solid or cored, as directed by the Engineer.

2.16.3 SIZE

Brick shall be of standard size as approved.

2.16.4 BRAND

Brick need not be branded.

2.16.5 MATERIAL AND MANUFACTURE

Brick shall be made from clay or shale and burned so that they are free from cracks, warpage and exposed stones, pebbles or particles of lime.

2.16.6 CHEMICAL AND PHYSICAL REQUIREMENTS

Except as otherwise provided herein, brick shall comply with the following requirements:

Type 1 Brick, ASTM Designation C32, Grade MS
Type 2 Brick, ASTM Designation C32, Grade SS

2.16.7 VISUAL INSPECTION

Brick shall be subject to visual inspection. Individual imperfect brick will be rejected for any of the following causes:

(1) DEFECTS - The presence of cracks, warpage, stones, pebbles or particles of lime that would affect the serviceability of the brick.

(2) IRREGULAR SHAPE - Brick not of rectangular cross-section with substantially straight square corners or where ends and at least one (1) edge do not have plain surfaces.

(3) VARIATION IN SIZE - Brick which vary from specified size by more than plus or minus one-eighth (1/8) inch in either transverse dimension or by more than plus or minus one-quarter (1/4) inch in length.

(4) VARIATION FROM APPROVED SAMPLES - Brick that shall vary from the standard of comparison as established from the approved samples.

2.16.8 REJECTION

(A) Approximately one (1) percent of each type of brick shall be taken at random for visual inspection. If five (5) percent of the sample is not acceptable on the basis of visual inspection, the entire delivery shall be rejected. The Contractor, however, may cull such a delivery at the Contractor's own expense and resubmit the delivery for acceptance.

(B) Brick may be inspected either (a) at the place of manufacture, or (b) at the dock or siding as unloaded, before delivery on the street, or (c) at both locations. All deliveries will be subjected to further inspection at the place of use, and brick that do not comply with the specification requirements will be rejected.

2.16.9 CONSTRUCTION METHODS, BRICK MASONRY

(A) The bricks shall be wet when laid and each brick shall be laid in cement mortar so as to form full bed, end and side joints at one operation. The joints shall not be wider than three-eighth (3/8) inch, except when the bricks are laid radially, in which case the narrowest part of the joint shall not exceed one-quarter (1/4) inch. Brickwork shall be smoothly coated both inside and outside with a layer of cement mortar one-half (1/2) inch thick. Brickwork shall be laid with a satisfactory bond, and as it progresses shall be racked back in courses, unless otherwise permitted.

(B) All fresh brickwork shall be carefully protected from freezing and from the drying effects of the sun and wind, and if required, it shall be sprinkled with water at such intervals and for such time as may be directed. Brickwork shall be protected from injuries of all sorts, and all portions that may become damaged or may be found defective shall be repaired or if directed, be removed and rebuilt. In freezing weather bricks shall be heated sufficiently to remove all ice and frost before lying.

SECTION 2.17
POLYETHYLENE SLEEVE

2.17.1 POLYETHYLENE ENCASEMENT - SCOPE

This standard covers materials for polyethylene encasement to be applied to underground installations of ductile-iron pipe. This standard also may be used for polyethylene encasement of fittings, valves, and other appurtenances to ductile-iron pipe systems.

2.17.2 DEFINITION

Polyethylene encasement: The encasement of piping with polyethylene film in tube or sheet form.

2.17.3 MATERIALS

2.17.3.1 Polyethylene. Polyethylene film shall be manufactured of virgin polyethylene material conforming to the following requirements of ASTM D1248-84, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.

TABLE 2.17
POLYETHYLENE TUBE AND SHEET SIZES

Nominal Pipe Diameter inches	Minimum Polyethylene Width inches (cm)	
	Flat Tube	Sheet
3	14 (35)	28 (70)
4	16 (41)	32 (82)
6	20 (51)	40 (102)
8	24 (61)	48 (122)
10	27 (69)	54 (137)
12	30 (76)	60 (152)
14	34 (86)	68 (172)
16	37 (94)	74 (188)
18	41 (104)	82 (208)
20	45 (114)	90 (229)

2.17.3.2 Polyethylene film:

Tensile strength: 1200-psi (8.3-MPa) minimum
Elongation: 300-percent minimum
Dielectric strength: 800-V/mil (31.5-V/µm) thickness minimum

2.17.3.3 Thickness: Polyethylene film shall have a nominal thickness of 0.008-inch. (8-mil or 200-µm). The minus tolerance on thickness is ten (10) percent of the nominal thickness.

2.17.3.4 Tube size or sheet width: Tube size or sheet width for each pipe diameter shall be as listed in Table 2.17.

SECTION 2.18
FILTER FABRIC

2.18.1 FURNISHING AND INSTALLING FILTER FABRIC - DESCRIPTION

The Contractor shall furnish and install filter fabric in water main trenches as shown on Standard Drawing No. 44292-B-Z to the extent required and as directed by the Engineer.

2.18.2 MATERIAL

The filter fabric shall be Mirafi 500X, manufactured by Fibers Industries, Inc. (Subsidiary of Celanese Corporation), or an approved equal.

Application for approval of filter fabric other than that mentioned above shall be made by submitting a one square yard sample of the fabric and the manufacturer's affidavit as to the physical properties of the fabric, to the Engineer.

The approval of the filter fabric shall be based upon the submitted information and the evaluation of the fabric sample.

SECTION 2.19
SCREENED GRAVEL AND BROKEN STONE

2.19.1 DESCRIPTION

This section describes screened gravel and broken stone.

2.19.2 MATERIAL

Screened gravel and broken stone shall be clean, well-graded, sound, hard, roughly cubical in shape and free from organic and other deleterious materials. They shall have a maximum size of one and one-half (1-1/2) inches and a minimum size of one-quarter (1/4) inch.

SECTION 2.20
NO SECTION

SECTION 2.21
BACKFILL MATERIAL

2.21.1 DESCRIPTION

This section describes the material required to backfill sewer and water main trenches and excavations.

All trenches and excavations shall be backfilled immediately after the structures are built and inspected, and the Engineer has given permission.

2.21.2 MATERIAL

(A) GENERAL - All material for backfilling shall have a moisture content and gradation suitable for attaining the required density.

All material for backfilling shall be free from frost at the time of placement.

Miscellaneous fill material removed from the trenches and excavations shall not be considered as acceptable backfill material unless found acceptable and approved in writing by the Engineer.

The project site subsurface conditions may consist partially of variable thickness layers of Unsuitable Material. This material may not be considered as acceptable backfill material as described herein, or as determined by the Engineer.

(B) SELECT GRANULAR FILL - Select granular fill material shall be approved clean earth or sand of low silt and clay content (less than five (5) percent passing the No. 200 sieve), free from bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign matter and shall not contain particles larger than one-quarter (1/4) inch in diameter. For the purpose of this contract, this backfill material shall be called Select Granular Fill.

(C) APPROVED EXCAVATED SUITABLE FILL - Approved excavated suitable fill material shall be approved earth, free of bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign matter and shall not contain stones larger than six (6) inches in their largest dimension. Stones shall be so distributed that all interstices are filled with fine material. For the purpose of this contract, this backfill material shall be called Approved Excavated Suitable Fill.

(D) CLEAN FILL - Clean fill material shall be approved clean earth or sand of low silt and clay content (less then twelve (12) percent passing No. 200 sieve), free from bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign matter and shall not contain stones larger than six (6) inches in their largest dimension. Stones shall be so distributed that all interstices are filled with fine material. For the purpose of this contract, this backfill material shall be called Clean Fill.

(E) PROCESSED FILL - If approved in writing by the Engineer, excavated material determined to be unsuitable may be processed (i.e. screened and/or crushed) to produce select granular fill material or clean fill material. Such processed materials must be in compliance with the materials specifications in **Subsection 2.21.2(B) - Select Granular Fill** and in **Subsection 2.21.2(D) - Clean Fill**. No separate or additional payment will be made for the cost of all labor, materials, plant, equipment, samples, tests and insurance necessary or required to perform this processing work.

SECTION 2.22
HOUSE SERVICE CONNECTIONS

2.22.1 DESCRIPTION

This section describes the materials required for new house service connections or parts thereof. New house service pipe may be required to extend an existing service to a new water main, to repair a damaged service or to install a new service as required and as approved by the Engineer.

2.22.2 MATERIALS

Only new materials shall be used for installation or repair of service pipes. New service pipes of two (2) inches in diameter or less may be brass (with the exception mentioned below) or copper tubing. Service pipes larger than two (2) inches in diameter may be brass (with the exception mentioned below), or ductile iron. Except for the gooseneck, as specified in **Subsection 5.14.3(C)**, the material and diameter of a new service pipe shall be the same from the tap up to and into the building or to a point where service is fully metered.

The mechanical coupling the Contractor must use for connecting an existing lead service line to a new piece of copper tubing or brass service pipe shall be Lead-Pak Coupling, Lead pipe one end - Type K copper tube other end, manufactured by the Ford Meter Box Co., Inc., Wabash, Indiana, or approved equal.

The Department must individually approve fittings and pipe of material other than specified in these specifications. Pipe approved for use shall conform to the following types and their applicable specification, as hereinafter given:

TYPE OF PIPE	APPLICABLE SPECIFICATIONS
Brass	Dept. of Citywide Administrative Services 32-P-3:93
Copper Tubing	Dept. of Citywide Administrative Services 32-T-3:03
Ductile Iron	ANSI/AWWA C151/A21.51-96 Class 2 (3 and 4-inch only Diameter) Class 6 (Over 4-inch Diameter)

2.22.3 INSULATION

Insulation where required shall be FOAMGLAS cellular glass insulation manufactured in accordance with ASTM C552 "Standard Specification for Cellular Glass Thermal Insulation", by Pittsburgh Corning Corporation whose quality system for manufacturing, inspecting and testing of FOAMGLAS insulation is certified to meet the requirements of ISO 9002. The FOAMGLAS or approved equal insulation shall be fabricated in half sections wherever possible. For large diameter piping where half sections are not practical, curved sidewall segments are preferred. Wherever possible, the insulation should be factory jacketed with PITWRAP SS Jacketing - a 70-mil (1.7-mm) thick self sealing high polymer asphaltic membrane with an integral glass scrim and aluminized Mylar film on the surface or approved equal.

Mastic - PITCOTE 300 Finish, an asphalt cutback mastic or approved equal.

Reinforcing Fabric - PC Fabric 79 open mesh polyester fabric with a 6 x 5.5 mesh/inch configuration or approved equal.

Sealant - PITTSEAL 444N sealant, a nonsetting butyl sealant with a minimum 85% solids content or approved equal.

SECTION 2.23
STEEL SHEETING

2.23.1 INTENT

This section describes Steel Sheet Piling.

2.23.2 KIND

Steel sheet piling shall be the continuous interlock type and of an approved type and shape.

2.23.3 SIZE

(A) Sections of piling shall be of the shapes and sizes shown, specified or required.

(B) Piles shall be in single lengths as required in the work.

(C) At changes in direction and at closures, special fabricated or rolled steel sheet piles shall be furnished as shown, specified or required.

2.23.4 BRAND

Each length of steel sheet piling shall be stamped with a steel die or rolled with the following information: Manufacturer's Name or Mark, Date of Manufacture and Inspector's Mark.

2.23.5 CHEMICAL AND PHYSICAL REQUIREMENTS

Steel sheet piling shall comply with the requirements of ASTM Designation A328.

SECTION 2.24
NO SECTION

SECTION 2.25
WATERSTOPS

2.25.1 DESCRIPTION

Waterstops shall be provided in all construction joints in water bearing structures and at other such locations as required by the contract drawings.

2.25.2 MATERIAL

Waterstops for construction joints shall be polyvinyl chloride (PVC).

Waterstops in expansion joints shall be PVC and shall be installed where shown on the contract drawings or as determined by the Engineer.

The polyvinyl chloride shall be extruded from an elastomeric plastic compound of which the basic resin shall be polyvinyl chloride (PVC). The compound shall contain any additional resins, plasticizers, stabilizers or other materials needed to insure qualities that will meet the requirements of the Corps of Engineer's Specifications CRD-C-572-65.

The required minimum physical characteristics for this material are:

Tensile strength:	1,400-psi
Ultimate elongation:	not less than 280%.

No reclaimed PVC shall be used for the manufacturing of the waterstops.

The Contractor shall furnish certification that the Contractor's proposed waterstops meet the above requirements.

Waterstops for construction joints shall be flat ribbed type, six (6) inches wide with a minimum thickness at any point of three-eighth (3/8) inches.

2.25.3 PLACEMENT

Waterstops shall be carefully positioned so that they are embedded to an equal depth in concrete on both sides of the joint. They shall be kept free from oil, grease, mortar and other foreign matter. Where necessary, PVC waterstops shall be braced or supported. Such method shall be submitted to the Engineer for review.

Splices in PVC waterstops shall be made with a thermostatically controlled heating element. Splices shall be made in strict accordance with the manufacturer's recommended instructions and procedures. At least three satisfactory sample splices shall be made on the site. The Engineer may require tests on these splices by an approved laboratory. The splices shall exhibit not less than 80% of the strength of the unspliced material.

2.25.4 PAYMENT

Payment for furnishing and installing the waterstops shall be deemed included in the prices bid for all items of work. No separate or additional payment will be made for waterproofing.

SECTION 2.26
WATERPROOFING

2.26.1 DESCRIPTION

Waterproofing for chambers shall consist of four layers of woven glass fabric treated with bituminous waterproofing material on all exterior surfaces of the chambers including that of the floor slab, as shown on the drawings and as ordered by the Engineer.

2.26.2 MATERIAL

Woven glass fabric treated with bituminous material shall conform to the requirements of ASTM D1668, Type I. All woven glass fabric supplies shall have the same width. Bituminous material shall conform to the requirements of ASTM D449, Type I.

2.26.3 PREPARATION

Prepared surface shall be clean and dry immediately prior to the application of the hot bituminous material. Surfaces shall be reasonably smooth and free from projections and holes.

Bituminous material shall be heated to a temperature not less than 350-degree F. and not more than 400-degree F. in a heating kettle equipped with a thermometer, and shall be stirred frequently to avoid local overheating. The hot bituminous material shall be applied in an even coating by mopping, rolling or spraying. It shall be applied to dry surfaces in two equal coats at right angles to each other and shall not be applied in wet weather or when ambient temperature is below 35-degree F. The treated glass fabric strips shall be carefully set into place, immediately following the hot bituminous coating.

2.26.4 PAYMENT

Payment for furnishing and installing the waterproofing shall be deemed included in the prices bid for all items of work. No separate or additional payment will be made for waterproofing.

SECTION 2.27
NEOPRENE PAD

2.27.1 DESCRIPTION

A neoprene pad shall be provided where shown on the contract plans and the Standard Drawings.

2.27.2 MATERIAL

Neoprene Pad shall be one (1) inch (25-mm.) thick, and shall comply with the latest requirements of ASTM D2000 and Rubber Manufacturers Association RMA3BC-608-A14-E03.

2.27.3 PAYMENT

Payment for furnishing and installing the neoprene pad shall be deemed included in the prices bid for all items of work. No separate or additional payment will be made for neoprene pad.

SECTION 2.28
ALUMINUM GRATING

2.28.1 DESCRIPTION

This section describes Aluminum Gratings.

2.28.2 TYPE OF GRATING

Only riveted type gratings shall be installed by the Contractor. Grating designs shall be in accordance with Water Main Standard Drawings or as shown on the contract drawings. Other designs of equal strength, rigidity and serviceability may be submitted to the Engineer for approval.

2.28.3 MATERIAL AND CONSTRUCTION

The riveted type grating assembly shall consist of parallel main or bearing bars spaced not more than one and one-eighth inches (1-1/8”) apart joined by crimp or lacing bars attached by cold driven rivets spaced not more than seven inches (7”) on center in accordance with the ANSI/NAAMM (National Association of Architectural Metal Manufacturers) MBG 531-00 Metal Bar Grating Manual, Designation R-18-7. Grating finish shall be mill finish as fabricated. The minimum allowable main or bearing bar size shall be 2” x 3/16”.

Aluminum gratings and appurtenances shall conform to the requirements specified herein and to the following specifications:

Main or Bearing Bars ..... ASTM B221 Alloy 6061-T6
Crimp or Lacing Bars ..... ASTM B221 Alloy 6063-T5
Rivets ..... ASTM B316 Alloy 6053-T61

2.28.4 GENERAL

The Contractor shall check all dimensions in the field after all piping and equipment are set in place and determine the exact dimensions and locations of openings and cutouts. Templates shall be made where required.

2.28.5 CONTRACTOR'S WORKING DRAWINGS

Gratings that are specified in the Water Main Standard Drawings shall not require detailed working drawing submittal.

Completely detailed drawings of all other gratings shown on the contract drawings, and which are not specified as Water Main Standard Drawings, shall be submitted by the Contractor for approval of the Engineer in accordance with the specifications. These gratings shall not be manufactured until the Contractor's working drawings have been approved.

2.28.6 WORKMANSHIP

Gratings shall be accurately fabricated, free from warps, twists or other defects which affect the appearance and serviceability of the grating. The tops of the bearing bars and lacing bars shall be in the same plane.

Gratings shall be installed with each section readily removable and replaceable. Adjacent units shall be neatly fitted together. The clearance at the ends and between sections of grating shall be a maximum of one-quarter (1/4) inch. Gratings shall be set with a full and uniform end bearing on the supports to preclude rocking movement. Wedges or similar shimming devices shall not be used. Edges of gratings shall be neatly banded with bearing bars.

2.28.7 FASTENING DEVICES

Approved aluminum fastening devices shall be installed to hold the gratings rigidly to the supports with means for easy removal. Fastening devices shall not protrude above the walking surface of the grating. Fasteners shall be installed in accordance with the manufacturer's directions.

2.28.8 CUTOUTS

Cutouts shall be provided in the grating as directed by the Engineer for the passage of pipe, valve stems, columns and similar work. Where more than four (4) bearing bars are included in the cutout, banding bars of the same dimensions as the bearing bars shall be provided around the opening and welded or electric forged to the component parts of the grating.

2.28.9 CONTACT SURFACES - COATING

Aluminum surfaces in contact with concrete or dissimilar metals shall be thoroughly protected with a heavy coating of bituminous paint or other approved insulating material.

2.28.10 PAYMENT

Payment for furnishing and installing the aluminum grating shall be deemed included in the price bid for the item labeled "FURNISHING AND PLACING CAST-IN-PLACE CONCRETE CLASS 40 AND PRECAST CONCRETE CLASS 50". No separate or additional payment will be made for the aluminum grating.

2.28.11 SEPARATE PAYMENT

Separate payment shall be made for furnishing and installing the anchored steel frame for the aluminum grating under the price bid for the item labeled “FURNISHING, DELIVERING AND PLACING STRUCTURAL, REINFORCING AND MISCELLANEOUS STEEL”.

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THE CITY OF NEW YORK

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER AND SEWER OPERATIONS

DIVISION III

NO DIVISION

NO TEXT ON THIS PAGE

CITY OF NEW YORK

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER AND SEWER OPERATIONS

DIVISION IV

GENERAL CONSTRUCTION PROVISIONS

SECTIONS 4.01 TO 4.11

NO TEXT ON THIS PAGE

SECTION 4.01
SCOPE OF WORK

4.01.1 DESCRIPTION

The description and location of the work for this contract are specified on Attachment 1 (Bid Information).

4.01.2 PROSECUTION OF WORK AND STAGING OPERATIONS

The Contractor shall conduct the Contractor's operations so as to cause a minimum interference to vehicular and pedestrian traffic. The time, place and manner in which the work is to be performed shall be as directed by the Engineer. Only as much of the roadway as the Engineer shall designate, may be closed to traffic and only for as long as the Engineer may prescribe. The work shall be prosecuted simultaneously at one or more places as ordered by the Engineer.

SECTION 4.02
TRENCHES - GENERAL

4.02.1 OPEN CUT, NO TUNNELING

All work shall be done in open trenches or excavations except where construction by tunneling methods is specifically provided for in the contract documents.

4.02.2 PROTECTION OF PERSONS AND PROPERTY

The Contractor, in order to prevent damage to subsurface structures and adjacent buildings, to safeguard persons and property and to minimize inconvenience to traffic and the public, also to protect the structure to be installed and to provide suitable and safe working conditions, shall adequately sheet and brace trenches or excavations. Except as otherwise provided, deviations from the above will be permitted only where, in the judgment of the Engineer, such exception will not result in any of the hazards described above.

4.02.3 TRENCHES

(A) All trenches in earth shall be excavated with vertical sides, and shall be supported by close sheeting, properly braced, unless otherwise permitted. Sheeting and bracing shall extend from at least the existing surface of the ground to an adequate depth below the subgrade of the structure, except where otherwise specified on the plans, or permitted by the Engineer in writing. Sheeting must be driven below the area of the pilot cut. Driving of sheeting above the pilot cut is subject to the directions of the Engineer.

Pilot cuts for trenches shall not exceed five (5) feet at any time. The Engineer may reduce the depth of the pilot cut should soil and subsurface conditions warrant such action.

The Engineer may direct the Contractor to use other types of equipment, and to revise the procedure during the excavation of the pilot trench and the driving of the sheeting should it be found necessary to do so.

Trenches, five (5) feet in depth or less, need not be sheeted and braced, except where the trenches are in close proximity to existing structures or subsurface structures or where the Engineer, in writing, specifically prohibits the use of a nonsheeted trench.

(B) Where shown, specified or permitted in writing by the Engineer, the sides of the trenches shall be sloped to elevations approved by the Engineer. Side slopes must be stable and shall be, in the dry, at least one and one-half (1-1/2) vertical on one (1) horizontal. In all cases, the sides of the trench excavations shall not be sloped to the elevations lower than two (2) feet above the top of the pipe or structure to be constructed. The maximum width of trench shall be in conformity with **Subsection 4.02.4.**

4.02.4 WIDTHS AND DEPTHS OF TRENCHES

The width and depths of trenches shall be in conformance with the requirements of **Section 5.02 - Laying Ductile Iron Pipe And Fittings.**

Where surface or subsurface structures are encountered in the prosecution of the work, the pipe shall be laid in such a manner as to avoid them, as directed by the Engineer. In such cases, the above specified width of trench may be reduced, safety requirements permitting, as ordered or approved by the Engineer.

The trench shall be excavated at each joint of such width and depth as may be necessary to give adequate room for making up the joints.

Where ground water or ledge rock is encountered, the main shall be laid with a cover of not less than three (3) feet, unless otherwise directed by the Engineer.

Where an existing main and appurtenances, which are to be removed and replaced by a new main, are removed first, the trench shall be excavated to suit the requirements for laying of the new main.

Where the new main is to be laid in the trench alongside of an existing main, which is to be removed or abandoned, the trench shall be excavated to such width that there shall be about one foot of clear space between the existing pipe and the new pipe.

Rock shall be excavated throughout the entire length and depth of the trench two (2) feet wider than the outside diameter of the pipe and at least six (6) inches deeper than the outside diameter of the pipe. (Where bottom of trench is in rock, pipe shall be supported on at least six (6) inches of select granular fill bedding in filter fabric wrap, or on concrete cradle, as shown on the Water Main Standard Drawings or as directed by the Engineer.) Projections of rock, which come within six (6) inches of the outside of any portion of the pipe barrel or bell, or within one (1) foot of any hydrant standpipe or elbow, shall be removed. (See **Section 5.22**.)

4.02.5 PROTECTION

In cases where sheeting and bracing will not adequately protect adjacent structures from damage and settlement, the Contractor will be required to use such methods as are necessary to safely support and maintain adjacent and abutting property and structures and to maintain the work safe to life, limb and property.

4.02.6 SHEETING AND BRACING AND FORMWORK

Sheeting and Bracing of the trenches shall be done in accordance with **Section 4.05 - Sheeting and Bracing**.

Unless otherwise specified in the plans or these specifications or specifically permitted in writing by the Engineer, the Contractor shall remove all sheeting and bracing throughout this project as per **Subsection 4.05.7**.

When sheeting is specifically shown on the plans or specifically described in the specifications or specifically ordered in writing by the Engineer to be left in place all work shall be done in accordance with **Subsection 4.05.2**.

Prior to the backfilling of trenches and excavations all formwork shall be removed.

4.02.7 LENGTH OF TRENCH

Unless otherwise specified in the contract documents or ordered in writing by the Engineer, there shall not be more than six hundred (600) feet of open trench in a roadway at any one time. (Trenches backfilled but not yet temporarily paved are considered open trenches.)

Unless otherwise specified in the contract documents or ordered in writing by the Engineer, all trenches in rock shall be excavated to its full depth for a minimum distance of twenty (20) feet in advance of the length

of pipe permitted to be laid; however, the total length of trench shall not be less than fifty (50) feet. The only exception to this is at its upper end or ends, where rock shall be excavated to its full depth to a distance of not less than five (5) feet beyond the pipe to be built. (See **Section 5.22**.)

Trenches for house services shall not be opened on both sides of the street at the same time unless permission has previously been given to close the street. Unless otherwise directed, each trench for house services shall be fully excavated for its entire length before any pipe is laid therein.

4.02.8 TREES AND STUMPS

The Contractor shall clear and grub the surface over the trenches and excavations of all trees and stumps and remove the same from the site of work. All work associated with tree stump removal shall be done in accordance with **Subsection 1.06.5** of the specifications and as specified by the Department of Parks and Recreation permits.

4.02.9 MATERIALS TO BE DISINFECTED

If required, any or all of the excavated material shall be satisfactorily disinfected or deodorized prior to removal from the site of work.

4.02.10 ROADWAY, SIDEWALKS, ETC. TO BE KEPT CLEAR

Materials of construction shall be so deposited, and the work shall be so conducted as to leave open and free for traffic all crosswalks and a space on each sidewalk not less than one-third (1/3) the width of such sidewalk but not less than five (5) feet in width. A roadway not less than one-third (1/3) of the width of the total roadway but not less than eleven (11) feet shall be provided for the free passage of vehicles, unless otherwise specified in **Subsection 1.06.29** or permitted in writing by the Engineer. Street hydrants, water gates, fire alarm boxes and letter boxes shall be kept accessible for use at all times. Not more than two hundred (200) feet of available sidewalk shall be used at any time for storage of materials of construction. During the progress of the work the Contractor shall maintain all crosswalks, sidewalk, driveways and roadways in a safe, neat, clean and satisfactory condition. The work shall at all times be so conducted as to cause a minimum of inconvenience to public travel and permit safe access to private and public property along the line of the work. All work shall be done in accordance with **Subsection 1.06.29** and Department of Transportation permits.

4.02.11 NO EXCAVATED MATERIAL STORED ALONG THE LINE OF THE WORK

Excavated material shall not be stored at any time along the line of the work.

The work may be conducted in the following way:

(1) All material excavated from the first one hundred (100) feet of trench shall be carted away by the Contractor as soon as excavated. The material subsequently excavated, if suitable for backfill in accordance with **Section 4.06**, may be used to backfill the trench in which the pipe has been built and for which permission to backfill has been given.

(2) Where deficiency of acceptable backfill material occurs, the required amount of suitable backfill material shall be brought to the work and used to backfill the trench.

(3) All excess excavated material shall be removed from the site of work immediately upon excavation. Work shall be done in accordance with **Subsection 1.06.7**.

4.02.12 SUBGRADE OF TRENCHES

The subgrade of all trenches and excavations shall be constructed neat and compacted to the elevations and grades required as shown or specified in the contract documents, and as directed by the Engineer.

4.02.13 FENCE

The Contractor shall completely enclose by temporary fences all trenches and excavations and all other potentially hazardous locations as determined by the Engineer, as soon as such conditions exist. Fences shall be constructed, placed, maintained, measured and payment made for in accordance with **Section 5.29** of the specifications.

4.02.14 TEMPORARY WALKS AND BRIDGES

Where specified or required, the Contractor shall construct and maintain, as directed, suitable temporary walks and bridges for pedestrians and vehicles. Temporary walks and/or bridges must be installed across trenches at all active hydrant locations and crosswalks specified, required or ordered. Where specified or required, temporary bridges shall be installed across trenches in order to provide vehicles access to driveways. Where specified or required, street intersections and/or sidewalk areas shall be temporarily bridged or decked over and kept open to vehicular and pedestrian traffic.

The Contractor shall work one-half (1/2) of an intersection at a time and shall keep the other one-half (1/2) of the intersection open to vehicular traffic at all times, unless otherwise specified.

The Contractor shall, at each intersection, maintain open for pedestrian traffic at least one (1) pedestrian crossing, unless otherwise specified or ordered in writing by the Engineer.

If a trench runs between the lane designated for emergency traffic and a hydrant(s), a walkway over the trench at each hydrant location must be installed and maintained by the Contractor.

All designated pedestrian walks, crosswalks and bridges shall be protected from the excavation area and the construction operation through the use of an approved barrier, temporary fence, or other temporary devices and in a manner approved by the Engineer. As a minimum requirement, pedestrian crossings over excavations shall be constructed with steel plates and lined on both sides of the plates with temporary fence attached to timber curbs. Where steel plates cannot be used a substantial timber walk or bridge shall be constructed with temporary fence attached to timber curbs on both sides of the walk or bridge. Such crossings shall have a clear distance between timber curbs with fencing of not less than three (3) feet in width.

All temporary walks, crosswalks and bridges shall be maintained in a safe, neat, clean and satisfactory condition and shall be suitably lighted at night. All walks, bridging and decking shall be firmly secured so as to eliminate any possible shift or movement.

The removal of the pavement and the placing of the temporary walkways, bridging or decking shall be done during the hours of the day or night designated by the Engineer, which will cause the least inconvenience to business properties along the line of the improvement and to public travel in general. If approved in writing by the Engineer, during certain hours of the day or night designated by the Engineer, sections of walks, bridging or decking, no more than eight (8) feet in length may be temporarily removed for the purpose of removing excavated material or receiving materials of construction or for backfilling. All timber walks, bridging and decking together with their supporting structures shall be submitted for approval prior to commencement of construction operations in accordance with **Subsection 4.05.5 and Subsection 4.05.6** and shall be constructed in accordance with the approved drawings on file with the Engineer.

All work shall be done in accordance with **Subsection 1.06.29**, Department of Transportation Permits and as directed by the Engineer.

4.02.15 DISPOSAL OF WATER FROM TRENCHES

The Contractor shall at all times during the progress of the work keep the trenches and excavations free from water. The water from the trenches and excavations shall be disposed of in such a manner as will not cause injury to the public health, nor to public or private property, nor to the work completed or in progress, nor to the surface of the streets, nor cause any interference with the use of the same by the

public. All sewers used for disposal of water from the trenches and excavation during construction shall be acceptably cleaned.

The Contractor shall, with the Contractor's own equipment, provide dewatering where required at no additional cost to the City. The cost for all labor, equipment, materials, etc. required to dispose of water from the trenches shall be deemed included in the prices bid for all items of the contract.

All dewatering and discharge pipes and hoses which cross traveled roadways shall be placed in such a manner so as to eliminate any disruption of traffic flow. If so ordered by the Engineer, the Contractor shall place the pipes and hoses in shallow trenches that will then be plated over. All header pipes shall be buried below existing roadway grade at driveways in order to maintain access to driveways.

All plates shall be firmly secured so as to eliminate any possible shift or movement.

All pumps used in the dewatering operation shall be electric and shall be powered directly from a Con Edison drop, unless otherwise unavailable.

Dewatering by means of well points or deep wells will not be allowed in the Boroughs of Brooklyn or Queens where the rate of pumping exceeds forty-five (45) gallons per minute unless the appropriate permit has been secured from the New York State Department of Environmental Conservation.

SECTION 4.03
EARTH EXCAVATION

4.03.1 DEFINITION, EARTH EXCAVATION

(A) Earth Excavation shall include the removal and disposal of all materials of whatever nature encountered in the prosecution of the work, unless otherwise specified. All materials of whatever nature encountered shall be defined as including, but not be limited to, the following:

(1) soil;
(2) stones;
(3) soft weathered rock that can be excavated by mechanical means other than air hammer or drilling and blasting;
(4) miscellaneous fill and refuse, anything thrown away or rejected as worthless or useless (both organic and inorganic material) that can be excavated by mechanical means other than air hammer or burning and cutting;
(5) sidewalk pavements (all types) and curbs (all types) within limits of trenches and excavations and cutbacks;
(6) existing man-made objects or structures within the trenches and excavations, which objects or structures are shown on the contract drawings or indicated in the specifications, or if not shown or specified could reasonably have been anticipated by the Contractor and which do not materially affect the cost of removal and disposal to the Contractor, as determined by the Commissioner; and,
(7) existing man-made objects or structures outside the trenches and excavations, which objects or structures are shown on the contract drawings or indicated in the specifications to be removed and disposed of by the Contractor.

(B) Earth Excavation shall not include the following:

(1) boulders in open cut as defined in **Subsection 4.04.1**;
(2) rock as defined in **Subsection 5.22.2**;
(3) roadway pavements (i.e., asphaltic concrete pavements, concrete pavements, composite pavements, reinforced concrete pavements, granite/brick pavements) within limits of trenches and excavations and cutbacks (**See Section 5.31**);
(4) contaminated or hazardous materials that materially affect the cost of removal and disposal to the Contractor; and,
(5) existing man-made objects or structures that are not shown on the contract drawings or indicated in the specifications, that could not reasonably have been anticipated by the Contractor, were not anticipated by the City, and which materially affect the cost of removal and disposal to the Contractor, as determined by the Commissioner.

(C) If the City anticipates that any of the items in paragraph (B) above need to be excavated and disposed of, a separate contract item will be included in this contract.

If a separate contract item is not included in the contract and the City determines: (1) that the Contractor could not have reasonably anticipated that such materials would need to be excavated and disposed of; and (2) that such excavation and disposal would materially affect the Contractor's costs; then such excavation and disposal shall be paid for as Extra Work.

4.03.2 WIDTHS OF TRENCHES

The widths of trenches in earth and the dimensions of excavations in earth shall be in accordance with **Section 5.02** of the specifications.

4.03.3 DEPTH OF TRENCHES

The trenches in open cut shall be excavated to the depth required for the foundations of the pipes and appurtenances. Where conditions are such as to make it necessary to excavate to additional depths, as directed by the Engineer, separate payment shall be made under the item labeled "ADDITIONAL EARTH EXCAVATION INCUDING TEST PITS", and as described in **Section 5.24 - Additional Earth Excavation Including Test Pits**. All irregularities in the bottom of the trenches shall be filled to the required subgrade with either Select Granular Fill or Screened Gravel or Broken Stone as directed by the Engineer.

SECTION 4.04
EXCAVATION OF BOULDERS IN OPEN CUT

4.04.1 DEFINITION

Excavation of boulders in open cut shall include the excavation, removal and disposal of boulders or parts thereof from within the limits of the sheeted and unsheeted trenches and excavations, more than one-half (1/2) cubic yard in volume. The term boulders as used herein shall include riprap, rock fill, thrust blocks and loose masonry.

4.04.2 REMOVAL

The Contractor may elect to remove an entire boulder when partly extending into the trench. Boulders shall be removed from the site of the work immediately after being excavated and measurements taken by the Engineer. Excavated boulders shall become the Contractor's property and shall be properly disposed of at the Contractor's expense.

4.04.3 NO SEPARATE PAYMENT

No separate or additional payment will be made for excavating, removal and disposal of boulders one-half (1/2) cubic yard or less in volume the cost thereof shall be deemed included in the prices bid for all items of this contract.

No separate or additional payment will be made whenever the Contractor elects to remove an entire boulder that extends partly into the trench or excavation. Payment will only be made for that volume of the boulder that is within the limits of the sheeted and unsheeted trench or excavation. No separate or additional payment will be made for the removal of boulders or for the filling of voids left by the removal of boulders beyond the limits of the sheeted and unsheeted trench or excavation.

SECTION 4.05
SHEETING AND BRACING

4.05.1 SHEETING AND BRACING

(A) The sides of the trenches and excavations shall be supported by adequate sheeting and properly braced. All sheeting and bracing systems the Contractor elects to use or are ordered by the Engineer or the Department shall comply with these specifications and must receive the approvals stated herein.

Timber sheeting and bracing shall be vertical sheeting with ranges and braces or horizontal sheeting supported by vertical steel soldier beams and the necessary bracing.

(B) Where the material to be excavated is of such character as to render it necessary, the sheeting shall be tongued and grooved and driven to such depths below the subgrade as may be directed.

(C) Where the nature of the material encountered or the safety of the adjacent structure render it necessary, the Contractor may resort to the use of steel sheet piling with prestressed bracing or the Contractor may underpin the structure or buildings.

(D) Other sheeting systems may be permitted upon approval of the Department of Design and Construction. (Trench Boxes will not be permitted for use in trenches and excavations that exceed twelve (12) feet in depth. (See **Subsection 4.05.4(E)**.))

(E) In general, sheeting and bracing in excavations shall be designed and installed so that the sheeting shall not be braced or blocked against any part of the new structure, or manholes, or chambers. When conditions warrant, bracing against such structures may be permitted following the approval of drawings prepared and submitted by a Professional Engineer licensed in the State of New York, showing the assumed design loads and stresses, and details of such bracing.

(F) If, in the opinion of the Engineer, any of the approved temporary or permanent supporting structures are inadequate or unsuitable for the actual conditions in the field, the Engineer may direct the Contractor to strengthen the supporting structures at no additional cost to the City. The Contractor shall be responsible for the sufficiency of all temporary and permanent supporting structures whether or not directed by the Engineer to strengthen them.

(G) Unless otherwise specified in the plans or these specifications, the Contractor shall remove all sheeting and bracing throughout this project as per **Subsection 4.05.7**.

4.05.2 SHEETING LEFT IN PLACE

When sheeting is specifically shown on the plans or specifically described in the specifications or specifically ordered in writing by the Engineer to be left in place, it refers to all sheeting and bracing in trench excavations for pipe lines including manholes, valves and chambers. Excavations for house services and other excavations not considered part of the trench excavation for pipe lines shall have their sheeting and bracing removed entirely.

When sheeting is to be left in place, all elements such as rangers and braces, of the sheeting used, must be left in place, except for such temporary braces required removed to make way for the structure. Where it is necessary to remove such temporary braces, the sheeting shall be rebraced in a manner approved by the Engineer; however, in no case shall the sheeting be braced against the side of the structure unless approved in writing by the Engineer. Where lagging and soldier beams are used, the soldier beams and all the rangers and braces shall also be left in place. Where steel sheeting is used, the rangers and braces shall also be left in place.

When sheeting is to be left in place, the Contractor shall cut sheeting at the elevations ordered in writing by the Engineer; however, in general such cutoffs shall not be less than four (4) feet below the final grade. Timber sheeting shall be cut off by sawing. Steel sheeting or soldier beams shall be cut off by burning. Breaking off of sheeting will not be permitted. The Contractor shall remove from the trench and away from the site of work, to the Contractor's own place of disposal, all cut sheeting and soldier beams together with all rangers, lagging and braces above the ordered elevation of cut. Where the removal of rangers and braces above the ordered elevation of cut is determined by the Engineer to render the sheeting system unstable, rangers and braces shall be placed prior to cutting at a level below the ordered elevation of cut and left in place.

Additional payment will be made for sheeting and bracing that is specifically shown on the plans or specifically described in the specifications or ordered in writing by the Engineer, to be left in place. Payment will be made in accordance with **Section 5.21**.

4.05.3 MATERIALS

(A) Timber sheeting and bracing shall be of new or acceptable used timber free from injurious defects.

(B) Steel soldier beams shall comply with the requirements of **Section 2.12 - Structural, Reinforcing and Miscellaneous Steel**, except that approved used material will be permitted. Steel sheet piling shall comply with the requirements of **Section 2.23 - Steel Sheeting**, except that approved used materials will be permitted. Timber and lumber for bracing, shoring, fencing, bridging, and decking shall conform to the requirements of **Section 2.15 - Timber and Lumber**. Steel used for sheeting systems or for any other purposes herein shall conform to the requirements of the ASTM Designation A36 and all other applicable requirements of ASTM.

4.05.4 CONSTRUCTION METHODS

(A) GENERAL - Timber sheeting and bracing and other sheeting systems shall be of sufficient dimensions and strength, and steel sheeting shall be of sufficient type, size and weight, to support adequately the sides of the trenches and excavations and insure the safety of adjacent structures and shall be installed in accordance with the approved sheeting details. The Contractor shall be solely responsible for the adequacy and sufficiency of all sheeting and bracing used.

(B) SHEETING - Unless otherwise specified, timber sheeting and bracing shall be driven or placed ahead of the excavation in such a manner as to prevent the loss or slippage of ground in order to safeguard adjacent surface and subsurface structures. The sheeting shall be driven to adequate depth below subgrade. As the work progresses, any voids back of the sheeting shall be filled and compacted in accordance with **Section 4.06** and as directed by the Engineer.

(C) Sheeting can be used as forms for concrete work. Whenever sheeting is used as formwork as specified or approved by the Engineer only timber sheeting will be permitted unless otherwise approved or specified in writing by the Engineer. When sheeting is used as formwork, an approved protection shall be placed between the sheeting, bracing or soldier beams and the concrete. In addition, when sheeting is used as formwork for any structure or portion thereof, the thickness of that structure or portion of such structure shall be increased be three (3) inches beyond the original neat line of such structure or portion thereof. In no case shall the sheeting, soldier beams or other bracing encroach upon the original neat line of the structure. In such instances when sheeting, soldier beams or other bracing is found to encroach upon the neat line of the structure, the Engineer shall direct the Contractor to remove such sheeting, soldier beams or other braces and redrive and/or replace the sheeting, soldier beams or other braces outside the neat line of the structure. All sheeting used as formwork shall be removed.

(D) All open cuts shall be excavated with vertical sides and properly supported with close sheeting and bracing in conformity with the requirements of **Section 4.03 - Earth Excavation** and with Industrial Code Rule 23 - "Protection of Persons Employed in Construction and Demolition Work" and 16NYCRR Part 753 of the Industrial Code - "Protection of Underground Facilities" of the State of New York, Department of Labor, Board of Standards and Appeals.

(E) The Contractor is advised that trench boxes will be permitted for use as a sheeting system provided that the depth of trench does not exceed twelve (12) feet. The use of trench boxes to partially sheet trenches that are greater than twelve (12) feet in depth, will be strictly prohibited.

Should trench boxes meeting the above requirements be utilized, the trench will not have to be sheeted completely to subgrade. The trench box will be permitted to “hang up” to a maximum of two (2) feet above subgrade provided that the existing soil in the area of the subgrade can “stand up” on its own without sheeting. Should running ground be encountered or should the soil in the subgrade area begin to slough off, the Contractor will be required to extend the trench box to subgrade. The Engineer shall always maintain the right to order the Contractor to lower the trench box to subgrade as required.

No deductions will be made from any payment for not sheeting the bottom two (2) feet of trench if approved by the Engineer and no additional payment will be made should the Contractor be directed to sheet completely to subgrade.

All sheeting and bracing drawings submitted for approval which indicate trench boxes must be designed for the full depth of trench (to subgrade) and shall show the trench box extending to subgrade.

(F) Sloped sides will not be permitted, unless shown, specified or permitted in writing by the Engineer.

4.05.5 SHOP DRAWINGS

The Contractor will be required to submit Shop Drawings detailing the sheeting system whenever the depth of cut exceeds five (5) feet.

(A) Before commencing any excavating operation the Contractor shall have approved drawings from the Department of Design and Construction for all types of sheeting and bracing systems, cofferdams, shoring, underpinning, bridging, decking and all other temporary or permanent supporting structures required.

(B) The Contractor shall submit for approval five (5) copies of sheeting and bracing drawings, and other structures (i.e. decking, bridging) drawings that the Contractor proposes to use for the work and allow a minimum of two (2) weeks to review same. This time requirement is to be considered in forming a work schedule.

(C) The Contractor shall have these drawings prepared by a Licensed Professional Engineer, currently registered in the State of New York. Such drawings shall be submitted together with design calculations, references, tables and charts. Both drawings and design calculations shall bear the imprint of the Licensed Professional Engineer's seal and signature.

(D) In designing the sheeting stated above, the Contractor's Engineer shall take note of the standard minimum load diagram requirements for Watertight and Non-Watertight sheeting structures. (See Sewer Design Standards.)

(E) The following notes shall be required on all sheeting detail submissions:

(1) If the actual surcharge is in excess of three hundred thirty (330) pounds per square foot the Contractor shall adequately reinforce the sheeting and bracing as required at no additional cost to the City.

(2) Maximum pilot cut shall be five (5) feet.

The sheeting and bracing drawings shall also include but not be limited to the following: the density of the soil, the internal angle of friction of the soil, the stress grade and type of lumber, the allowable steel stresses and the sequence of construction operation where required.

(F) Shop drawings of sheeting, bracing and other structures used by the Contractor shall be signed by and carry the seal of a Professional Engineer licensed in the State of New York. These drawings shall be submitted together with proper design computations bearing the same seal and signature. Shop drawings shall be on sheets twenty-seven (27) inches by forty (40) inches with a one-half (1/2) inch marginal space on three (3) sides and a two (2) inch marginal space for binding on the left side.

Shop drawings shall be numbered consecutively and shall accurately and distinctly present the following:

(1) All working and erection dimensions.
(2) Arrangement and sectional views.
(3) Necessary details, including complete information for making connections between work under this contract and work under other contracts.
(4) Kinds of materials.

(G) Each shop drawing shall be dated and contain:

(1) The name of this project and this contract number.

(2) The description name of classified contract item number or numbers under which it is or they are required.
(3) The locations or points at which the sheeting is to be installed in the work.

4.05.6 DESIGN CRITERIA

The following criteria shall be used in calculating the required sheeting, bracing and/or decking systems.

(A) All compression members (struts) shall be designed with a factor of safety of two (2.0). The factor of safety of two (2.0) shall be a value above and beyond the allowable value for compressive stresses for steel as designated in the "Manual of Steel Construction" (AISC), and for wood as designated in the "National Design Specification for Stress-Grade Lumber and its Fastening". All other allowable stresses (not including compression members) may be increased by thirty-three and one-third (33-1/3) percent where sheeting and bracing is deemed a temporary structure.

(B) A factor of safety shall be used to determine the minimum embedment for sheeting as follows:

Vertical Timber - 15%
Soldier Beams - 20%
Steel Sheeting - 30%

(C) Embedment shall be calculated in accordance with the procedures and standard minimum load diagrams specified herein. The maximum allowable embedment for vertical timber sheeting shall not exceed three feet six inches (3'-6"). The minimum embedment shall be two (2) feet.

(D) The Contractor is advised that the maximum allowable bending stress (Fb) for all timber members shall not exceed one thousand seven hundred fifty (1,750) pounds per square inch. If the Contractor elects to use a bending stress higher than Fb=1,750 psi, written certification of bending stress test results shall be submitted to the Engineer prior to use of such material in construction.

(E) Where it is anticipated that heavier crane or equipment loads will fall within the influence line of the trench, design loads shall be increased accordingly.

(F) The Contractor shall compute and include in the Contractor's submission of drawings and calculations the following:

(1) Maximum bending stress
(2) Maximum horizontal shear in wale
(3) Compression perpendicular to grain
(4) Maximum vertical shear stress

(G) DECKING

(1) Unless otherwise specified in the contract documents or approved in writing by the Engineer, the minimum live load on decking shall be AASHTO HS20-44 or Contractor's equipment or heaviest truck loading (i.e. concrete trucks) whichever is greater plus an impact factor of thirty-three (33) percent.

(2) Unless otherwise approved timber mats shall extend a minimum of three (3) feet from sheeting line on either side of trench.

(3) Unless otherwise approved a minimum one thousand (1,000) pounds per square feet surcharge load shall be used for sheeting below decking.

(H) Maximum trench widths shown on sheeting details shall not exceed those allowed by the latest standards or specifications.

(I) The Contractor shall provide an individual cross-sectional sheeting (trench) detail for each size pipe to be constructed unless permission to do otherwise is granted.

(J) Where the water table lies above the subgrade of trench and a well point or deep well dewatering system is not used, the Contractor shall include the effect of hydrostatic loading in calculations for both watertight and non-watertight sheeting.

(K) Sheeting details shall accurately depict actual field operations. The Contractor shall be restricted to a maximum five (5) feet deep pilot cut and all details must reflect this. Additional braces and wales may be required to install sheeting due to the five (5) feet maximum pilot cut restriction. The Contractor shall not assume that additional pilot cut depths will be allowed.

4.05.7 REMOVAL OF SHEETING

All sheeting design and requirements shall be in strict conformance with all appropriate Addenda to the specifications, except as noted herein.

Unless otherwise specified in the plans or these specifications, the Contractor shall remove all sheeting and bracing throughout this project.

(A) The sheeting shall be removed in lifts during the backfilling operation in order to permit proper placement and compaction of material against the structure and the earth bank. This work shall be accomplished in conjunction with the removal of wales and braces. In no case shall the lifts for sheeting exceed the specified or otherwise approved depth of compaction layer.

(B) The Contractor shall submit to the Engineer, for approval, the Contractor's method for installation and removal of sheeting and the method for backfilling the trench. The submission shall also specify if there are any location(s) where sheeting cannot be removed and detail the reasons why the sheeting cannot be removed. The submission shall be signed by and carry the seal of a New York State Licensed Professional Engineer. These methods must be strictly adhered to.

(C) The Contractor is advised that the Contractor will be responsible for, and shall solely at the Contractor's own expense, repair, replace and/or relocate all City owned utilities that are damaged and/or disturbed due to the Contractor's removal of sheeting operation.

(D) Additional payment made if the Contractor is required to leave the sheeting system in place in accordance with **Section 5.21**.

(E) This section shall not be construed to relieve the Contractor of the Contractor's obligation under the contract to maintain, protect and support (temporarily and permanently) all City owned utilities within the influence lines of the excavated trenches. The Contractor in accordance with the latest standards of the agencies having jurisdiction thereof shall perform such maintenance, protection and support.

(F) The cost of maintenance, protection and support (temporarily and permanently) of City owned utilities shall be included in the prices bid for all items for which there are bid prices.

(G) If a soldier beam and lagging sheeting system is utilized then all parts of the system (i.e. soldier beams, bracing, wales and lagging) must be removed.

(H) There shall be no additional payment made for repairing, replacing and/or relocating City owned utilities that may be damaged and disturbed due to the Contractor's removal of sheeting operation, or for work performed by the Contractor as directed in paragraph **(E)** above.

4.05.8 COST INCLUDED

There shall be no separate payment for the sheeting and bracing of water mains larger than 20-inches in diameter or for sheeting any appurtenances thereto including valve or regulator chambers. The cost of all labor, material, plant, equipment and insurance necessary or required to furnish and install all timber and steel sheeting together with all necessary rangers, bracing, lagging, soldier beams, etc., excavation for the placing of sheeting, backfill and compaction behind sheeting to prevent loss of ground, cut off of sheeting as specified, together with all work incidental thereto, all in accordance with the plans and specifications

and as directed by the Engineer, shall be deemed included in the prices bid for the respective contract items.

4.05.9 SEPARATE PAYMENT

Separate payment will be made for the sheeting of Water Mains 20-inches and smaller in diameter. Payment will be made in accordance with **Section 5.21** of the Specifications.

SECTION 4.06
BACKFILLING

4.06.1 BACKFILLING

All trenches and excavations shall be backfilled immediately after the structures are built and inspected, and the Engineer has given permission to backfill.

4.06.2 MATERIAL FOR BACKFILLING

(A) GENERAL - All material for backfilling shall have a moisture content and gradation suitable for attaining the required density.

In general, it is expected that material excavated from a trench shall be used to backfill only the upper portion of the trench. It is not expected that such material will be used to backfill the lower portion of the trench.

The project site subsurface conditions may consist partially of variable thickness layers of Unsuitable Material. This material may not be considered as acceptable backfill material as described herein, or as determined by the Engineer. No separate or additional payment will be made for the removal, testing and off-site disposal of such unsuitable materials, the cost of which shall be deemed included in the prices bid for all contract items of work.

The Contractor shall take such borings, excavate such test pits and make such sieve analyses as the Contractor may deem necessary to schedule the Contractor's operations consistent with the need of having an adequate supply of satisfactory backfill material available along the line of the installation so that the Contractor may proceed without undue interruptions; and no payment other than hereinbefore provided will be allowed the Contractor for delays or other expenses incurred because the satisfactory backfill material is not available at the proper time and place; and no other allowance will be made to the Contractor for disposing of the unsatisfactory excavated material, the cost of which will be included, as necessary, in the unit price bid for Backfill Material.

All material for backfilling shall be free from frost at the time of placement.

Miscellaneous fill material removed from the trenches and excavations shall not be considered as acceptable backfill material unless found acceptable and approved in writing by the Engineer.

(B) SELECT GRANULAR FILL - Select Granular Fill shall be placed in the lower portion of the trench within the following limits: full width of trench but not less than one (1) foot on either side of the pipe; not less than six (6) inches below the barrel of the pipe and twelve (12) inches above the top of the barrel of the pipe.

Select Granular Fill shall also be placed within any area less than two (2) feet wide in its least dimension (i.e. space between face of trench and outside face of structure, cavities behind sheeting left in place, filling of voids left by removal of boulders beyond the limits of sheeted trench, etc.) and within eighteen (18) inches around all underground facilities (i.e. pipes, mains, conduit, cable, etc.)

There shall be no separate payment for furnishing and placing such backfill. The cost thereof, including the cost of removing and disposing of that portion of the excavated material that cannot be reused, shall be deemed to be included in the unit prices bid for Laying Pipe.

The cost of providing select granular fill as specified hereinabove, together with all labor, materials, plant, equipment, samples, tests and insurance necessary and required for delivering, placing, compacting and

testing of select granular fill, shall be deemed included in the prices bid for all contract items of work. No separate or additional payment shall be made for this work.

Select Granular Fill shall meet the requirements of **Subsection 2.21.2 (B)**.

(C) APPROVED EXCAVATED SUITABLE FILL - Approved excavated suitable material shall be utilized for backfilling the remainder of the trenches and excavations. This material will be accepted for backfill from a point twelve (12) inches above the barrel of the pipe to the underside of the pavement.

All approved excavated suitable material within the project limits shall be utilized for backfill. The cost for all labor, materials, plant, equipment, samples, tests and insurance necessary and required for the hauling, storing, placing, compacting and testing of approved excavated suitable material all in accordance with the specifications and as directed by the Engineer, shall be deemed included in the prices bid for all respective items. No separate or additional payment shall be made for this work.

Approved Suitable Excavated Fill shall meet the requirements of **Subsection 2.21.2(C)**.

(D) CLEAN FILL - Clean fill material shall be fill ordered in writing by the Engineer where there is a deficiency of acceptable backfill. Clean fill material shall be required in order to backfill trenches and excavations, from twelve (12) inches above the top of pipe to the height of the ground surface as it existed at the start of the work, caused by the removal of boulders, unsuitable backfill materials, existing pipes and associated structures, and any other underground facilities or structures.

This backfill shall be exclusive of the normal backfill required in the trenches and excavations for proposed pipes and associated structures for which payment is included therein. Payment shall be made in accordance with **Subsection 4.06.6**.

Clean Fill shall meet the requirements of **Subsection 2.21.2(D)**.

(E) PROCESSED FILL - If approved in writing by the Engineer, excavated material determined to be unsuitable may be processed (i.e. screened and/or crushed) to produce select granular fill material or clean fill material. Such processed backfill materials must be in compliance with the materials specifications in **Subsection 2.21.2(B) - Select Granular Fill** and in **Subsection 2.21.2(D) - Clean Fill**. No separate or additional payment will be made for the cost of all labor, materials, plant, equipment, samples, tests and insurance necessary or required to perform this processing work. Payment for the costs of all labor, material, equipment and insurance necessary and required to furnish and deliver, and to place, compact, sample and test these processed acceptable backfill materials shall be in accordance with **Subsection 4.06.6**. (Excavated material that is hand groomed and/or groomed with the use of excavating equipment of bricks, blocks, pavement materials, debris, stumps, roots, stones, boulders, timber, wood, etc., so as to render the excavated material acceptable for backfill; whether ordered by the Engineer or at the Contractor's own discretion; shall not be considered as processed material but shall be considered as approved excavated suitable material. No separate or additional payment will be made for the use of this groomed excavated material as backfill, the cost of all labor and material shall be deemed included in the prices bid for all contract items of work.)

4.06.3 METHOD OF DEPOSITING ALL BACKFILL

Pipes, for which permission to backfill has been given, shall be covered for a depth of at least two (2) feet above the top of the pipe before the completion of each day's work. Unless otherwise approved in writing by the Engineer, this backfill shall be progressively deposited to equal depths on all sides of the pipe in uniform and successive horizontal layers not exceeding six (6) inches in depth for the entire width of the trench or excavation and each successive layer shall be solidly compacted by mechanical tamping or other approved means in such a manner as to avoid injury to the pipe and so as to achieve the required density.

Unless otherwise approved in writing by the Engineer, backfill from two (2) feet above the top of the pipe to the final ground surface elevation shall be progressively deposited in uniform and successive horizontal layers not exceeding twenty-four (24) inches in depth for the entire width of the trench or excavation and

each successive layer shall be solidly compacted by mechanical tamping or other approved means so as to achieve the required density.

The use of backhoe buckets for the compaction of backfill material in all trenches and excavations will not be permitted.

All backfill shall be carefully deposited and spread by approved methods.

Backfill shall proceed simultaneously with the withdrawal of sheeting. Withdrawal of sheeting below levels previously backfilled and compacted is prohibited.

Each layer must be compacted to a minimum of ninety-five (95) percent of Standard Proctor Maximum Dry Density (as determined by AASHTO T-99 Test Method), before a successive layer is deposited.

The Contractor shall retain the services of a testing laboratory, in accordance with **Subsection 4.06.4 - Soil Density Testing**, to make all compaction tests of backfill materials used and placed. All compaction tests shall be witnessed and verified by the Engineer.

The Contractor shall furnish to the Engineer, copies of in-process compaction reports certified by an Independent Testing Laboratory. These certified compaction reports shall be submitted as directed by the Engineer.

Compaction to a minimum of ninety-five (95) percent of Standard Proctor Maximum Dry Density shall be attained by the use of impact rammers, plate or small drum vibrators, or pneumatic button head compaction equipment. The equipment shall be capable of exerting a pressure equivalent to two hundred fifty (250) to three hundred (300) pounds per inch width of compression roll, or an equivalent pressure if other than smooth wheel or pneumatic tired rollers are permitted. In areas inaccessible to power rolling or adjacent to construction that may be damaged, other types of approved compaction equipment may be used.

Hand tamping shall not be permitted except in the immediate area of underground facilities. The backfill within the immediate area of underground facilities shall be deposited progressively in layers not exceeding six (6) inches in depth on all sides of the underground facilities, wetted (except where clay) in lifts of six (6) inches and lightly hand tamped with as many strokes as required to achieve ninety-five (95) percent of Standard Proctor Maximum Dry Density. Where no specific written information is available to the Engineer, the definition of the immediate area shall be the area within eighteen (18) inches around all underground facilities.

The Contractor shall be responsible for the proper compaction of all backfill in accordance with the specifications. The Contractor shall also be responsible for determining and maintaining the proper moisture content of the backfill material at all times during the compaction process.

The Contractor shall backfill with material that has the optimum moisture content, as result of Proctor Analyses, so as to provide for the proper compaction of that material. In order to obtain the optimum moisture content, water shall be added, as required, and shall be thoroughly incorporated into the soil. Manipulation shall be provided whenever necessary to attain uniform moisture distribution to the soil. When the moisture content of a layer about to be compacted exceeds the required optimum moisture content, compaction shall be deferred until the required optimum moisture content is achieved or, if directed by the Engineer, a more suitable material shall be substituted. No separate or additional payment shall be made for any costs associated with the achievement of optimum moisture content, including any additional excavation due to the removal of any layer not meeting the specified requirements and for the replacement of any layers with suitable material. Costs shall be deemed included in the prices bid for all items of work.

In-place soil density tests shall be required to ensure that the soil compaction requirements of the specifications are met. In-place soil density tests shall be taken for each and every layer of backfill placed, at a maximum of one hundred (100) foot intervals along the length of each layer. However, the location of the tests shall vary horizontally along each successive layer, such that no two (2) tests are

conducted at the same station location as any previous layers. The number and locations of in-place soil density tests shall be as directed by the Engineer.

Up to each one thousand (1,000) cubic yards of each type of backfill soil utilized, for which in-place soil density tests are to be performed, shall undergo a minimum of one (1) Proctor analysis in order to determine the maximum dry density and optimum moisture content of the soil material to be tested. Due to varying soil conditions, additional Proctor analyses may be required by the Engineer. The number and locations of all samples to undergo Proctor analysis shall be as directed by the Engineer.

Proctor analyses and in-place soil density tests shall be performed in accordance with **Subsection 4.06.4 - Soil Density Testing**.

No separate or additional payment shall be made for the depositing, compacting and sampling of backfill or for the services of the approved testing laboratory, the costs thereof, shall be deemed included in the prices bid for all items of work.

Where sheeting has been used for the excavation, it shall be pulled when the excavation has been filled or backfilled to the maximum unsupported depth allowed by New York State Department of Labor Industrial Code Rule 23 and Title 29 Code of Federal Regulations Part 1926, Safety and Health Regulations for Construction. Where a difference exists between regulations, the more stringent requirement shall apply.

Select granular fill material, approved excavated suitable fill material and clean fill material shall not be used to fill voids in the subgrade of the trenches and excavations for proposed pipes and associated structures unless otherwise specified on the plans or in the contract documents, or as ordered in writing by the Engineer.

4.06.4 SOIL DENSITY TESTING

(A) INTENT - This section describes the performance of Proctor analyses of designated soils and the testing of designated soils for in-place density, to ensure that soil compaction requirements for the project are met. The Contractor shall retain the services of an independent Soils Testing Laboratory, subject to the prequalification requirements hereinafter specified, to perform the work under this section.

(B) PREQUALIFICATION OF TESTING LABORATORY

(1) Prior to start of work, the Contractor shall submit to the Commissioner the name, address and phone number of each of three (3) independent testing laboratories, for consideration as the Soils Testing Laboratory for this project.

(2) All proposed testing laboratories shall be completely independent from the Contractor or any subsidiary thereof.

(3) All proposed testing laboratories shall be duly licensed by the New York City Department of Buildings, such license to be maintained for the duration of the project. Testing laboratories licensed outside of New York may be considered subject to the prior approval of the Commissioner.

(4) All proposed testing laboratories shall have a proven record of performance in providing the soil testing services specified under this section.

(5) The Commissioner will select one (1) testing laboratory from the list of three (3) submitted, to perform the work required under this section. The Commissioner reserves the right to select an alternate testing laboratory if all proposed laboratories are deemed unacceptable.

(6) It is understood that no subcontract for the performance of required soil testing work will release the Contractor from the Contractor's responsibility under the contract to execute all work in conformance with the project plans and specifications.

(C) SCOPE OF WORK - Under this section, the Contractor and approved Laboratory shall furnish all labor, materials, plant, equipment, insurance, and necessary incidentals required to: obtain soil samples from the site or other locations, transport to Laboratory, perform Proctor analyses of soil samples and submit written documentation of results; perform in-place soil density tests and submit written documentation of results; and perform all work incidental thereto, all in accordance with the specifications and as directed by the Engineer.

(1) PROCTOR ANALYSIS OF SOIL SAMPLES - Soils for which in-place density tests are to be performed shall undergo a Proctor analysis in order to determine the maximum dry density and optimum moisture content of the soil material to be tested. Soils designated for Proctor analysis may include existing subgrade materials as well as proposed fill material, as directed by the Engineer. The number and locations of soil samples to undergo Proctor analyses shall be as specified and as directed by the Engineer.

Each soil sample designated for Proctor analysis shall be recovered from the site or other location (stockpile, etc) and transported to the Laboratory, in a manner acceptable to the Laboratory and the Engineer.

The maximum dry density and the optimum moisture content of each soil sample shall be determined by the Standard Proctor Test in accordance with AASHTO T-99 (ASTM D698). If, in the opinion of the Laboratory, a soil sample is too granular to achieve realistic maximum dry density and optimum moisture content readings by the Standard Proctor Test method, other appropriate test methods (Vibratory Table, etc.) may be substituted, subject to the approval of the Engineer.

Written documentation on Laboratory stationery of the results of each Proctor analysis shall be furnished to the Engineer, such documentation to include the following:

(a) Date Sample was Tested.
(b) Location and Date Sample was Obtained.
(c) Brief Description of Sample (Soil Type, Color, Consistency, etc.) or other identification.
(d) Maximum Dry Density (pounds per cubic foot).
(e) Optimum Moisture Content (percent).
(f) Test Method (If other than Standard Proctor Test).
(g) Signature and Seal of Qualified Laboratory Representative.

Distribution of copies of Proctor analysis results shall be as directed by the Engineer.

(2) IN-PLACE SOIL DENSITY TESTS - In-place soil density tests will be required to ensure that soil compaction requirements for the project are met. In-place soil density tests and results shall be performed and completed on site by the approved testing laboratory.

Test locations may include: existing subgrade material upon which fill material is to be placed, or upon which sewer pipe, water pipe, catch basins, basin connection pipe or other structures are to be constructed; compacted fill material for pavement construction or for backfill of sewer pipe, water pipe, catch basins, basin connection pipe or other structures; and other locations as directed by the Engineer. The number and locations of in-place soil density tests shall be as specified and as directed by the Engineer.

The Contractor's attention is directed to the fact that it will be necessary in some cases to excavate through temporary pavements in order to test the compaction of backfill over pipes, etc., and upon completion of the test, backfill and place new temporary pavement as necessary. No separate or additional payment will be made for such excavation, backfill or replacement of temporary pavement. All costs shall be deemed included in the prices bid for all items of work.

The preferred test method for determining the in-place dry density and moisture content of the soil is the Sand Cone Test, in accordance with AASHTO T-191, T-205. Other approved types of density tests (nuclear, etc.) are permitted, provided that density values corresponding to those obtained by the Sand Cone Test method are established to the satisfaction of the Engineer. Such alternate density test methods shall be checked at least once every fifty (50) tests against the Sand Cone Test

method, as directed by the Engineer, to minimize equipment calibration errors. No separate or additional payment will be made for additional density tests taken solely for calibration purposes. All costs shall be deemed included in the prices bid for all items of work.

After the in-place dry density of the soil is determined, the Degree of Compaction shall be computed by the following formula:

$$\text{Degree of Compaction (\%)} = \frac{\text{In-Place Dry Density (lbs./cu. ft.)}}{\text{Maximum Dry Density (lbs./cu. ft.)}} \times 100$$

Written documentation on Laboratory stationery of the results of each in-place soil density test shall be furnished to the Engineer, such documentation to include the following:

(a) Date of Field Test.
(b) Location of Field Test.
(c) Brief Description of Tested Soil (Soil Type, Color, Consistency, etc.) or other identification.
(d) In-Place Dry Density (pounds per cubic foot).
(e) In-Place Moisture Content (percent).
(f) Density Test Method (If other than Sand Cone Test).
(g) Maximum Dry Density (pounds per cubic foot) from corresponding Proctor analysis of same soil type.
(h) Degree of Compaction (percent).
(I) Signature and Seal of Qualified Laboratory Representative.

Distribution of copies of Density Test results shall be as directed by the Engineer.

(D) EVALUATION OF SOIL TEST RESULTS - All natural earth subgrade, fill and backfill material under this contract shall be compacted to a minimum of ninety-five (95) percent of Standard Proctor Maximum Dry Density.

The Degree of Compaction, as determined above, will be used for control purposes in determining compliance with project compaction requirements. However, it will be the responsibility of the Engineer to evaluate the results of the soil tests performed and determine the acceptability of subgrade preparation and fill construction.

(E) METHOD OF PAYMENT - The cost of all labor, materials, plant, equipment, insurance and necessary incidentals required to perform all Proctor Analyses including the obtaining of soil samples, transportation of samples to the Laboratory, providing of written documentation of all results, and performing all work incidental thereto, all in accordance with the specifications and as directed by the Engineer, shall be deemed included in the prices bid for all contract items of work. No separate or additional payment shall be made for any costs associated with the performing of all Proctor Analyses of soil samples.

The cost of all labor, materials, plant, equipment, insurance and necessary incidentals required to perform all In-Place Soil Density Tests including the providing of written documentation of all results, and performing all work incidental thereto, all in accordance with the specifications and as directed by the Engineer, shall be deemed included in the prices bid for all contract items of work. No separate or additional payment shall be made for any costs associated with the performing of all In-Place Soil Density Tests.

4.06.5 BACKFILLING AROUND SHEETING

When sheeting is withdrawn all cavities remaining in or adjoining the trench and excavation shall be filled and meet all the requirements of **Subsections 4.06.2 and 4.06.3**. When sheeting is left in place all cavities behind such sheeting shall be filled as directed and in such a manner so as to ensure compliance with all the requirements of **Subsections 4.06.2 and 4.06.3**.

4.06.6 DEFICIENCY OF BACKFILL MATERIAL

Unless otherwise shown on or specified in the contract documents, the Contractor shall backfill and compact all trenches and excavations to the height of the ground surface as it existed at the start of the work. Where deficiency of acceptable backfill material occurs, the trenches and excavations shall be backfilled with the acceptable backfill materials as specified in **Subsection 4.06.2**. Payment for the cost of all labor, material, equipment and insurance necessary and required to furnish and deliver these acceptable backfill materials, where a deficiency of acceptable backfill material occurs, shall be made as follows:

(A) For providing acceptable select granular fill (whether natural or processed) to satisfy the requirements of **Subsection 4.06.2(B)** payment for the cost shall be deemed included in the prices bid for all contract items of work. No separate payment will be made for this work.

Payment will be made for Select Granular Fill when ordered, in writing, by the Engineer in accordance with **Section 5.25** of the specifications.

(B) For providing acceptable clean fill (whether natural or processed) to satisfy the requirements of **Subsection 4.06.2 (D)** to fill voids left by the removal of ledge rock payment shall be deemed included in the price bid under the contract item labeled “ROCK EXCAVATION”. The Contractor’s attention is directed to **Section 5.22 - Rock Excavation** of the specifications.

(C) For providing acceptable clean fill (whether natural or processed) to satisfy the requirements of **Subsection 4.06.2(D)** payment shall be made under the contract item labeled “CLEAN BACKFILL”. The Contractor’s attention is directed to **Section 5.32 - Clean Backfill** of the specifications.

The cost of rehandling and acceptably disposing of excavated material deemed not suitable for backfill and which requires replacement with clean backfill (with the exception of excavated material that is classified as hazardous material) shall be included in the price bid for the contract item labeled “CLEAN BACKFILL”.

The cost for all labor, materials, equipment and insurance necessary and required to place, compact, sample and test provided acceptable backfill material shall be deemed included in the prices bid for all contract items of work. No separate or additional payment will be made for this work.

4.06.7 TEMPORARY BULKHEADS

For retaining compacted backfill, only temporary bulkheads will be allowed over pipes. Such temporary bulkheads shall not be constructed of stone, and they shall be removed as the adjacent trenches and excavations are backfilled. This removal of temporary bulkheads along with the backfilling of adjacent trenches and excavations shall proceed simultaneously and shall be accomplished in strict accordance with **Subsections 4.06.2 and 4.06.3**.

4.06.8 REMOVAL OF SURPLUS MATERIAL

As the trenches are backfilled, the Contractor shall remove all surplus material, and regrade and leave free, clear and in good order all roadways and sidewalks adjacent to the completed work and within fifty (50) feet of the end of the completed work. During the progress of and until the final acceptance of the work, the Contractor shall maintain in good and safe condition the surface of roadways and sidewalks over and adjoining all the trenches and excavations, and promptly fill in depressions over and adjoining the trenches and excavations caused by the settlement of the backfill. All surplus material or any part thereof shall be deposited, if required by the Engineer and at the Engineer’s direction, on the streets and avenues within the limits of this contract where they are below grade or contain depressions. Such work shall be performed in such a manner so as to leave the surfaces of the backfill compact and even with the adjoining surfaces, and shall be done in accordance with **Subsection 4.06.3**.

SECTION 4.07
CONSTRUCTION OF ADJACENT PIPES IN THE SAME TRENCH

4.07.1 DESCRIPTION

The criteria for construction of adjacent pipes in the same trench shall be defined as follows:

(A) When shown on the plans, specified in the contract documents or ordered in writing by the Engineer, pipes shall be constructed within the same excavation between two (2) lines of sheeting or between two (2) lines of sheeting with an intermediate line of sheeting between the pipes.

(B) When the clear distance between the closest side faces (i.e. walls, edge of pipe, cradles) of the two (2) pipes is 4'-6" or less for a continuous distance of at least ten (10) feet, the pipes may be constructed (with the written permission of the Engineer) within the same excavation between two (2) lines of sheeting or between two (2) lines of sheeting with an intermediate line of sheeting between the pipes.

(C) Pipes that transverse each other shall not be considered as eligible for construction as adjacent pipes in the same trench.

The pipes to be constructed under this section shall be constructed in accordance with the respective specifications that pertain to each, and payment for the work of each constructed as adjacent parallel pipes in the same trench shall be paid for under the contract item bid for each of the respective pipes.

4.07.2 CONSTRUCTION REQUIREMENTS

Where the Contractor is permitted to use a common trench for the installation of two (2) or more adjacent pipes or structures, the Contractor shall excavate to the subgrade of the higher-level structure first.

While excavating for the lower level structure, the Contractor shall install intermediate sheeting within the common trench in order to maintain the undisturbed subgrade of the higher-level structure.

In the event the subgrade is over excavated or otherwise disturbed, the Contractor shall replace the disturbed or over excavated subgrade with three-quarter (3/4) inch to one-quarter (1/4) inch crushed stone complying with ASTM Designation C33, Size No. 67.

Under no condition is the Contractor permitted to install any pipes or structures on disturbed subgrade.

4.07.3 PRICE INCLUDED

The contract price for construction of adjacent pipes in the same trench shall be paid at the respective unit prices per linear foot for each size and type of pipe to be constructed adjacent to each other in the same trench and each shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required or necessary to construct each of the pipes of the sizes, types, materials and dimensions shown by the normal sections and special sections and to the lines and grades shown, including the excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**); all pumping; fluming; bridging; decking; backfilling; cleaning up; temporary restoration of street surfaces, and furnishing and installing all other items necessary to complete this work and do all work incidental thereto, all in accordance with the plans and specifications and as directed by the Engineer.

The Contractor, after obtaining the written permission of the Engineer, may elect, at the location(s) specified, to construct the adjacent pipes in separate trenches, or at different times. When the Contractor elects to do this, no additional sums will be paid for constructing the pipes individually in separate trenches or at different times. Where pipes are not adjacent, they will be constructed in separate trenches as required and will also be paid for at the respective unit prices bid for each size and type of pipe.

SECTION 4.08
TEMPORARY RESTORATION AND CLEANING UP

4.08.1 RESTORATION OF STREET SURFACE

Unless otherwise specified or directed, in all areas (except projects within the Borough of Staten Island) where an existing pavement of any type, or sidewalk, is disturbed by the work done under this contract (i.e. over trenches, excavations, test pits), the Contractor shall temporarily restore the surface of the street where disturbed with not less than four (4) inches of plant mixed binder base on dirt, flush with the adjacent surfaces, immediately after completion of backfilling and compactions.

On all projects within the Borough of Staten Island where an existing pavement of any type, or sidewalk, is disturbed by the work done under this contract (i.e. over trenches, excavations, test pits), the Contractor shall temporarily restore the surface of the street where disturbed with not less than four (4) inches of plant mixed binder base on six (6) inches of broken stone, flush with the adjacent surfaces, immediately after completion of backfilling and compactions.

All temporary pavement shall be thoroughly compacted and laid flush with the surrounding pavement unless otherwise specified or ordered.

Such temporary restoration shall be maintained in acceptable condition until replaced by final restoration. Unless otherwise specified or directed, the temporary surfacing shall not be replaced with the permanent restoration for a period of not less than six (6) weeks, after it has been laid to the satisfaction of the Department of Design and Construction.

4.08.2 TEMPORARY RESTORATIONS

All pavement restoration shall be done according to the latest revisions of the standards and specifications of the Department of Transportation, and to the satisfaction of the Department of Design and Construction.

4.08.3 MAINTENANCE OF TEMPORARY RESTORATIONS

The Contractor at the Contractor's own cost and expense shall maintain all temporary restoration, in a suitable and safe condition for traffic until the final restorations have been made or the work finally accepted.

Should settlement occur or other defect develop in temporary pavement, which in the opinion of the Engineer may cause hazards or undue inconvenience to pedestrian or vehicular traffic, the Contractor shall immediately restore such pavement to proper grade or otherwise repair the defects.

4.08.4 TEMPORARY RESTORATION COST INCLUDED

Unless otherwise specified in the contract documents, the cost of all temporary restoration including the maintenance thereof is to be included in the prices bid for all items of work.

4.08.5 CLEANING UP

At such times as may be directed, the Contractor shall remove from the street and site of the work, all materials which were placed thereon by the Contractor as a consequence of performing this work and which are not required by the contract to be left as part of the finished work. The entire work and portions of the street affected thereby shall be left clean and in a satisfactory condition.

4.08.6 COLOR CODING

The Department of Design and Construction has been assigned the following marker colors:

(1) AQUA - For Sewer Work
(2) BRIGHT SILVER - For Water Supply Work

Markers shall be placed six (6) inches adjacent to the curbside of the trench upon placing temporary restoration. Spacing shall be every twenty-five (25) linear feet if trench is over seventy-five (75) feet in length. For trenches under seventy-five (75) feet in length markers shall be placed approximately one-third (1/3) the length apart. A minimum of two (2) markers shall be required for all trenches over ten (10) feet long. For trenches or cuts less than ten (10) feet, one (1) marker in the linear center of the cut shall be required.

Markers shall be painted in the shape and size of a three (3) inch diameter solid circle.

Marker colors shall correspond to Federal Specification #TT-P-115D and Federal Standard Booklet #595.

Traffic Base White shall be stained or tinted to match the assigned colors as per Federal Standard #595 (color standards).

Material Requirements shall be satisfied under Section 3.1 through 3.3 of the Federal Specification #TT-P-115D.

Qualitative Requirements shall be satisfied under Section 3.4 through 3.5.10 of the Federal Specification #TT-P-115D.

SECTION 4.09
FINAL RESTORATION OF PAVEMENTS

4.09.1 DESCRIPTION

Restoration of permanent roadway pavement shall include the restoration of each kind of roadway pavement shown, specified or required. The Contractor shall obtain the latest revisions of the specifications and standards of the Department of Transportation.

4.09.2 MATERIALS

The materials for roadway pavement to be restored shall conform in all respects to the requirements set forth in the latest revisions of the specifications and standards of the Department of Transportation.

4.09.3 CONSTRUCTION METHODS

(A) SAWCUTTING - All saw cutting of pavements shall be done in conformance with **Section 5.20**.

(B) REMOVAL OF EXISTING PAVEMENT - All pavement excavation shall be done in conformance with **Section 5.31**.

(C) FINAL RESTORATION - All Final Restoration shall be done in conformance with **Section 5.33**.

4.09.4 NOTIFICATION OF RESTORATION

At least forty-eight (48) hours before making any restoration of pavements destroyed during the construction of the pipes in this contract the Contractor shall notify the Department of Transportation that the Contractor intends to make such restoration so that the necessary inspection can be provided.

4.09.5 RESTORATION OF UNPAVED ROADWAYS, SIDEWALKS, ETC.

Unless otherwise shown, specified or directed, all unpaved roadways, unpaved gutters and unpaved sidewalk areas affected by the work done under this contract shall be restored by the Contractor to the same condition in which they were at the time of the opening of bids for this contract, as determined by the Department of Design and Construction. The cost for this restoration shall be deemed included in the prices bid for all items of work.

4.09.6 TRENCHES AND EXCAVATIONS

Before laying any final pavements, sidewalks, crosswalks, curbs, etc., the trenches and excavations shall have been filled and compacted all in accordance with **Section 4.06**.

4.09.7 CLEANING UP

At such times as may be directed, the Contractor shall remove from the streets all materials which were placed thereon by the Contractor as a consequence of performing this work, and which are not required by the contract to be left as part of the finished work. The entire work and portions of the streets affected thereby shall be left in a satisfactory condition. The sidewalks and crosswalks shall be swept clean of all material that may have come thereon by reason of the work under this contract, and if required, they shall be sprinkled with water during the sweeping.

4.09.8 BROOM CLEANING

The Contractor shall broom clean all streets after final restoration has been made.

4.09.9 THICKNESS OF PAVEMENT AND COMPOSITION, ETC., OF PAVEMENT BY CORES

Cores will determine the thickness of all pavements. Tests for composition and all other testing required by the Department of Design and Construction will be determined from cores. Unless otherwise specified, cores shall be taken and tested at the Contractor's expense by an approved independent New York State Licensed Testing Laboratory. The taking of all cores and all tests to be performed shall be in accordance with the requirements of the Department of Transportation. The results of all measurements and tests shall be certified by the Testing Laboratory and shall be submitted to the Department of Design and Construction.

One (1) core shall be taken for each two hundred (200) linear feet of trench up to one thousand (1,000) feet of trench and thereafter one (1) core shall be taken for each three hundred (300) feet of trench, except that not less than three (3) cores shall be taken per contract. Deductions in contract payments will be made for core deficiencies in accordance with the latest provisions of Section 1.05.4 of the Standard Specifications of the Department of Transportation. Such deductions shall be transferred to the Department of Transportation in order to provide for the cost of repairs.

4.09.10 GUARANTEE AND MAINTENANCE PERIOD

The guarantee and maintenance period shall be eighteen (18) months after the date of substantial completion of the work as certified by the Department of Design and Construction. The guarantee shall cover failure of any kind of the restored pavement, curb, sidewalk and etc., from whatever cause. In the event that a pavement failure is not maintained in a manner satisfactory to the Department of Transportation, repairs of pavement, curbs and sidewalks will be made by the Department of Transportation. Where seeding, sodding, etc., is not maintained in a manner satisfactory to the Department of Transportation, repairs will be made by the Department of Transportation. All cost associated with work performed by the Department of Transportation will be deducted from the Contractor’s payments. The cost of this work shall be determined at the sole discretion of the Department of Transportation.

4.09.11 ACCEPTANCE OF FINAL RESTORATION

The Department of Design and Construction will secure acceptance of final restoration from the Department of Transportation as a condition for final payment to the Contractor and before release of monies deposited for the guarantee period.

4.09.12 COLOR CODING

The Department of Design and Construction has been assigned the following marker colors:

(1) AQUA - For Sewer Work
(2) BRIGHT SILVER - For Water Supply Work

Markers shall be placed six (6) inches adjacent to the curbside of the trench upon placing temporary restoration. Spacing shall be every twenty-five (25) linear feet if trench is over seventy-five (75) feet in length. For trenches under seventy-five (75) feet in length markers shall be placed approximately one-third (1/3) the length apart. A minimum of two (2) markers shall be required for all trenches over ten (10) feet long. For trenches or cuts less than ten (10) feet, one (1) marker in the linear center of the cut shall be required.

Markers shall be painted in the shape and size of a three (3) inch diameter solid circle.

Marker colors shall correspond to Federal Specification #TT-P-115D and Federal Standard Booklet #595.

Traffic Base White shall be stained or tinted to match the assigned colors as per Federal Standard #595 (color standards).

Material Requirements shall be satisfied under Section 3.1 through 3.3 of the Federal Specification #TT-P-115D.

Qualitative Requirements shall be satisfied under Section 3.4 through 3.5.10 of the Federal Specification #TT-P-115D.

SECTION 4.10
CONSTRUCTION SIGNS

4.10.1 DESCRIPTION

The Contractor shall be required to provide the following signs for this project:

(1) PROJECT SIGN as specified in **Subsection 4.10.2;**
(2) PROJECT RENDERING SIGN as specified in **Subsection 4.10.3;**
(3) TEMPORARY NOTIFICATION SIGNS as specified in **Subsection 4.10.4**.

4.10.2 PROJECT SIGN

(1) RESPONSIBILITY: The Contractor shall produce and install one (1) project sign which shall be posted and maintained upon the site of the project at a point and in a position where directed by the Commissioner. The Contractor shall protect the sign from damage during the continuance of work under the contract and shall do all patching of lettering, painting and bracing thereof necessary to maintain same in first class condition and in proper position. Prior to fabrication, the Contractor shall submit an 8-1/2" x 11" color match print proof from the sign manufacturer of the completed sign for approval by the Commissioner. Signs shall remain on display where posted until the completion of the work except that, when so ordered by the Engineer, the Contractor shall remove, relocate or repost sign as directed.

(2) SIGN QUALITY: The Contractor shall provide all materials required for the production of the sign as specified herein. Workmanship shall be of the best quality, free from defects and shall be produced in a timely manner.

(3) SCHEDULE: Upon project mobilization, the Contractor shall commence production and installation of the sign.

(4) SIGN CONSTRUCTION:

(A) FRAME: The frame shall be from quality dressed 2" x 2" pine, fire retardant, pressure treated lumber, that surrounds the inside back edge of the sign. The sign shall have one (1) intermediate vertical and two (2) diagonal supports, glued and screwed for rigidity. Frame shall be painted white with two (2) coats of exterior enamel paint, prior to mounting of sign panel.

(B) EDGING: U-shaped, 22-gauge aluminum edging, with a white enameled finish to match sign background, shall run around entire edging of sign panel and frame. Corners shall be mitered for a tight fit. Channel dimensions shall be 1-inch (overlap to sign panel face) x 1-3/4-inch (or as required across frame depth) x 1-inch (back overlap).

(C) SIGN PANEL: 4' x 8' panel shall be constructed in one (1) piece of 14-gauge (.0785") 6061-T6 aluminum. This panel shall be prefinished both sides with a glossy white baked-on enamel finish and be flush with edge of 2" x 2" wood frame. Samples must be submitted for approval.

(D) FASTENING: Fasten sign panel to wood frame using cadmium plated No. 8 sheet metal screws at 1/2-inch below edge of panel and 8-inches on center. The U-shaped aluminum channel shall be applied over the wood frame edge and fastened with cadmium plated No. 8 sheet metal screws at 12-inches on center around the entire perimeter.

(5) SIGN GRAPHICS:

(A) All visual components of the sign are in an Adobe *.pdf file, which is provided by the Commissioner's representative. The file is to be opened in Acrobat Professional or Acrobat Approval in order to be saved with project information. The Commissioner's representative shall insert the project name and names and titles of personnel (three (3) or more) and any other required information associated with the project. At no point in the update, saving or renaming of the file should it be locked by any user. The digital file shall be provided by DDC to the Contractor (on a CD or via E-mail) for printing.

(B) The DDC *.pdf file with names provided by the Commissioner shall be reproduced at the Sign Panel size of 4' x 8' on 3M High Performance Vinyl or approved equal. The sign manufacturer is required to print from the Acrobat *.pdf provided, and must match the following colors specified by Pantone: 3025 C, 119 C, 131 C, 1805 C, 1817 C in their exact locations as indicated in the *.pdf file, and on the DDC website: www.nyc.gov/buildnyc.

(C) Color shall be created in a four-color process to reproduce Pantone Colors (per Pantone formula).

(a) Pantone Color 3025 C (C-100, M-17, Y-0, K-51).

(b) Pantone Color 119 C (C-0, M-12, Y-100, K-49).

(c) Pantone Color 131 C (C-0, M-32, Y-100, K-23).

(d) Pantone Color 1805 C (C-0, M-91, Y-100, K-23).

(e) Pantone Color 1817 C (C-0, M-90, Y-100, K-66).

The typeface, Helvetica shall be used in all text-fields as is specified in the settings of the Acrobat *.pdf.

Note: 3M High Performance Vinyl or equivalent shall be guaranteed for nine (9) years. Guarantee must cover fading, peeling, chipping or cracking.

(6) PROTECTION: After the sign face has been created, it shall be protected by a highly durable, solvent resistant, self adhesive, transparent overlay film of fluoride resin or fluoropolymer, at least 0.04mm thick, similar to Hi-S Cal EF-40801 (F-Cal) Overlay Film as manufactured by Nippon Carbide Industries Co., Inc., 1450 Garrett Drive, Wall, New Jersey 07719, Telephone No. (732) 280-7332; Series 1160 Protective Overlay Film as manufactured by 3M Traffic Safety Systems Division, 3M Center, Building 225-5S-08, P.O. Box 33225, St. Paul, MN 55144-3225; or, an approved equivalent. Prior to applying the transparent overlay film, the sign face shall be cleaned and dried as per the instructions of the overlay film manufacturer.

4.10.3 PROJECT RENDERING SIGN **(**Refer to subsequent Addenda for applicability of this Subsection)

(1) RESPONSIBILITY: In addition to the Project Sign, the Contractor (when directed in a subsequent Addendum to this project) shall furnish and install one (1) sign showing a rendering of the project.

(2) SIGN CONSTRUCTION AND GRAPHICS:

From an approved image file provided by the DDC, the Project Rendering is to be sized, printed, mounted, and protected in an identical manner as described in **Subsection 4.10.2** above for the Project Sign. Any area of the 4' X 8' panel area not filled by the rendering shall be printed in Pantone color 3025 (C-100, M-17, Y-0, K-51). A color proof of the Rendering Sign printed from the supplied file is to be submitted to DDC for approval before fabrication. The Rendering Sign is to be posted at the same height as the Project Sign. Where possible, the Rendering Sign shall be mounted with a perfect match of the short sides of the rectangle so that the Rendering Sign and the Project Sign together will create one long rectangle.

4.10.4 TEMPORARY NOTIFICATION SIGNS

(1) RESPONSIBILITY: In addition to the Project Sign, the Contractor shall provide Temporary Notification Signs conspicuously displayed at the site of each street opening or at a minimum of one (1) sign per block along a series of excavations or continuous cuts. All sign locations shall be as directed by the Engineer.

(2) SIGN CONSTRUCTION AND GRAPHICS:

(A) Temporary Notification Signs shall be of sufficient size to contain the required and appropriate text, and shall be reusable along the work site and for various stages of work.

(B) Temporary Notification Signs shall be clean, readable and in letters that are at least one and one-half (1-1/2) inches in height, and shall conform to the Department of Transportation's specifications. A sample of the proposed notification signs must be submitted to the Engineer for approval, prior to any signs being posted.

(C) The following information shall be indicated upon the Temporary Notification Signs:

(a) The Name of the Contractor doing the work.
(b) The Name of the Agency (Department of Design and Construction) for whom the work is being done.
(c) The Name of Subcontractors, when employed.
(d) The Permit Number.
(e) The Purpose of the Street Opening (e.g. Construction of Sanitary/Storm Sewers).
(f) The Start and Scheduled Completion Dates of the work.
(g) The Engineer's Field Office Telephone Number for complaints.

4.10.5 MAINTENANCE AND NAME CHANGES

The Contractor shall maintain the signs during the performance of the contract in a condition satisfactory to the Engineer. This includes, but is not limited to restoration of portions or all of any signs that may be defaced with graffiti. Restoration shall be in accordance with original details and shall be performed by the Contractor when requested by the Engineer.

If during the duration of contract time, any changes in the names of elected officials occur or any other information change occurs that is deemed important by the Engineer, the Contractor shall be notified of such changes. It shall be the Contractor's responsibility to make all appropriate corrections to the signs and to dismount and remount the signs during the duration of the contract.

4.10.6 REMOVAL OF SIGNS

At the completion of all work under the contract, the Contractor shall remove and dispose of all project signs away from the site.

4.10.7 PAYMENT

The cost for all labor, materials, plant, equipment and samples required and necessary to furnish, deliver, place, relocate and remove the Project Sign, Project Rendering Sign (when applicable) and the Temporary Notification Signs all in accordance with the specifications, and as directed by the Engineer, shall be deemed included in the price bid for all contract items of work. No separate or additional payment shall be made for this work.

SECTION 4.11
PRICES TO COVER

4.11.1 COST TO COVER

Unless otherwise specified, the cost of all labor, materials, plant, equipment, samples, tests and insurance required and necessary to furnish, deliver, install and perform all work as specified in **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS, from Sections 4.02 to 4.10, inclusively**, shall be deemed included in the prices bid for all contract items of work.

4.11.2 NO SEPARATE OR ADDITIONAL PAYMENT

No separate or additional payment will be made for any of the materials and work described in **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS, Sections 4.02 thru 4.10 inclusively**, except as otherwise specified.

CITY OF NEW YORK

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER AND SEWER OPERATIONS

DIVISION V

CLASSIFIED SECTIONS OF WORK

SECTIONS 5.01 TO 5.37

NO TEXT ON THIS PAGE

SECTION 5.01
FURNISHING AND DELIVERING DUCTILE IRON PIPE

5.01.1 DESCRIPTION

This section describes furnishing and delivering of ductile iron water main pipe, of the sizes, kinds and classes shown, specified or ordered.

5.01.2 MATERIALS

Ductile iron pipe shall be in accordance with **Section 2.01 - Specifications For Ductile-Iron Pipe And Accessories**.

5.01.3 CONSTRUCTION

Prior to ordering ductile iron pipe, the Contractor shall submit to the Engineer a vendor list for approval. Within five (5) consecutive calendar days after receiving vendor approval, the Contractor shall submit evidence to the Department of Design and Construction of having ordered the material from an acceptable foundry.

All ductile iron pipes must be manufactured at least ten (10) consecutive calendar days before delivery to the site to allow for proper inspection and recording of the accepted pipe.

After the completion of manufacture and inspection of the ductile iron pipe to be furnished by the Contractor (but prior to the shipment thereof), the Contractor shall furnish a detailed schedule of the ductile iron pipe that constitutes the content of each shipment. This schedule shall be delivered to the Engineer. The schedule shall give in numerical order the description and number of each and every article constituting the shipment. The Contractor shall not make shipments until the schedule has been checked and approved, in writing, by the Engineer.

The Engineer must approve storage of ductile iron pipe and appurtenances within the project limits. On-site storage is limited to ductile iron pipe and appurtenances projected for use within seven (7) calendar days, as per the Contractor's approved schedule. The Engineer reserves the right to limit the storage of on-site materials to three (3) calendar days in business or congested areas.

All ductile iron pipe and all other castings, valves, hydrants and materials of construction shall be supported upon wooden blocks of sufficient size to prevent injury to the pavement.

The Contractor shall be responsible for all materials, including ductile iron pipe, until they are finally accepted and incorporated in the work.

During any suspension of the work, all materials delivered upon but not placed in the work, shall be neatly piled so as not to obstruct public travel, or shall be removed from the work site at the direction of the Engineer; pipes and other castings, valves and hydrants, if directed, shall be temporarily stored at a site designated by the Contractor and approved in writing by the Engineer.

Unless so removed by the Contractor, within ten (10) calendar days of written notice from the Engineer, the Engineer may have the materials moved at the expense of the Contractor.

5.01.4 MEASUREMENT

The quantity of ductile iron pipe to be measured for payment shall be the number of linear feet actually furnished and delivered and incorporated into the work, complete, as shown, specified or required and as measured along the center line axis of the pipe when installed.

5.01.5 PRICE TO COVER

Payment for the FURNISHING AND DELIVERING OF DUCTILE IRON PIPE shall be the unit price bid per linear foot for each size, kind and class of pipe contained in the bid schedule.

SECTION 5.02
LAYING DUCTILE IRON PIPE AND FITTINGS

5.02.1 DESCRIPTION

Ductile iron water main pipe shall be laid as described herein.

The Contractor shall install the new ductile iron water mains in the lanes indicated on the contract drawings or as determined by the Engineer.

Where the word “relay” appears on the contract drawings or in the specifications, the new main shall be installed in the same location as the old main, unless otherwise directed by the Engineer.

5.02.2 MATERIALS

Ductile iron pipe and shall comply with the requirements of **Section 2.01 - Specifications For Ductile-Iron Pipe And Accessories**. Ductile iron fittings shall comply with the requirements of **Section 2.02 - Specifications For Ductile Iron Fittings And Accessories**.

5.02.3 CONSTRUCTION METHODS

(A) Trench Width and Depths of Cover:

(1) In general the Width of Trenches shall be as follows:

Unsheeted Trench - Nominal Pipe Diameter plus two (2) feet
Sheeted Trench - Nominal Pipe Diameter plus four (4) feet

Note: Trenches that are Skeleton Sheeted shall be considered Unsheeted Trenches for trench width.

(2) In general all pipes shall be laid with the following cover:

6 and 20-inch pipe - 4'-0” of cover
8-inch pipe - 3'-9" of cover
12-inch pipe - 3'-5" of cover

(B) Laying Pipe:

(1) After the trench has been excavated in accordance with the provisions of these specifications, the pipe shall be brought to the side of the trench and then carefully lowered by suitable rigging and placed as herein described.

(2) Laying Pipe in Rock Trench: Where ledge rock is encountered in the trench, the new main shall be laid with a minimum cover of three (3) feet over the top of the barrel of the pipe, except where a greater or lesser cover over the pipe is dictated by field conditions, as determined by the Engineer. (See **Section 5.22**.)

Where a water pipe intersects the trench or is exposed therein, and the rock is ordered removed for a distance of five (5) feet on either side or below the pipe, the water mains so located may, upon approval, be temporarily removed and later relaid and reconnected.

If the Contractor requests and receives permission to relocate a water main to avoid the excavation of rock, the Contractor shall furnish the necessary pipe and fittings required to reconnect the main, and shall furnish all other labor and material necessary to disconnect the pipe, temporarily cap the same, and later reconnect the cut pipe, at the Contractor’s own cost.

(C) All Work to be Inspected: The Contractor is expressly prohibited from laying pipes and fittings, or from setting valves, hydrants or other appurtenances, except under the direct supervision of the Engineer,

the Engineer's authorized agents or inspectors.

(D) Cleaning and Disinfecting Pipe:

Prior to starting work, the Contractor will be required to show the Engineer that the Contractor has the equipment and materials available for cleaning and disinfecting pipe and maintaining it clean during the laying process, all as herein specified.

(1) CLEANING PIPE

Pipes or fittings delivered to the site of the work must be stored in a fashion, which would prevent the entrance of surface drainage, excavated material or other foreign matter into the pipe.

Prior to laying any pipe and fittings, the interiors shall be thoroughly flushed with clean water of sufficient volume and pressure from a hose to ensure the removal of all foreign matter that may have been introduced during the storage period. After all visible dirt or other foreign material has been removed from the pipe and fittings but before they are installed, the Contractor shall thoroughly spray the inside surfaces of all pipes and fittings with a one percent (1%) hypochlorite solution. The hypochlorite solution application and cleaning shall be repeated as often as required to keep the pipes and fittings free of dirt or foreign matter.

After each pipe and fitting has been sprayed with the hypochlorite solution, the ends of the pipe or fitting shall be sealed by means of an approved type of wooden or rubber plug, which shall be thoroughly cleaned and washed with the same hypochlorite solution before being inserted into the ends of the pipe or fitting. The plugs shall not be removed until the pipe or fitting is lowered into the trench ready for immediate socketing of the joint. If the plugs have been removed prior to this time, the Contractor shall then repeat the processing of cleaning and disinfecting the pipe, and inserting the plugs.

(2) DISINFECTION OF PIPE

After the main has been laid, but prior to being put into service, it shall be thoroughly disinfected with chlorine concentration as follows:

25-PPM;	24-hour contact time (dry lay)
100-PPM;	3-hour contact time (dry lay)
300-PPM;	15-minute contact time (relay)

DRY LAYS (i.e., main is isolated from distribution system and does not have to be put into service immediately) the required chlorine solution shall be injected through a tap inserted in the line for that purpose by the Contractor, the point of application to be at one end of the pipe section with the bleed at the opposite end.

Chlorine residual shall be monitored at the bleed end to determine if the proper chlorine concentration is reached. When the proper concentration is reached, the required contact period shall begin.

When using 100-PPM solution for three (3) hours, if the concentration goes below 50-PPM during disinfecting, chlorine must be added to bring the concentration back to 100-PPM.

When using 25-PPM solution for twenty-four (24) hours, the chlorine residual must be checked at the end of twenty-four (24) hours. If the residual is less then 10-PPM, the above procedure must be repeated.

After the mains are sufficiently disinfected they shall be thoroughly flushed. Samples will then be obtained and tested. The main will not be put into service until such time that the test results have been found acceptable.

RELAYS OR WETLAYS (i.e., main must be put into service as soon as possible) chlorine powder shall be distributed uniformly in the main during installation of the pipe to obtain the 300-PPM concentration. This solution shall have a minimum contact time of fifteen (15) minutes and be thoroughly flushed

before putting the main into service and opening the service lines. This should be accomplished by having the one and one-half (1-1/2) inch tap used for flushing opened only slightly during the first fifteen (15) minutes followed by complete flushing of the system of all excess chlorine. In all cases, this flushing shall not be less than fifteen (15) minutes after the tap is fully open.

At tie-ins where flushing cannot be accomplished without the possibility of a heavy concentration of chlorine entering the distribution system, disinfecting procedures may be altered at the discretion of the Engineer. However, all new pipes must be thoroughly cleaned and sprayed with a one percent (1%) hypochlorite solution prior to installation and flushed thoroughly.

In all cases, the main shall not be put into service for domestic consumption until the sanitary condition of the interior of the main is satisfactory to the Engineer.

Should the Contractor neglect or refuse to comply with any of the above stipulated provisions for cleaning and disinfecting the pipes and fittings and maintaining them clean while the pipe is being laid, then the Department may, without further notice, stop all work on the contract until the Contractor complies.

(E) Bedding And Foundation Of Pipes:

(1) ON EARTH - The pipes shall be laid to the required line and grade, wherever necessary sandbags shall be used to accomplish this purpose. Well-tamped bedding consisting of select granular backfill shall be placed under the pipe for the entire width of the trench. Particular care shall be taken in backfilling the trench to secure a firm and continuous bed for the support of the pipe where no special foundation is required.

(2) CONCRETE SUPPORTS - Concrete cradles shall support the pipe under such conditions as hereinafter stated and as shown on **Standard Drawing No. 45700-W** on file at the office of the Engineer or as otherwise required by the contract drawings.

Where it is required to support the pipe on unyielding soil stratum located much deeper than the bottom of the pipe, the pipe for such length, as directed, shall be supported on concrete saddles, which are to be supported on individual piers carried to this deep stratum, or on a reinforced concrete mat, as shown on **Standard Drawing No. 45700-W**.

Where the trench is in fresh fill or in soil of low bearing capacity, the pipe, where and as directed, shall be laid on concrete saddles, supported on a continuous reinforced concrete mat.

Where specified and directed the pipe shall be supported on concrete cradles and piles.

Concrete saddles, cradles and mats shall be constructed in accordance with **Standard Drawing No. 45700-W** on file in the office of the Engineer or as otherwise required and as shown on the contract drawings or ordered. The placing of supports under the pipe shall not, however, relieve the Contractor from the work of backfilling the trench with select granular backfill material, as ordered, and providing a firm and continuous bed for the pipe by compacting the fill under and around the pipe and between the cradles.

(3) ON ROCK - Where the bottom of the trench is in rock, see **Section 5.22** of these specifications.

(4) SCREENED GRAVEL OR BROKEN STONE BEDDING - To the extent required and as directed by the Engineer, the new mains shall be installed with a bed of gravel, or broken stone below the pipe as shown on **Standard Drawing No. 44292-B-Z** or on the contract drawings or as ordered by the Engineer as specified in **Section 5.19** of these specifications.

(5) SHALLOW COVER - Where mains 24-inches and smaller are laid with covers of 2'-0" or less, the Contractor shall provide protection in accordance with **Standard Drawing No. 42063-Y** or as directed by the Engineer.

Where mains 24-inches and smaller are laid with covers between 2'-6" and 2'-0", the Contractor shall provide steel plates over the main with dimensions as shown on **Standard Drawing No. 46464-Z** or as

directed by the Engineer.

Where mains 30-inches and larger are laid with covers of 2'-6" or less, the Contractor shall provide protection in accordance with **Standard Drawing No 46464-Z** or as directed by the Engineer.

Covers over the new mains shall not be less than 1'-6".

(6) FILTER FABRIC - Furnishing and installing filter fabric shall be in accordance with **Section 5.18** of these specifications.

(7) Requirements regarding backfilling of trenches described in **Section 5.25** of these specifications shall be observed.

(F) Temporary Closure of Access Manholes and Ends of Pipes: The Contractor shall devise a method for the temporary closure of access manholes and open ends of pipe to prevent unauthorized access to water supply facilities when the construction site is unattended by the Contractor's personnel.

The temporary closure shall be such that it can be removed only by using special tools or methods available only to authorized personnel of the Contractor.

The Contractor shall submit the Contractor's proposed method to the Engineer for approval before construction begins.

(G) Joints: All joints on new ductile iron pipe 20-inches and less in diameter must be restrained as specified in **Section 2.01 - Specifications For Ductile-Iron Pipe And Accessories**.

Joints on ductile iron pipe 24-inches and larger in diameter shall be restrained within the lengths specified in TABLE 5.02. Outside of these limits of required pipe restraint, ductile iron pipe 24-inches and larger in diameter shall have push-on joints.

When using push-on joint pipe and/or mechanical joint fittings, the joints shall be made as herein described.

(1) Push-On Joint Pipe with Field-Lok Gaskets:

(a) The inside of the bell and outside of the spigot end shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter.

(b) The circular rubber gasket shall be flexed inward and inserted in the gasket recess of the bell.

(c) A thin film of gasket lubricant shall be applied to the inside surface of the gasket and the spigot end of the bell.

(d) The spigot end of the pipe shall be entered into the socket with care used to keep the joint from contacting the ground. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or jack-type tool or other device approved by the Engineer. Pipe that is not furnished with a depth mark shall be marked before assembly to assure that the spigot end is inserted to the full depth of the joint. Field cut pipe lengths shall be filed or ground to duplicate the spigot end of such pipe as manufactured, and thus remove the rough edges of the cut pipe that may damage the gasket. Complete assembly instructions must be made available from the pipe manufacturer.

(2) Mechanical Joint Fittings:

The inside of the bell mechanical joint and the outside of the spigot end of the pipe (8-inch length) shall be thoroughly cleaned to remove oil, grit, excess coating and other foreign matter, and then painted with a soap solution made by dissolving one-half cup of granulated soap in one gallon of water. Lubrication and additional cleaning should be provided by brushing both the gasket and the plain end with soapy water or an approved pipe lubricant meeting the requirements of ANSI/AWWA C111/A21.11, just prior to slipping the gasket onto the plain end for joint assembly.

(a) Plain Glands: Plain Glands will not be accepted.

(b) Wedge Restraint Gland: Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket.

Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.

Push the gland toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand tighten nuts. Make any deflections required after the joint assembly but before tightening the bolts.

Tighten the bolts to the normal range of bolt torque (see table below) while at all times maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, finally the remaining bolts. Repeat the process until all bolts are within the appropriate range of torque. The use of a torque-indicating wrench will facilitate this procedure.

Pipe Size (in.)	Bolt Size (in.)	Range of Torque (ft-lbs)
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1-1/4	120-150

Tighten the torque limiting twist off nuts in a clockwise direction until all wedges are in firm contact with the pipe surface. Continue tightening in an alternate manner until all of the nuts have been twisted off.

If removal is necessary, utilize the 5/8-inch hex head. If reassembly is required, assemble the joint in the same manner as above; tighten the wedge bolt to 90-ft-lb.

(3) Flanged Joints:

(a) Material for flanges and accessories shall be as per **Section 2.01 - Specifications For Ductile-Iron Pipe And Accessories**.

(b) Flanges shall be installed as outlined in AWWA Manual M-11 or as directed by the Engineer.

(c) Bolts and studs for flanges with full face rubber gaskets shall be installed with the nominal axial loads as per the following table. Torque wrenches shall be calibrated at least once each working day by tightening, in a device capable of indicating actual bolt tension, not less than three (3) typical bolts and studs of each diameter chosen from the bolts and studs installed. The device shall be as manufactured by Skidmore Wilhelm Manufacturing Company, or approved equivalent.

Pipe Diameter (inches)	Nominal Axial Load (kips)
6 to 8	5
12	10
20	11
24 to 30	12
36	16
48	17
60 to 72	26

(H) Restrained Pipe Joints: Shall be as per **Section 2.01 - Specifications For Ductile-Iron Pipe And Accessories**.

Typical minimum lengths of required restraint for pipe and various fittings with 150-psi test pressure and with a cover varying from two (2) feet to six (6) feet of well-tamped sand backfill are shown in TABLE 5.02. For intermediate heights of cover, the required length of restraint may be taken as the average of those shown for the preceding lower and the following higher value of cover.

Lengths of restraint shown in TABLE 5.02 are applicable on both the downstream and upstream sides of fittings.

For determining the length of restraint required for test pressure higher or lower than that of 150-psi, the lengths shown in TABLE 5.02 shall be increased or deceased by the ratio of the specified test pressure to 150-psi, respectively.

TABLE 5.02

TYPICAL MINIMUM LENGTHS OF REQUIRED PIPE RESTRAINT
LINEAR FEET FOR AVERAGE SOIL CONDITIONS (SAND) AND FOR TEST PRESSURE OF 150-PSI

DIA. (in)	COVER (ft)	HORIZONTAL BENDS				VERTICAL BENDS				VALVES AND CAPS	REDUCERS		TEES
		90°	45°	22-1/2°	11-1/4°	90°	45°	22-1/2°	11-1/4°		SIZE	LENGTH	
8	2	24	14	8	4	32	21	13	8	48	8x6 8x4	21 35	0
	4	12	7	4	2	16	12	7	4	24	8x6 8x4	11 18	0
	6	8	5	3	2	11	8	5	3	16	8x6 8x4	7 12	0
12	2	35	20	11	6	47	32	20	11	74	12x8 12x6	41 55	20
	4	19	11	6	3	25	18	11	6	37	12x8 12x6	20 28	0
	6	13	8	4	2	17	12	8	4	25	12x8 12x6	14 18	0
20	2	55	31	17	9	77	50	30	17	125	20x16 20x12	45 80	57
	4	30	18	10	5	42	30	18	10	63	20x16 20x12	23 40	10
	6	21	12	7	4	28	20	12	7	42	20x16 20x12	15 27	0
24	2	65	36	20	10	91	59	35	20	151	24x20 24x16	46 84	76
	4	36	21	12	6	49	36	21	12	75	24x20 24x16	23 42	19
	6	25	15	8	4	34	23	15	9	50	24x20 24x16	15 28	0
30	2	78	42	23	12	111	70	42	23	190	30x24 30x20	68 106	99
	4	44	25	14	8	61	45	25	14	95	30x24 30x20	34 53	32
	6	31	18	10	5	42	29	18	11	63	30x24 30x20	23 35	9
36	2	89	48	26	14	130	81	47	26	228	36x30 36x24 36x20	70 127 158	124
	4	52	29	16	9	72	54	29	17	114	36x30 36x24 36x20	35 64 80	45
	6	36	21	12	6	50	34	21	12	76	36x30 36x24 36x20	23 42 53	18
48	2	110	58	31	16	164	99	57	31	306	48x36 48x30	134 187	165
	4	66	36	20	11	94	72	37	21	153	48x36 48x30	67 93	69
	6	47	27	15	8	66	44	27	15	102	48x36 48x30	45 62	34

(I) Cutting Pipe: The Contractor when required shall cut only ductile iron pipe that has been certified to be full gauge throughout its length. Where any pipe is damaged in cutting, the damaged sections will not be accepted. Undamaged sections and cut portions of straight pipe may be incorporated in the work.

Ductile iron pipe shall be cut in the field only by means of abrasive saws, hacksaws, wheel type cutters or milling type cutters. The use of "squeeze" type cutters, cutting torches, diamond points and dog chisels shall not be permitted.

(J) Connecting and Relaying Existing Mains:

(1) Whenever it is necessary to connect with or relay existing water mains, the Contractor shall make such connections or alterations.

(2) Sections of the existing mains, except caps, which must be cut out for making the required connections or changes, and which are not required in reconnecting the mains, shall become the property of the Contractor and shall be removed and disposed of by the Contractor.

(3) Wet Connections: The cuts in the mains for water services requiring wet connections will be made by D.E.P. forces. The Contractor shall do all other work, including the setting of the wet connection sleeves and valves.

(K) Shutdowns for Making Connections with Existing Mains: Shutdowns of any portion of the water service, to make connections with the existing mains, shall be made only with the consent of the Engineer. When any main is shut off for such purposes, the work on the connection shall be carried on continuously by the Contractor and with all possible dispatch until the water is again turned on into the main.

The Engineer will identify situations where people and institutions have special water needs or anyone for whom temporary water shut off will pose special hazards or problems. The shutdown may be made between 7 P.M. and 7 A.M. or on weekends, as directed by the Engineer.

In general, no water main shutdowns will be made prior to 8:30 A.M.

Water supply shutdowns will not be permitted unless the 9:30 A.M. temperature is at least twenty-seven (27) degrees Fahrenheit and rising unless specific permission to do so is obtained from the Engineer.

The Contractor shall notify the Engineer at least one (1) week prior to the date when the Contractor wishes a main shut down, and if approved, the Department of Environmental Protection shall shut down the main at the time stipulated. The Contractor must deliver individual notices to residents and businesses at least by the afternoon before the scheduled water shut-off notifying residents and businesses that water service will be interrupted. The locations to be given Notices shall be as directed by the Engineer. Shutdowns for making connections will not be made unless and until the Contractor has everything on the ground in readiness for the work. If, on account of failure to shut down any main due to any difficulty encountered or to any act or omission on the part of The City, the work of connection is delayed, no other claim will be allowed the Contractor for such delay, except an extension of the time specified for the performance of the work herein provided equal to the time which may have been lost by such delay.

(L) Laying Temporary Connections: When new water mains are laid and it becomes necessary to provide a temporary connection between the existing main and new mains laid under this contract, the Contractor shall, if ordered, provide all labor, equipment and facilities for laying, maintaining and removing, when directed, temporary connections and appurtenances. If City forces do laying of temporary connections, the Contractor shall make all required equipment and facilities available to them. No payment will be made for providing temporary services unless otherwise specified in the contract.

(M) Field Test of Mains:

(1) LEAKAGE TEST - FOR MAINS 20-INCH AND LARGER - The work of laying the pipes and fittings, and of setting valves and hydrants shall be of such character as to leave all the pipes and connections watertight. To insure these conditions, the Contractor shall subject 20-inch mains and all mains of larger diameter and their appurtenances to a proof by water pressure test of not less

than 150-psi held for two (2) hours.

If the new main is to replace an existing main and the pressure test is deemed impractical, the requirement for pressure testing may be waived, in which case a deduction amounting to one percent (1%) of the price bid for "Laying Water Mains", as shown in the Bid Schedule for the corresponding size will be taken. The Contractor's attention is specifically called to the necessity of carefully and thoroughly making up the joints without any leakage.

(a) The tests shall be made between valves as far as practicable in sections of approximately one thousand (1,000) feet in length, or as directed, and within twelve (12) working days after the completion of such sections of mains. Temporary caps shall be placed where necessary to permit the making of tests where valves are not available, as directed by the Engineer.

(b) Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valve section thereof, to maintain pressure in the pipe within 5-psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

(c) The leakage from the mains and connections for each section tested, while the test pressure is maintained, shall not be greater than that calculated by the following formula:

$$L = \frac{ND\sqrt{P}}{3700} \quad ; \text{where}$$

L = Allowable leakage in gallons per hour

N = Number of joints in the length of pipe tested

D = Nominal diameter of the pipe in inches

P = 150-psi as the average test pressure

To determine the rate of leakage the Contractor shall, as required, furnish a suitable pump, pressure gauge and water meter or other appliance for measuring the amount of water pumped. These instruments shall be tested for accuracy as frequently as directed.

The pressure shall be raised to the required test pressure, as noted on the contract drawings or in the specifications, and it shall be maintained for a period of not less than one (1) hour. The amount of water forced into the main during this time shall be determined and this amount shall be compared with the allowable leakage computed by formula, to determine whether or not the test section of main is acceptable. The Contractor shall furnish all the necessary labor and material to make the tests and to perform any work incidental thereto.

The trench shall be backfilled immediately after the pipe is laid and before the test is made, unless otherwise ordered or approved by the Engineer. If the leakage is at a greater rate than specified, the Contractor shall re-excavate the trench where necessary and shall repair or relay the joints and replace defective work until the leakage shall be reduced to the allowable amount.

No payment will be made for the laying of pipes 20-inch and larger until such time that the above field tests have been satisfactorily made.

(2) OPEN-TRENCH TEST - FOR ALL 6-INCH, 8-INCH AND 12-INCH MAINS - This test shall apply to all 6-inch, 8-inch, and 12-inch mains, and to new 20-inch mains replacing existing mains and where the pressure test, as previously specified, is impracticable.

(a) The pipe trench shall not be backfilled until the pipe, fittings and joints have passed the open-trench test. All exposed pipe, fittings and joints shall be thoroughly inspected during the open-trench test.

(b) The section to be tested shall be subjected to a water pressure equal to the line pressure in the area but in no case less than forty (40) pounds per square inch. The Contractor shall, as required, furnish a pressure gauge to measure the line pressure. Should the line pressure be below forty (40) pounds per square inch the Contractor shall furnish a suitable pump and pressure gauge to attain and measure the test pressure. The instruments shall be tested for accuracy as frequently as directed.

(c) Any joint showing visible leaks shall be remade until tight. If, after remaking the joint, the joint still shows visible leakage, the Contractor shall replace the defective joint in such a manner as to attain no visible leakage.

The Contractor shall replace any cracked or defective pipe or fitting and the test repeated until no visible leaks on the section being tested are obtained.

(d) After all visible leaks or other defects have been repaired to the satisfaction of the Engineer, the trench shall be backfilled.

(3) DELAY IN TESTING MAINS - Whenever the testing of any section of main is delayed beyond the time hereinbefore specified, the Engineer shall notify the Contractor in writing to make the test forthwith, and, if this order is not complied with within five (5) days from the date of said notice, the Department may make the required test and deduct the cost thereof, including the cost of any excavation or other work necessary to make the joints, valves, etc., watertight, from the amount due to or become due the Contractor under this contract.

(N) Temporary Caps: Where it is impracticable to test between valves, or near connections to existing mains, the Contractor shall, as directed, temporarily place caps or plugs on the mains and test the section of the new main so closed. The Contractor shall furnish all necessary caps and plugs as required.

(O) Polyethylene Wrap: The Contractor shall encase the new ductile iron mains and appurtenances to be installed in an approved loose 8-mil thick polyethylene wrap, where required and ordered by the Engineer, as specified in **Section 5.17** of these specifications.

(P) Alterations in Sewers: Whenever it shall become necessary on the line of the water main trench to alter, remove or relay any portion of a sewer, a culvert or other structure connected therewith, the Contractor shall do such work in such form and manner as ordered, directed or approved by the Engineer.

All temporary installation and permanent restoration of NYC Sewers shall conform to the Department of Design and Construction design standards. Design drawings for such work shall be submitted to the Engineer for review and approval. Construction shall be conducted in the presence and at the direction of the Engineer.

(Q) Offsetting Water Mains: If in the course of the actual progress of work, the Engineer finds that it is necessary to change the locations of mains or the arrangement of connections, or to alter existing mains in a manner other than that described by the drawings, such changes shall be made by the Contractor as directed. Payment for all work done will be made for the actual work performed and at the unit prices established as provided in the Bid Schedule, irrespective of changes in lengths, quantities, or locations made during the progress of the work sufficient to carry out the intent of the contract.

Offsetting required to avoid City Structures will be paid for under the unit prices bid by the Contractor in the contract, regardless of the lane in which the main is installed.

Horizontal Offsets required to avoid utilities will be paid for under the unit prices bid by the Contractor in the contract, regardless of the lane in which the main is installed.

Vertical or Rolled (Combination Horizontal and Vertical) Offsets required to avoid utilities are not considered to be a part of this contract and shall be a matter of adjustment between the Contractor and the affected Utility. The Engineer shall make the determination as to the type of Offset required whether it is Horizontal, Vertical or Rolled.

5.02.4 MEASUREMENT

(1) The quantity of payment for laying ductile iron pipe shall be the length of the new mains laid including fittings measured in linear feet along the axis of the pipes already installed as part of the contract work. The laying length of valves and fittings shall be included for purposes of this calculation as well as the allowances for fittings installed as stipulated below:

Allowances for Fittings, 24-Inches and Smaller
Mechanical Joint Fittings

For each cap or plug	One (1) foot of pipe
For each bend, reducer, offset or sleeve	Two (2) feet of pipe
For each three-way	Three (3) feet of pipe
For each four-way	Four (4) feet of pipe

(2) The larger size of reducers and the larger size of the run on three-ways and four-ways shall be used as the basis of payment for lay lengths and allowances.

5.02.5 PRICE TO COVER

(1) No Payment for Removal and Disposal of Existing Pipe and Appurtenances: No separate or additional payment will be made for the removal and disposal of existing pipe, valves, valve supports, castings, chambers, manholes, etc. where the new pipe to be installed is laid, including all required earth excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**) necessary to accommodate new work, regardless of whether such removal is shown on the drawings or ordered by the Engineer. Payment will be deemed included in the prices bid for all items of work.

(2) No Payment for Removal and Disposal of Existing Casting on Abandoned Water Mains: No separate or additional payment will be made for the removal and disposal of castings where the existing water main pipe is to be abandoned, including all required earth excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**), and any additional backfill material required and necessary to remove the castings and properly abandon the appurtenances, regardless of whether such removal is shown on the drawings or ordered by the Engineer. Payment will be deemed included in the prices bid for all items of work.

(3) Compensation for Bands, Rods, Washers, Nuts and Bolts, etc.: Payment for furnishing, delivering and installing bands, rods, washers, nuts and bolts, and all other materials required to restrain pipe joints that are ordered by the Engineer to protect against unbalanced pressures will be made to the Contractor at the unit prices bid for item labeled “FURNISHING, DELIVERING AND INSTALLING BANDS, RODS, WASHERS, ETC., COMPLETE, FOR RESTAINING JOINTS”. (See **Section 5.16**.)

(4) Offsetting required to avoid utilities as noted in **Subsection 5.02.3(Q)** above will be paid for under the unit prices bid by the Contractor in the contract, regardless of the lane in which the main is installed.

(5) The cost of installing mechanical joint fittings and wedge restraint glands shall be deemed to be included in the unit price bid by the Contractor for laying pipe (which includes allowances for mechanical joint fittings).

(6) All excess materials shall remain the property of the Contractor.

(7) The contract item for laying ductile iron pipe shall be bid per linear foot for each size and shall cover the cost of all labor, material and equipment to complete this work.

(8) The cost of all the labor and materials required to place supports, mats, cradles, and protection, shall be paid for under the applicable bid item located in the Bid Schedule.

(9) No separate payment will be made to the Contractor for the temporary closure of access manholes and ends of pipes 12-inches in diameter or larger, but payment shall be deemed included in the prices bid for all items of work.

(10) (a) No payment will be made to the Contractor for furnishing, delivering, installing and removing temporary caps for water mains as ordered by the Engineer. Payment shall be deemed included in the prices bid for all items of the contract.

(b) Payment for temporary valves and/or fittings, ordered by the Engineer during the course of the work to be installed will be paid for at the same rates as for valves and/or fittings permanently installed.

(c) If ordered by the Engineer, removal of valves and/or other fittings, including their transfer and disposal shall be deemed included in the prices bid for all items of the contract. No separate or additional payment will be made for this work.

(11) Payment for furnishing and delivering ductile iron fittings shall be paid for under the applicable bid item in the Bid Schedule for the quantity of weight in tons as follows:

Fittings: The weight for payment shall be based on the bare body weights listed in the latest edition of ANSI/AWWA Standard C110/A21.10-93, for ductile iron fittings only.

Bolt nuts and gaskets shall be considered as having been included in the price stipulated for the fittings.

Wedge Restraint Glands: For fittings or rodding purposes shall be paid for in accordance with their weight as listed in the latest edition of EBAA iron, Inc., Eastland, Texas 76448, catalog for Megalug restraint glands.

(12) The Contractor's attention is specifically called to the fact that, in both sheeted and unsheeted trenches, no extra payment shall be made for furnishing and placing select granular backfill (substituted or otherwise) in the lower portion of the trench even if the Contractor has to bring in imported fill to backfill said lower portion of the trench. “Lower portion of the trench” is defined as: a width of trench two (2) feet wider than the nominal diameter of pipe in unsheeted trenches; four (4) feet wider than the nominal diameter of pipe in sheeted trenches; and from six (6) inches below the barrel of the pipe to twelve (12) inches above the barrel of the pipe for both sheeted and unsheeted trench types. The cost of all such work, including the cost of removing and disposing of excavated material that cannot be reused in the lower portion of the trench shall be deemed included in the prices bid for “LAYING PIPE”.

(13) No Extra Payment for Flanges: No extra payment will be made for flanges on straight pipe and fittings, but payment thereof will be included in the unit prices bid for furnishing and laying straight pipe and fittings.

No extra payment will be made for insulated flange joints indicated on the standard and contract drawings, but payment thereof will be deemed included in the prices bid for all items of work.

(14) Compensation for all work as required by the drawings and specifications, or as ordered by the Engineer but not included specifically in the Bid Schedule shall be deemed included in the prices bid for all items of the contract. No separate or additional payment will be made for this work.

SECTION 5.03
FURNISHING AND DELIVERING GATE VALVES

5.03.1 DESCRIPTION

This specification describes furnishing and delivering of double disc 3-inch to 20-inch gate valves, resilient seated 6-inch hydrant gate valve and resilient seated 3-inch to 12-inch tapping valves.

5.03.2 MATERIALS

Double disc 3-inch to 20-inch gate valves shall be in compliance with **Section 2.06 - Standard**

Specifications For Double Disc 3-Inch To 20-Inch Gate Valves With Various End Connections For Water Supply System.

Resilient-seated 6-inch hydrant gate valves and resilient seated 3-inch to 12-inch tapping valves shall be in compliance with **Section 2.05 - Standard Specifications For Resilient-Seated 3-Inch Through 20-Inch Gate Valves With Various End Connections And 3-Inch Through 12-Inch Tapping Valves**.

5.03.3 CONSTRUCTION METHODS

All submittals, testing and packaging shall be in compliance with **Section 2.05 - Standard Specifications For Resilient-Seated 3-Inch Through 20-Inch Gate Valves With Various End Connections And 3-Inch Through 12-Inch Tapping Valves and Section 2.06 - Standard Specifications For Double Disc 3-Inch To 20-Inch Gate Valves With Various End Connections For Water Supply System**.

5.03.4 MEASUREMENT

The quantity of gate valves measured for payment shall be the number of gate valves of each size and kind actually furnished and delivered by the Contractor as ordered and approved by the Engineer.

5.03.5 PRICE TO COVER

The contract price for FURNISHING AND DELIVERING GATE VALVES shall be the unit price bid for each size and kind of gate valve furnished and delivered and shall cover the cost of all labor, equipment, materials, plant, samples, tests and insurance required and necessary to furnish and deliver gate valves in the manner specified herein. No separate or additional payment will be made for any costs associated with the work of furnishing and delivering gate valves.

SECTION 5.04
SETTING GATE VALVES

5.04.1 DESCRIPTION

This specification describes the installation of double disc 3-inch to 20-inch gate valves, resilient seated 6-inch hydrant gate valve and resilient seated 3-inch to 12-inch tapping valves. It also describes the installing of manhole frames (skirts and heads) and covers.

5.04.2 MATERIALS

Double disc 3-inch to 20-inch gate valves shall be in compliance with **Section 2.06 - Standard Specifications For Double Disc 3-Inch To 20-Inch Gate Valves With Various End Connections For Water Supply System**.

Resilient-seated 6-inch hydrant gate valves and resilient seated 3-inch to 12-inch tapping valves shall be in compliance with **Section 2.05 - Standard Specifications For Resilient-Seated 3-Inch Through 20-Inch Gate Valves With Various End Connections And 3-Inch Through 12-Inch Tapping Valves**.

Manhole frames (skirts and heads) and covers shall be in compliance with **Section 2.07 - Standard Specification For Iron Castings**.

5.04.3 CONSTRUCTION METHODS

(A) Excavation: Ample excavation shall be made by the Contractor for the purpose of setting the valves and making the joints, as herein provided for laying pipes and appurtenances, and for the construction of valve manholes and chambers.

Where the excavation is in a wet trench, and so ordered by the Engineer, the Contractor shall place crushed stone (three-quarter (3/4) inch to one-quarter (1/4) inch crushed stone complying with ASTM Designation C33, Size No. 67) or select granular fill under the masonry footing as shown on **Standard Drawing No.**

11576-A-Z. Payment for the crushed stone or select granular fill will be deemed to be included in the unit price bid for setting valves.

(B) Valve Boxes: Valve boxes shall be set for line valves of twenty (20) inches or less in diameter. A foundation or footing of Portland cement concrete, or concrete blocks, as shown on **Standard Drawing No. 11576-A-Z** laid on firmly compacted ground, shall be built under all valve boxes. The boxes shall be fitted together securely, so that the cover shall be flush and even with the existing surface of the street. Before the permanent paving is laid, the Contractor shall, if necessary, raise or lower the box and cover so that the cover shall be even with the final surface of the new paving.

5.04.4 MEASUREMENT

The quantity of gate valves measured for payment shall be the number of gate valves of each size and kind actually set by the Contractor as ordered and approved by the Engineer.

5.04.5 PRICE TO COVER

(A) The contract price for SETTING GATE VALVES shall be the unit price bid for each size and kind of gate valve set and shall cover the cost of all labor, equipment, materials, plant, samples, tests and insurance required and necessary to set gate valves in the manner specified herein. No separate or additional payment will be made for any costs associated with the work of setting gate valves.

(B) No direct payment will be made for the removal of valves. Payment will be deemed included in the unit price for installing new valves.

(C) There will be no direct payment for furnishing and installing waterproofing for valve chambers, including waterstops. Payment will be deemed included in the prices bid for all items of work.

(D) Payment for chambers such as concrete, reinforcing steel, structural steel, miscellaneous steel, manhole steps, brick masonry and pipe-to-wall penetration seals shall be made under their respective bid items. Steel sleeves and anchor/water stop plates shall be paid for under the bid items for "FURNISHING, DELIVERING AND INSTALLING PIPE-TO-WALL PENETRATION SEAL, INCLUDING STEEL SLEEVE AND ANCHOR/WATER STOP PLATE", as contained in the bid schedule.

(E) The cost of installing the various castings shall be deemed included in the prices bid for the various items of the contract.

(F) Payment for the furnishing, delivering and installing of 36-inch cast iron manhole heads and covers shall be made under the item labeled “FURNISHING, DELIVERING AND INSTALLING 36-INCH CAST IRON MANHOLE HEADS AND COVERS”.

SECTION 5.05
FURNISHING, DELIVERING AND INSTALLING PRESSURE REGULATOR (REDUCING) VALVES

5.05.1 DESCRIPTION

These specifications are applicable for installing pressure regulator (reducing) valves with its appurtenant valves and piping.

5.05.2 MATERIALS

Pressure regulator valves shall be in compliance with **Section 2.04 - Standard Specifications For Pressure Reducing Valves 8-Inch Through 30-Inch Nominal Pipe Size**.

5.05.3 CONSTRUCTION METHODS

(A) The pressure regulator valves shall be installed at the locations and in accordance with the general layout of piping shown on the contract drawings. Such locations and layout may, however, be varied, as required, by actual conditions during the progress of the work, in accordance with the directions of the

Engineer. The 12-inch and 20-inch pressure regulating valves and adjacent gate valves shall be housed in a chamber which shall be constructed by the Contractor in accordance with the details shown on **Standard Drawing No. 19840-A-X**, "Standard Regulator Chambers," latest revision. The Contractor may be required to submit installation drawings of 8-inch, 16-inch, 24-inch and 30-inch pressure regulator valves for approval.

In order to provide ease of access for the Department of Environmental Protection (DEP) operational personnel, the valve piping control valves and petcocks shall be installed on the same side of the distribution line and in close proximity of the access ladder of the concrete chamber. This shall eliminate the need for field personnel to climb over the distribution piping to adjust the valve settings. The orientation shall be specified by Department of Environmental Protection, Bureau of Water and Sewer Operations (DEP-BWSO) or Department of Design and Construction (DDC) as applicable.

(B) Installing the pressure-regulating valve shall be as follows:

(1) Control piping should be removed before lowering the regulator into the trench and reassembled after the regulator has been lowered into the chamber.

(2) Suitable rigging such as padded nylon slings shall be used to carefully lower the regulator. Chains will not be allowed.

(3) When installing the valve, the inlet flange should be matched with the upstream end of the pipe and the control piping should be on the left hand side of the valve when looking into the inlet flange of the regulator.

(4) Regulator must be supported as shown on **Standard Drawing No. 19840-A-X**. Care must be taken to keep bottom cap vent hole opened to the atmosphere.

(C) Starting up the pressure regulator valve:

(1) Close all ball valves in control piping.

(2) Crack open downstream gate valve, 2-3 turns.

(3) Check if all joints are tight and not leaking.

(4) Open strainer bleed cock.

(5) Open top cap air vent.

(6) Open inlet control piping ball valve.

(7) When air is purged, close strainer bleed cock and close top cap air vent.

(8) Completely open downstream gate valve.

(9) Crack open upstream gate valve, 2-3 turns.

(10) Open pilot ball valve.

(11) Once inlet pressure regulator is controlling 50-psi, completely open the upstream gate valve.

(D) After the pressure regulating valves have been tested under service conditions, the Contractor shall make such modifications, including substitution of the entire apparatus, if necessary, as may be necessary to cause them to function in all respects in accordance with the specifications throughout the required maintenance period of the contract.

5.05.4 MEASUREMENT

The quantity of pressure regulating valves measured for payment shall be the number of regulators of each size actually furnished, delivered and installed by the Contractor and approved by the Engineer.

5.05.5 PRICE TO COVER

(A) The contract price for FURNISHING, DELIVERING AND INSTALLING PRESSURE REGULATOR VALVES shall be the unit price bid for each size and kind of pressure regulator valve furnished, delivered and installed and shall cover the cost of all labor, equipment, materials, plant, samples, tests and insurance required and necessary to furnish, deliver and install pressure regulator valves in the manner specified herein. No separate or additional payment will be made for any costs associated with the work of furnishing, delivering and installing pressure regulator valves.

(B) Payment for the chamber (concrete, reinforcing steel, structural steel, miscellaneous steel, manhole steps and pipe-to-wall penetration seals), gate valves, piping and castings shall be made to the Contractor under the appropriate bid items.

SECTION 5.06
FURNISHING AND DELIVERING DUCTILE IRON FITTINGS

5.06.1 DESCRIPTION

These specifications are applicable for furnishing and delivering ductile iron fittings.

This includes all bends, 3-ways, 4-ways, caps, offsets, plugs, reducers and sleeves complete with all accessories, including wedge type restraint glands.

5.06.2 MATERIALS

All fittings and their accessories shall conform to the requirements of **Section 2.02 - Specifications For Ductile Iron Fittings And Accessories**.

5.06.3 CONSTRUCTION METHODS

Prior to ordering any ductile iron fittings, the Contractor shall submit to the Engineer a vendor list for approval. Within five (5) consecutive calendar days after receiving vendor approval, the Contractor shall submit evidence to the Department of Design and Construction of having ordered the material from an acceptable foundry.

Material must be manufactured at least ten (10) days before delivery to the site to allow for proper inspection and recording of accepted fittings.

5.06.4 MEASUREMENT

The quantity to be paid for the fittings shall be the weight in tons as follows:

(1) Fittings: the weight for payment shall be based on the bare body weights listed in the latest edition of ANSI/AWWA Standard C110/A21.10, for ductile iron fittings only.

(2) Wedge Restraint Glands: for fittings or rodding purposes shall be paid for in accordance with their weight as listed in the latest edition of EBAA Iron, Inc., Eastland, Texas 76448, catalog for Megalug restraint glands.

5.06.5 PRICE TO COVER

(A) Bolts, nuts and gaskets: payment shall be considered as having been included in the price stipulated for the fittings.

(B) No extra payment will be made for insulated and non-insulated flanged joints indicated on the standard and contract drawings, but payment thereof will be deemed included in the prices bid for all items of work.

(C) Payment for furnishing and delivering ductile iron fittings shall be made under the bid item labeled "FURNISHING AND DELIVERING DUCTILE IRON MECHANICAL JOINT FITTINGS WITH WEDGE TYPE RETAINER GLANDS" as contained in the Bid Schedule.

SECTION 5.07
FURNISHING AND DELIVERING VARIOUS CASTINGS

5.07.1 DESCRIPTION

This section describes furnishing and delivering various castings, including, but not limited to, hydrant valve boxes, main line valve boxes, cast iron drains, 24-inch and 36-inch manhole frames (skirts and heads) and covers, etc.

5.07.2 MATERIALS

The various castings shall be in accordance with **Section 2.07 - Standard Specification For Iron Castings**.

5.07.3 DETAILS

Prior to ordering any special castings, the Contractor shall submit to the Engineer a vendor list for approval. Within five (5) consecutive calendar days after receiving vendor approval, the Contractor shall submit evidence to the Department of Design and Construction of having ordered the applicable castings required for the contract and approved by the Engineer from an acceptable foundry.

Material must be manufactured at least ten (10) days before delivery to the site to allow for proper inspection and recording of accepted castings.

5.07.4 MEASUREMENT

The quantity to be measured for payment shall be the number of tons of castings furnished as required and complete.

5.07.5 PRICE TO COVER

Payment for furnishing and delivering various castings shall be made under the bid item labeled "FURNISHING AND DELIVERING VARIOUS CASTINGS" as contained in the bid schedule.

The cost of installing the various castings shall be deemed included in the prices bid for the various items of the contract.

5.07.6 SEPARATE PAYMENT

Separate payment will be made for the furnishing, delivering and installing of 36-inch cast iron manhole heads and covers under the item labeled "FURNISHING, DELIVERING AND INSTALLING 36-INCH CAST IRON MANHOLE HEADS AND COVERS".

SECTION 5.08
FURNISHING AND DELIVERING HYDRANTS

5.08.1 DESCRIPTION

This section describes furnishing and delivering fire hydrants.

5.08.2 MATERIALS

Fire hydrants shall be in accordance with **Section 2.08 - Standard Specifications For Dry Barrel Fire Hydrants And Extension Kits**.

5.08.3 CONSTRUCTION METHODS

Prior to ordering any hydrants, the Contractor shall submit to the Engineer a vendor list for approval. Within five (5) consecutive calendar days after receiving vendor approval, the Contractor shall submit evidence to the Department of Design and Construction of having ordered the material from an acceptable foundry.

All hydrants must be manufactured at least ten (10) consecutive calendar days before delivery to the site to allow for proper inspection and recording of the accepted hydrants.

After the completion of manufacture and inspection of the hydrants to be furnished by the Contractor (but prior to the shipment thereof), the Contractor shall furnish a detailed schedule of the hydrants that constitutes the content of each shipment. This schedule shall be delivered to the Engineer. The schedule shall give in numerical order the description and number of each and every article constituting the shipment. The Contractor shall not make shipments until the schedule has been checked and approved in writing by the Engineer.

The Engineer must approve storage of hydrants and appurtenances within the project limits. On-site storage is limited to hydrants and appurtenances projected for use within seven (7) calendar days, as per the Contractor's approved schedule. The Engineer reserves the right to limit the storage of on-site materials to three (3) calendar days in business or congested areas.

Hydrants shall be supported upon wooden blocks of sufficient size to prevent injury to the pavement.

The Contractor shall be responsible for the hydrants until they are finally accepted and incorporated in the work.

During any suspension of the work, all materials delivered upon but not placed in the work, shall be neatly piled so as not to obstruct public travel, or shall be removed from the work site at the direction of the Engineer; hydrants, if directed, shall be temporarily stored at a site designated by the Contractor and approved in writing by the Engineer.

Unless so removed by the Contractor, within ten (10) calendar days of written notice from the Engineer, the Engineer may have the materials moved at the expense of the Contractor.

5.08.4 MEASUREMENT

The quantity of fire hydrants to be measured for payment shall be the number of hydrants supplied by the Contractor as ordered and approved by the Engineer.

5.08.5 PRICE TO COVER

The contract price for FURNISHING AND DELIVERING HYDRANTS shall be the unit price bid for each hydrant furnished and delivered and shall cover the cost of all labor, equipment, materials, plant, samples, tests and insurance required and necessary to furnish and deliver hydrants in the manner specified herein. No separate or additional payment will be made for any costs associated with the work of furnishing and delivering hydrants. Payment for furnishing and delivering hydrants shall be made under the bid item labeled “FURNISHING AND DELIVERING HYDRANTS” as contained in the bid schedule.

SECTION 5.09
SETTING HYDRANTS

5.09.1 DESCRIPTION

This section describes the setting of fire hydrants.

5.09.2 MATERIALS

All hydrants installed or replaced shall be two-piece "Breakaway" hydrants, Types S2-LP or D2-LP, as shown on the latest revisions of BWSO **Standard Drawing Nos. 43250-Z or 43142-Z**, respectively, and as specified in accordance with **Section 2.08 - Standard Specifications For Dry Barrel Fire Hydrants And Extension Kits**.

5.09.3 CONSTRUCTION METHODS

(A) HYDRANT INSTALLATION - Hydrants shall be installed at the location shown on the drawings or where directed by the Engineer and in accordance with AWWA Standard C600, entitled "Installation of Ductile Iron Water Mains, and Their Appurtenances", and as described herein or ordered by the Engineer.

All hydrants shall stand plumb, each of their nozzles facing the curb at an angle of 45-degrees.

Hydrants shall be set to the established grade with the centerline of the nozzle at an elevation above the grade as determined by the Engineer. If street grades are adjusted, hydrant heights shall be adjusted to meet Department of Design and Construction requirements.

Each hydrant shall be connected to the main with a 6-inch diameter branch controlled by a 6-inch valve installed with valve box and appurtenances as shown on the latest revision of BWSO **Standard Drawing No. 31050-Z**, "Standard Methods for Hydrant Drain Base".

Drainage shall, in general, be provided at the base of the hydrant by one of the following two methods that may be ordered by the Engineer:

(a) by setting the hydrant upon a cast iron drain base and connecting it to the latter with 3/4-inch diameter brass pipe, Tubeloy or soft-temper copper tubing, and brass fittings, as shown on the latest revision of BWSO **Standard Drawing No. 31050-Z**.

(b) by connecting the hydrant by means of a 3/4-inch diameter Tubeloy or soft-temper copper tubing, and all necessary brass fittings, to a blind drain consisting of a concrete box filled with broken stone, as shown on the latest revision of BWSO **Standard Drawing No. 31050-Z**.

Hydrants set in accordance with method (b) shall be set upon a stone or concrete block base not less than one (1) foot square and six (6) inches thick.

The hydrants, in general shall be set according to the method described under (a). Method (b) shall be followed only when ordered by the Engineer.

When the drain outlets of hydrants are set below the ground water level, the above-specified drainage facilities shall be omitted, the drain outlet of the hydrant suitably plugged, as directed, and the hydrant set upon a stone or concrete block not less than one (1) foot square and six (6) inches thick. On the roadway face of the hydrant, there shall be stenciled, in white paint the letter “P”, five (5) inches in height. The quality of paint is hereinafter specified.

(B) RECESS VAULTS FOR HYDRANTS - Where sidewalk or building vaults occupy the space needed for hydrant setting, recess vaults will be required for the setting of the hydrant.

Where the Contractor is ordered to construct recess vaults in existing sidewalk or building vaults, to allow for the installation of hydrants, the Contractor shall construct it in accordance with designs furnished by the DDC.

Where recess vaults are constructed by others, the hydrant shall be set therein by the Contractor and no adjustment in payment other than herein allowed for the hydrant drainage will be made to the Contractor.

(C) BROKEN STONE OR SCREENED GRAVEL FOR DRAIN - The material for drains shall be clean broken stone or screened gravel not less than one-quarter (1/4) inch and not more than two (2) inches in diameter.

(D) LAYING DRAIN PIPE - The drain pipe from the hydrant to the broken stone drain shall, in general, be laid in the trench made for laying the hydrant branch and shall be uniformly sloped to meet the top of the stone drain. Care shall be taken to avoid kinking the pipe or tubing where bending is required.

(E) PAINTING COLORS AND NUMERALS - After the hydrants have been set and adjusted, the standpipe above the ground line shall be thoroughly cleaned and, with the exception of the dome, shall be given one heavy coat of quick drying black or red enamel paint, and the dome one heavy coat of bright aluminum paint, all of the quality specified for painting the hydrants in the shop shall be as specified in **Section 2.08 - Standard Specifications For Dry Barrel Fire Hydrants And Extension Kits**. All hydrants connected to mains 24-inches in diameter and larger shall be painted red and aluminum. All other hydrants shall be painted black and aluminum.

On the standpipe, just below the nozzles, on the roadway face of the hydrant, shall also be stenciled, in white numerals five (5) inches high, the size of the main to which the hydrant is connected. The paint for the white numerals shall be an oil type paint, designed for exterior use. It shall cover solidly in one (1) coat and dry to a satisfactory gloss. This white paint shall be a standard brand of recognized quality approved by the Engineer.

No painting shall be done in wet or freezing weather, or upon surfaces holding any moisture, or upon painted surfaces until the previously applied paint has thoroughly set.

The Contractor shall furnish and put up in conspicuous places on the hydrants warning signs labeled "Wet Paint".

The Contractor shall also paint, as above specified, all existing hydrants which are removed, and reset as described in **Subsection 5.09.3(A)** at new locations, as well as hydrants which are disconnected from mains abandoned or removed and connected to new mains, or to existing mains retained in service in the same streets.

(F) RESETTING CURBING - All curbing disturbed or removed in the course of installing the hydrants shall be reset by the Contractor in accordance with the specifications of the Agency, Department or Bureau having jurisdiction. If the Contractor damages the existing curbing, the Contractor shall furnish at the Contractor's own cost and expense new curbing to replace the damaged curbing.

5.09.4 HYDRANT COLLARS

5.09.4.1 DESCRIPTION - All hydrants shall be provided with concrete collars.

5.09.4.2 MATERIALS - Concrete shall be in accordance with **General Specification 11 - Concrete, as modified in Section 2.11**, Class B-32, Type IA or Type IIA, as specified.

5.09.4.3 CONSTRUCTION METHODS

Concrete collar around hydrant and hydrant fenders shall be in accordance with the layout, dimensions and methods shown on **Standard Drawing No. 45161-A-Z** or as approved by the Engineer.

(A) Where the hydrant, which is to be connected to a new main, is located in an unpaved area, a square-shaped concrete collar, two (2) feet in the least dimension measured from the outer perimeter of the hydrant barrel, six (6) inches thick, and flush with the finished or existing surface, shall be placed around the hydrant.

(B) Where the hydrant and fenders are installed in an unpaved area such as between existing or proposed sidewalk and curb, the concrete collar shall be installed in accordance with the layout, dimensions and methods shown on **Standard Drawing No. 45161-A-Z**.

5.09.5 MEASUREMENT

The quantity to be measured for payment shall be the number of hydrants actually installed and approved by the Engineer, as required, complete, in place.

5.09.6 PRICE TO COVER

The contract price for SETTING HYDRANTS shall be the unit price bid for each hydrant installed and shall cover the cost of all labor, equipment, materials, plant, samples, tests and insurance required and necessary to install hydrants in the manner specified herein and shall include the earth excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**); backfilling; and all other work necessary to complete this work and do all work incidental thereto, all in accordance with the plans and specifications and as directed by the Engineer. Payment for installing hydrants shall be made under the bid item labeled "SETTING HYDRANTS COMPLETE WITH WEDGE TYPE RETAINER GLANDS" as contained in the bid schedule.

Payment will be made to the Contractor for each recess vault constructed under the applicable items labeled "FURNISHING AND PLACING CAST-IN-PLACE CONCRETE CLASS 40, AND PRECAST CONCRETE CLASS 50", "FURNISHING, DELIVERING AND PLACING STRUCTURAL, REINFORCING AND MISCELLANEOUS STEEL" and "ADDITIONAL BRICK MASONRY". Payment will be made for the actual quantity placed as directed and approved by the Engineer.

The above item shall include the cost of all necessary waterproofing and all other work incidental to the vault construction.

The price for adjusting the height of a hydrant when street grades are adjusted shall be deemed included in the prices bid for all items of this contract.

The concrete and finishing thereof and joint filler, shall conform to the requirements of items labeled "4" CONCRETE SIDEWALK (UNPIGMENTED)" or "4" CONCRETE SIDEWALK (PIGMENTED)", as applicable. Payment for placing that portion of the concrete collar that exceeds the thickness of the proposed sidewalk will be made under the price bid for item labeled "SETTING HYDRANTS COMPLETE WITH WEDGE TYPE RETAINER GLANDS", and the balance will be paid for under the appropriate items specified above for placing 4" thick concrete sidewalks.

SECTION 5.10
REMOVING HYDRANTS

5.10.1 DESCRIPTION

This section describes the removal of fire hydrants.

5.10.2 CONSTRUCTION METHODS

(A) REMOVAL OF HYDRANTS - Unless ordered retained, the Contractor shall remove hydrants found on the existing mains that are to be removed or abandoned, and all except Standard hydrants will become the Contractor's property. Cast Iron drain bases shall be deemed to be part of the standard hydrants. These standard hydrants shall be either incorporated in the work or hauled to a department yard as directed by the Engineer. Any hydrants ordered retained shall be connected up to the new main or to an existing main to be kept in service.

(B) All openings made by removing hydrants shall have temporary pavement placed by the Contractor as soon as the openings have been backfilled, and then the Contractor shall permanently restore all pavements and sidewalks, that are disturbed.

(C) RESETTING CURBING - All curbing disturbed or removed in the course of removing the hydrants shall be reset by the Contractor in accordance with the specifications of the Agency, Department or Bureau having jurisdiction. If the Contractor damages the existing curbing, the Contractor shall furnish at the Contractor's own cost and expense new curbing to replace the damaged curbing.

5.10.3 MEASUREMENT

The quantity to be measured for payment shall be the number of hydrants removed as required.

5.10.4 PRICE TO COVER

The contract price for “REMOVING HYDRANTS" shall be a unit price bid for each hydrant removed together with drain base and shall cover the cost of all labor, materials, plant, equipment and insurance required to complete the work, including the earth excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**); backfilling; cleaning up; temporary restoration of street surfaces, hauling away and disposing of all removed materials (except as otherwise specified herein), together with all other items necessary to complete this work and do all work incidental thereto, all in accordance with the plans, specifications and standards, and as directed by the Engineer and the Department of Environmental Protection.

Included in the price hereunder shall be the cost for delivering hydrant(s) to a Department Of Environmental Protection Yard(s) when and as directed by the Engineer. No separate or additional payment will be made for this delivery work.

In addition, included in the price hereunder shall be the cost of all labor and materials necessary to remove all required existing hydrant fenders, hydrant valves, branch pipe and castings including drain basins.

SECTION 5.11
HYDRANT FENDERS

5.11.1 DESCRIPTION

This section describes the furnishing, delivering and installing of hydrant fenders

5.11.2 MATERIALS

All hydrant fenders installed or replaced shall be 5-inch steel pipe Schedule 80, as shown on **Standard Drawing No. 45161-A-Z**.

5.11.3 CONSTRUCTION METHODS

Steel pipe hydrant fenders shall be installed where required, encased in concrete collars, and painted in accordance with the applicable layout and method, and other pertinent details shown on the latest revision of BWSO **Standard Drawing No. 45161-A-Z** or as directed.

5.11.4 MEASUREMENT

Payment for hydrant fenders will be made for each installed fender approved by the Engineer at the unit price bid for item labeled "HYDRANT FENDERS".

5.11.5 PRICE TO COVER

The contract price for “HYDRANT FENDERS" shall be a unit price bid for each hydrant fender furnished, delivered and installed and shall cover the cost of all labor, materials, plant, equipment and insurance required to complete the work, including the earth excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**); backfilling; cleaning up; temporary restoration of street surfaces, hauling away of all removed materials, together with all other items necessary to complete this work and do all work incidental thereto, all in accordance with the plans, specifications and standards, and as directed by the Engineer and the Department of Environmental Protection. Payment for installing hydrant fenders shall be made under the bid item labeled “FURNISHING, DELIVERING AND INSTALLING HYDRANT FENDERS” as contained in the bid schedule.

The concrete and finishing thereof and joint filler, shall conform to the requirements of items labeled “4” CONCRETE SIDEWALK (UNPIGMENTED)” or “4” CONCRETE SIDEWALK (PIGMENTED)”, as applicable. Payment for placing that portion of the concrete collar that exceeds the thickness of the proposed sidewalk will be made under the price bid for item labeled “FURNISHING, DELIVERING AND INSTALLING HYDRANT FENDERS”, and the balance will be paid for under the appropriate items specified above for placing 4” thick concrete sidewalks.

SECTION 5.12
NO SECTION

SECTION 5.13
WITHDRAWING AND REPLACING HOUSE SERVICES

5.13.1 DESCRIPTION

This section describes the withdrawing and replacing house services using screw taps or wet connection sleeves.

5.13.2 MATERIALS

The wet connection sleeves and screw taps shall be in accordance with **Section 2.09 - Standard Specifications For Stainless Steel Tapping Sleeves With Branch Connections For Flanged Tapping Valve Or Mechanical Joint Tapping Valve and Section 2.10 - Specifications For Corporation Stops And Quarter Bends**.

5.13.3 CONSTRUCTION METHODS

(A) REPLACING CONNECTIONS - The Contractor shall replace all house service or other connections found on the mains. Except where otherwise specified, no house services shall be transferred from the existing main to a new main until the sanitary condition of the interior of the main is found to be satisfactory to the Engineer. When connections are smaller than or equal to four (4) inches they shall be replaced with corporation stops or wet connections of the same size as the house service pipe. When connections are larger than four (4) inches they shall be replaced with wet connections one (1) size smaller than the house service pipe. If any reducer or other special casting is required, such casting shall be furnished by the Contractor and shall be set by the Contractor. No corporation stops smaller than 3/4-inch shall be installed. Connections two (2) inches and smaller shall be made using brass corporation stops with a tapered screw fitted for tapered screw taps with tailpieces, all of which shall be furnished by the Contractor.

In all instances where house services are to be transferred from mains to be abandoned or removed to the new mains, new taps and tailpieces, new goosenecks, and new extension piping to the extent made necessary by the service transfer, shall be utilized in the new work. Extreme care shall be taken in excavating for tap transfers to prevent injury to the existing service pipes.

Where the house service pipes are to be extended for lengths greater than five (5) feet, the sizes of the house service extension pipes and the goosenecks shall be the same size as the existing house service pipes, but in no case smaller than one (1) inch.

(B) TRANSFERRING CONNECTIONS - After the new main has been laid and found to be in a satisfactory sanitary condition and the taps made, the Contractor shall reconnect the house services to the new main, furnishing all the labor and material necessary to make all the connections complete. If after the house connection is made, there is interference in the flow of water in the house service pipe, the Contractor shall correct the condition if, in the opinion of the Engineer, it is due to improper work or carelessness on the part of the Contractor.

The Engineer will identify situations where people and institutions have special water needs or anyone for whom temporary water shut-off will pose special hazards or problems. The shutdown in these instances may be made between 7 p.m. and 7 a.m. or on weekends as directed by the Engineer. Whenever a shutdown affects buildings where water is used for domestic purposes, the making of connections to existing mains, or the changing of house service connections, may be made during the daytime, but the water must not be turned off from any premises for a longer period than twelve (12) hours, unless special permission is obtained from the Engineer. Where the valves provided under this contract are so located that the length of main between valves is too great to allow, the replacing of the house connections and the making of the necessary main connections within twelve (12) hours, the Contractor shall place caps or plugs, so that the period during which the water is turned off shall not be longer than twelve (12) hours. These caps or plugs will be furnished by the Contractor, and the Contractor shall replace any that handling or removing may damage. The Contractor will in no case be allowed to cut off the flow of water through any main, unless the

Engineer grants permission.

The Contractor shall notify the Engineer at least one (1) week prior to the date when the Contractor wishes a main shut down, and if the time set is approved, the Department of Environmental Protection shall shut down the main at the time stipulated. The Contractor must deliver individual notices to residents and businesses at least by the afternoon before the scheduled water shut-off notifying residents and businesses that water service will be interrupted. Shutdowns for making connections will not be made unless and until the Contractor has everything in readiness for the work before and after a shutdown is made, the work must be carried on continuously until the water is again turned on. If, on account of failure to shut down any main, due to any difficulty encountered, or to any act or omission on the part of The City, the work of connection is delayed, no other claim shall be allowed the Contractor for such delay except an extension of the time specified for the performance of the work equal to the time which may have been lost by such delay.

(C) WET CONNECTIONS - Department force will make the cuts in the mains for services requiring wet connections. The Contractor shall do all other work, including the setting of the wet connection sleeves and valves, placing the cutting machine in position and all required excavation.

(D) LICENSED AND BONDED PLUMBERS - The installation, transfer, alteration or repair of house services shall be made only by licensed and bonded plumbers who are duly registered in the office of the Department of Buildings in the borough in which the work is to be performed.

(E) HOUSE SERVICES - Whenever an existing lead service line must be reconnected to a new piece of copper tubing or brass service pipe, installed as part of a water main project, the connection must be made using an approved mechanical coupling. A wiped (soldered) connection will no longer be acceptable.

5.13.4 MEASUREMENT

The Quantities to be measured for payment shall be the number of house connections withdrawn and installed as required, complete, in place.

5.13.5 PRICE TO COVER

The contract price for “WITHDRAWING AND REPLACING HOUSE SERVICES USING SMALLER THAN 1-1/2-INCH SCREW TAPS” and “WITHDRAWING AND REPLACING HOUSE SERVICES USING 1-1/2-INCH OR LARGER SCREW TAPS” shall be a unit price bid for each withdrawal and replacement of service and shall cover the cost of all labor, materials, plant, equipment and insurance required to complete the work, including the earth excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**); backfilling; cleaning up; temporary restoration of street surfaces, hauling away of all materials, together with all other items necessary to complete this work and do all work incidental thereto, all in accordance with the plans, specifications and standards, and as directed by the Engineer and the Department of Environmental Protection.

SECTION 5.14
EXTENDING HOUSE SERVICE CONNECTIONS

5.14.1 DESCRIPTION

This section describes extending house service connections and replacing deteriorated house service connections. A service pipe is defined as that portion of the water pipe extending from the public water main to the house control valve, the building or to a point where the supply is fully metered.

5.14.2 MATERIALS

All service pipe, insulation and jacketing shall be in accordance with **Section 2.22**.

5.14.3 CONSTRUCTION METHODS

(A) WORK INCLUDED - Where it is necessary, in the opinion of the Engineer, to cut house water service

to lay new mains or where the services are to be extended in transferring from an existing main to a new, or to an existing parallel main, the Contractor shall furnish the necessary pipe for such work and all other materials and labor incidental to making the connection complete, including the cutting of the service and the stopping of the flow of water through the same.

The Contractor shall replace a house service that is deemed sufficiently deteriorated by the Engineer. A sufficiently deteriorated service shall be defined as a service that in the opinion of the Engineer will not withstand the ongoing construction activities surrounding it. The length of service to be replaced will be determined by the Engineer and as dictated by the limit of improved pavement restoration found in the contract.

(B) SERVICES TO BE STRAIGHT - Each new service pipe shall be laid in a straight line at right angles to the street main and extending from the tap to the main house control valve. Where the surface or subsurface conditions make it impracticable to install a service pipe in accordance with the above conditions, it may be otherwise laid, provided the plumber submits a plan showing the proposed alternative location of the service pipe, and procures the written approval of the Department. The driving of a service pipe through the ground is prohibited.

(C) GOOSENECK AND OFFSET SWING JOINTS ON SERVICE CONNECTION - Unless otherwise authorized by the Department of Design and Construction, each brass or copper tubing service shall have at least three (3) feet of copper tubing formed in a gooseneck connection to the tap and laid to the right hand, facing the tap. Each brass or copper pipe with threaded joints shall have, at the tap or wet connection, an offset swing joint consisting of four (4) elbows and three (3) pieces of pipe, each piece of pipe not less than two (2) feet in length, laid to the right side facing the connection. Connections to the City main by ductile iron or cast iron shall be made directly; no offset swing joint shall be used.

Where buildings are constructed on pile foundations or other unyielding supports, the brass or copper tubing service shall have two (2) goosenecks, and the brass or copper pipe with threaded joints shall have two (2) offset swing joints, one (1) at the tap or the wet connection, laid to the right side facing the main, and one (1) immediately outside the building, laid to the right side facing the building, with a sleeve to carry the service through the foundation wall.

(D) COVER FOR SERVICE PIPE - All service pipes shall be installed and maintained at a depth of at least three and one-half (3-1/2) feet and no more than six (6) feet below ground unless written permission to vary this requirement is obtained from the Department of Design and Construction. Where a service pipe has less than three and one-half (3-1/2) feet of cover, due to subsurface conditions, it shall be insulated and protected, if required, in a manner approved by the Department of Design and Construction.

A service pipe shall not be laid within twelve (12) inches of any other subsurface structure, conduit or pipe, nor directly below and parallel with subsurface structure, conduit or pipe.

(E) INSULATION FOR SERVICE PIPE

(1) All surfaces to be insulated shall be cleaned of all scale, rust, oil and foreign matter and shall be dry and free of frost prior to and during application of insulation.
(2) Sandblasting and priming of surfaces to be insulated are at the discretion of the Engineer.
(3) All testing of piping to be insulated shall be completed prior to the application of any insulation materials.
(4) All insulation and accessory materials shall be stored in an area that is dry and protected from weather before and during insulation application.
(5) Insulation should be provided with a factory-applied jacket as described in **Subsection 2.22.3**.
(6) Insulation shall be applied based on the approved manufacturer's requirements and as approved by the Engineer.
(7) There shall be no openings, folds, wrinkles or pinholes in the jacketing or the mastic finish.
(8) The Contractor shall have the Engineer approve the insulation and finish application procedures before, during and after the application.

(F) SERVICE IN SEWER TRENCH - Service pipe laid in a sewer or construction trench shall be protected from settlement by supports or by securely benching the service in side earth wall.

(G) BACKFILL - After a tap has been inserted or service pipe installed, the backfill around and one (1) foot over the main and service shall be Select Granular Fill and carefully tamped under and around the main and service. The remainder of the backfill shall be Approved Excavated Suitable Fill and shall be satisfactorily compacted either by tamping or flushing, or both. Where tunneling has been permitted the backfill of the tunnel portion shall be well compacted with Select Granular Fill.

(H) TEST OF SERVICE PIPE - Each new service pipe or repaired service pipe shall be subjected to a water test under the street main pressure by the plumber in the presence of the inspector. All pipes and appurtenances shall remain uncovered for the duration of the test and shall show no sign of leakage. Subject to the discretion of the Department when any question arise as to the installation being in conformity with these specifications, internal hydrostatic test as specifies for materials may be applied.

5.14.4 MEASUREMENT

The quantities of extending house services to be measured for payment shall be the number of linear feet of pipe incorporated in the work, complete, as shown, specified or required, measured from the center line of an existing main to a new water main that requires additional footage to service a house.

The quantities of replacing deteriorated house services to be measured for payment shall be the number of linear feet of pipe incorporated in the work, complete, as shown, specified or required, measured from the center line of the new water main to a point as determined by the Engineer.

5.14.5 PRICE TO COVER

COMPENSATION FOR EXTENDING HOUSE SERVICE LINES - Where the new mains are laid at a distance of more than three (3) feet measured center-line to center-line from the existing main (excluding the linear measurement of the goose-neck), compensation will be made to the Contractor at the unit price bid for all materials and sizes under the appropriate bid items, "EXTENDING HOUSE SERVICES (PIPE LESS THAN 3-INCH DIAMETER", and “EXTENDING HOUSE SERVICES (PIPE EQUAL OR GREATER THAN 3-INCH DIAMETER”.

The above compensation is in addition to the applicable contract items for "WITHDRAWING AND REPLACING HOUSE SERVICES", located in the bid schedule and shall be only for that distance beyond the three (3) feet as measured above. It shall cover the cost of all labor, materials, plant, equipment and insurance required to complete the work, including the earth excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**); backfilling; cleaning up; temporary restoration of street surfaces, hauling away of all materials, together with all other items necessary to complete this work and do all work incidental thereto, all in accordance with the plans, specifications and standards, and as directed by the Engineer and the Department of Environmental Protection. Related work such as pavement excavation and restoration, rock or boulder excavation, sheeting, etc. shall be paid under their applicable items.

COMPENSATION FOR REPLACING DETERIORATED HOUSE SERVICE LINES - Compensation for replacing deteriorated house services will be made under the items for "EXTENDING HOUSE SERVICES", various sizes, located in the bid schedule. It shall cover the cost of all labor, materials, plant, equipment and insurance required to complete the work including the earth excavation of all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**); backfilling; cleaning up; temporary restoration of street surfaces, hauling away of all materials, together with all other items necessary to complete this work and do all work incidental thereto, all in accordance with the plans, specifications and standards, and as directed by the Engineer and the Department of Environmental Protection. Related work such as pavement excavation and restoration, rock or boulder excavation, sheeting, etc. shall be paid under their applicable items.

The above compensation is in addition to the applicable bid items for "WITHDRAWING AND REPLACING HOUSE SERVICES" located in the bid schedule.

No direct payment will be made to the Contractor for insulating service pipes, where required. All costs associated with furnishing, delivering and installing insulation and appurtenances will be deemed included in the items "WITHDRAWING AND REPLACING HOUSE SERVICES" and "EXTENDING HOUSE SERVICES" various sizes, located in the bid schedule.

COMPENSATION FOR CUTTING AND OFFSETTING HOUSE SERVICE LINES - Payment for offsetting house service water connections will be made under items labeled “CUTTING AND OFFSETTING HOUSE SERVICE WATER CONNECTIONS, LESS THAN 3-INCH DIAMETER”, and “CUTTING AND OFFSETTING HOUSE SERVICE WATER CONNECTIONS, EQUAL OR GREATER THAN 3-INCH DIAMETER” only when it is necessary to cut and offset the service in order to avoid interference with the new main in its final position. No payment will be made to the Contractor for services which can be offset without cutting or where services are cut merely for Contractor’s ease in the installation of new mains.

SECTION 5.15
FURNISHING, DELIVERING AND INSTALLING WET CONNECTION SLEEVES

5.15.1 DESCRIPTION

This section describes the furnishing, delivering and installation of wet connection sleeves for this contract.

5.15.2 MATERIALS

Wet connection sleeves shall be in accordance with **Section 2.09 - Standard Specifications For Stainless Steel Tapping Sleeves With Branch Connections For Flanged Tapping Valve Or Mechanical Joint Tapping Valve**.

5.15.3 CONSTRUCTION METHODS

The Contractor shall adhere to **Section 5.13 - Withdrawing And Replacing House Services**.

Department force will make the cuts in mains for services requiring wet connections. The Contractor shall do all other work, including the setting of the wet connection sleeves and valves and placing the cutting machine in position.

5.15.4 MEASUREMENT

The quantity of wet connection sleeves to be measured for payment shall be the actual number of sleeves furnished, delivered and installed. Payment will be made under the various respective contract items for "FURNISHING, DELIVERING AND INSTALLING WET CONNECTION SLEEVES WITH VARIOUS OUTLETS" and will be paid for based upon the size of pipe the sleeve will be installed on regardless of the size of the outgoing branch (i.e. A wet connection sleeve on a 12-inch pipe with a 3-inch outlet will be paid as a wet connection sleeve on a 12-inch pipe; a wet connection sleeve on a 12-inch pipe with a 6-inch outlet will also be paid for as a wet connection sleeve on a 12-inch pipe; etc.).

5.15.5 PRICE TO COVER

The contract prices for FURNISHING, DELIVERING AND INSTALLING WET CONNECTION SLEEVES WITH VARIOUS OUTLETS shall be a unit price bid for each size wet connection sleeve installed and shall cover the cost of all labor, materials, plant, equipment and insurance required to complete the work in the manner herein set forth and specified. No separate or additional payment will be made under any other item or items of the contract for labor, equipment or materials used in connection with the work under this item, but the costs thereof shall be considered as having been included in the amount(s) stipulated for this item.

SECTION 5.16
FURNISHING, DELIVERING AND INSTALLING BANDS, RODS, WASHERS, NUTS AND BOLTS

5.16.1 DESCRIPTION

This section describes the furnishing, delivering and installation of bands, rods, washers, nuts and bolts for this contract.

5.16.2 MATERIALS

Bands, rods, washers, nuts and bolts shall be in accordance with **Section 2.12** of these specifications.

5.16.3 CONSTRUCTION METHODS

In order to protect against unbalanced pressures, the Contractor may use, if approved by the Engineer; bands and rods to restrain piping to meet the minimum lengths of required restraint as described in **Subsection 5.02.3(H)** of these specifications. Bands and rods shall only be used where it is impractical to install new ductile iron restrained joint pipe to meet the aforementioned requirements.

5.16.4 MEASUREMENT

The quantity of bands, rods, washers, nuts and bolts to be measured for payment shall be the weight in pounds as shown on **Standard Drawing No. 20731-Z-C** actually furnished and delivered and incorporated into the work, complete, as shown, specified or required.

5.16.5 PRICE TO COVER

Payment for furnishing, delivering and installing bands, rods, washers, nuts and bolts and all other materials required to restrain pipe joints that are ordered by the Engineer to protect against unbalanced pressures will be made to the Contractor under the unit price bid for contract item labeled "FURNISHING, DELIVERING AND INSTALLING BANDS, RODS, WASHERS, ETC., COMPLETE, FOR RESTRAINING JOINTS".

5.16.6. NO PAYMENT

No direct payment will be made for steel bolts, nuts and washers used to connect flanges. Payment will be deemed included in prices bid for all items of the contract. All bolts, nuts and washers removed during the course of the work must be replaced with new steel bolts, nuts and washers.

No direct payment will be made for application of protective coating to bolts, nuts, and flanges. Payment will be deemed included in prices bid for all items of the contract.

SECTION 5.17
FURNISHING AND PLACING POLYETHYLENE SLEEVE

5.17.1 DESCRIPTION

This section describes the furnishing, delivering and placing of Polyethylene Sleeve up to and including 20-inch diameter pipe.

5.17.2 MATERIALS

Polyethylene sleeve shall be in accordance with **Section 2.17**.

5.17.3 CONSTRUCTION METHODS

(A) The Contractor shall encase the new ductile iron mains and appurtenances (i.e., straight pipe, bends, reducers and offsets) to be installed in an approved loose 8-mil thick polyethylene sleeve, where required and ordered by the Engineer, in accordance with Method "A" of ANSI/AWWA C105/A21.5, latest revision. Method "A" is outlined below for the Contractor's information:

(1) The pipe shall be picked up by a crane or trenching machine at the side of the trench, using either a sling or pipe tongs, and raised about three (3) feet off the ground. A polyethylene tube, cut approximately two (2) feet longer than the length of the pipe, shall be slipped over the spigot end of the pipe and bunched up, accordion fashion, between the end of the pipe and the sling.

(2) The pipe shall be lowered into the trench; the spigot seated into the bell of the adjacent installed

pipe or fitting, and the pipe shall then be lowered to the bottom. A bell hole shall be provided in the trench bottom to facilitate the wrapping of the joint.

(3) The pipe joint shall then be made up.

(4) The sling shall be removed from the center of the pipe and hooked into the bell cavity. The bell shall be raised 3 to 4-inches and the tube of polyethylene film shall be slipped along the full length of the pipe barrel. Enough of the film should be left bunched up, accordion fashion, at each end of the pipe, to overlap the adjoining pipe or fitting about one (1) foot.

(5) To make the overlapped joint wrap, the film shall be pulled over the bell of the pipe, folded around the adjacent spigot, and wrapped with a minimum of three (3) circumferential turns of 2-inches wide polyethylene adhesive tape in order to secure the tube of film to the pipe. The tube on the adjacent pipe shall then be pulled over the first wrap on the pipe bell and secured in place behind the bell, using a minimum of three (3) circumferential turns of the polyethylene adhesive tape.

(6) The resulting loose wrap on the barrel of the pipe shall be pulled snugly around the barrel of the pipe, the excess material folded over the top, and the fold held in place, by means of short strips of polyethylene adhesive tape, at intervals of about three (3) feet along the pipe barrel.

(7) Taps shall be made by tapping through the polyethylene sleeve and taping around the screw tap.

(8) To avoid damage to the polyethylene sleeve, the trench shall be backfilled by hand for the first foot of cover with Select Granular Fill.

(B) All other appurtenances (i.e., three-ways, four-ways, valves, taps, service connections, etc.), repairs and junctions between wrapped and unwrapped pipe not mentioned in paragraph (A) above shall be encased as specified in ANSI/AWWA C105/A21.5, latest revision.

5.17.4 MEASUREMENT

The quantity of polyethylene sleeve to be measured for payment shall be the number of linear feet of ductile iron pipe water main wrapped and incorporated into the work.

5.17.5 PRICE TO COVER

Payment for furnishing, delivering and placing polyethylene sleeve will be made under the unit price bid for item labeled "FURNISHING AND PLACING POLYETHYLENE SLEEVE".

SECTION 5.18
FURNISHING, DELIVERING AND PLACING FILTER FABRIC

5.18.1 DESCRIPTION

This section describes the furnishing, delivering and placing of Filter Fabric.

5.18.2 MATERIALS

Filter fabric shall be in accordance with **Section 2.18**.

5.18.3 CONSTRUCTION METHODS

(A) DESCRIPTION - The Contractor shall furnish, deliver and install filter fabric in water main trenches as shown on **Standard Drawing No. 44292-B-Z** to the extent required and as directed by the Engineer.

(B) PLACEMENT OF MATERIAL - Filter fabrics, which are subject to deterioration by Ultraviolet rays, shall be protected from sunlight during transport and storage.

No fabric, (those subject to damage from sunlight as well as those that are not) shall be left exposed more than two (2) weeks before being covered by backfill.

(1) Bedding Trench: When gravel or broken stone bedding is required, the filter fabric shall be placed in the bedding trench so as to conform loosely to the shape of the trench. The bedding material shall then be placed and compacted as specified in the specification for gravel or broken stone bedding of pipe.

The filter fabric shall then be folded over the top of the bedding material to produce a minimum overlap of twelve (12) inches.

(2) Pipe Installation Trench: The filter fabric shall be placed in the trench, if ordered, on top of the filter fabric covering the bedding so as to conform loosely to the shape of the trench. The pipe shall be installed and the backfill placed and compacted up to the base of the existing or proposed pavement as specified in the specifications. The filter fabric shall then be folded over the top of the backfill material to produce a minimum overlap of twelve (12) inches.

(3) Overlap in Longitudinal Direction: Successive sheets installed in the longitudinal direction (parallel to the pipe) shall be overlapped a minimum of twelve (12) inches.

5.18.4 MEASUREMENT

The quantity to be measured for payment for furnishing, delivering and installing filter fabric shall be the number of square feet measured in place actually incorporated into the work in accordance with the payment lines shown on **Standard Drawing No. 44292-B-Z** or on the contract drawings or as ordered by the Engineer.

The area of filter fabric shall be calculated by multiplying the actual width of the filter fabric required to completely surround the bedding or refill material, as applicable, with the actual length of installation. The quantity to be paid for shall include a longitudinal top overlap of maximum twelve (12) inches.

No payment will be made for top overlaps exceeding twelve (12) inches, nor will payment be made for additional longitudinal or any peripheral overlap.

5.18.5 PRICE TO COVER

Payment for furnishing, delivering and placing filter fabric will be made under the unit price bid for item labeled "FURNISHING, DELIVERING AND PLACING FILTER FABRIC".

SECTION 5.19
FURNISHING, DELIVERING AND PLACING SCREENED GRAVEL OR BROKEN STONE BEDDING

5.19.1 DESCRIPTION

This section describes the furnishing, delivering and placing of Screened Gravel or Broken Stone Bedding.

5.19.2 MATERIALS

Screened gravel or broken stone bedding shall be in accordance with **Section 2.19**.

5.19.3 CONSTRUCTION METHODS

To the extent required and as directed by the Engineer, the new mains shall be installed with a bed of gravel, or broken stone below the pipe as shown on **Standard Drawing No. 44292-B-Z** or on the contract drawings or as ordered by the Engineer.

It shall be placed in horizontal layers not exceeding 6-inches in thickness. Each layer shall be tamped sufficiently with approved mechanical tampers to secure the required compaction.

5.19.4 MEASUREMENT

The quantity of Screened Gravel or Broken Stone Bedding to be measured for payment shall be the number of cubic yards of compacted volume of Screened Gravel or Broken Stone Bedding in place as determined by the Engineer, within the payment lines shown on **Standard Drawing No. 44292-B-Z** or on the contract drawings or as ordered by the Engineer.

5.19.5 PRICE TO COVER

Payment for furnishing, delivering and placing screened gravel or broken stone bedding will be made under the unit price bid for item labeled "FURNISHING, DELIVERING AND PLACING SCREENED GRAVEL OR BROKEN STONE BEDDING".

5.19.6 ADDITIONAL PAYMENT

Payment for the cost for all additional excavation required below the normal trench subgrade excavation limit in order to place the gravel or broken stone bedding to the depth shown, specified or ordered, shall be made under the unit price bid for item labeled "ADDITIONAL EARTH EXCAVATION INCLUDING TEST PITS". All additional excavation shall comply with the requirements of **Section 5.24 - Additional Earth Excavation Including Test Pits**.

SECTION 5.20
SAW CUTTING PAVEMENT

5.20.1 DESCRIPTION

This section describes Saw Cutting Pavement.

5.20.2 CONSTRUCTION METHODS

(1) The Contractor will be required to cut all asphaltic pavement; concrete pavement; asphaltic wearing course on concrete base pavement; and all other roadway pavements specified or ordered; as follows:

(a) full-depth saw cuts of pavement along the initial opening limits of all trenches and excavations. (Cuts labeled "CUTS NO. 1" in Section A of **Standard Drawings No. WM0401, WM0402 and WM0403**);

(b) full-depth chisel cuts of pavement along the edges of all trenches and excavations for cutbacks of trenches and excavations required for water mains 24-inches and larger in diameter. (Cuts labeled "CUTS NO. 2" in Section C of **Standard Drawing No. WM0403**);

(c) full-depth chisel cuts of pavement along the edges of all trenches and excavations for cutbacks of trenches and excavations required in streets protected by New York City Administrative Code §19-144 (Local Law No. 14). (Cuts labeled "CUTS NO. 2" in Section C of **Standard Drawing No. WM0402**);

(d) full-depth saw cuts of asphaltic wearing course along the edges of all trenches and excavations for cutbacks of asphaltic wearing course. (Cuts labeled "SAW-CUTS NO. 2" in Section E of **Standard Drawing No. WM0401**, and; Cuts labeled "SAW-CUTS NO. 3" in Section E of **Standard Drawings No. WM0402 and WM0403**); and;

(e) full-depth saw cuts of pavement across the widths of trenches, excavations and cutbacks.

NOTE: A "FULL-DEPTH CHISEL CUT" shall be defined as the cutting of pavement by either of these following methods:

(1) by both saw cutting to a minimum of one-half (1/2) the depth of the pavement base and cutting the remainder of the base with hand-held "Jack" hammers; or;

(2) by a full-depth Vermeer cut.

(2) The Contractor will be required to full-depth saw cut all sidewalks and curbs along the limits of trenches and excavations or as directed by the Engineer.

(3) Breaking Existing Pavement - All pavements shall be initially opened as specified in **Subsection 5.20.2 paragraphs (1)(a) and (2)** above. Unless otherwise specified, the remainder of the pavements between cuts may be opened with hand-held "Jack" Hammers, Hoe-Rams, or Truck-Mounted Pavement Breakers. Hoe-Rams will be permitted to crack the pavements between longitudinal cuts just prior (same day) to the excavation (where surrounding pavement is to remain). This applies to all streets at all times. The area under construction shall be kept as clean and neat as possible and no material shall restrict water flow in gutter areas. These requirements shall be the responsibility of the Contractor.

In order to minimize future settlements, cuts in recently constructed pavements still under guarantee by the Contractor; in which subgrade material is removed along with the pavement excavated; must be backfilled to subgrade of pavement with clean sand or run-of-bank gravel, except where subsurface conditions preclude select granular fill, as determined by the Engineer. All unsuitable excavated material must be removed from the site at no additional cost to the City.

All trenches shall be properly backfilled and the final subgrade of pavement shall be thoroughly tamped.

(4) As specified herein, the use of a Vermeer Wheel will be permitted provided the Contractor complies with the Department of Transportation Specification 1.06.28, Underground Facilities, Intent and 16NYCRR Part 753 of the New York State Industrial Code.

(5) All saw cutting shall be done with approved power tool equipment.

5.20.3 PAYMENT

(1) Full-Depth Saw Cutting Of Pavements Along The Initial Opening Limits Of All Trenches And Excavations - No separate payment will be made for any required full-depth saw cutting of pavements along the initial opening limits of all trenches and excavations. (Cuts labeled “CUTS NO. 1” in Section A of **Standard Drawings No. WM0401, WM0402 and WM0403**).

(2) Full-Depth Chisel Cutting Of Pavements Along The Edges Of All Trenches And Excavations For Cutbacks Of Trenches and Excavations Required For Water Mains 24-Inches And Larger In Diameter – No separate payment will be made for any required full-depth chisel cutting of pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required for water mains 24-inches and larger in diameter. (Cuts labeled “CUTS NO. 2” in Section C of **Standard Drawing No. WM0403**).

(3) Full-Depth Chisel Cutting Of Pavements Along The Edges Of All Trenches And Excavations For Cutbacks Of Trenches and Excavations Required In Streets Protected By New York City Administrative Code §19-144 (Local Law No. 14) - Separate payment will be made for any required full-depth chisel cutting of pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required in streets protected by New York City Administrative Code §19-144 (Local Law No. 14). (Cuts labeled “CUTS NO. 2” in Section C of **Standard Drawing No. WM0402**).

(4) Full-Depth Saw Cutting Of Asphaltic Wearing Course Along The Edges Of All Trenches And Excavations For Cutbacks Of Asphaltic Wearing Course - No separate payment will be made for any required full-depth saw cutting of asphaltic wearing course along the edges of all trenches and excavations for cutbacks of asphaltic wearing course. (Cuts labeled “SAW-CUTS NO. 2” in Section E of **Standard Drawing No. WM0401**, and; Cuts labeled “SAW-CUTS NO. 3” in Section E of **Standard Drawings No. WM0402 and WM0403**).

(5) Full-Depth Saw Cutting Of Pavements Across The Widths Of Trenches, Excavations And Cutbacks - No separate payment will be made for any required full-depth saw cutting of pavements across the widths of trenches, excavations and cutbacks.

(6) Full Depth Saw Cutting Of All Sidewalks And Curbs Along The Limits Of Trenches And Excavations -

No separate payment will be made for any required full-depth saw cutting of all sidewalks and curbs along the limits of trenches and excavations or as directed by the Engineer.

5.20.4 MEASUREMENT

Measurement for payment will be made **ONLY** for full-depth chisel cutting of pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required in streets protected by New York City Administrative Code §19-144 (Local Law No. 14), as follows:

> The quantity of saw cutting to be measured for payment shall be the number of linear feet of actual chisel cutting performed to the full depth required along each edge of the trenches and excavations for the cutbacks of trenches and excavations required in streets protected by New York City Administrative Code §19-144 (Local Law No. 14).

5.20.5 PRICE TO COVER

Payment will be made **ONLY** for full-depth chisel cutting of pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required in streets protected by New York City Administrative Code §19-144 (Local Law No. 14), as follows:

> Payment for full-depth chisel cutting of pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required in streets protected by New York City Administrative Code §19-144 (Local Law No. 14) shall be made under the unit price bid for the item labeled "SAW CUTTING PAVEMENT". The contract price for "SAW CUTTING PAVEMENT" shall be the unit price bid per linear foot for full-depth chisel cutting of pavement performed and shall cover the cost of all labor, materials, plant, equipment and insurance required and necessary to chisel cut pavements along the edges of all trenches and excavations for cutbacks of trenches and excavations required in streets protected by New York City Administrative Code §19-144 (Local Law No. 14), including saw cutting to a minimum of one-half (1/2) the depth of the pavement base and cutting the remainder of the base with hand-held "Jack" hammers; Vermeer cutting to the full depth; and to perform all incidental work necessary thereto, all in accordance with the plans, specifications and standards and as directed by the Engineer.

5.20.6 NO SEPARATE PAYMENT

No separate or additional payment will be made for the following saw cutting work. The costs of these saw cutting work shall be deemed included in the prices bid for all items of the contract.

(1) Full-Depth Saw Cutting Of Pavements Along The Initial Opening Limits Of All Trenches And Excavations;

(2) Full-Depth Chisel Cutting Of Pavements Along The Edges Of All Trenches And Excavations For Cutbacks Of Trenches and Excavations Required For Water Mains 24-Inches And Larger In Diameter;

(3) Full-Depth Saw Cutting Of Asphaltic Wearing Course Along The Edges Of All Trenches And Excavations For Cutbacks Of Asphaltic Wearing Course;

(4) Full-Depth Saw Cutting Of Pavements Across The Widths Of Trenches, Excavations And Cutbacks;

(5) Full Depth Saw Cutting Of All Sidewalks And Curbs Along The Limits Of Trenches And Excavations Or As Directed By The Engineer; and;

(6) Partial Depth Precutting Or Scoring Of Existing Pavement.

SECTION 5.21
SHEETING

5.21.1 DESCRIPTION

This section describes the use of Sheeting.

5.21.2 MATERIALS

(A) Timber sheeting and bracing shall be of new or acceptable used timber free from injurious defects.

(B) Steel soldier beams shall comply with **Section 2.12 - Structural, Reinforcing and Miscellaneous Steel**, except that approved used material will be permitted. Steel Sheet Piling shall comply with the requirements of **Section 2.23 - Steel Sheeting**, except that approved used materials will be permitted. Timber and lumber for bracing, shoring, fencing, bridging and decking shall conform to requirements of **Section 2.15 - Timber and Lumber**. Steel used for sheeting systems or for any other purposes herein shall conform to the requirements of the ASTM Designation A36 and all other applicable requirements of ASTM.

5.21.3 CONSTRUCTION METHODS

To prevent injury to workmen or to avoid damaging existing water pipes, structures, and pavements and their foundations through caving or sliding of the banks of a trench or other excavation, protection shall be provided for all excavation work except where a determination is made by the Contractor, the Engineer or the Engineer's inspector at the work site that the nature of the excavation does not require protection.

Excavation protection, when required, shall be provided in accordance with the requirements of:

(1) U.S. Occupational Safety and Health Administration (OSHA) Construction Safety and Health Regulations, Part No. 1926, Subpart P;

(2) Excavation and Demolition Operations at or Near Underground Facilities New York State Industrial Code, Rule 53;

(3) Special requirements detailed below.

NOTE: Whenever an interpretation difference exists as to selecting the applicable requirements, that of the most stringent one shall govern.

(A) Special Requirements

Unless specifically ordered otherwise by the Engineer or the Engineer's inspector at the work site, the following Special Requirements shall be adhered to:

(a) Trenches for Water Main Pipe 12-Inch in Diameter and Less

In general, such trenches shall not be sheeted since, with the laying depths used, the trench bottoms will be less than five (5) feet below the ground surface, and it is anticipated that, in most cases, the nature of the soil will not require sheeting at these depths. However, removal of existing pipe, or connections to existing pipe may, in some instances result in trench depths of five (5) feet or greater. In such cases, at a minimum, skeleton sheeting will be required.

If, in the opinion of the Engineer or the Engineer's inspector at the work site, sheeting is required, for whatever reason, in any trench or other excavation, the Contractor shall install it.

(b) Trenches for Water Main Pipe 20-Inch in Diameter

All such trenches shall, at a minimum, be skeleton sheeted at any place where a workman, or workmen, are required to enter the trench, such as when making up joints, inserting taps, or other

purposes as ordered by the Engineer.

(c) Trenches for Water Main Pipe Larger Than 20-Inch in Diameter; and Excavations for Chambers and Manholes

All such trenches shall be tight sheeted, regardless of the depth of the trench.

(d) Detailed Requirements As To Type and Size of Sheeting

Unless specifically noted otherwise on the contract drawings or in these specifications, the skeleton sheeting required in paragraphs (a), and (b), above, and the tight sheeting required in paragraph (c), above, shall be furnished and installed in full compliance with the requirements of Section 1926.652 of the OSHA Regulations.

The timber sheeting shall be of structurally sound hardwood at least 2" x 6" in size. The maximum horizontal distance between edges of the sheeting shall be three (3) feet.

Sheeting spacing, and the size and spacing of stringers and cross bracing required for various soil conditions shall meet the latest OSHA Regulation requirements.

(B) Substitution for Timber Sheeting

Any substitution for timber sheeting and bracing such as a self-supporting movable shield of timber or metal, etc., must be designed by and stamped with the seal of a Professional Engineer, licensed to practice in the State of New York, and must be approved by the Engineer in writing prior to its being used on the job. Submittal of proposed substitutions shall be made by the Contractor at least four (4) weeks prior to their scheduled use to allow for proper review and approval of it by the Engineer.

(C) Removal of Sheeting

All sheeting, skeleton or tight, used during the progress of the work to support the sides of a trench or excavation shall be removed as the trench is backfilled, unless the Engineer orders, in writing, the same left in place.

(D) Sheeting Left In Place

Where the sheeting is ordered to be left in place, the full amount of the lumber so left in place will be paid for at fifty percent (50%) of the market value thereof, without any allowance for the cost of delivery or placing in the work. Sheeting left in place shall be cut off in accordance with **Subsection 4.05.2**.

When sheeting is ordered to be left in place, the cost of all work required for the cutting, removal and disposal of the cut sheeting shall be deemed included in the fifty percent (50%) compensation paid above.

(E) Sloped Sides of Trenches or Excavations

Where the Contractor requests permission not to sheet a trench or excavation, and offers to slope the sides of such trench or excavation in accordance with OSHA Regulations in lieu of such sheeting, the Contractor's request shall be reviewed by the Engineer.

If the Engineer deems such sloping to be acceptable the Engineer shall so notify the Contractor in writing.

Pavement excavation and restoration requirements shall be governed by the width of the trench measured at the bottom of the pavement foundation. Pavement excavation and restoration in excess of those required in connection with standard trench excavation, as specified, shall not be paid for.

In those cases where the Contractor does not request permission to side slope, but the Engineer determines that side sloping is in the best interests of the City, the Engineer shall order the Contractor to proceed using such side sloping. In these cases, the additional pavement excavation and restoration will be paid for at the appropriate bid unit price.

In both of the above cases it shall be presumed that side sloping a trench or excavation is done to obtain a lower cost for the work to be performed. The City shall, therefore, take an appropriate credit to cover the difference in overall costs resulting from the use of side sloping instead of timber sheeting.

5.21.4 MEASUREMENT

The quantity of sheeting, skeleton or tight, incorporated into the work, complete, as shown, specified or required shall be computed as twice the depth of trench times the length of the sheeted trench. The depth of trench or excavation to be sheeted shall be from the ground surface to the bottom of the pipe. In those cases where a special foundation, such as a broken stone bed or a concrete cradle or mat is required, the depth of trench or excavation to be sheeted shall be from the ground surface to the bottom of such special foundation.

5.21.5 PRICE TO COVER

Payment for skeleton sheeting of trenches for water main pipe 12-inch in diameter and less shall be made under the bid item labeled "FURNISHING AND PLACING SHEETING AND BRACING IN TRENCH FOR WATER MAIN PIPE 12-INCH IN DIAMETER AND LESS" contained in the bid schedule.

Payment for skeleton sheeting of trenches for water main pipe 20-inch in diameter shall be made under the bid item labeled "FURNISHING AND PLACING SHEETING AND BRACING IN TRENCH FOR WATER MAIN PIPE 20-INCH IN DIAMETER" contained in the bid schedule. Where there is no bid item for such sheeting, because the quantities of such pipe to be installed are very small, or the work involves connecting smaller size pipe to 20-inch mains or larger, payment for such sheeting will be made at the unit price bid for item labeled "FURNISHING AND PLACING SHEETING AND BRACING IN TRENCH FOR WATER MAIN PIPE 12-INCH IN DIAMETER AND LESS".

Where the nature of the soil, or a particular construction condition, requires tight sheeting for any portion of a trench, and the Engineer orders the Contractor in writing to construct tight sheeting (unless such tight sheeting, and the method of payment therefore, has been specifically called for on the contract drawings, or in these specifications) the Contractor will be paid for such tight sheeting at a rate equal to two hundred percent (200%) of the unit price bid by the Contractor for skeleton sheeting.

The Contractor's attention is called to the fact that the Contractor's bid price for sheeting covers the cost of extra earth excavation and other extra costs involved in laying the pipe, such as but not limited to, lesser pipe footage being installed per day, etc.

All of the above provisions are intended to apply to those instances where sheeting is required in a trench in order to lay pipe. In such instances a wider trench is required (to accommodate the sheeting) than when pipe is laid in unsheeted trenches.

When sheeting is provided in portions of a trench (to protect men inserting taps, etc.) that was originally excavated for laying a water main, and when such trench was not sheeted at the time the water main was laid, payment shall be made only for the amount of sheeting actually placed. In all such cases the payment lines for pavement excavation, pavement restoration, and satisfactory backfill shall be those specified for unsheeted trenches.

Where the OSHA Regulations do not require sheeting, but where the Contractor, for the Contractor's own convenience, installs a more limited type of trench support (stay bracing, etc.) such limited type of trench support will not be paid for. The cost of such limited trench support shall be deemed included in the various unit prices bid.

All sheeting that is to be paid for must meet all requirements of the OSHA Regulations.

5.21.6 NO SEPARATE PAYMENT

No separate payment will be made for the tight sheeting of water main trenches for water mains larger than 20-inches in diameter, the costs thereof shall be deemed included in the prices bid for laying these mains.

No payment shall be made for tight sheeting at chambers and manholes, but payment thereof will be deemed to be included in the various items bid for constructing the chambers and manholes.

SECTION 5.22
ROCK EXCAVATION

5.22.1 INTENT

This section describes Rock Excavation.

5.22.2 DEFINITION, ROCK EXCAVATION

Rock excavation is the removal of a formation that cannot be excavated without the use of systematic drilling.

Rock excavation shall include the excavation, removal and disposal of unbroken ledge rock from within the rock excavation payment lines as shown, specified or ordered.

5.22.3 CONSTRUCTION METHODS

(A) GENERAL CONSTRUCTION PROVISIONS - The requirements of **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS** shall apply to the work to be done hereunder.

(B) ROCK SURFACE - The Contractor's attention is specifically directed to the fact that the assumed rock surfaces and estimated quantity set forth in the contract; while calculated from the best information obtainable; are approximate only, are not guaranteed to obtain the work, are given only to form a basis of comparison of bids, and are not to be considered as a binding feature of the contract. The bidders are required to examine the soundings and borings and the premises, and take such steps as may be necessary to judge for themselves the quantities and other circumstances affecting the cost of the work.

(C) NOTIFICATION BEFORE COMMENCING WORK - After ledge rock has been stripped of overlaying materials the Engineer shall be duly notified in order that the Engineer may take such measurements and surveys required to measure the amount of ledge rock. Any rock excavated before such measurements are taken will not be paid for.

(D) BLASTING - No blasting will be allowed. The Contractor shall use line drilling or other approved methods.

(E) EXCAVATION FOR BRANCHES - Whenever a branch for a proposed sewer or water main or extension of sewer or water main is built in rock the required trench shall be excavated for a distance of not less than five (5) feet beyond the end of such branch in the direction of the proposed pipe or extension.

(F) COVER FOR NEW WATER MAINS - Where ledge rock is encountered in the trench, the new water main shall be laid with a minimum cover of three (3) feet over the top of the barrel of the pipe, except where a greater or lesser cover over the pipe is dictated by field conditions, and as determined by the Engineer.

(G) PIPE SUPPORT - Where the bottom of the water main trench is in rock, the pipe shall be supported on at least six (6) inches of select granular fill bedding in filter fabric wrap, or on concrete cradle, as approved or ordered by the Engineer and as shown on **Standard Drawing No. 45700-W**.

(H) DISPOSAL OF ROCK FROM SITE - All rock excavated from the trench shall be properly disposed of immediately by the Contractor after its removal from the trenches and excavations.

5.22.4 WIDTH AND DEPTH OF ROCK EXCAVATION

The rock shall be excavated to the widths and to the depths required for the pipes, cradles and foundations of the structures. (See **Section 4.02**.)

5.22.5 LENGTH OF ROCK TO BE STRIPPED

Unless otherwise specified in the contract documents or ordered in writing by the Engineer, all rock shall be stripped in sections to its full depth for a minimum distance of twenty (20) feet in advance of the length of pipe permitted to be laid; however, the total length of stripped section shall not be less than fifty (50) feet. The only exception to this is at its upper end or ends, where rock shall be stripped to its full depth to a distance of not less than five (5) feet beyond the pipe to be built. Upon completion of this work the Engineer shall be notified in order that the Engineer may measure the rock removed. No payment will be made for rock excavated before such measurement is made.

The subgrade must be checked and accepted by the Engineer before any structure is placed thereon.

5.22.6 EXPOSED STRUCTURES TO BE PROTECTED

All exposed water mains, valves, sewers, manholes, receiving basins and other structures shall be carefully protected. The Contractor at the Contractor's own expense shall promptly repair any damage done to such structures.

5.22.7 MEASUREMENT

The quantity of rock excavation to be measured for payment shall be the volume of ledge rock removed and disposed of away from the site of the work, from between the approved vertical planes and extending from the subgrade of the trench or excavation to the rock surface that are established as defined in **Section 4.02**.

5.22.8 PRICE TO COVER

The contract price for "ROCK EXCAVATION" shall be the unit price bid per cubic yard and shall cover the cost of all labor, materials, plant, equipment and insurance required and necessary to remove and dispose of all ledge rock from within the limits of the rock excavation payment lines, together with all work incidental thereto, all in accordance with the plans and specifications and as directed by the Engineer.

Filling of the voids left by the removal of ledge rock within the limits of the rock excavation payment lines shall be done in accordance with **Section 4.06**. In addition, included in the price hereunder shall be the cost of all labor, material, plant, equipment and insurance required and necessary to furnish and deliver acceptable clean fill material required to fill the voids left by the removal of ledge rock.

5.22.9 NO SEPARATE PAYMENT

The Contractor is notified that the cost for all labor, materials, equipment and insurance required and necessary to place, compact, sample and test acceptable clean fill material required to fill voids left by the removal of ledge rock shall be deemed included in the prices bid for all contract items of work. No separate or additional payment will be made for this work.

SECTION 5.23
EXCAVATION OF BOULDERS IN OPEN CUT

5.23.1 DESCRIPTION

Excavation of boulders in open cut shall include the excavation, removal and disposal of boulders or parts thereof from within the limits of the sheeted and unsheeted trenches and excavations, more than one-half (1/2) cubic yard in volume. The term boulders as used herein shall include riprap, rock fill, thrust blocks and loose masonry. It shall not include pavement and pavement foundation, or existing sewer or water main structures.

5.23.2 CONSTRUCTION METHODS

(A) GENERAL CONSTRUCTION PROVISIONS - The requirements of **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS, Section 4.04** shall apply to the work to be done hereunder.

(B) NOTIFICATION AFTER REMOVAL FROM OPEN CUT - After the boulder has been removed from open cut, the Engineer shall be duly notified in order that the Engineer may take such measurements required to measure the boulder. Any boulder removed from the site of the work before such measurements are taken will not be paid for.

5.23.3 MEASUREMENT

The quantity of excavation of boulders in open cut to be measured for payment shall be the volume of boulders or parts thereof from within the limits of the sheeted and unsheeted trenches and excavations, more than one-half (1/2) cubic yard in volume, excavated and removed in open cut and disposed of away from the site of the work.

The volume of a boulder or parts thereof removed from open cut shall be computed by multiplying the maximum cross sectional area by seven-tenths (7/10) of the length.

Boulders one-half (1/2) cubic yard or less in volume, pavement and pavement foundations, trolley track foundations and existing sewers, manholes, valve chambers, regulator chambers and appurtenances will not be measured for payment.

5.23.4 PRICE TO COVER

The contract price for "EXCAVATION OF BOULDERS IN OPEN CUT" shall be the unit price bid per cubic yard and shall cover the cost of all labor, materials, plant, equipment and insurance required and necessary to excavate, remove and dispose of all boulders in open cut from within the limits of the sheeted and unsheeted trenches and excavations (whether whole or partial), together with all work incidental thereto, all in accordance with the plans and specifications and as directed by the Engineer.

5.23.5 NO SEPARATE PAYMENT

No separate or additional payment will be made wherever the Contractor elects to remove an entire boulder that extends partly into the trench or excavation. Payment will only be made for that volume of the boulder that is within the limits of the sheeted and unsheeted trench or excavation. No separate or additional payment will be made for the removal of boulders or for the filling of voids left by the removal of boulders beyond the limits of the sheeted or unsheeted trench or excavation.

SECTION 5.24
ADDITIONAL EARTH EXCAVATION INCLUDING TEST PITS

5.24.1 DESCRIPTION

This section describes earth excavations other than normal trench excavations required and approved in writing by the Engineer.

5.24.2 CONSTRUCTION METHODS

During the course of work the Contractor may be required or ordered to perform additional earth excavation outside of or within the specified trenches or excavation. These additional earth excavations include, but are not limited to the following purposes:

(a) For the enlargement of trenches and excavations due to changes in the design of standard or special structures.

(b) For the removal of obstructions or unsuitable material below the subgrade of trenches and excavations, and for the placing of additional bedding or concrete below the standard subgrade of trenches and excavations.

(c) For the construction of additional structures, and for grading and for compacting.

(d) For test pits, exploratory borings and other excavations ordered made and not subsequently included

within the limits of the trench in which the pipes, mains, structures and appurtenances are installed, or where such test pits, exploratory borings and other excavations are ordered backfilled prior to excavating the trench. Information regarding the types and strata of underlying material obtained by the subsurface exploration provide the basis for estimating the need for furnishing satisfactory backfill material; the findings shall be properly logged and submitted to the Engineer for the Engineer's evaluation and records.

(e) To locate the ends of existing pipes, mains, or structures to which new pipes, mains or structures are to be connected and where such excavation is not part of the trench or excavations in which said new pipes, mains or structures are laid, or where such excavation is ordered backfilled prior to excavating the trench or excavation.

(f) To excavate along the line of mains for the purpose of finding taps thereon, in excess of a length of six (6) feet for each individual tap, or where such mains have a cover greater than four (4) feet, or in excess of that indicated on the drawings.

(g) Where the mains are ordered to be laid at a depth which will make the cover on the top of the barrel of the pipe greater by a minimum of one (1) foot that which is called for on the drawings or required in the opinion of the Engineer.

The requirements of **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS** shall apply to the work to be done hereunder.

5.24.3 MEASUREMENT

The quantity of additional earth excavation to be measured for payment shall be the number of cubic yards of material actually excavated, as ordered in writing by the Engineer, and as measured in its original position. No measurement for payment will be made for excavation beyond the limits ordered.

5.24.4 PRICE TO COVER

The contract price for "ADDITIONAL EARTH EXCAVATION INCLUDING TEST PITS" shall be the unit price bid per cubic yard for additional earth excavation and shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required and necessary to excavate all materials of whatever nature encountered (See **Section 4.03 - Earth Excavation**) as specified or ordered, including the providing of all sheeting and bracing; modifications of sheeting systems; pumping; bridging; decking; cleaning up; disposal of surplus and rejected excavated material; grading and compacting of subgrades; and do all work incidental thereto, all in accordance with the plans, specifications and standards, and as directed by the Engineer.

In addition, included in the price hereunder shall be the cost of all labor and materials necessary to remove all specified or ordered existing sewers, water mains, manholes and appurtenances, that may be in the line of the work and do all work incidental thereto, all in accordance with **Sections 1.06.12 and 1.06.27** of the specifications and as directed by the Engineer.

Where the Engineer orders the area excavated under this item to be backfilled, the work shall be done in accordance with **Section 4.06** and payment will be made as per **Section 5.19 - Screened Gravel or Broken Stone Bedding, Section 5.25 - Additional Select Granular Backfill and Section 5.32 - Clean Backfill**.

All pavement disturbed, either within or outside the limits of the trench and excavation, shall be replaced by the Contractor and payment will be made under the applicable items contained in the Bid Schedule.

5.24.5 SPECIAL CONSIDERATION

The cover on new water main shall, in general, be as indicated on the drawings or as otherwise specified.

NO PAYMENT - No payment for excess excavation for water mains will be made if the excavation ordered by the Engineer exceeds by one (1) foot or less the depth required to lay the water main at

the cover called for on the drawings or as specified.

SEPARATE PAYMENT - Payment for excess excavation for water mains will be made only if the excavation ordered by the Engineer exceeds by more than one (1) foot the depth required to lay the water main at the cover called for on the drawings or as specified.

The volume of excavation for which additional compensation will be made shall be the product of the average depth which is in excess of one (1) foot the depth required to lay the water main at the cover called for on the drawings or as specified, with the trench width called for on the drawings or as specified, with the length of excavation that exceeds by more than one (1) foot the depth required to lay the water main at the cover called for on the drawings or as specified.

SECTION 5.25
ADDITIONAL SELECT GRANULAR BACKFILL

5.25.1 DESCRIPTION

Additional select granular backfill shall be the select granular fill ordered in writing by the Engineer to fill voids outside or within the limits of the ordered trenches and excavations. This backfill material shall be exclusive of the normal backfill requirements as specified in **Subsection 4.06.2**.

5.25.2 MATERIALS

Select Granular Backfill shall comply with the requirements of **Subsection 2.21(B)**.

If approved in writing by the Engineer, excavated material determined to be unsuitable, in accordance with **Subsection 4.06.2**, may be processed (i.e. screened and/or crushed) to produce select granular fill as specified herein. In such case, the material furnished in accordance with these specifications, to be used as specified in **Subsection 5.25.1** shall be accepted for payment under the contract item for "ADDITIONAL SELECT GRANULAR BACKFILL" computed in accordance with **Subsection 5.25.4**.

5.25.3 CONSTRUCTION METHODS

The requirements of **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS** shall apply to the work to be done hereunder.

5.25.4 MEASUREMENT

The quantity of additional select granular backfill to be measured for payment shall be the number of cubic yards of additional select granular backfill, as ordered in writing by the Engineer, in place after compaction and limited to the conditions specified in **Subsection 5.25.1**.

Where additional select granular backfill is ordered by the Engineer to be placed within the limits of the ordered trenches, the following shall apply:

If actual trench widths are less than either payment maximums stated in **Subsection 5.02.3(A)(1)**, those smaller widths shall serve as the basis upon which the actual volume of substituted select granular backfill is measured for purposes of determining additional compensation. If, however, actual trench widths exceed those maximums, no payment will be made for select granular backfill placed outside these established limits. The cost of such excess backfill shall be borne solely and exclusively by the Contractor.

Where impracticable to measure additional select granular backfill in place, measurements may be made in scows and vehicles, and the quantity to be paid for will be eight-tenths (8/10) of the yardage determined by such measurements.

5.25.5 PRICE TO COVER

The contract price for "ADDITIONAL SELECT GRANULAR BACKFILL" shall be the unit price bid per

cubic yard for additional select granular backfill and shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required and necessary to furnish, deliver, place, compact, sample and test the additional select granular backfill material and to do all work incidental thereto, all in accordance with the plans and specifications, and as directed by the Engineer.

5.25.6 NO SEPARATE PAYMENT

No separate or additional payment will be made under this item for the select granular fill material that is required to place Select Granular Fill not less than twelve (12) inches on either side of the pipe; not less than six (6) inches below the barrel of the pipe and twelve (12) inches above the barrel of the pipe, etc. as described under **Subsection 4.06.2**, the cost of which is deemed included in the prices bid for all contract items of work.

SECTION 5.26
FURNISHING AND PLACING CONCRETE

5.26.1 DESCRIPTION

This section describes the use of concrete for the construction of water main structures (i.e., manholes, chambers, recess vaults, cradles, saddles, piers, pipe foundations, etc.) as approved by the Engineer.

5.26.2 MATERIAL

All concrete shall be in accordance with **General Specification 11 - Concrete, as modified in Section 2.11**.

5.26.3 CONSTRUCTION METHODS

(1) The Contractor shall furnish, deliver and place concrete and other concrete related work as required by the contract drawings or as ordered by the Engineer.

(2) The Contractor shall perform the work in accordance with New York City Department of Environmental Protection **General Specification 11 - Concrete, as modified in Section 2.11**.

(3) Concrete shall be of the dimension shown on the drawings.

5.26.4 MEASUREMENT

(1) The quantity of concrete to be measured for payment shall be the number of cubic yards of concrete incorporated into the work, complete, as shown, specified or required.

(2) The number of cubic yards of concrete shall be the actual volume of concrete placed in the work in conformance with the contract drawings and contract documents.

(3) When concrete is to be paid for by lump sum or by linear foot, or by the square foot, or by the square yard of completed structure, it will not be measured for payment under the concrete item unless specifically so stated on the contract drawings or shown in the Bid Schedule.

(4) Deductions will be made for the volume of openings, the areas of which are greater than one square foot and for bevels on beams, columns and in wall openings when such bevels exceed four inches on the diagonal faces.

(5) Deductions will not be made for the portion of piles embedded in concrete foundations.

(6) Deductions will not be made for expansion joints, structural steel, steel reinforcement, nor for conduits and pipes with a sectional area less than one square foot.

5.26.5 PRICE TO COVER

The contract price for "FURNISHING AND PLACING CAST-IN-PLACE CONCRETE CLASS 40 AND PRECAST CONCRETE CLASS 50" shall be unit price bid per cubic yard and shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required to furnish, deliver and do all work incidental thereto, all in accordance with the Plans, Specifications and Standards and as directed by the Engineer.

5.26.6 NO SEPARATE PAYMENT

(1) No payment will be made for concrete or cement placed outside the lines and grades indicated, specified or ordered in writing by the Engineer, or placed to fill unauthorized excavation or used for replacing defective work.

(2) No payment will be made for concrete or cement specified to be included in the lump sum price bid for a structure.

SECTION 5.27
FURNISHING, DELIVERING AND PLACING STRUCTURAL, REINFORCING AND MISCELLANEOUS STEEL

5.27.1 DESCRIPTION

This section describes the use of structural, reinforcing and miscellaneous steel for the construction of chambers, manholes and pipe foundations as approved by the Engineer.

5.27.2 MATERIALS

All steel, reinforcing, structural and miscellaneous, shall be in accordance with **Section 2.12**.

5.27.3 CONSTRUCTION METHODS

(1) Work included. The Contractor shall furnish, deliver and place Steel I beams, expanded metal or any other structural steel or steel shapes, steps, ladders, bands, bolts, nuts, washers, and other steel work required by the drawings or ordered by the Engineer.

(2) Painting. Steel surfaces shall be cleaned and painted in accordance with **Subsection 2.12.5**, and as directed by the Engineer.

5.27.4 MEASUREMENT

The quantity of structural, reinforcing and miscellaneous steel to be measured for payment shall be the number of pounds of structural, reinforcing and miscellaneous steel incorporated into the work, complete, as shown, specified or required.

5.27.5 PRICE TO COVER

The contract price for "FURNISHING, DELIVERING AND PLACING STRUCTURAL, REINFORCING AND MISCELLANEOUS STEEL" shall be the unit price bid per pound of structural, reinforcing and miscellaneous steel and shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required to furnish, deliver and place the structural, reinforcing and miscellaneous steel and do all work incidental thereto, all in accordance with the plans, specifications and standards and as directed by the Engineer.

SECTION 5.28
ADDITIONAL BRICK MASONRY

5.28.1 DESCRIPTION

Additional brick masonry shall be the brick masonry ordered in writing by the Engineer to be incorporated in the work exclusive of brick masonry for which payment is provided for under separate items. Additional brick masonry shall also be the brick masonry shown, specified or ordered placed in water main structures in accordance with water main standard drawings.

5.28.2 MATERIALS

Brick masonry shall be in accordance with **Section 2.16**.

Cement mortar shall be in accordance with **Section 2.13**.

5.28.3 CONSTRUCTION METHODS

(1) The requirements of **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS** shall apply to the work to be done hereunder.

(2) Brick Masonry shall comply with the provisions of **Subsection 2.16.9**.

(3) Brick shall be laid to a line and with close joints, and all joints exposed to view shall be pointed and shall be left in a neat condition.

(4) All unfinished work shall be racked back, or toothed, as directed, and before new work is joined to its surface, the bricks shall be scraped, thoroughly cleaned and scrubbed with a stiff brush and well moistened.

5.28.4 MEASUREMENT

The quantity of brick masonry to be measured for payment shall be the number of cubic yards of brick masonry furnished and incorporated into the work, complete, as shown, specified or required.

5.28.5 PRICE TO COVER

The contract price for “ADDITIONAL BRICK MASONRY” shall be the unit price bid per cubic yard for brick masonry and shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required and necessary to furnish, deliver and place the brick masonry and do all work incidental thereto, all in accordance with the plans, specifications and standards, and as directed by the Engineer.

SECTION 5.29
FENCING

5.29.1 DESCRIPTION

The Contractor shall completely enclose by temporary fences all excavations, steep embankments, open shops and storage areas and all other potentially hazardous locations as soon as such condition exists and as ordered by the Engineer. The fencing is in addition to any provisions that the Contractor would normally follow to safeguard the Contractor’s work operations and in no way reduces the Contractor’s obligations as provided in the contract.

5.29.2 MATERIALS

Fencing shall be five (5) foot high above the existing surface and shall be constructed in ten (10) linear foot removable sections to facilitate construction. Each section shall consist of three (3) horizontal rails of 2" x 8" lumber nailed at each end to 2" x 8" vertical posts. The lower rail shall be located not more than six (6) inches above ground or street surface. The posts shall be of sufficient height to be firmly anchored in

a manner approved by the Engineer. The spaces between rails shall be covered with 1/12-inch (0.083") diameter, (No. 14 B.W.G.) iron wire (both directions) of an electrically welded rectangular mesh, with openings no greater than two (2) inches wide by four (4) inches high.

5.29.3 CONSTRUCTION METHODS

(A) The Contractor shall be solely responsible for the furnishing, erecting, relocating, maintenance and removal and replacement of all temporary fencing required under this contract.

The Contractor shall maintain all fencing in a satisfactory and safe condition. The Contractor shall replace, at no additional cost to the City, any and all fencing that the Engineer deems cannot be maintained and/or fails to meet the requirements of this section.

(B) The Contractor shall be permitted to remove such portions of the fencing as are required for the purpose of performing the Contractor's construction operations during working hours, providing that the public is continuously safeguarded by other satisfactory means during these construction operations. In all such cases the sections of fencing removed shall be restored to their original locations at the end of each workday.

5.29.4 MEASUREMENT

The quantity of fencing to be measured for payment shall be the number of linear feet of temporary fencing incorporated into the work, complete, as shown, specified or required.

5.29.5 PRICE TO COVER

The contract price for FENCING shall be the unit price bid per linear foot fencing and shall cover the cost of all labor, materials, plant, equipment and insurance required and necessary to furnish, erect, relocate, maintain and remove and replace all temporary fencing and to do all work incidental thereto, all in accordance with the plans and specifications and as directed by the Engineer.

SECTION 5.30
NO SECTION

SECTION 5.31
PAVEMENT EXCAVATION

5.31.1 DESCRIPTION

This section describes the removal of pavements.

5.31.2 CONSTRUCTION METHODS

REMOVAL OF PAVEMENTS - All pavements shall be initially opened as specified in **Section 5.20**.

Unless otherwise specified, the remainder of the pavements between cuts may be opened with hand-held "Jack" Hammers, Hoe-Rams, or Truck-Mounted Pavement Breakers. Hoe-Rams will be permitted to crack the pavements between longitudinal cuts just prior (same day) to the excavation (where surrounding pavement is to remain). This applies to all streets at all times. The area under construction shall be kept as clean and neat as possible and no material shall restrict water flow in gutter areas. These requirements shall be the responsibility of the Contractor.

All pavement removal shall be done in such a manner so as not to disturb the existing pavements outside the specified and ordered area of removal and restoration.

For pavement removal and replacement refer to **Standard Drawing Nos. WM0401, WM0402 and WM0403** and as specified herein.

For the removal and restoration of brick or block pavements the edges of the pavement shall be toothed

or racked back.

5.31.3 PAYMENT

The Contractor will be compensated for breaking, removal and disposal of excavated pavement, provided that the pavement removed meets the following conditions:

(1) Pavement excavated is:

(a) within the ordered trench and cutback limits, or
(b) outside the ordered trench and cutback limits and has been specifically shown on the plans, specified in the contract documents, or ordered and approved in writing to be removed by the Engineer, or
(c) within the ordered test pit excavation limits.

and

(2) Pavement shall consist of:

(a) asphaltic concrete wearing course on a cement concrete base course, or
(b) asphaltic concrete wearing course on an asphaltic concrete base course, or
(c) cement concrete (sidewalks and curbs shall not be included), or
(d) brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course (sidewalks and curbs shall not be included).

5.31.4 MEASUREMENT

(1) Within Ordered Trench And Cutback Limits In Non-Protected Streets For Water Mains 20-Inches And Less In Diameter - When water main work is required in non-protected streets for water mains 20-inches and less in diameter, the payment lines (unless otherwise approved in writing by the Engineer) for the volume of pavement excavated, (i.e., broken, removed and disposed of, irrespective of the actual pavement material encountered), shall be computed as follows:

(A) Unsheeted Trenches:

(a) For existing pavement consisting of asphaltic concrete wearing course on a cement concrete base course, or asphaltic concrete wearing course on an asphaltic concrete base course, or brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course:

The product of the average depth of the base course, by the actual length of trench, by the width of the base course two (2) feet wider than the nominal diameter of the pipe installed; plus, the product of the average depth of the wearing course, by the actual length of trench, by the width of the wearing course three and one-half (3-1/2) feet wider than the nominal diameter of the pipe.

(b) For existing pavement consisting of cement concrete:

The product of the average depth of the full pavement, by the actual length of trench, by the width of the pavement three and one-half (3-1/2) feet wider than the nominal diameter of the pipe.

(B) Sheeted Trenches:

(a) For existing pavement consisting of asphaltic concrete wearing course on a cement concrete base course, or asphaltic concrete wearing course on an asphaltic concrete base course, or brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course:

The product of the average depth of the base course, by the actual length of trench, by the width of the base course four (4) feet wider than the nominal diameter of the pipe installed; plus, the product of the average depth of the wearing course, by the actual length of trench, by the width of the wearing course five and one-half (5-1/2) feet wider than the nominal diameter of the pipe.

(b) For existing pavement consisting of cement concrete:

The product of the average depth of the full pavement, by the actual length of trench, by the width of the pavement five and one-half (5-1/2) feet wider than the nominal diameter of the pipe.

(C) These payment lines shall be maximums. The width of pavement components to be excavated is based on the trench width, as specified. If actual trench widths are less than those maximums, the smaller widths shall become the payment lines. When, due to unforeseen or special field conditions changing the trench width from that specified becomes necessary, and the change is approved by the Engineer, the width of the pavement components' excavation to be paid for shall be increased or decreased by the dimension equal to that of the change in the trench width.

(2) Within Ordered Trench And Cutback Limits In Streets Protected By NYC Administrative Code §19-144 (Local Law No. 14.) For Water Mains 20-Inches And Less In Diameter - When water main work is required in streets protected by NYC Administrative Code §19-144 (Local Law No. 14) for water mains 20-inches and less in diameter, the payment lines (unless otherwise approved in writing by the Engineer) for the volume of pavement excavated, (i.e., broken, removed and disposed of, irrespective of the actual pavement material encountered), shall be computed as follows.

(A) Unsheeted Trenches:

(a) For existing pavement consisting of asphaltic concrete wearing course on a cement concrete base course, or asphaltic concrete wearing course on an asphaltic concrete base course, or brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course:

The product of the average depth of the base course, by the actual length of trench, by the width of the base course three (3) feet wider than the nominal diameter of the pipe installed; plus, the product of the average depth of the wearing course, by the actual length of trench, by the width of the wearing course four and one-half (4-1/2) feet wider than the nominal diameter of the pipe.

(b) For existing pavement consisting of cement concrete:

The product of the average depth of the full pavement, by the actual length of trench, by the width of the pavement four (4) feet wider than the nominal diameter of the pipe.

(B) Sheeted Trenches:

(a) For existing pavement consisting of asphaltic concrete wearing course on a cement concrete base course, or asphaltic concrete wearing course on an asphaltic concrete base course, or brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course:

The product of the average depth of the base course, by the actual length of trench, by the width of the base course five (5) feet wider than the nominal diameter of the pipe installed; plus, the product of the average depth of the wearing course, by the actual length of trench, by the width of the wearing course six and one-half (6-1/2) feet wider than the nominal diameter of the pipe.

(b) For existing pavement consisting of cement concrete:

The product of the average depth of the full pavement, by the actual length of trench, by the width of the pavement six (6) feet wider than the nominal diameter of the pipe.

(C) These payment lines shall be maximums. The width of pavement components to be excavated is based on the trench width, as specified. If actual trench widths are less than those maximums, the smaller widths shall become the payment lines. When, due to unforeseen or special field conditions changing the trench width from that specified becomes necessary, and the change is approved by the Engineer, the width of the pavement components' excavation to be paid for shall be increased or decreased by the dimension equal to that of the change in the trench width.

(3) Within Ordered Trench And Cutback Limits In All Streets For Water Mains 24-Inches And Larger In Diameter - When water main work is required in streets for water mains 24-inches and larger in diameter, the payment lines (unless otherwise approved in writing by the Engineer) for the volume of pavement excavated, (i.e., broken, removed and disposed of, irrespective of the actual pavement material encountered), shall be computed as follows.

(A) Sheeted Trenches:

(a) For existing pavement consisting of asphaltic concrete wearing course on a cement concrete base course, or asphaltic concrete wearing course on an asphaltic concrete base course, or brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course:

The product of the average depth of the base course, by the actual length of trench, by the width of the base course six (6) feet wider than the nominal diameter of the pipe installed; plus, the product of the average depth of the wearing course, by the actual length of trench, by the width of the wearing course seven and one-half (7-1/2) feet wider than the nominal diameter of the pipe.

(b) For existing pavement consisting of cement concrete:

The product of the average depth of the full pavement, by the actual length of trench, by the width of the pavement six (6) feet wider than the nominal diameter of the pipe.

(B) These payment lines shall be maximums. The width of pavement components to be excavated is based on the trench width, as specified. If actual trench widths are less than those maximums, the smaller widths shall become the payment lines. When, due to unforeseen or special field conditions changing the trench width from that specified becomes necessary, and the change is approved by the Engineer, the width of the pavement components' excavation to be paid for shall be increased or decreased by the dimension equal to that of the change in the trench width.

(4) Outside The Ordered Trench And Cutback Limits Or Within The Ordered Test Pit Excavation Limits - When pavement excavation is outside the ordered trench and cutback limits or within the ordered test pit excavation limits and has been specifically shown on the plans, specified in the contract documents, or ordered and approved in writing to be removed by the Engineer, the maximum payment lines for the volume of pavement excavated, (i.e., broken, removed and disposed of, irrespective of the actual pavement material encountered), shall be as defined and approved in writing by the Engineer.

(5) The method of measurement for computing the average depths specified herein shall be as ordered by the Engineer and shall be taken in the Engineer's or the Engineer's representative's presence. The Engineer shall verify all measurements. No quantities for volume of pavement excavated will be accepted unless approved in writing by the Engineer.

5.31.5 PRICE TO COVER

Payment for the volume of pavement excavated shall be made under the unit price bid for the item labeled "UNCLASSIFIED EXCAVATION". The contract price for "UNCLASSIFIED EXCAVATION" shall be the unit price bid per cubic yard for excavation of pavement and shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required and necessary to break, remove and dispose of

excavated pavement, irrespective of the pavement material encountered, and to do all work incidental thereto all in accordance with the plans, specifications and as ordered by the Engineer.

5.31.6 NO SEPARATE PAYMENT

Sidewalk and driveway pavements shall be removed in whole flags, squares or sections, or as directed by the Engineer. Curb removal shall be as ordered or approved in writing by the Engineer.

The Contractor is notified that the cost for all labor, materials, equipment and insurance required and necessary to break, remove and dispose of sidewalk and driveway pavements and curbs, irrespective of sidewalk, driveway and curb material encountered, shall be deemed included in the prices bid for all contract items of work. No separate or additional payment will be made for this work.

SECTION 5.32
CLEAN BACKFILL

5.32.1 DESCRIPTION

Clean backfill shall be the clean fill ordered in writing by the Engineer, where there is a deficiency of acceptable backfill in accordance with **Subsections 4.06.2, 4.06.6 and 4.06.8**. This backfill shall be exclusive of the normal backfill requirements as specified in **Subsection 4.06.2**. Clean backfill shall not be used to fill voids in the subgrade of the trenches and excavations unless otherwise specified on the plans or in the contract documents, or as ordered in writing by the Engineer. Clean backfill shall not be used at any time to fill voids in the trenches and excavations from subgrade to one (1) foot above the top of the barrel of the pipe, within any area less than two (2) feet wide in its least dimension and within eighteen (18) inches around all underground facilities (i.e. pipes, mains, conduit, cable, etc.).

5.32.2 MATERIALS

Clean Backfill shall comply with the requirements of **Subsection 2.21.2(D)**.

If approved in writing by the Engineer, excavated material determined to be unsuitable, in accordance with **Subsection 4.06.2**, may be processed (i.e. screened and/or crushed) to produce clean fill as specified herein. In such case, the material furnished in accordance with these specifications, to be used as specified in **Subsection 5.32.1** shall be accepted for payment under the contract item for "CLEAN BACKFILL" computed in accordance with **Section 5.32.4**.

5.32.3 CONSTRUCTION METHODS

The requirements of **DIVISION IV - GENERAL CONSTRUCTION PROVISIONS** shall apply to the work to be done hereunder.

5.32.4 MEASUREMENTS

The quantity of clean backfill to be measured for payment shall be the number of cubic yards of clean backfill, as ordered in writing by the Engineer, in place after compaction and limited to the conditions specified in **Section 5.32.1** of the specifications.

If actual trench widths are less than either payment maximums stated in **Subsection 5.02.3(A)(1)**, those smaller widths shall serve as the basis upon which the actual volume of substituted clean backfill is measured for purposes of determining additional compensation. If, however, actual trench widths exceed those maximums, no payment will be made for clean backfill placed outside these established limits. The cost of such excess backfill shall be borne solely and exclusively by the Contractor.

Where impracticable to measure clean backfill in place, measurements may be made in scows and vehicles, and the quantity to be paid for will be eight-tenths (8/10) of the yardage determined by such measurements.

5.32.5 PRICE TO COVER

The contract price for "CLEAN BACKFILL" shall be the unit price bid per cubic yard for clean backfill and shall cover the cost of all labor, materials, plant, equipment, samples, tests and insurance required and necessary to furnish and deliver the clean backfill material and to do all work incidental thereto, all in accordance with the plans and specifications and as directed by the Engineer.

The Contractor is notified that the cost for all labor, materials, plant, equipment and insurance required and necessary to place, compact, sample and test provided acceptable clean backfill shall be deemed included in the prices bid for all contract items of work.

SECTION 5.33
FINAL RESTORATION OF PAVEMENTS

5.33.1 DESCRIPTION

Restoration of permanent roadway pavement shall include the restoration of each kind of roadway pavement shown, specified or ordered.

5.33.2 MATERIALS

The materials for roadway pavement to be restored shall conform in all respects to the requirements set forth in the latest Standard Details of Construction and the Standard Specifications of the New York City Department of Transportation.

5.33.3 CONSTRUCTION METHODS

The Contractor will be required to replace all permanent pavement disturbed in the course of the work, in accordance with the requirements of the latest Standard Details of Construction and the Standard Specifications of the New York City Department of Transportation.

When performing final restoration work no more than six hundred (600) linear feet of trench shall be excavated and pending installation of concrete or asphaltic concrete base at any time.

Unless otherwise specified, final restoration must commence upon completion of two thousand (2,000) linear feet of water main installation. Except for water mains installed during the period of December 1 to April 30 there shall be no more than three thousand (3,000) linear feet of water main trench pending final restoration. If, on May 1, there are more than three thousand (3,000) linear feet pending final restoration then no new excavations for pipe installation may be made until this requirement is met.

All trenches and excavations shall be backfilled and compacted in accordance with **Section 4.06**.

All manhole covers and other hardware shall be adjusted or raised to final grade, prior to the final wearing course installation. All loose, slippery or broken manhole covers and other street hardware shall be replaced at no additional cost.

Immediately after any street opening has been backfilled and the compaction completed, the Contractor shall install the permanent or temporary pavement as directed by the Engineer. All pavement materials and methods of restoration shall comply with the latest Standard Details of Construction and the Standard Specifications of the New York City Department of Transportation. The temporary pavement shall consist of plant mixed binder base as specified in **Section 4.08**, flush with the adjacent roadway surfaces. Immediately upon completion of the installation of the temporary pavement, all equipment construction materials and debris shall be removed from the site.

Final restoration of pavements shall conform to the requirements of **Section 4.09**.

Whenever a permanent pavement is to be installed and a temporary restoration has been used all of the temporary pavement shall be removed and the new roadway shall be installed.

All concrete used for base shall be Class B-32 (3,200 psi) Type 1A. For bus stops or reinforced pavements, Class A-40 (4,000 psi) Type 11A shall be used.

When a permanent full depth concrete pavement is to be installed as the final pavement, all work shall be done in strict accordance with the latest revised **Department of Transportation Standard Detail of Construction No. H-1042B**.

When existing granite block pavements are encountered the Contractor shall reinstall the granite block on a new six (6) inch concrete base, unless more than fifty (50) percent of the adjacent street is already patched with asphalt. In that case, the Contractor shall replace the granite block with a three (3) inch asphaltic concrete wearing course on a six (6) inch to nine (9) inch concrete base. Unless otherwise directed by the Borough Administrative Superintendent of Street Maintenance, all granite block shall be cleaned and delivered to the Borough Highway Yard of the Department of Transportation. The Contractor shall coordinate delivery with the Borough's Administrative Superintendent of Street Maintenance. In the restoration of block pavements the edges of the pavement shall be toothed or racked back.

All roadway markings including crosswalks and thermoplastic lane dividers removed as a result of construction shall be replaced in kind to the latest Standard Details of Construction and the Standard Specifications of the New York City Department of Transportation.

All sidewalks, curbs, and concrete bus stops disturbed as a result of construction shall be restored in strict accordance with the latest Standard Details of Construction and the Standard Specifications of the New York City Department of Transportation.

All restorations shall conform to the standards and specifications of the latest Standard Details of Construction and the Standard Specifications of the New York City Department of Transportation.

The Contractor will be required to construct pavement keys and apply tack coat in accordance with the Standard Details of Construction and the Standard Specifications of the New York City Department of Transportation. Payment for the complete construction of all pavement keys and application of tack coat shall be deemed included in the price bid for all pavement restoration items. No separate or additional payment shall be made for this work.

Roadways, driveways and sidewalk pavements, crosswalks, curbs, etc., shall be satisfactorily restored and adjusted by the Contractor at such times as may be directed by the Department of Design and Construction. Sidewalk and driveway pavements shall be restored in whole flags, squares or sections, and in general, shall be restored with concrete laid on six (6) inch thick foundation materials unless otherwise specified. All work and materials used in such restoration and adjustment shall conform in all respects to the latest revisions of the standards and specifications of the Department of Transportation for similar work and materials. The cost for these restorations shall be included and payment shall be made under the appropriate bid items. Unless otherwise specified, the cost for any grading work and for supplying and placing of any foundation materials shall be deemed included in the prices bid for all items of work.

If roadway pavements, driveway and sidewalk pavements, crosswalks, curbs, etc., are specified in the contract documents to be laid where none existed at the time the bids for this contract were opened, the Contractor shall excavate, remove and grade such portions of the areas where the new roadways, driveways, sidewalks, crosswalks, curbs, etc., and their foundations are to be placed upon and are necessary for the prosecution of the work and the Contractor will be required to make a permanent restoration of them. Payment for the work performed will be made under the appropriate bid items.

Where roadway pavements, driveway and sidewalk pavements, crosswalks, curbs, etc., are not specified in the contract documents to be laid where none existed at the time the bids for this contract were opened; however, the Engineer orders such work done, payment shall be made for the work performed in accordance with **Articles 25 and 26** of the Contract.

The Contractor shall install new curb and concrete sidewalk within the project limit at the locations where required due to missing or defective curb and/or sidewalk as directed by the Engineer. New curbs and sidewalks shall be constructed in compliance with NYCDOT's latest requirements and specifications.

Payment for this work shall be made under the appropriate curb and sidewalk items. (This does not include damage to curbs and sidewalks caused by the Contractor's construction operation; such damage shall be repaired at the sole expense of the Contractor. Nor does it include curb and sidewalk work required for house service connections and catch basin installation, such work shall be deemed included in the prices bid for house service connections and catch basins.)

The Contractor is required to install pedestrian ramps within the project limit at those corners where back to back catch basin connections are called for and at all corners where there are no existing pedestrian ramps or where there are existing pedestrian ramps that do not comply with the current NYCDOT Standards and Specifications, as directed by the Engineer. All pedestrian ramps shall comply with Highway Standard Drawing No. H1011A-R88(2), with a detectable warning surface installed in the ramp, within two (2) feet of the curb, in accordance with NYS Department of Transportation Detectable Warning Details Standard Sheet M608-5R1. Payment for this work shall be made under the appropriate curb and sidewalk items.

Prior to the start of final restoration the Contractor will be required to submit to the Engineer, for approval, a layout of the proposed final restoration.

5.33.4 SPECIFIC PAVEMENT RESTORATION PROVISIONS

(A) The permanent restoration requirements shall be as specified in the Addenda to the specifications. Where restoration is required to satisfactorily complete the contract, but permanent restoration requirements are not specified in the Addenda, the Contractor shall restore the pavements as encountered and as directed by the Engineer.

(B) All roadway markings including thermoplastic reflectorized pavement markings (crosswalks and lane dividers) removed as a result of the construction operations, shall be replaced in kind to the Department of Transportation specifications.

(C) The Contractor shall restore the following existing sidewalk and curb structures that are disturbed due to the construction operations.

(D) The Department of Design and Construction will make all necessary inspections of restoration.

5.33.5 MEASUREMENT

(A) Within Ordered Trench And Cutback Limits In Non-Protected Streets For Water Mains 20-Inches And Less In Diameter - When water main work is required in non-protected streets for water mains 20-inches and less in diameter, the quantity of pavement restoration for each kind of roadway pavement required shall be based on the following pay limits:

(1) Pay limits for laying pavement consisting of asphaltic concrete wearing course on a cement concrete base course, or asphaltic concrete wearing course on an asphaltic concrete base course, or brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course shall be the actual length of trench, and the width calculated by adding the dimensions shown in the Table below to the nominal diameter of the pipe laid::

	Base Course	Wearing Course
Unsheeted Trenches	2-Feet	3-1/2-Feet
Sheeted Trenches	4-Feet	5-1/2-Feet

(2) Pay limits for full pavement consisting of cement concrete:

	Full Pavement
Unsheeted Trenches	3-1/2-Feet
Sheeted Trenches	5-1/2-Feet

(3) These payment limits shall be maximums. The width of pavement components to be excavated is based on the trench width, as specified. If actual trench widths are less than those maximums, the smaller widths shall become the payment lines. When, due to unforeseen or special field conditions changing the trench width from that specified becomes necessary, and the change is approved by the Engineer, the width of the pavement components' restoration to be paid for shall be increased or decreased by the dimension equal to that of the change in the trench width.

(B) Within Ordered Trench And Cutback Limits In Streets Protected By NYC Administrative Code §19-144 (Local Law No. 14.) For Water Mains 20-Inches And Less In Diameter - When water main work is required in streets protected by NYC Administrative Code §19-144 (Local Law No. 14) for water mains 20-inches and less in diameter, the quantity of pavement restoration for each kind of roadway pavement required shall be based on the following pay limits:

(1) Pay limits for laying pavement consisting of asphaltic concrete wearing course on a cement concrete base course, or asphaltic concrete wearing course on an asphaltic concrete base course, or brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course shall be the actual length of trench, and the width calculated by adding the dimensions shown in the Table below to the nominal diameter of the pipe laid::

	Base Course	Wearing Course
Unsheeted Trenches	3-Feet	4-1/2-Feet
Sheeted Trenches	5-Feet	6-1/2-Feet

(2) Pay limits for full pavement consisting of cement concrete:

	Full Pavement
Unsheeted Trenches	4-Feet
Sheeted Trenches	6-Feet

(3) These payment limits shall be maximums. The width of pavement components to be excavated is based on the trench width, as specified. If actual trench widths are less than those maximums, the smaller widths shall become the payment lines. When, due to unforeseen or special field conditions changing the trench width from that specified becomes necessary, and the change is approved by the Engineer, the width of the pavement components' restoration to be paid for shall be increased or decreased by the dimension equal to that of the change in the trench width.

(C) Within Ordered Trench And Cutback Limits In All Streets For Water Mains 24-Inches And Larger In Diameter - When water main work is required in streets for water mains 24-inches and larger in diameter, the quantity of pavement restoration for each kind of roadway pavement required shall be based on the following pay limits:

(1) Pay limits for laying pavement consisting of asphaltic concrete wearing course on a cement concrete base course, or asphaltic concrete wearing course on an asphaltic concrete base course, or brick or block pavers wearing course on asphaltic concrete base course or cement concrete base course shall be the actual length of trench, and the width calculated by adding the dimensions shown in the Table below to the nominal diameter of the pipe laid::

	Base Course	Wearing Course
Sheeted Trenches	6-Feet	7-1/2-Feet

(2) Pay limits for full pavement consisting of cement concrete:

	Full Pavement
Sheeted Trenches	6-Feet

(3) These payment limits shall be maximums. The width of pavement components to be excavated

is based on the trench width, as specified. If actual trench widths are less than those maximums, the smaller widths shall become the payment lines. When, due to unforeseen or special field conditions changing the trench width from that specified becomes necessary, and the change is approved by the Engineer, the width of the pavement components' restoration to be paid for shall be increased or decreased by the dimension equal to that of the change in the trench width.

(D) Outside The Ordered Trench And Cutback Limits Or Within The Ordered Test Pit Excavation Limits - When roadway pavement restoration is outside the ordered trench and cutback limits or within the ordered test pit excavation limits and has been specifically shown on the plans, specified in the contract documents, or ordered and approved in writing to be restored by the Engineer, the payment limits for the roadway pavement restoration, shall be as defined and approved in writing by the Engineer.

(E) Sidewalk And Driveway Pavement And Curb Restoration - When sidewalk and driveway pavement restoration is required whether due to water main work in the sidewalk area or when shown on the plans, specified in the contract documents, or ordered and approved in writing to be restored by the Engineer, the payment limits for the sidewalk and driveway pavement restoration shall be measured in whole flags, squares or sections, or as directed by the Engineer.

When curb restoration is required whether due to water main work or when shown on the plans, specified in the contract documents, or ordered and approved in writing to be restored by the Engineer, the payment limits for the curb restoration, shall be as ordered or approved in writing by the Engineer.

(F) Pavement Restoration In Connection With Various Construction Operations - Pay limits for pavement restoration in connection with various construction operations are as follows:

Removing Pipe: An additional allowance equal to the nominal interior diameter of the pipe removed will be made where an existing main is removed which is in the same trench and alongside the new main; where the existing main to be removed does not come within the limits of the trench excavated for laying the new main, limits will be based upon the length of pipe removed and a width of one-half (1/2) of a foot less than that allowed for laying pipe.

Test Pits: The area allowed in paving over test pits will be one (1) foot wider and one (1) foot longer than the area excavated, in all kinds of pavements; but the pavement area coming within the limits of the pipe trench will not be allowed for measurement twice unless such paving is ordered restored and is completed before the trench for laying pipe is excavated.

Wet Connections: The total amount of paving of all kinds allowed in making wet connections will be based upon a length three (3) feet longer than the distance from the back of the sleeve to the extreme end of the tapping apparatus after same is in position and ready for operation, and a width five (5) feet greater than the maximum length of the split sleeve.

Valve Chambers, etc.: For the building of valve chambers and other structures, the limits for all kinds of pavement allowed will be based upon areas one and one-half (1-1/2) feet outside of the outside faces of such structures, measured to the nearest foot, no deduction being made for irregularities. No additional pavement over the regular pipe trench will be allowed for setting valve and valve boxes.

Connection to Existing Mains: Where cuts are made in existing mains for the purpose of making connections thereto or for setting valves upon same, the allowable limits in all kinds of pavements will be based upon a length five (5) feet longer than the distance between the extreme joints run and caulked by the Contractor and a width as herein given for laying pipe.

Removing Valve Boxes: For removing valve boxes from abandoned mains that are left in place, the allowable limits in all kinds of pavements will be six (6) feet square for large boxes and four (4) feet square for hydrant boxes.

Extending House Service Connections: Where the service is transferred from an existing to a new or to a parallel existing main, the allowance outside the limits of the pipe trench in all kinds of pavements will be based upon a width of three (3) feet.

Sewer or Culvert Connections: For relaying sewer or culvert connections the allowable limits will be as specified in the Standard Sewer Specification and Sewer Design Standards.

Locating Taps: For locating existing taps on mains to be abandoned the allowable limits will be based upon a width of trench as specified for laying pipe and for a length parallel to the axis of the pipe one (1) foot more than actually needed to locate the tap, as determined by the Engineer. For making taps on an existing main which is to be retained in service the allowable limits will be based upon widths five (5) feet greater than the nominal interior diameter of the pipe to be tapped and a length parallel to the axis of the pipe of four (4) feet for a single tap, in all kinds of pavements. Where a main to be abandoned lies sufficiently close to a parallel existing main, so that they can both be exposed in the same trench, the Contractor shall first excavate along the main to be abandoned to locate the tap; when the tap is found the trench shall be widened, where and as directed by the Engineer to uncover the main to be adapted. Allowance will be made for a width for pavement of any kind at right angles to the axes of the pipes of five (5) feet wider than the distance between the outside of the pipes and for a length parallel to the axes of the pipes of four (4) feet long for a single tap. Where two or more taps are located on the main to be abandoned or made in the new or retained main, in one trench, the length of pavement allowed will be four (4) feet greater than the distance between the extreme taps.

5.33.6 PRICE TO COVER

Payment for furnishing, delivering and placing of all pavement restoration of each kind of roadway pavement required shall be made under the appropriate bid items, as shown, specified or ordered, contained in the bid schedule and within the pay limits described herein.

Payment for reinstalling granite block shall be made under the appropriate bid items.

The cost for cleaning and delivery of granite block as specified herein shall be deemed included in prices bid for all items of work.

Grass or Lawn areas that are injured or defaced as a result of the Contractor's construction operations shall be replaced with Sod, unless otherwise directed by the Engineer, in accordance with the recommendations of the Department of Parks and Recreation. Unless otherwise specified, payment for the replacing of injured or defaced Grass or Lawn areas due to the Contractor's construction operations or due to the installation of items under this Contract shall be deemed included in the unit prices bid for all items of the contract.

Payment for installing pedestrian ramps shall be made under the appropriate bid items.

The cost of all labor and materials required to restore all pavements, sidewalks, curbs, etc. all in accordance with the standards and specifications of the Department of Transportation and as directed by the Engineer, shall be deemed included in the prices bid for the appropriate roadway pavement, sidewalk pavement and curb items. Where there are no specific classified bid item(s) of work for roadway pavement, sidewalk pavement and curb, payment shall be made in accordance with **Articles 25 and 26** of the Contract.

5.33.7 NO SEPARATE PAYMENT

There will be no separate payment for the excavation, removal and disposal of the temporary pavement and portion of the backfill prior to placing the concrete or asphaltic concrete base, payment therefore shall be deemed included in the unit prices bid for all items of the contract.

No separate payment will be made for the restoration of existing sidewalks, curbs and concrete bus stops that are to remain undisturbed but are damaged as a result of the Contractor's operations. All such restoration shall be performed in accordance with the Standard Details of Construction and the Standard Specifications of the New York City Department of Transportation at the sole expense of the Contractor unless otherwise indicated on the plans or in the specifications.

If, when the pavement is to be replaced, it is found that additional area must be replaced due to undermining caused by the work performed under the contract, the Contractor at the Contractor's own

cost and expense shall restore such additional pavement.

Should a settlement occur, or other defect develop in restored pavement, sidewalk and curb or in pavement, sidewalk and curbs adjacent thereto within the period of maintenance which, in the opinion of the Engineer is due to improper workmanship or to materials furnished or installed under this contract, such defective pavement and/or sidewalk and curbing shall be replaced and/or restored by the Contractor to the satisfaction of the Engineer, at the Contractor's expense.

Unless otherwise specified, no separate payments will be made for the removal of pavement markings and replacement with thermoplastic reflectorized pavement markings (crosswalks and lane dividers), and for the placement and eradication of temporary roadway markings, payment therefore shall be deemed included in the unit prices bid for all items of the contract.

SECTION 5.34
MAINTENANCE AND PROTECTION OF TRAFFIC

5.34.1 DESCRIPTION

The Contractor shall maintain both vehicular and pedestrian traffic, protect the public from all damage to person and property and minimize inconveniences to the residents and businesses adjacent to the contract area throughout the duration of the contract. The Contractor shall observe the laws and traffic ordinances of the City of New York and the traffic stipulations and requirements of the Department of Transportation (DOT), and the Office of Construction Mitigation and Coordination (OCMC) - Streets for this contract.

5.34.2 CONSTRUCTION METHODS

The Contractor must maintain and protect each work area in this contract, during the operation of excavation, main installation, backfilling, placing temporary pavement and installation of concrete base, by placing plastic barrels (as per NYCDOT Standard Highway Specification) and temporary pedestrian steel barricades (Section 7.36 of NYCDOT Standard Specification) along the line of work. The plastic barrels shall be placed with a maximum spacing of ten (10) feet and will divide the work area from the traffic lane. The temporary pedestrian steel barricades will run consecutively and divide the construction work areas from the pedestrian/sidewalk areas. A barrel taper with a sign saying "Construction Ahead" shall be placed on the "Approach Blocks". All signage must be posted by the Contractor a minimum of thirty-six (36) hours in advance of construction, notifying the particular block of impending work. The Contractor shall also follow all the requirements listed in the "Standard Maintenance and Protection of Traffic (MPT) Requirements For Typical Operations" which are included in the specifications (See **Section 1.06.29**).

All temporary advance warning signs, temporary traffic control devices, barricades, lights, etc. shall be furnished, erected, installed and maintained in accordance with the "New York State Manual on Uniform Traffic Control Devices" (NYSMUTCD), and all maintenance and protection of traffic shall be in accordance with **Section 1.06.29 - Contractor to Provide for Traffic** and as directed by the Department of Transportation (DOT), the Office of Construction Mitigation and Coordination (OCMC) - Streets and the Engineer.

The use of unauthorized or unapproved signs, barricades, traffic cones, or traffic delineators will not be permitted.

The Contractor shall keep all signs in proper position, clean and legible at all times. Care shall be taken so that weeds, shrubbery, soil and construction materials and equipment are not allowed to obscure any sign, light, barricade, warning signal, etc.

Suitable ingress and egress shall be provided at all times for all abutting properties, residences, and businesses. The Contractor shall, where required, provide travel lanes and pedestrian passways. The travel lanes and pedestrian passways shall be drained and kept reasonably smooth, safe and in suitable condition at all times and shall cause a minimum interference to traffic consistent with the proper prosecution of the work.

Throughout the course of the work the health and welfare of people shall be provided for. The Contractor shall, at least one (1) week prior to start of work, ascertain the specific needs of individuals whose homes or place of business may require special consideration for access while required construction work is in progress. In all such cases, the Contractor shall make all arrangements with health, safety and protective agencies to ensure that any and all emergency or accidental needs of seriously ill and/or handicapped people will be cared for. Unless otherwise specified, construction on streets that must be completely closed to traffic shall be carried on during the normal workweek. One (1) week advance notification of construction shall be given to affected residents.

Free access must be maintained to every fire hydrant, fire alarm box and standpipe connection. No obstructions will be allowed at any time within fifteen (15) feet of a fire hydrant.

The Contractor is placed on notice that the maintenance and protection of traffic during construction is considered as important as is the actual construction. The Contractor shall at all times conduct the Contractor's operation in a manner to ensure the safety of not only the motorist, but also the pedestrian and the Contractor's own employees.

5.34.3 PAYMENT

The cost of all labor, materials, plant, equipment and insurance required and necessary to perform all work specified herein, or as ordered, shall be deemed included in the lump sum price bid for "MAINTENANCE AND PROTECTION OF TRAFFIC". This includes all work in conjunction with the placing of plastic barrels and temporary pedestrian steel barricades, and steel plates.

5.34.4 PAYMENT SCHEDULE

Payment will be made in proportion to the percentage of actual contract completion. The Contractor shall receive additional compensation based upon a proportion of the bid amount for overrun work.

5.34.5 NONCONFORMANCE

No payment will be made under Maintenance and Protection of Traffic for each calendar day or portions (1-hour intervals) thereof, during which there are deficiencies in compliance with the foregoing specification requirements, as determined by the Engineer.

The amount of such calendar day nonpayment will be determined by dividing the lump sum price bid by the Base Contract Duration for this project as specified in Schedule "A" (consecutive calendar days ("ccds")).

If the Contractor fails to maintain and protect the traffic, or any portion thereof, adequately and safely for a period of three (3) or more consecutive hours, the Engineer will correct the adverse conditions by any means the Engineer deems appropriate, including, but not limited to, "outside services," and shall deduct the cost of the corrective work from any monies due the Contractor. The cost of this work shall be in addition to the nonpayment for traffic maintenance and protection listed above.

However, where continued nonconformance with the requirements of this specification is noted by the Engineer, and prompt Contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the Engineer, regardless of whether corrections are made by the Engineer as stated in the paragraph above.

Furthermore, in addition to the remedies specified above, in the event the Contractor shall fail to comply, within three (3) consecutive hours after written notice from the Engineer, with the requirements of this contract and the specifications in the matter of providing facilities and services for the maintenance and protection of traffic at the construction site, the Contractor shall pay to the City of New York, until such notice has been complied with or rescinded, the sum of FIVE HUNDRED DOLLARS ($500.00) per calendar day, for each instance of such failure, as liquidated damages and not as a penalty, for such default.

Any money due the City of New York under this provision shall be deducted from the amounts due or to

become due to the Contractor for work performed under this contract.

SECTION 5.35
MAINTENANCE OF SITE

5.35.1 DESCRIPTION

The Contractor shall keep the work site and adjacent areas free and clean from all rubbish, garbage, debris, and discarded or left over materials during construction. The Contractor shall also keep the Contractor's haul routes outside the work site free and clean from all rubbish and debris resulting from the Contractor's operations.

5.35.2 CONSTRUCTION METHODS

Waste material and excavated material will under no condition be permitted to remain on the site of the work or streets, but must immediately be removed by the Contractor. The Contractor shall thoroughly clean and keep clean all roadways, sidewalks and other places in which the work is to be done, or which are to be used in connection therewith. The Contractor shall protect such areas against unauthorized dumping of waste materials and shall remove such materials.

Any unsanitary conditions such as uncollected garbage or debris, caused by or resulting from the Contractor's operation that will provide food and shelter to the resident rodent population shall be removed by the Contractor immediately after notification of such condition by the Engineer.

Waste material shall not be dumped in or on any part of the City's property except by special permission of the Engineer. Concrete mixing trucks shall not be washed on City streets nor shall the waste material from the washing out of concrete mixing trucks be discharged to any street, public property, sewer, sewer manhole, catch basin, or other above or below around structures.

While performing the above maintenance work the Contractor shall have available an approved mechanical street sweeper with operator, adequate size pick-up truck with driver and laborers, and necessary hand tools and materials. These men with equipment shall patrol the Contract area correcting all matters requiring attention and shall be on call to respond to directives issued by the Engineer regarding specific problems of maintenance.

Pursuant to **Article 7** of the Contract, the Contractor shall be fully responsible for maintaining completed work in an acceptable condition and protecting the completed work until relieved of such responsibility. On completion of the work and before final acceptance and final payment are made, the Contractor shall remove all surplus and discarded material, rubbish, equipment, debris, and temporary structures from the site, and restore the working site as required. All work (sewers, water mains, appurtenant structures, etc.) shall be, clean, free from debris or deposits, and ready for use as required by the plans and specification.

The Contractor shall arrange to have necessary men and equipment assigned to satisfy complaints relating to required clean up and restoration work. The Contractor shall perform this work during the normal working day. However, when required or directed, the Contractor shall be prepared to extend this work beyond the normal workday, including weekends.

To allay dust conditions, the Contractor shall, when directed by the Engineer, furnish and spread calcium chloride for dust control. Calcium chloride shall conform to the requirements of AASHTO M144, except that the pellet form and the flake from shall be equally acceptable. Calcium Chloride shall be applied only at the locations, at such times, and in the amounts directed by the Engineer. It shall be spread in such a manner and by such devices that uniform distribution is attained over the entire area on which it is ordered placed.

Where access to regularly scheduled private and/or public sanitation pickups, such as garbage and recycled materials, is blocked due to the Contractor's operation, the Contractor shall coordinate a schedule for collection of said materials, and/or the Contractor shall collect and transport garbage and recycled materials to collection points, as directed by the Engineer, for disposal by public or private collections, as appropriate.

5.35.3 PAYMENT

The cost of all labor, materials, plant, equipment and insurance required and necessary to perform all work specified herein or as ordered shall be deemed included in the lump sum price bid for "MAINTENANCE OF SITE".

5.35.4 PAYMENT SCHEDULE

Payment will be made in proportion to the percentage of actual contract completion. The Contractor shall receive additional compensation based upon a proportion of the bid amount for overrun work.

5.35.5 NONCONFORMANCE

No payment will be made under Maintenance of Site for each calendar day or portions (1-hour intervals) thereof, during which there are deficiencies in compliance with the foregoing specification requirements, as determined by the Engineer.

The amount of such calendar day nonpayment will be determined by dividing the lump sum price bid by the Base Contract Duration for this project as specified in Schedule “A” (consecutive calendar days (“ccds”)).

If the Contractor fails to maintain and protect the site, or any portion thereof, adequately and safely for a period of three (3) or more consecutive hours, the Engineer will correct the adverse conditions by any means the Engineer deems appropriate, including, but not limited to, "outside services," and shall deduct the cost of the corrective work from any monies due the Contractor. The cost of this work shall be in addition to the nonpayment for site maintenance listed above.

However, where continued nonconformance with the requirements of this specification is noted by the Engineer, and prompt Contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the Engineer, regardless of whether corrections are made by the Engineer as stated in the paragraph above.

Furthermore, in addition to the remedies specified above, in the event the Contractor shall fail to comply, within three (3) consecutive hours after written notice from the Engineer, with the requirements of this contract and the specifications in the matter of providing facilities and services for the maintenance, protection and cleanup of the construction site, the Contractor shall pay to the City of New York, until such notice has been complied with or rescinded, the sum of FIVE HUNDRED DOLLARS ($500.00) per calendar day, for each instance of such failure, as liquidated damages and not as a penalty, for such default.

Any money due the City of New York under this provision shall be deducted from the amounts due or to become due to the Contractor for work performed under this contract.

SECTION 5.36
MOBILIZATION

5.36.1 DESCRIPTION

Under this section, the Contractor shall set up the necessary general plant, including shops, storage areas, office and such sanitary and other facilities as are required by the City, State or Federal law or regulation. Unless otherwise provided, the cost of required bonds and/or any other similar significant initial expense required for the initiation of the contract work shall also be included in this section. The determination of the adequacy of the Contractor’s facilities, except as noted above, shall be made by the Contractor.

5.36.2 MATERIALS

Unless otherwise specified, such materials as are required that are not to be a part of the completed

contract shall be as determined by the Contractor, except that they shall conform to any pertinent City, State, or Federal law, regulation or code.

5.36.3 CONSTRUCTION METHODS

Such work as is done in providing the facilities and services under this section shall be done in a safe and workmanlike manner and shall conform to any pertinent City, State, or Federal law, regulation or code. Good housekeeping consistent with safety shall be maintained.

5.36.4 PRICE TO COVER

Payment will be made by lump sum. This amount shall include the furnishing and maintaining of any plant, services or other facilities noted under "Description" to the extent and at the time the Contractor deems them necessary for the Contractor's operations, consistent with the requirements of this section and this contract. The amount bid for this lump sum item shall be payable to the Contractor whenever the Contractor shall have completed ten percent (10%) of the work, provided the final contract price, which includes this item, is at least fifty percent (50%) of the original price bid for this contract. For the purpose of this item, ten percent (10%) of the work shall be considered completed when the total payments earned, not including the amount bid for this item, shall exceed ten percent (10%) of the total amount of the Contractor's bid for this contract.

However, should the contract be terminated prior to completion of at least fifty percent (50%) of the original price bid for this contract, or should the final contract price be less than fifty percent (50%) of the original contract price bid for this contract, then the Contractor will be paid a portion of this item based on actual costs submitted to, verified and approved by the Engineer. Where the Contractor has already received the original total payment for this item after completion of ten percent (10%) of the work, then any monies owed the City due to the above specified reduction in payment will be withheld from monies owed the Contractor.

The amount bid for Mobilization shall not exceed four percent (4%) of the total contract price, excluding the price bid for Mobilization, and in no case will payment under this item exceed the original price bid for this item.

SECTION 5.37
HYDRAULIC FILL FOR ABANDONED SEWERS AND WATER MAINS

5.37.1 INTENT

This section describes the provision and placement of Hydraulic Fill For Abandoned Sewers And Water Mains.

5.37.2 DESCRIPTION

The Contractor shall hydraulically fill all sewers 12-inches and larger in their least dimension and all water mains 24-inches and larger in diameter that are to be abandoned within the limits of this contract as shown or specified with an excavatable flowable fill.

5.37.3 MATERIALS

(A) Cement shall be Type-I or Type-II Portland Cement that conforms to the requirements of **General Specification 11 - Concrete, as modified in Section 2.11**. Each bag of cement shall be deemed to be one (1) cubic foot.

(B) Fine Aggregate - Sand shall be Concrete Sand or Natural Sand and shall conform to the requirements of **General Specification 11 - Concrete, as modified in Section 2.11**.

(C) Fly Ash shall conform to the chemical and physical requirements for Mineral Admixture, Class F listed in ASTM C618 including Table 1A (except for Footnote A). Loss on ignition shall not exceed four percent (4%).

(D) Water shall be fresh, clean and free from oils, acids, alkali or organic matter.

(E) Admixtures may be used in the Hydraulic Fill Mix to enhance certain properties. (Air entraining or water reducing admixtures shall not be used.) No admixtures may be used without the prior approval of the Engineer. Laboratory test results or Manufacturer's data must be submitted by the Contractor to the Engineer proving that the admixture will not detract from the specified twenty-eight (28) day compressive strength.

All admixtures considered for inclusion in the Hydraulic Fill Mix shall comply with the State of New York, Department of Transportation, Standard Specifications, Section 711-08 "Admixtures", latest edition. The name of the admixture must be found on the "Approval List" issued by the NYS DOT Materials Bureau. The brand name of the approved admixture must be plainly marked on the admixture container.

5.37.4 METHODS

(A) Mix Design

HYDRAULIC FILL MIX (EXCAVATABLE FLOWABLE FILL) - The Contractor shall prepare a design mix and produce a trial batch to show compliance with the specifications and submit design mix and test results to the Engineer for approval prior to construction. The approved Hydraulic Fill Mix shall not be altered unless otherwise directed by the Engineer. The mix design proportion parameters per cubic yard shall be as follows:

MIX DESIGN PROPORTION PARAMETERS
PER CUBIC YARD

Cement (lbs.)	30 - 70
Fly Ash (lbs.)	250 - 600
Fine Aggregate (lbs.)	2500 - 3000
Water (lbs.) (gal.)	350 (41.9) - 500 (59.9)
Slump (in.)	8 - 10
28-Day Comp. Strength (psi)	50 - 100

The hydraulic fill shall be thoroughly mixed, in a mechanical mixer, to the desired consistency and in accordance with ACI 506R-90 before being placed in a calibrated hopper for discharge into the abandoned sewer and/or water main through nozzles and or other suitable apparatus. Calibration of the hopper shall be subject to inspection, verification and approval of the Engineer.

Hydraulic fill may be supplied from an established concrete plant that has been approved by the Engineer.

The hydraulic fill mix that has gone for a period of forty-five (45) minutes or longer from the time of mixing without being incorporated into the work, shall be discarded. Remixing or tempering shall not be permitted.

(B) Application

The hydraulic fill mix shall not be placed during freezing weather at the site of application. The hydraulic fill mix shall not be placed when it is anticipated that the temperature during the following twenty-four (24) hours will drop below forty (40) degrees Fahrenheit at the site of application.

The proposed method of application shall be submitted to the Engineer for prior approval and shall be in a manner that will thoroughly hydraulically fill the abandoned sewer and water main from bottom to top of existing sewer and water main and from bulkhead to bulkhead, complete, as directed by the Engineer. Included in this submittal shall be the recommended maximum distances for hydraulically filling the abandoned sewer and water main, together with drawings showing the locations of any sections of abandoned sewer and water main that require removal in order to facilitate the hydraulic filling operation.

5.37.5 MEASUREMENT

The quantity of Hydraulic Fill For Abandoned Sewers And Water Mains to be paid for shall be the number of cubic yards of hydraulic fill furnished and placed in the work, complete, as determined by (a) truck delivery tickets from an approved concrete batching plant, or (b) the volume of hydraulic fill batched, mixed on the site, and dispensed from calibrated discharge hoppers, all as shown on the contract drawings, specified and as required and approved by the Engineer.

5.37.6 PRICE TO COVER

The contract price for “HYDRAULIC FILL FOR ABANDONED SEWERS AND WATER MAINS" shall be the unit price bid per cubic yard for hydraulic fill for abandoned sewers and water mains and shall cover the cost of all labor, materials, plant, equipment, samples and tests required and necessary to hydraulically fill the abandoned sewers and water mains, including the removal of sections of sewer and water main pipe if required to facilitate the hydraulic filling operation, the construction of brick bulkheads at each end of the fill, submittals and do all work incidental thereto, all in accordance with the contract drawings and specification, and as directed by the Engineer.

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