

**BOOK 3
TECHNICAL SPECIFICATIONS**

PROJECT TITLE: Term Agreement for Equity Lead Service Line Replacements

SPECIFICATION NO.: 1216757

CITY OF CHICAGO



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Issued by the
DEPARTMENT OF PROCUREMENT SERVICES

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All Signatures To Be Sworn To Before A Notary Public

Any contract entered into as a result of this bid process is governed by the terms and conditions set forth in Book 1 "Terms and Conditions for Construction" for the Department of Water Management projects funded by CDBG, as amended and incorporated as if fully set forth here by this reference; and by Book 2, Book 3 (if applicable), plans, drawings, exhibits, and attachments as appropriate.

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Description of Work
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- F. Dust Control
- G. Salvaging of Existing Materials
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1.2 DESCRIPTION OF WORK

- A. General Description of Work: Work to be done under this Contract is described in the Project Information found on Book 2 of these specifications.
- B. Brief Description of "Sub-Orders" under Book 2 Project Information: This section outlines the Complete Work the Contractor shall execute in the Term Agreement of the Contract Documents. The Term Agreement Work is broken down into "Sub-Order(s)", which are Commissioner defined and issued "Project(s)". The term "Sub-Order" shall be considered synonymous and interchangeable with the term "Project" within these Contract Documents; and the same terms, conditions, requirements and responsibilities are binding to both "Sub-Order(s)" and "Project(s)", as referenced in the Project Information section in Book 2.
- C. Furnishing all Labor, Materials, Equipment, and Transportation Services: Contractor must furnish all labor, materials, proper equipment and machinery, and transportation services necessary to perform and complete, in a workmanlike manner and within the specified time, all Work required under this contract. If overtime or premium labor time is required to perform the Work and/or to comply with permit requirements, the Contractor is solely

responsible for the additional labor costs. Additional labor costs shall not be passed onto the Commissioner.

- D. Project Site: Contractor must maintain the project site and Work area in a clean, orderly and safe manner.
- E. Coordination: Contractor must coordinate his Work with other contractors, agencies, and utilities as required or directed by the Commissioner.
- F. Protection of Work: Contractor must provide protection, repair and restoration of all finished Work or property damaged during construction.
- G. Implied Work: It is the intent of these Specifications to provide the City with improvements to, and ability to maintain a complete operable water distribution system. Any part or item of Work, which is implied and normally required to make each water service installation satisfactorily and completely operable, is deemed to be included in the Work and Contract price. All miscellaneous appurtenances and other items of Work incidental to meeting the intent of the Contract Documents, such as traffic control, is also deemed to be included in the Work and Contract price, even though such appurtenances may not be specifically shown or specified.
- H. Construction Permitting: The Contractor is required to submit permits and pay permit fees for all work associated with this project. There will be no separate fee reimbursement in connection with all the above permits and fee requirements and all costs therefore will be considered as incidental to the Project. Work under this contract is not eligible for the permit fee waivers under the Homeowner-Initiated LSLR Program.
- I. Water Use Permitting: The Contractor will be required to apply for a water use permit from the Department of Water Management per Book 1, Section X, subsection A of the Contract Documents. All fees associated with water use necessary for Department of Water Management generated projects will be waived.

There will be no separate fee reimbursement in connection with all the above permits and fee requirements and all costs therefore will be considered as incidental to the Project.

Department of Buildings (Water Use)

Room 906, City Hall 60602

1.3 CONSTRAINTS

- A. The Contract documents are intended to allow the Contractor flexibility in the construction of the Work; however, the Contract Documents do contain

constraints on project activities. In addition to constraints that may be stated elsewhere in the Contract Documents, the following also apply:

1. The Contractor must prepare and submit a comprehensive schedule of the proposed sequence of construction of the various parts of the Work included under this contract for review by the Commissioner. Also, the Contractor must arrange the schedule to complete the Work in phases and permit operation by the City of completed phases or parts thereof as directed by the Commissioner.
2. The Work under this Contract must also be accomplished while maintaining access to the surrounding residences, businesses and facilities. Any Work that affects access must be carried out such that the fire protection and emergency services will not be jeopardized or materially reduced as a result of the Work performed during the construction period.
3. The Work under the Contract must be accomplished while maintaining water service and fire protection to surrounding residences, businesses and facilities. Any Work that affects the existing water service or fire protection must be carried out so that existing service will not be jeopardized or materially reduced as a result of the Work performed during the construction period.
4. All active trench cuts or excavations open to traffic including vehicles, pedestrians, bicycles, etc., must have temporary pavement which consists of HMA or asphalt cold patch to provide a smooth and level surface. Compacted crushed stone fill will be allowed as temporary pavement in active trench cuts or excavations located in permitted closed work zones to allow for temporary parking relief as directed by the Commissioner and must meet the requirements of Section 351 of the SSRBC.
5. As part of performing the work, the Contractor shall not disturb more than two (2) square feet of any painted interior surface or twenty (20) square feet of any painted exterior surface. If a site would require the Contractor to disturb a painted area greater than these limits, the Contractor shall notify the Commissioner.
6. The Contractor must maintain emergency access to surrounding residences, businesses and facilities at all times.
7. The Commissioner will be the sole judge of when the Contractor's operations are causing interference with water distribution operations, and the Commissioner's orders and instructions must be carried out without delay.

8. Contractor must conduct operations so as not to inconvenience the general public.
9. The critical path method (CPM) schedule of the general proposed Work specified in Book 1 is to be submitted electronically in Primavera.

B. Notification and Limitations of Water Service shut downs.

1. When an existing water service, house drain, water main or section of the main, or sewer main or section of sewer main is to be shut down during the course of construction, individual consumers must be notified at least seventy-two (72) hours prior to the shut down and twenty-four (24) hours prior to shut down and at transfer completion (See Exhibit "Water Service Interruption"). The Contractor must not operate an existing water valve for a shut down or other purpose, without notifying and obtaining Commissioner's approval.
2. Time for consumer shut downs must not exceed an eight (8) hour period. No shut downs will be permitted before 8:00 AM without prior written approval of the Commissioner.
3. If emergency shut downs are required, the Contractor must notify customers within the affected area immediately. Notification must be verbal, or written if the customer cannot be contacted and placed at the property site showing all pertinent information regarding the shut down. The notice must contain a phone number the consumer may call for information or express any concerns they have about the shut down.
4. If it is determined a consumer cannot withstand a planned shut down of water service due to providing a critical emergency service, the need to maintain an ongoing manufacturing process, or medical reason, the Commissioner must be notified 48-hours before the shut down is started by the Contractor.

C. The Contractor must insure that all installer personnel are properly licensed and bonded. The Contractor must employ only competent, efficient workers of the highest character and fitness, and must not use any person not skilled in the work assigned to them to perform any work under this Contract. The Contractor must provide the Department with the name of any proposed employee, and other information as may be required. The Department reserves the right to disapprove the use of any proposed employee on this Contract. However, the Contractor must be solely responsible for selecting its employees and for the behavior of its employees.

D. The Contractor's field personnel must wear easily recognizable uniforms containing the Contractor's name, as well as prominently displayed picture

identification badges containing the Contractor's name, employee name, title and signature, employee picture and employee I.D. number. Employees must also be issued and carry identification cards issued by the Department. The Contractor's employees who are no longer employed by the Contractor must be required to return their uniforms and identification cards immediately upon termination of employment and the Contractor must immediately notify the Department of all such terminations and if identification cards were received from terminated employee. Employee pictures shall be submitted to the Commissioner's staff for display on the Commissioner's website.

- E. Each prospective employee of the Contractor must be subject to a criminal background check of each state and county in which the prospective employee has resided during the last ten years and a check of the prospective employee's driver's license and vehicle registration. Such checks must be performed at the Contractor's sole cost and expense by a licensed private security firm retained by the Contractor. The results of these investigations must be made available to the Department if requested. The Contractor must have a background check for each employee performed annually over the duration of the contract. Any oversight provided by the Department will in no way relieve the Contractor of the responsibility to hire personnel with the appropriate character and fitness to perform the work required.
- F. Exclusive Work Agreement
 - 1. The Contractor and/or its employees or subcontractors will not solicit or accept any business from the property owner nor must they attempt to solicit or accept any business for a period of two (2) years from the date of the work under this Contract. The Contractor and its employees or subcontractors must not solicit or accept any payment or gratuity for performing the work of this Contract other than payments made by the City pursuant to the Contract. The Contractor must obtain signed statements from all employees and subcontractors confirming their understanding of these restrictions and that violations may lead to dismissal. The Contractor is advised that periodic, random checks will be conducted by the Department during the contract period and the years afterward. Failure to meet this requirement may result in termination of the Contract by the Department.
 - 2. The direct or indirect recommendation to property owner(s) or their representatives, made by or through the Contractor or its employees, of a particular plumber or other company for the performance of any work is strictly prohibited.
- G. The Contractor must have a staffed, twenty-four (24) hour emergency number. An answering machine or voice mail is not acceptable for the twenty-four (24) hour emergency number

1.4 WORK SEQUENCE

- A. The Contractor must construct the Work in stages as indicated on the drawings, unless directed otherwise by the Commissioner. The Work must proceed in such manner so as to accommodate the City's and public's use of the project site during construction the period.
- B. Pre-Construction Meeting with Property Owner
 - 1. When the Commissioner issues a sub-order for a property, the Contractor shall meet with the Property Owner and Commissioner to agree upon the scope of work. This will include:
 - a. Scope of demolition and restoration
 - b. Scope of the replacement of the water service. If the interior plumbing requires additional copper pipe beyond the extent specified in the Drawings and Section 33 12 13 to maintain water access throughout the property, the Commissioner may direct the Contractor to include this work in the Shop Drawing submittal.
 - 2. The Contractor shall not be reimbursed for any permit fees, pot holing, or other construction mobilization costs until the Property Owner has signed their agreement to the terms discussed at the pre-construction meeting, unless the Commissioner has specifically directed this work in writing.
 - 3. Site Safety Inspection
 - a. Each property issued as a Sub-Order shall have been previously visited by the Commissioner and information from this report shall be provided to the Contractor. However, this report may not be complete and shall not relieve the Contractor from needing to perform a separate inspection.
 - b. During the pre-construction meeting, the Contractor shall evaluate whether the basement is reasonably safe before entering. Ensure there is no flooding, steps are in reasonable repair, animals are contained, site is sanitary, etc. If the site is not safe, inform the customer in writing of conditions that need to be remedied before service can be performed.
 - c. Inspect any insulation on the interior piping near the shut-off valve. Plan to restore any insulation that might be disturbed or add any insulation that might be needed. The Contractor must determine whether there is any risk of disturbing asbestos insulation with the installation. If there is, the installation

cannot proceed. The Contractor must call the Department to confirm this judgment. The Department will explain the problem to the customer and direct them to have the insulation tested (and, if necessary, abated on the pipe within three feet (3') on either side of the proposed installation through the shut-off valve) and to have documentation demonstrating that any problem has been resolved before rescheduling the installation. Leave written notification with the customer.

1.5 EMERGENCIES

- A. In an emergency affecting the safety of life, work or adjoining property, the Contractor, without special instruction or authorization from the Commissioner, may act as necessary to prevent loss or injury. In such an emergency, if the Contractor is instructed or authorized by the Commissioner to act to prevent loss or injury, he must so act without appeal. The amount to be paid to the Contractor for such emergency work will be determined in the same manner as the amounts to be paid for alterations as determined under "Payment for Changes" in BOOK 1, TERMS AND CONDITIONS FOR CONSTRUCTION.

1.6 PROJECT SIGNS

- A. The Contractor must furnish, erect and maintain at each Work Area at points and in positions to be designated by the Commissioner, two signs 2'-0" X 3'-0" or 4'-0" X 6'-0" or other signs as directed. Lettering on each sign will be as per the Details or as ordered or provided by the Commissioner. Upon completion of the work, the Contractor must remove all such signs unless otherwise ordered by the Commissioner and deliver these signs to the Department. Contractor shall protect signs from damage; and shall promptly replace signs that are damaged or defaced to the satisfaction of the Commissioner. The cost of furnishing, erecting and maintaining project signs will be included in the prices bid for Mobilization.

1.7 DUST CONTROL

- A. The Contractor's operations, including hauling of materials and backfill, and mixing of concrete, must be constructed in such a way as to keep dust to a minimum. In the event that the Contractor's operations create a nuisance due to the presence of excessive dirt and dust, at the work site or along the route of his hauling operations, he must upon orders from the Commissioner, immediately dispel the dust nuisance by removing the cause or by applying a suitable dust-reducing agent. No additional payment will be made to the Contractor resulting from any expenses incurred by him while eliminating dust as specified.

- B. Should the Commissioner (in his opinion) determine that Contractor's dust control and clean-up operations for the Work site are insufficient or non-responsive in maintaining a dust, material and debris free Work area, DWM may perform remedial work with all expenses to be incurred by the Contractor. This remedial action will be in accordance with Book 1 Part III.D and other applicable sections of the Contract Documents.

1.8 SALVAGING OF MATERIALS

- A. The Contractor must use reasonable care in removing materials designated for salvage encountered in the work, and will deliver this material to locations designated by the Commissioner.
- B. The Contractor must obtain a signed and dated receipt for all materials that are delivered to the designated storage point.

1.9 RESTORATION

- A. The Contractor shall restore water connection to all areas of the property which were previously connected to the water main. The Contractor shall notify the Commissioner if additional service line replacement beyond the extent identified in Section 33 12 13 is required to fully restore the water connection.
- B. The Contractor shall restore the drain connection to all areas of the property which were previously connected to the sewer main.
- C. Existing public and private driveways and sidewalks disturbed by the construction shall be replaced to the limits and thicknesses existing prior to construction.
- D. Existing trees shall be preserved whenever possible. No trees shall be removed without prior authorization from the Commissioner. Tree replacement shall not be the responsibility of the Contractor.
- E. All non-paved areas shall be hydroseeded. The extent of grassy areas shall be defined during the pre-construction meeting with the Property Owner.
- F. Destruction of existing structures and features (porches, fences, gardens, plants, etc.) on the private property shall be minimized. The Contractor shall be responsible for restoring the ground to the pre-existing elevation and hydroseeding. The Property Owner shall be responsible for restoring existing structures or features. The Contractor may be responsible for removing these structures as necessary to complete the work and shall salvage as much as possible for the Property Owner.
 - 1. The Contractor shall explicitly identify existing structures and features that will be impacted by construction to the Property Owner during the

Pre-Construction meeting and in the Shop drawing submittal. If in the course of construction additional structures or features will be impacted, the Contractor must notify the Property Owner and get the Property Owner's approval before removing or destroying these structures and features.

2. Outdoor tiles, pavers, or other ground coverings should be preserved as much as possible and stored for Property Owner to re-install.
 3. Trenching or cutting through any existing structures, features, or ground covering is incidental to the work.
- G. Interior pits shall be restored with a smooth finished concrete cap. Contractor shall minimize damage to existing flooring. Where possible, the existing flooring over the interior pit shall be removed and stored for the Property Owner. Property Owner shall be responsible for further flooring restoration. The extent of expected Property Owner restoration shall be clearly identified during the Pre-Construction meeting.
- H. In cases where the water service and/or house drain enters the property behind a wall, the Contractor shall minimize the opening cut through the wall. The Property Owner shall be responsible for restoring and /or repairing the wall. The extent of expected Property Owner restoration shall be clearly identified during the Pre-Construction meeting. Where possible, if a full panel of drywall/wall covering may be removed and preserved for re-installation instead of cutting through, this option should be offered to the Property Owner. If a home is unmetered, and the meter dimensions will prevent the Property Owner from re-installing the drywall, the Property Owner shall be notified during the Pre-Construction meeting.
- I. All restoration of pavements must comply with the requirements of latest version of the Chicago Department of Transportation (CDOT) "Rules and Regulations for Construction in the Public Way". Pavement markings and road features shall be restored to their original condition.
- J. After completion and acceptance of all water service line and main work, Contractor must complete full pavement restoration within thirty (30) calendar days. Contractor will be responsible for maintaining the roadway(s) in a safe and passable condition during construction through the installation of final surface and pavement markings.
- K. In constructing the Items of surface restoration under this Contract, the Contractor must clean and adjust all existing catch basins along the route of the work when ordered by the Commissioner. The Contractor must also repair or replace all damaged catch basins and inlets, including drain connections if necessary, and must replace all gutter boxes with inlets, wherever, in the opinion of the Commissioner, such should be done.

- L. Catch basins or inlets which are not located along the route of the work of this Contract but which are destroyed or damaged by the Contractor due to his construction or hauling operations must be repaired or replaced by the Contractor at his expense. Gutter boxes which are not located along the route of the work of this Contract, but which are destroyed or damaged by the Contractor due to his construction or hauling operations must be replaced by the Contractor at his expense.

1.10 CONTRACTOR WORK DOCUMENTATION SUBMITTALS

- A. Contractor must document all construction related activities including but not limited to the amount of material used, labor and fixed rate items as requested by the Commissioner. This documentation must conform with the guidelines set by the City of Chicago. The documentation shall be in the form of a daily report with information including number of workers and trade classification, equipment, pay items completed, hand sketches and or logs of completed activity. This documentation must be provided to the Commissioner on a daily basis.
- B. All construction equipment costing to be in conformance with IDOT Force Account Billing procedures based on the Equipment Watch Rental Rate Blue Book.
- C. Contractors must enter all pre-construction and post-construction inspections, digital photographs, daily work sheets, daily work activities, completion statuses and billing information into the Department's work order tracking system: Infor10EAM, CW, CTSPACE, and Primavera (P-6). Payment will be made for only the completed and accepted Work, which is properly entered into Infor10EAM by the Contractor. Contractor is required to enter the data via wireless communication devices compatible with the above mentioned work order tracking system software.
- D. Contractor will be responsible for all expenses in order to document their work force productivity including but not limited to the procurement of above mentioned software, licenses and data communication devices. The initial training regarding the above software and technology systems will be provided by the Commissioner with a "Train the Trainer" approach as part of the initial agreement. All subsequent training sessions for Contractor's staff required to use these systems must be conducted by the Contractor.
- E. Contractor is responsible for ensuring that all work is completed in accordance with the Time of Completion in the Proposal Section of Book 2. The only work assignment source will be Infor10EAM; no other sources will be acceptable for evaluating the timeline outlined in this document. Any emergency or rush work orders will be entered and transferred into Infor10EAM or the City's 311 Service Request System by the Commissioner.

- F. Substantial completion of all pavement and parkway restoration, including but not limited to curb and gutter, striping, landscape, etc. must be completed within thirty (30) days of the installation of the new water service. ADA ramps, sidewalk restoration and completing the concrete cap with broom finish (concrete base course) in the road must be completed during the 14 days allocated for Water Service Construction. See Book 2 for details. Contractor will be responsible for maintaining the roadway(s) in a safe and passable condition during construction through the installation of final surface and pavement markings. If the work is completed when the asphalt plants are closed, the Contractor shall have forty-five (45) days after the plants begin operation to complete the work. Exceptions are any project with a Notice to Proceed on or after March 1, must be completed within thirty (30) days of the installation of the new water service.

NOTICE of Water Service Interruption

Project:

Street Location:

DEAR OWNER OR OCCUPANT

The water supply to your house, building and / or property will be temporarily interrupted due to water system improvement work in your neighborhood.

DATE: _____

BETWEEN the HOURS of _____ and _____.

Please contact _____ with
_____ at phone no.: _____
with any questions or concerns.

Thank you in advance for your patience.

Department of Water Management, City of Chicago

END OF SECTION 01 11 00

SECTION 01 20 00

MEASUREMENTS AND PAYMENTS

PART 1 – BID ITEMS

1.1 GENERAL

- A. This section identifies Bid items by number and lists applicable Specification sections and methods of payment and measurement.
- B. The Contractor must provide all Work as specified in Section 01 11 00 – Summary of Work necessary to construct each Bid item as shown on the Drawings, specified here, or as directed by the Commissioner.
- C. **Furnishing all Labor, Materials, Equipment and Transportation Services:** Contractor must furnish all labor, materials, proper equipment and machinery and transportation services necessary to perform and complete in a workmanlike manner and within the specified time, all Work required under this contract.
 - 1. **Furnish:** Furnish means supply and deliver to the Work area, ready for unloading, unpacking, assembly, installation and similar operations.
 - 2. **Install:** Install means the actual unloading, packing, assembly, erection, constructing, placing, anchoring, applying, working to dimension, finishing, curing and protecting, cleaning and similar operations.
 - 3. **Provide:** Furnish and Install as required.
 - 4. **Work:** All labor necessary to produce the construction required by the Contract Documents and all materials and equipment incorporated or to be incorporated in such construction. Work is also used to mean the same as Project/Sub-Order.
- D. All costs of required items of Work and incidentals that are necessary for the satisfactory completion of the Work shall be considered as included in the Item Bid. The cost of work not directly covered by the pay items shall be considered incidental to the contract and no additional compensation shall be allowed.
- E. The Contractor shall take no advantage of any apparent error or omission on the Drawings or Specifications and the Commissioner shall be permitted to make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents.

1.2 UNIT PRICE ITEMS

- A. Payment for all Work shall be in accordance with the unit price bid items in the Schedule of Prices and shall be full compensation for all labor, materials and equipment required to furnish, install, construct and test the Work covered under the unit price Bid item.
- B. Payment will be made only for the actual quantities of work performed in compliance with the Drawings and Specifications and as approved by the Commissioner. The Contractor will be paid an amount equal to the approved quantity times applicable unit price. Any unused balance of the unit price work shall revert to the Commissioner upon completion of the project.
- C. All unit price work shall be considered as part of the Work to be performed within the time limits specified elsewhere for Substantial Completion and Project Completion. No increase in contract time will be allowed for increases in quantities of unit price Work performed beyond the quantities shown in the Notice to Proceed, unless it can be demonstrated that the additional Work performed under the unit price item is on the critical path of the Project Schedule.

1.3 MEASUREMENT OF QUANTITIES

- A. Quantities will be measured on a daily basis and entered into Infor10EAM by the Contractor. Final payment quantities shall be evaluated from the record drawings. The record drawing lengths, dimensions, quantities, etc. shall be determined by a survey after completion of all required Work. The precision of final payment quantities shall match the precision shown for that item in the Bid Schedule. Measurements will be taken according to the United States standard measurements and in the manner as specified in these Specifications.
- B. Measurements Devices
 - 1. Scales shall be inspected, tested and certified by the applicable Weights and Measures Department within the past year and shall be of sufficient size and capacity to accommodate the conveying vehicle.
 - 2. Metering devices shall be inspected, tested and certified by the applicable department within the past year.
 - 3. Volume shall be determined by cubic dimension by multiplying mean length by mean width by mean height or thickness.
 - 4. Area shall be determined by square dimension by multiplying mean length by mean width or height.
 - 5. Linear measurement shall be measured by linear dimension, along the item centerline or mean chord.

6. Stipulated price measurement shall include items measured by number, weight, volume area, length or combination thereof as appropriate.

| Item | Method of Measurement |
|-------------|---|
| AC | Acre - Field Measure |
| AL | Allowance |
| CY | Cubic Yard - Field Measure within limits specified or shown, or measured in vehicle by volume, as specified |
| DAY | Calendar Day |
| EA | Each - Field Count |
| GAL | Gallon - Field Measure |
| HR | Hour |
| LB | Pound(s) - Weight Measure by Scale |
| LF | Linear Foot - Field Measure |
| LS | Lump Sum - Unit is one; no measurement will be made |
| SF | Square Foot |
| SY | Square Yard |
| TON | Ton - Weight Measure by Scale (2,000 pounds) |
| VF | Vertical Foot - Field Measure |

1.4 DESCRIPTION OF BID ITEMS

A. **Bid Item No. 1: MOBILIZATION / JOB SET-UP**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Book 1 and Book 2 of Contract Documents

- b. Section 01 11 00 – Summary of Work.
- c. Section 01 55 26 – Traffic Control.

2. Method of Payment:

All payment for Work under ITEM No. 1, MOBILIZATION/JOB SET-UP, will be paid for the contract price per EACH per the following schedule:

| Percent of Job Set-up | Activity |
|------------------------------|---|
| 5% | Pre-Construction Meeting with Property Owner and Commissioner |
| 20% | Permitting (including all permit fees to all jurisdictional agencies and City Departments), bonding and insurance |
| | Submittals |
| | Inspection and documentation of existing conditions, including locations and elevations of water service and house drain |
| | Submit Proposed Service Installation Drawings and Information |
| | Posting No Parking signs |
| | Any additional required project planning and preparation to replace lead service lines and related project work. |
| 50% | Mobilization of personnel, equipment, supplies and incidentals |
| | Dust control |
| | Removing dirt, mud and other debris from work site and city streets |
| | Keep site clean and organized in a workmanlike manner |
| | All other work which must be performed, or costs incurred, when beginning a project in the City and replacing lead service lines |
| 25% | Site clean-up and removal of all construction equipment, material and debris from the streets, parkways and / or private lots after restoration is complete |
| | Removal of No Parking signs |

Permits include all relevant departmental permit submission and payment including, but not limited to: Department of Buildings,

Department of Water Management, and Chicago Department of Transportation.

If the project is cancelled before the Work is complete, the job set-up cost will be pro-rated based on the amount of work that was completed at the time of cancellation. Final payment of Item No. 1 will be adjusted, up or down, at the end of a project based on quantities actually constructed.

B. Bid Item No. 2: NEW WATER SERVICE

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 01 55 26 – Traffic Control.
- b. Section 02 60 00 – Special Soils Excavation and Disposal
- c. Section 31 23 10 – Excavation, Trenching and Backfilling.
- d. Section 31 23 19 – Dewatering Excavation.
- e. Section 33 12 13 – Water Services 2-Inches and Smaller.
- f. Section 33 12 14 – Water Meter Installation

2. Measurement for Payment:

NEW WATER SERVICE will be measured per LINEAR FOOT installed for the diameter specified, exclusive of footage included in other bid items, for Work which includes:

- a. Saw cutting to full pavement depth, removal and disposal of existing surface features including, but not limited to asphalt or concrete pavement / reinforced pavement, curb and gutter, pavers to be discarded, landscaping, sidewalk or any other flatwork encountered.
- b. Furnishing and installing new water service, corporation cocks, and appurtenances.
- c. Furnishing and installing new roundways and appurtenances. Removing existing roundways.
- d. Cutting, coring, or patching as needed to bring the water service inside the property.

- e. Providing connections to the existing water service inside the property to the location either five (5) feet from the foundation or to the first shut-off valve (whichever is further inside the house).
- f. Cutting, capping and bracing the existing service and removal of any associated pipe both at the water main, and at the residence.
- g. Work inside the residence to complete the installation of new service line and all related components and appurtenances.
- h. Installing a new meter and removing (as needed) the existing meter.
- i. Excavation and disposal of spoils in accordance with Federal, State and Local guidelines and requirements.
- j. Furnishing, placing and removing excavation protection systems.
- k. Dewatering excavations.
- l. Traffic control.
- m. Environmental protection.
- n. Furnishing, placing and compacting trench backfill and bedding to pavement surface.

EXTRA COPPER INTERIOR PIPE will be measured per LINEAR FOOT installed for the diameter specified, exclusive of footage included in other bid items, for Work which includes:

- a. Providing and installing copper pipe in the home interior to connect to interior plumbing that is more than five (5) feet from the foundation or past the shut off valve when requested by the Commissioner.
- b. Providing fittings necessary to connect the copper pipe from the end point under Item No. 2a, 2b, or 2c to the additional water service connection point.
- c. Removal and disposal of existing pipe.
- d. Provide and install piping support as necessary.

- e. Note that this piping will all be inside the home and not include any excavation or restoration.
- f. Payment will only be allowed under this item if the Contractor has obtained prior written permission from the Commissioner for additional copper pipe replacement.

3. Method of Payment:

All payment for Work under ITEM No. 2 NEW WATER SERVICE, will be paid for under Bid Items will be paid for under Bid Items designated 2a through 2c as noted in the Schedule of Prices. All Work for Water Service will be paid per LINEAR FOOT for:

| | |
|---------|---|
| ITEM 2a | NEW WATER SERVICE FROM WATER MAIN TO SHUT-OFF VALVE, 1-INCH |
| ITEM 2b | NEW WATER SERVICE FROM WATER MAIN TO SHUT-OFF VALVE, 1-1/2-INCH |
| ITEM 2c | NEW WATER SERVICE FROM WATER MAIN TO SHUT-OFF VALVE, 2-INCH |

All payment for Work under ITEM No. 2d EXTRA COPPER INTERIOR PIPE will be paid for under Bid Item 2d as noted in the Schedule of Prices. All Work for Water Service will be paid per LINEAR FOOT for:

| | |
|---------|---|
| ITEM 2d | EXTRA COPPER INTERIOR WATER SERVICE, 1-INCH TO 1-1/2-INCH |
|---------|---|

C. **Bid Item No. 3: REPLACEMENT OF EXISTING SEWER, EXISTING DRAIN PIPES AND EXISTING HOUSE DRAINS (24-INCH AND SMALLER)**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 01 55 26 – Traffic Control.
- b. Section 01 32 36 – Televised Inspection of House Drains
- c. Section 02 60 00 – Special Soils Excavation and Disposal
- d. Section 31 23 10 – Excavation, Trenching and Backfilling

- e. Section 31 23 19 – Dewatering Excavations
- f. Section 33 01 31 – Cleaning and Lining of Private Drains
- g. Section 33 05 22 – Replacement of House Drains and Structures

2. Measurement for Payment:

TEST PIT will be measured as per EACH, for Work included in Bid Item 3a which includes:

- a. Test pitting to locate existing residential sanitary service and other utilities as directed by Commissioner.
- b. The maximum depth of a test pit shall be up to ten (10) feet.
- c. Backfilling and restoring location test pit performed.

REPLACEMENT OF EXISTING HOUSE DRAIN with DUCTILE IRON PIPE will be measured as LINEAR FOOT installed, for Work (see Bid Items 3b-3d) which includes:

- a. Saw cutting to full pavement depth, removal and disposal of existing surface features including, but not limited to asphalt or concrete pavement / reinforced pavement, curb and gutter, pavers to be discarded, landscaping, sidewalk or any other flatwork encountered.
- b. Work inside the residence to accommodate the work.
- c. Excavation and disposal of spoils in accordance with Federal, State and Local guidelines and requirements.
- d. Furnishing, placing and removing excavation protection system.
- e. Dewatering excavations.
- f. Traffic control.
- g. Furnishing and installing ductile iron piping, transition couplings, fittings, gaskets, polyethylene encasement and appurtenances.
- h. Conducting televised house drain inspections where required.
- i. Furnishing and installing flexible transition coupling for sewer piping.

- j. Furnishing and placing Bentonite Seal when required.
- k. Furnishing, placing and compacting trench backfill and bedding.
- l. Providing for and maintaining the existing sewage flow.
- m. Connecting of replacement pipe to the existing house drain.

TELEVISED INSPECTION OF SEWERS AND SEWER STRUCTURES will be measured as LINEAR FOOT of sewer inspected, for Work which includes:

- a. Televised inspections of the sewers and house drains will only be paid as a separate line item when the inspection is specifically directed to be performed by Commissioner. If not specifically directed to perform the inspection by the Commissioner, the work is incidental to the replacement of the existing house drain.
- b. Providing permitting, job set-up and traffic control as required to perform work.
- c. Performing a televised inspection of pipe (paid per linear foot) as directed by the Commissioner.
- d. Performing additional televised inspections as necessary to verify that all remedial cleaning and repair work has been satisfactorily completed to a minimum of pre-construction conditions will be considered incidental to the Work and no additional payment will be allowed.
- e. In the instance the Contractor encounters an impassable obstruction, the Contractor will notify the Commissioner of the obstruction and obtain approval prior to discontinuing the inspection.

3. Method of Payment:

All payment for Work under ITEM No. 3a, TEST PIT will be paid for under Bid Item 3a as noted in the Schedule of Prices. All Work will be paid per EACH for:

| | |
|---------|-----------|
| ITEM 3a | Test Pits |
|---------|-----------|

All payment for Work under ITEM No. 3, REPLACEMENT OF EXISTING DRAIN PIPES AND EXISTING HOUSE DRAINS with DUCTILE IRON

will be paid for under Bid Items designated 3b through 3d as noted in the Schedule of Prices. All Work will be paid per LINEAR FOOT for:

| | |
|---------|--|
| ITEM 3b | Replacement of Existing Sewer with Ductile Iron Pipe, 6-Inch Dia. |
| ITEM 3c | Replacement of Existing Sewer with Ductile Iron Pipe, 8-Inch Dia. |
| ITEM 3d | Replacement of Existing Sewer with Ductile Iron Pipe, 10 to 12-Inch Dia. |

All payment for Work, under ITEM No. 3e, TELEVISED INSPECTION OF SEWERS AND SEWER STRUCTURES, will be paid for under Bid Item designated 3e as noted in the Schedule of Prices. All Work will be paid per LINEAR FOOT for:

| | |
|---------|---|
| ITEM 3e | Televised Inspection of Sewers and Sewer Structures |
|---------|---|

D. Bid Item No. 4: ADDITIONAL TRENCH EXCAVATION

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 31 23 10 – Excavation, Trenching and Backfilling.
- b. Section 31 23 19 – Dewatering Excavation.

2. Measurement for Payment:

Work under items 4a and 4b will be measured per CUBIC YARD of additional excavation below the depth of eight (8) feet from ground level. ADDITIONAL TRENCH EXCAVATION will be measured as CUBIC YARD of additional trench excavation, for Work which includes:

- a. Trench excavation, hauling and disposal of spoils.
- b. Furnishing, placing and removing excavation protection system.
- c. Furnishing, placing and compacting trench backfill, bedding and trench stabilization stone.
- d. Dewatering excavations.

3. Method of Payment:

All payment for Work under ITEM No. 4, ADDITIONAL TRENCH EXCAVATION, will be paid for under Bid Items designated 4a through 4b as noted in the Schedule of Prices. All Work will be paid per CUBIC YARD for:

| | |
|---------|---|
| ITEM 4a | Additional Trench Excavation (Within Trench Neat Lines) 8 to 12 feet from Ground Level |
| ITEM 4b | Additional Trench Excavation (Within Trench Neat Lines) 12 to 16 feet from Ground Level |

1. Measurement for Payment:

E. **Bid Item No. 5: PVC CASING PIPE**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 31 23 10 – Excavation, Trenching and Backfilling.
- b. Section 31 23 19 – Dewatering Excavations.
- c. Section 33 07 10 – PVC Encasement for Water Pipe.
- d. Section 33 12 13 – Water Services 2-Inches and Smaller.

2. Measurement for Payment:

PVC CASING PIPE will be measured as LINEAR FOOT installed, for Work which includes:

- a. Furnishing and installing PVC casing pipe.
- b. All work to place the PVC casing pipe around the carrier pipe.
- c. Sealing the ends of the casing pipe with brick and mortar, rubber end-seal, or other appropriate method of providing a water tight seal.

(The copper pipe will be paid separately under ITEM No. 2)

3. Method of Payment:

All payment for Work under ITEM No. 5, PVC CASING PIPE, will be paid for under Bid Items designated 5a and 5b as noted in the Schedule of Prices. All Work will be paid per LINEAR FOOT for:

| | |
|---------|----------------------------------|
| ITEM 5a | PVC Casing Pipe, 2-Inch Diameter |
| ITEM 5b | PVC Casing Pipe, 3-Inch Diameter |

F. **Bid Item No. 6: SUB-BASE GRANULAR MATERIAL**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 31 23 10 – Excavation, Trenching and Backfilling.
- b. Section 32 12 16 – Asphalt Pavement.
- c. Section 32 13 13 – Concrete Pavement.
- d. Section 32 16 21 – Concrete Curbs, Gutters & Walks.

2. Measurement for Payment:

SUB-BASE GRANULAR MATERIAL will be measured per SQUARE YARD of sub-base course of the type and thickness specified placed, for Work which includes:

- a. Excavation and preparation of sub-grade.
- b. Furnishing, placing and compacting granular material for sub-base, per CDOT Standards.
- c. QC / QA in accordance with Section 32 16 21 Concrete Curbs, Gutters, & Walks.

3. Method of Payment:

All payment for Work under ITEM No. 6, SUB-BASE GRANULAR MATERIAL, will be paid for under Bid Item 6 as noted in the Schedule of Prices.

All Work for Sub-Base Granular Material will be paid per SQUARE YARD for:

| | |
|--------|---|
| ITEM 6 | Sub-base Granular Material, CA-6 Type "B" |
|--------|---|

G. **Bid Item No. 7: COMBINATION CURB AND GUTTER AND CURB TYPE B**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 03 20 00 – Concrete Reinforcing.
- b. Section 31 23 10 – Excavation, Trenching and Backfilling.
- c. Section 32 16 21 – Concrete Curb, Curb & Gutter and Sidewalk.

2. Measurement for Payment:

CURB AND GUTTER AND CURB TYPE B REMOVAL AND REPLACEMENT will be measured per LINEAR FOOT of curb and gutter removed, for Work which includes:

- a. Saw cutting, removing, hauling and disposing of existing curb and gutter to provide a vertical joint to undamaged curb and gutter or as directed by the Commissioner.
- a. Excavating, hauling and disposing of surplus earth and crushed stone surface fill to the proposed sub-grade level.
- b. Preparing the sub-grade.
- c. Furnishing, placing and compacting crushed stone fill sub-base.
- d. Furnishing and constructing combination curb and gutter and curb TYPE B including forming, finishing, curing and sealing.
- e. Providing reinforcement, bar supports, dowel ties, tie bars, joint filler, sealant materials and accessories as required.
- f. Removal of forms and backfilling of voids.
- g. QC / QA in accordance with Section 32 16 21 – Concrete Curb, Curb & Gutter and Sidewalk.

3. Method of Payment:

All payment for Work under ITEM No. 7, COMBINATION CURB AND GUTTER AND CURB TYPE B will be paid for under Bid Items designated 7a and 7b as noted in the Schedule of Prices. All Work will be paid per LINEAR FOOT for:

| | |
|---------|---|
| ITEM 7a | Concrete Curb and Gutter and Curb Type B Removal and Replacements |
| ITEM 7b | Concrete Curb, Type B Removal and Replacement |

H. **Bid Item 8: PORTLAND CEMENT CONCRETE SIDEWALK AND SIDEWALK REMOVAL AND REPLACEMENT**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 03 20 00 – Concrete Reinforcing.
- b. Section 31 23 10 – Excavation, Trenching and Backfilling.
- c. Section 32 13 13 – Concrete Pavement.
- d. Section 32 16 21 – Concrete Curb, Curb & Gutter and Sidewalk.

2. Measurement for Payment:

PORTLAND CEMENT CONCRETE SIDEWALK will be measured as SQUARE FOOT of sidewalk installed for Work which includes:

- a. Saw cutting to full pavement depth, removal hauling and disposing of existing PCC sidewalk.
- b. Excavating, hauling and disposing of surplus earth and crushed stone surface fill to the proposed sub-grade level.
- c. Providing steel plating over the excavated area.
- d. Preparing the sub-grade.
- e. Furnishing, placing and compacting sub-base fill per CDOT Standards.

- f. Adjusting existing B-boxes and residential water meter structures, frames and lids, including exposing existing structures, prior to adjustment.
 - g. Furnishing and constructing PORTLAND CEMENT CONCRETE SIDEWALK including forming, jointing, finishing, curing and sealing.
 - h. Removal of forms and backfilling.
 - i. Providing and installing cast iron detectible warning tiles.
 - j. Sub-base for PCC Sidewalk, ADA Ramps (5-Inch) and ADA Ramps (8-inch) shall be provided per CDOT Standards.
 - k. Saw cutting and removal to provide a vertical joint to undamaged sidewalk or as directed by the Commissioner.
 - l. Sidewalk ramp raised curbing.
 - m. Construct ADA ramps per CDOT requirements. The Contractor will be required to have the constructed ramp inspected by the Commissioner to confirm that the work is compliant with CDOT Standards. The Commissioner or his representatives will perform the QC and QA.
 - n. QC / QA in accordance with Section 32 16 21 – Concrete Curb, Curb & Gutter and Sidewalk.
 - o. Providing joint filler, sealant materials and accessories as required per CDOT Standards.
 - p. Providing detour signs and pedestrian traffic control as required by CDOT.
 - q. Resetting or installation of all signs in the public way disturbed by Water Main Construction forces or by restoration work. It is the responsibility of the Contractor to contact the necessary party for the replacement of all missing/damaged signs (street, parking, traffic, etc.).
3. Method of Payment:

All payment for Work under ITEM No. 8, PORTLAND CEMENT CONCRETE SIDEWALK will be paid for under Bid Items designated 8a through 8b as noted in the Schedule of Prices.. All Work will be paid per SQUARE FOOT for:

| | |
|---------|---|
| ITEM 8a | Portland Cement Concrete Sidewalk – 5-Inch removal and replacement, Including Keystone and Flares |
| ITEM 8b | Portland Cement Concrete ADA Ramps, 5-Inch |

I. **Bid Item No. 9: PORTLAND CEMENT CONCRETE BASE COURSE**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 03 20 00 – Concrete Reinforcing.
- b. Section 31 23 10 – Excavation, Trenching and Backfilling.
- c. Section 32 13 13 – Concrete Pavement.

2. Measurement for Payment:

PORTLAND CEMENT CONCRETE BASE COURSE will be measured as SQUARE YARD of base course, for Work which includes:

- a. Saw cutting to full pavement depth, excavating, hauling and disposing of surplus earth and crushed stone surface fill down to the proposed sub-grade level, per CDOT Standards.
- b. Providing steel plating over any open excavated area and the PCC base course.
- c. Furnishing, placing and compacting of sub-base Granular Material. Type B, will be paid under Bid Item No. 210b.
- d. Preparing the sub-grade and additional excavation required, per CDOT Standards.
- e. Furnishing and constructing PORTLAND CEMENT CONCRETE BASE COURSE including forming, jointing, finishing, curing and sealing.
- f. Drilling and grouting dowel bars into existing adjacent concrete pavement, base course or curb and gutter will be paid for separately.
- g. QC / QA in accordance with Section 03 30 00 Cast-In-Place Concrete.

Additional Portland Cement Concrete placed due to excavation beyond the standard Water Main trench detail limits will not be included in measurement and payment, unless directed by the Commissioner.

3. Method of Payment:

All payment for Work under ITEM No. 9, PORTLAND CEMENT CONCRETE BASE COURSE, will be paid for under Bid Item designated 9a through 9b as noted in the Schedule of Prices. All Work will be paid per SQUARE YARD for:

| | |
|---------|---|
| ITEM 9a | PORTLAND CEMENT CONCRETE BASE COURSE, 9-INCH |
| ITEM 9b | PORTLAND CEMENT CONCRETE BASE COURSE, 11-INCH |

J. **Bid Item No. 10: 8-INCH PORTLAND CEMENT CONCRETE DRIVEWAY / ALLEY**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 03 20 00 – Concrete Reinforcing.
- b. Section 31 23 10 – Excavation, Trenching and Backfilling.
- c. Section 32 13 13 – Concrete Pavement.
- d. Section 32 16 21 – Concrete Curb, Curb & Gutter and Sidewalk..

2. Measurement for Payment:

8-INCH PORTLAND CEMENT CONCRETE DRIVEWAY / ALLEY will be measured as SQUARE YARD of Portland cement concrete driveway / alley pavement constructed. The Work includes:

- a. Saw cutting and removal to full pavement depth and to provide a vertical joint to undamaged alley or driveway or as directed by the Commissioner. Removal hauling and disposing of existing.
- b. Excavating, hauling and disposing of surplus earth and crushed stone surface fill to the proposed sub-grade level.

- c. Providing steel plating over the excavated area and the base course.
- d. Preparing the sub-grade.
- e. Furnishing, placing and compacting of sub-base Granular Material. Type B, will be paid under Bid Item No. 210b.
- f. Furnishing and constructing 8-INCH PORTLAND CEMENT CONCRETE DRIVEWAY / ALLEY pavement including forming, finishing, curing and sealing.
- g. Removal of forms and backfilling of voids.
- h. QC / QA in accordance with Section 32 13 13 Concrete Pavement.
- i. Providing reinforcement, bar supports, dowel bars, tie bars, joint fillers, sealant materials and accessories as required.
- j. All pavement markings to restore to initial condition.

3. Method of Payment:

All payment for Work under ITEM No. 10, 8-INCH PORTLAND CEMENT CONCRETE DRIVEWAY / ALLEY will be paid for under Bid Item 10 as noted in the Schedule of Prices. All Work will be paid per SQUARE YARD for:

| | |
|---------|--|
| ITEM 10 | Portland Cement Concrete Driveway and Alley Pavement Removal and Replacement, 8-Inch (Class PV, High Early Strength) |
|---------|--|

K. Bid Item No. 11: PORTLAND CEMENT CONCRETE BUS PADS (HIGH EARLY STRENGTH, PV)

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 03 20 00 – Concrete Reinforcing.
- b. Section 31 23 10 – Excavation, Trenching and Backfilling.
- c. Section 32 12 16 – Asphalt Pavement.
- d. Section 32 13 13 – Concrete Pavement.

2. Measurement for Payment:

PORTLAND CEMENT CONCRETE BUS PADS will be measured per CUBIC YARD of Portland cement concrete pavement, for Work which includes:

- a. Excavating, hauling and disposing of surplus earth and crushed stone surface fill to the proposed sub-grade.
- b. Providing steel plating over the excavated area and the base course.
- c. Preparing the sub-grade.
- d. Furnishing, placing and compacting of sub-base Granular Material. Type B, will be paid under Bid Item No. 6.
- e. Furnishing and constructing PORTLAND CEMENT CONCRETE BUS PADS including forming, finishing, curing and sealing.
- f. Providing reinforcement, bar supports and baskets for bus pads and pavement, tie bars, dowel bars (dowel bars installed in existing pavements are paid for separately), pins, preformed joint filler, joint materials and accessories as required.
- g. QC / QA in accordance with Section 32 13 13 – Concrete Pavement.

3. Method of Payment:

All payment for Work under ITEM No. 1, PORTLAND CEMENT CONCRETE BUS PADS, will be paid for under Bid Items designated 11 as noted in the Schedule of Prices. All Work will be paid per CUBIC YARD for:

| | |
|---------|--|
| ITEM 11 | Bus Pads (Class PV, High Early Strength) |
|---------|--|

L. **Bid Item No. 12: PAVEMENT RESTORATION – DOWEL BARS AND TIE BARS**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 03 20 00 – Concrete Reinforcing.

b. Section 32 13 13 – Concrete Pavement.

2. Measurement for Payment:

PAVMENT RESTORATION – DOWEL BARS AND TIE BARS will be measured as EACH dowel bar and tie bar installed, for Work which includes:

a. Drilling, removing debris from hole and providing adhesive for dowel bars and tie bars into the existing concrete pavement or curb.

b. Furnishing and installing dowel bars and tie bars.

3. Method of Payment:

All payment for Work under ITEM No. 12, PAVEMENT RESTORATION – DOWEL BARS AND TIE BARS, will be paid for under Bid Item designated 12 as noted in the Schedule of Prices. All Work will be paid per EACH for:

| | |
|---------|---|
| ITEM 12 | Furnish and Install Dowel Bars and Tie Bars |
|---------|---|

M. **Bid Item No. 13: HOT-MIX ASPHALT SURFACE REMOVAL AND PAVEMENT REMOVAL**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

a. Section 31 23 10 – Excavation, Trenching and Backfilling.

b. Section 32 12 16 – Asphalt Pavement.

2. Measurement and Payment:

HOT-MIX ASPHALT SURFACE REMOVAL will be measured as SQUARE YARD of bituminous material removed by cold milling of the thickness required including temporary ramping at butt joints.

3. Method of Payment:

All payment for Work under ITEM No. 13, HOT-MIX ASPHALT SURFACE REMOVAL, will be paid for under Bid Items designated 13a through 13b as noted in the Schedule of Prices. All Work will be paid per SQUARE YARD for:

| | |
|----------|--|
| ITEM 13a | Hot-Mix Asphalt Surface Removal, Up to 2-1/2-Inch (Cold Milling) |
| ITEM 13b | Hot-Mix Asphalt Surface Removal, greater than 2-1/2-Inch and Up to 5-Inch (Cold Milling) |

N. **Bid Item No. 14: HOT-MIX ASPHALT PAVING**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 32 12 16 – Asphalt Pavement.
- b. Section 32 17 23 – Pavement Markings.

2. Measurement for Payment:

HOT-MIX ASPHALT PAVING will be measured as per SQUARE YARD of hot-mix asphalt binder and surface course placed, for all Work which includes:

- a. Cleaning and preparing the base course.
- b. Providing temporary hot-mix asphalt surfacing including ramps at butt joints and at adjusted utilities structures.
- c. Providing tack coat, prime coat and prime coat aggregate.
- d. Furnishing and placing hot-mix asphalt surface and binder courses and other materials as necessary for complete hot-mix asphalt pavement installation.
- e. QC / QA in accordance with Section 32 12 16 – Asphalt Pavement.
- f. “Hand Method” shall be any work involving use of hand labor, hand tools, hand tamping and small hand operated equipment for providing, placing, compacting, etc. of hot-mix asphalt binder and surface courses and other materials complete for small areas of hot-mix asphalt pavement installation, in accordance with IDOT SSRBC as directed by the Commissioner.
- g. All pavement markings to restore to initial condition.

3. Method of Payment:

All payment for Work under ITEM No. 14, HOT-MIX ASPHALT PAVING, will be paid for under Bid Items designated 14 as noted in the Schedule of Prices. All Work will be paid per SQUARE YARD for:

| | |
|---------|--|
| ITEM 14 | HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70, UP TO 2 INCHES |
|---------|--|

O. **Bid Item No. 15: LANDSCAPE RESTORATION – HYDRO-SEEDING**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 31 23 10 – Excavation, Trenching and Backfilling.
- b. Section 32 90 00 – Landscape Restoration.

2. Measurement for Payment:

LANDSCAPE RESTORATION - HYDRO-SEEDING will be measured as SQUARE YARD of hydro-seeded area placed, for all Work which includes:

- a. Excavation and hauling away surplus earth fill to a minimum depth of four (4) inches.
- b. Adjusting existing B-boxes and residential water meter structures, frames and lids, including exposing existing structures, prior to adjustment.
- c. Preparing the planting surface.
- d. Providing, placing and spreading a minimum of four (4) inches of topsoil.
- e. Providing and placing hydro-seed with fertilizer and soil amendments.
- f. Watering and maintaining the landscaped areas.
- g. Provide salt tolerant seed as directed by the Commissioner.
- h. Resetting or installation of all signs in the public way disturbed by Department forces or by restoration work. It is the

responsibility of the Contractor to contact the necessary party for the replacement of all missing/damaged signs (street, parking, traffic, etc.).

3. Method of Payment:

All payment for Work under ITEM No. 15, LANDSCAPE RESTORATION – HYDRO-SEEDING, will be paid for under Bid Item designated 15 as noted in the Schedule of Prices. All Work will be paid per SQUARE YARD for:

| | |
|---------|---------------------------------------|
| ITEM 15 | Landscape Restoration – Hydro-Seeding |
|---------|---------------------------------------|

P. **Bid Item No. 16: FLOWABLE FILL BACKFILL / CONTROLLED LOW STRENGTH MATERIAL (CLSM)**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 31 23 10 – Excavation, Trenching and Backfilling.

2. Measurement for Payment:

The width and depth of trench for pay purposes will be the measured width and depth of the actual trench excavation, but will not exceed the dimensions of the pipe trench as detailed on the Drawings, plus any allowance made for installing sheeting, bracing or pipe bedding. FLOWABLE FILL BACKFILL CONTROLLED LOW STRENGTH MATERIAL (CLSM) will be measured as CUBIC YARD of flowable fill backfill placed.

3. Method of Payment:

All payment for Work under ITEM No. 16, FLOWABLE FILL BACKFILL / CONTROLLED LOW STRENGTH MATERIAL (CLSM), will be paid per cubic yard for only the incremental cost above the costs for granular trench backfill included as incidental to water main and sewer installation items. All Work will be paid per CUBIC YARD for:

| | |
|---------|--|
| ITEM 16 | Flowable Fill Backfill / Controlled Low Strength Material (CLSM) |
|---------|--|

Q. **Bid Item No. 17: WINTER PROTECTION OF NEW CONCRETE**

1. Specification References:

Work of the following Specification Sections are referenced under this Bid Item.

- a. Section 32 13 13 – Concrete Pavement.
- b. Section 32 16 21 – Concrete Curb, Curb & Gutter and Sidewalk .

2. Measurement for Payment:

WINTER PROTECTION OF NEW CONCRETE will be measured as SQUARE YARD of exposed surface area of Portland cement concrete base course, driveway pavement, alley pavement, sidewalk, PCC pavement or combination of curb and gutter constructed. The Work includes:

- a. Providing, installing, protecting and removing insulation protection.
- b. The measurement for winter protection will be in addition to the measurement for the construction of the item.

3. Method of Payment:

All payment for Work under ITEM No. 17, WINTER PROTECTION OF NEW CONCRETE, will be paid for under Bid Item designated 17 as noted in the Schedule of Prices. All Work will be paid per SQUARE YARD for:

| | |
|---------|-----------------------------------|
| ITEM 17 | Winter Protection of New Concrete |
|---------|-----------------------------------|

PART 2 – PRODUCTS

(Not Applicable)

PART 3 – EXECUTION

(Not Applicable)

END OF SECTION 01 20 00

SECTION 01 25 00

SECURITY REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Contractor must comply with Department of Water Management Security Requirements.
- B. Contractor must provide completed Background Check Consent Forms and Visitor Authorization Request Forms to receive authorization to access Site.

1.2 DEPARTMENT OF WATER MANAGEMENT SECURITY REQUIREMENTS

- A. For purposes of this section “employee” refers to any individual employed or engaged by Contractor or by Subcontractor. If any employee, in the performance of this Contract, has or will have access to a Chicago Department of Water Management facility, the City may conduct such background and employment checks, including criminal history checks and work permit documentation, as the Commissioner of the Department of Water Management and the City may deem necessary, on Contractor, any Subcontractor, or any of their respective employees. The Commissioner of the Department of Water Management has the right to require Contractor to supply or provide access to any additional information the Commissioner of the Department of Water Management deems relevant. Before beginning work on the Project, Contractor must:
 - 1. Provide the City with a list of all employees requiring access to enable the City to conduct such background and employment checks;
 - 2. Deliver to the City consent forms signed by all employees who will work on the Project consenting to the City’s and Contractor’s performance of the background checks in this Section; and
 - 3. Deliver to the City consent forms signed by all employees who will require access to the Department facility consenting to the searches described in this Section.
- B. The Commissioner of the Department of Water Management may preclude Contractor, any Subcontractor, or any employee from performing on the Project. Further, Contractor must immediately report any information to the Commissioner of the Department of Water Management relating to any threat to Department infrastructure or

facilities or the water supply of the City and must fully cooperate with the City and all governmental entities investigating the threat. Contractor must, notwithstanding anything contained in the Contract Documents to the contrary, at no additional cost to the City, adhere, and cause Subcontractors to adhere, to any security and safety guidelines developed by the City and furnished to Contractor from time to time during the time of performance under this Contract and any extensions of it.

- C. Each employee who Contractor wishes to have access to a Department facility must submit a signed, completed "Area Access Application" to the Department to receive a Department Security Badge. If Contractor wishes a vehicle to have access to a Department facility, Contractor must submit a vehicle access application for that vehicle.
- D. The applications will solicit such information as the Commissioner of the Department of Water Management in his discretion may require including, name address, date of birth, social security number (and for vehicles: make, model, driver's license number, vehicle license plate number, and appropriate stickers). Contractor is responsible for requesting and completing these forms for each employee who will be working at Department facilities and all vehicles to be used on the Work site. The Commissioner of the Department of Water Management may grant or deny the application at the Commissioner's sole discretion. Contractor must make available to the Commissioner of the Department of Water Management, within one business day of the request, the personnel file of any employee who will be working on the Project.
- E. At the Commissioner of the Department of Water Management's request, Contractor and Subcontractors must maintain an employment history of employees going back 5 years from the date Contractor began Work on the Project. If requested, Contractor must certify that they have verified the employment history as required on the form designated by the Commissioner of the Department of Water Management. Contractor must provide the City, at its request, a copy of the employment history for each employee. Employment history is subject to audit by the City.
- F. Department Security Badges and Vehicle Permits will only be issued based upon properly completed Area Access Application Forms. Employees or vehicles without proper credentials will not be allowed on Department property.
- G. The following rules related to Security Badges and Vehicle Permits must be adhered to:
 - 1. Each employee must wear and display the Department Security Badge issued to that employee on their outer apparel at all times.

2. At the sole discretion of the Commissioner of the Department of Water Management and law enforcement officials, including but not limited to the Chicago Police Department, Cook County Sheriffs Office, Illinois State Police or any other municipal, state or Federal law enforcement agency, all vehicles (and their contents) are subject to interior and exterior inspection entering or exiting Department facilities, and all employees and other individuals entering or exiting Department facilities are subject to searches. Vehicles may not contain any materials other than those needed for the Project. The Commissioner of the Department of Water Management may deny access to any vehicle or individual at the Commissioner of the Department of Water Management's sole discretion.
 3. All individuals operating a vehicle on Department property must be familiar and comply with motor driving regulations and procedures of the State of Illinois and the City. The operator must be in possession of a valid, state-issued Motor Vehicle Operator's Drivers License.
 4. All required City stickers and State Vehicle Inspection stickers must be valid.
- H. Individuals must remain within their assigned area and haul routes unless otherwise instructed by the Commissioner of the Department of Water Management or the City.
- I. Access to the Work sites will be shown or designated on the Contract Documents, Drawings or determined by the Commissioner of the Department of Water Management. The Commissioner of the Department of Water Management may deny access when, at the Commissioner's sole discretion, the vehicle or individual poses some security risk to Department.
- J. Whenever Contractor receives permission to enter Department property in area where exit/entrance points are not secured by the City, Contractor may be required to provide gates that comply with Department design and construction standards. Contractor must provide a licensed and bonded security guard, subject to the Commissioner of the Department of Water Management's approval and armed as deemed necessary by the Commissioner of the Department of Water Management, at the gates when the gates are in use. Department Security will provide the locks. Failure to provide and maintain the necessary security will result in an immediate closure by Department personnel of the point of access.
- K. Stockpiling materials and parking of equipment or vehicles near Department security fencing are prohibited.

- L. Any security fencing, gates, or alarms damaged Contractor or Subcontractors must be manned by Contractor's licensed and bonded security guard at Contractor's expense until the damaged items are restored. Contractor must restore them to their original condition within an 8-hour period from the time of notice given by the Commissioner of the Department of Water Management.
- M. Temporary removal and security fencing, gate, or alarm to permit construction must be approved by the Commissioner of the Department of Water Management, and Contractor must provide a licensed and bonded security guard at the site, approved and armed as deemed necessary by the Commissioner of the Department of Water Management, at Contractor's expense, on a 24-hour basis during the period of temporary removal. Contractor must restore the items removed to their original condition when construction is completed.
- N. Unauthorized hazardous or illegal material, including but not limited to hazardous materials as defined in 49 CFR Parts 100-185 (e.g., explosives, oxidizers, radiological materials, infectious materials), contraband, firearms and other weapons, illegal drugs and drug paraphernalia, may not be taken on Department property. Alcoholic beverages are also prohibited.
- O. All employees and vehicles working near Department facilities must be properly identified. All vehicle passes will be issued to the Contractor by the Commissioner of the Department of Water Management, as required. Contractor, Subcontractors, and employees must return identification material to the Commissioner of the Department of Water Management upon completion of your and their respective Work within the Project, and in all cases, Contractor must return all identification material to the Commissioner of the Department of Water Management after completion of the Project. Final Payment will not be made until all passes issued have been returned to Department Security.

1.3 SECURITY COORDINATION

- A. Contractor must meet the requirements for Department of Water Management security as specified elsewhere in these contract documents. Department of Water Management will decide which Contractor personnel receive badges allowing daily access to the site over the contract period, and which Contractor personnel will only be allowed short term access to the site with a visitor pass. Contractor must conform to the Department of Water Management security requirements without any modification to contract price or contract time.
- B. Background Check Consent Form

1. Contractor must provide Department of Water Management with a completed Background Check Consent Form on the Contractor's letterhead for each Contractor employee, Subcontractor employee and other personnel who will receive Department of Water Management Contractor Badge allowing him/her daily access to the project site over the term of the Contract. A copy of the format of the form is attached. Department of Water Management review and approval of the Consent Form and Contractor personnel use of badges provided shall be in accordance with the requirements for Department of Water Management security as specified elsewhere in these contract documents.

C. Visitor Authorization Request Form

1. Contractor must provide Department of Water Management with completed Visitor Authorization Request Form for each Contractor employee, Subcontractor employee and other personnel who will receive Department of Water Management Visitor Badge allowing him/her daily access for "short term" access to the project site. Representative of the Commissioner must receive the completed forms at least 48 hours before the visiting individual(s) can receive a visitor pass(es) allowing entry on the site. A copy of the format of the form is attached. Department of Water Management review and approval of the Visitor Authorization Request Form and Contractor personnel use of visitor badges provided must be in accordance with the requirements for Department of Water Management security as specified elsewhere in these contract documents.

END OF SECTION 01 25 00

SECTION 01 30 00

HEALTH AND SAFETY PLAN

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements for providing a Health and Safety Plan.
- B. Prevention of accidents on or near the Work is the Contractor's responsibility. The Contractor shall take all necessary precautions to assure the safety of all persons and property during performance of the Work and will protect the Work and adjacent property from damage. The Contractor will conform to all laws and regulations relating to health and safety. The Contractor shall designate a qualified representative responsible for safety.
- C. The Contractor shall at all times be solely responsible for all aspects of safety in connection with the Work, including initiating, maintaining and supervising all safety precautions and plans. The Contractor shall perform the Work or ensure that it is performed, in a manner to avoid risk of injury to persons or damage to property and shall continuously inspect the Work, which includes all of the Contractor's materials, equipment and lower tier subcontractors, to discover the existence of any conditions which impose a risk of bodily injury or damage to property.

1.2 SUBMITTALS

- A. Prior to beginning the Work, the Contractor shall submit for the Commissioner's review, a written Safety Plan, with detail commensurate with the Work. Such Plan shall be prepared by an appropriate health or safety professional and shall describe anticipated hazards and control methods. The Contractor will employ to administer a Safety Plan which provides adequate safeguards for all construction employees, the Commissioner's employees, site visitors, and the public. The Plan's safety measures, policies and standards shall conform to those required or recommended by governmental and quasi-governmental authorities having jurisdiction and by the Commissioner, including, but not limited to, requirements imposed by the Contract Documents.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

1.1 The Safety Plan must include, at a minimum, the following components:

- A. **Training.** The Contractor is responsible for the safety education of their employees. The training must comply with all laws and standards and include additional training for site supervision. Training must continue through the term of the Contract. The Contractor shall provide copies of training certificates to the Commissioner for all operations, which require such training. These documents must be submitted prior to performing the Work. As a minimum, the following training is required:
1. Supervisor Safety Training – must cover record keeping, incident investigation, OSHA inspections, H&S documentation requirements, and the OSHA 10 hour course for construction.
 2. Competent Person Training – each person designated as a competent person shall attend training on that particular operation. Operations requiring a competent person per OSHA requirements include, but are not limited to, trenching and excavation, fall protection, scaffolds, confined space entry, and rigging.
 3. Employee Orientation Training – must cover the various safety policies, safety manuals, first aid availability, accident reporting procedures, safety meeting participation, personal protective equipment, and enforcement procedures.
 4. Emergency Procedures – must cover notification procedures, evacuation routes, mustering points, and accountability.
 5. Safety Meetings – must be conducted weekly with all Subcontractor's onsite personnel. Documentation detailing the subject discussed and signatures of all participants must be kept for each meeting.
 6. Hazard Communication Standard – must cover all aspects of the standard including MSDSs, chemicals onsite, labeling and the written program. Annual re-training is required.
 7. Lockout / Tagout – must cover each individual piece of machinery or equipment that is to be serviced or altered during this Project.
- B. **Incident Investigation.** The Contractor must report all OSHA recordable injuries and any property damage to the Commissioner immediately (within 1 hour of incident). An incident investigation must be conducted and a complete report issued to the Commissioner within twenty-four (24) hours of incident.

- C. **Emergency Procedures and First Aid/Medical Services.** The Contractor must meet OSHA's first aid requirements and provide at least one (1) onsite employee possessing a current training certification in CPR and First Aid.
 - D. **Record Keeping.** Project-specific OSHA 300 and first aid logs must be maintained onsite at all times.
 - E. **Personal Protective Equipment.** The Contractor shall provide and inspect all personal protective equipment (PPE). In addition, the Contractor shall enforce the use of PPE by its employees, as specified in the project health and safety plan. Minimum PPE for the Commissioner projects includes: hard hats, safety glasses, hard soled work boots and high visibility warning vests (meeting ANSI/ISEA 107-2004 standards) when personnel are in proximity to moving equipment. The minimum dress code for the Commissioner projects includes appropriate clothing (long pants and sleeved shirts that must cover torso).
 - F. **Competent Person.** The Contractor agrees to provide a competent person onsite at all times during operations which require such according to the OSHA regulations. This person must be experienced in the operation and have received detailed training on the regulations pertaining to the operation. The competent person shall perform a daily inspection of the operation.
 - G. **Housekeeping and Site Services.** The Contractor is solely responsible for housekeeping in their work areas. Good housekeeping is essential for all work performed at any of the Commissioner's sites. The Contractor is responsible to supply drinking water, adequate toilets, washing facilities, fire extinguishers, first aid kits and jobsite posters per OSHA requirements.
- 1.2 The Contractor shall designate a qualified safety representative with responsibility for preventing accidents and implementing and supervising the Safety Plan and other safety programs. The safety representative shall attend all project safety meetings, participate fully in all activities outlined in the Safety Plan and shall devote whatever time is necessary to perform such duties properly.

END OF SECTION 01 30 00

SECTION 01 32 33

CONSTRUCTION VIDEOTAPING AND PHOTOGRAPHIC DOUCMENTATION OF PROJECT SITE

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements for televising construction areas prior to the start of construction.
- B. The section includes administrative and procedural requirements for the following:
 - 1. Land-based preconstruction photographs.
 - 2. Land-based final completion construction photographs.

1.2 SUBMITTALS

- A. The Contractor must provide a DVD of the televised inspection of the construction area(s) prior to the start of any construction. Recordings are to be in high quality color. Printed labels DVD containers and disks must include the contract name and number, date the recording was made, and location of the televised inspection.
- B. The Contractor must provide a log detailing all defects and deficiencies within the project limits. The footage from the beginning of recording as well as the approximate street address must be included.
- C. Digital Photographs land-based: Submit image files within three days of taking photographs.
 - 1. File Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped. Photograph names shall following file naming convention for images:

| Location | Naming Convention | Example |
|----------|--|--|
| Exterior | There will be multiple photos for each property, the name of each photo shall start with the address including street number; E(=exterior); date of photos; Pre (= pre-construction) or Post (= post construction); sequential number . #####_ADDRESS_E_MMDDYYY_pre.jpg | 555_Mercer_E_04012018_pre_1.jpg 555_Mercer_E_04012018_pre_2.jpg |

| Location | Naming Convention | Example |
|---------------|---|--|
| Interior | There will be multiple photos for each property, the name of each photo shall start with the address including street number; I(=interior); date of photos; Pre (= pre-construction) or Post (= post construction); sequential number . #####_ADDRESS_I_MMDDYYYY_post.jpg | 555_Mercer_I_04012018_post_1.jpg 555_Mercer_I_04012018_post_2.jpg |
| Pipe Material | There may be multiple photos for each pipe, the name of each photo shall start with the address including street number; PM(=pipe material); date of photos; Corp (= main/corp stop/pipe) or Curb (= curb stop/pipe) or meter (= water meter/pipe); sequential number . #####_ADDRESS_PM_MMDDYYYY_corp.jpg | 555_Mercer_PM_04012018_corp_1.jpg 555_Mercer_PM_04012018_curb_1.jpg 555_Mercer_PM_04012018_Meter_1.jpg |

2. The first exterior photo, both pre and post shall be of the address number on the building in clear focus and readable. If no number is visible, then Contractor shall provide a white board and write the address number on board with minimum number height of 3-inches.
3. Photographic data shall be uploaded onto the application specified by the Commissioner. Contractor is responsible for supplying one tablet per crew and all training need to learn the system. Contractor shall ensure data is uploaded correctly, any data missing in the database shall provided by the Contractor at no additional cost to the owner. The Contractor shall backup all digital photographs on media storage devices in a data format acceptable to Engineer.
 - a. Two, mirrored media storage devices (including USB drives or portable solid state hard drives)
 - b. Package each drive, clearly and indelibly labeled using self-adhesive labels specifically designed for labeling of media storage devices. Include on the label the project name program number, Owner and the time period covered by the photographs contained on the disc.
4. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Construction Manager.

- d. Name of Contractor.
- e. Date and time photograph was taken.
- f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- g. Unique sequential identifier keyed to accompanying key plan.

D. Pre-construction and Post-construction

- 1. Submit with payment application PDF files with side by side pre-construction and post-construction photos taken from same location and looking in same direction for each service line replaced. These photos must include both inside and outside the property.

1.3 QUALITY ASSURANCE

- A. Videographer Work is to be performed by a professional video operator having appropriate equipment and significant documentable experience in televising similar construction sites.
- B. Photography Work is to be performed by a professional photographer having appropriate equipment and significant documentable experience in photographing similar construction sites

PART 2 – PRODUCTS

2.01 PHOTOGRAPHIC MEDIA

- A. Provide digital photographs produced by a dedicated, fixed- or interchangeable-lens digital camera. Images made with webcams, and wearable cameras are not acceptable.
- B. Digital Camera: Have a minimum image resolution of five (5) megapixels and produce images in JPEG (.JPG) format with image dimensions of not less than 2500 by 1900 pixels.

2.02 DIGITAL VIDEO RECORDINGS:

- A. Provide video recordings made with a dedicated digital video camera specifically made for video recordings. Video recordings made with cell phones, tablets, webcams, and wearable cameras are not acceptable.
- B. Digital Video Camera: Have a minimum resolution of 720p (1280 x 720, progressive).
- C. Provide video recordings in a common digital video format such as .MP4. The

minimum resolution of all video files shall be 720p (1280 x 720, progressive).

PART 3 - EXECUTION

1.4 GENERAL

- A. No additional working days will be allowed due to delays in securing the televising services of a private vendor.
- B. All construction areas must be televised within three (3) months of the start of any construction, unless directed otherwise by the Commissioner.
- C. Prior to televising, the Contractor must visually inspect all areas to be videotaped and make notations of any features that may not be readily visible during the televising of the area. Contractor must identify and record all measurements of such items during the pre-videotape inspection, and include the information in the narration of the area when it is televised.
- D. Any out of focus or distorted audio on any portions of the recording will be cause for rejection of the recording and require re-televising the area in question at the Contractor's expense.
- E. After Construction, the post-construction video shall retrace path of preconstruction video or as directed by Engineer or Commissioner.

1.5 TELEVISIONING PROCEDURE

- A. The camera must be moved through the construction area while tracking progress with a measuring wheel at a uniform rate not to exceed 50 feet per minute, stopping when necessary to ensure proper documentation of the condition of the area. Panning and zoom in/out rates are to be controlled to maintain clarity of the documented item(s) during playback.
- B. The exterior construction areas must be televised during periods of good weather. Contractor must avoid televising during periods of poor visibility, precipitation, or times of the year when fallen leaves or snow obscures features in areas to be recorded. Auxiliary lighting must be provided when required to fill in shadow areas during taping.
- C. Televised coverage must include all areas within the zone of influence of the type of construction shown on the drawings, unless directed otherwise by the Commissioner. Audio and video coverage is to be recorded simultaneously.
- D. Defects or deficiencies revealed by the televised inspection must be noted on the recording and highlighted by audio commentary. Existing debris and damage to buildings or other structures, paved areas, utility structures, curb, gutter, sidewalk, driveways, aprons and other features must be recorded and

audibility noted. Notation shall include the approximate street address as well as distance measured from the start of recording.

1.6 RECORDED INFORMATION

A. Audio Information

1. Each DVD must begin with the recording date, project name and city department, followed by general location references (i.e. street names, building addresses, viewing side and direction of travel, references to building floor plans, or prominent architectural features), as appropriate for the type of project, unless directed otherwise by the Commissioner. The audio track is to contain the narrative commentary of the camera operator recorded simultaneously with the fixed elevation video record within the zone of influence of construction.

B. Video Information

1. All video recordings must be by electronic means, display the following information continuously and digitally on screen. The information should be positioned on screen so as not to obscure information being videotaped.
 - a. Report or tape number
 - b. Date recorded
 - c. Location reference

3.4 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs that clearly show the Work. Exhibit correct exposure and focus, accurate color balance, maximum depth of field, minimal optical distortion, and minimal noise. Photographs that, in the Engineer's opinion, do not meet these quality criteria will not be accepted and shall be re-taken at no additional cost to the Owner.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Pre-construction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Engineer.
 1. Flag excavation areas before taking construction photographs.

2. Take four (4) photographs of each adjacent properties to show existing conditions before starting the Work.
 3. Take four (4) photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 4. Take two (2) photographs of pipe material after test pits (as applicable) and (2) photographs interior pipe.
 5. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements. Show protection efforts by Contractor.
 6. Take four (4) photographs to show condition of the existing curb and pavement surfaces within the work areas. This shall include one show that captures the entire width of the road and shall be taken from across the street from the address where work is to take place.
 7. Take six (6) photos of building interior depicting area of pipe penetration and meter connection.
- D. Post-Construction Photographs: Duplicate the photos location taken for pre-construction or as directed by Engineer or Commissioner.

END OF SECTION 01 32 33

SECTION 01 32 36

TELEVISED INSPECTION OF HOUSE DRAINS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes requirements for televising the interior of existing house drains (also called private drains) to document the physical condition of the pipe.
- B. The following is a list of standards which may be referenced in this section:
 - 1. U.S. Department of Transportation, Federal Highway Administration: Manual on Uniform Traffic Control Devices (MUTCD), Part 6, Temporary Traffic Control.
 - 2. NASSCO: Pipeline Assessment Certification Program (PACP).

1.2 SUBMITTALS

- A. The Contractor shall provide televised house drain inspections as directed by the Commissioner. Televised house drain inspections are utilized to document existing house drain conditions within the area of the water service. The house drain(s) should be televised for the entire length of the house drain, starting at the house, working downstream, to the public sewer
- B. Contractor shall provide two (2) sets of DVDs or two (2) USB Flash Drives for each type of house drain inspection, as directed by the Commissioner. The location and narration of the type of televised house drain inspection (pre-water or post water service construction) shall be indicated, and must be synchronized by means of narration; also, an on screen distance meter shall be included to enable a comparison to be made to judge the physical condition of the house drain(s) before and after construction as directed by the Commissioner.
- C. Videotaped inspections must be recorded on a USB Flash Drive or a set of DVD(s). USB Flash Drive shall have adequate storage memory to include all video/televised recordings and pertinent data files inclusive. DVDs shall be formatted to be viewed on a PC or multiple-format DVD player in a read only format. All recordings are to be in high quality color. Printed labels on DVD containers and cases must include the name of the water main project, contract number, and date of inspection(s). USB Flash Drives shall include an attached name tag of sufficient size to include water service address, contract number, and date of inspection(s).

1.3 QUALITY ASSURANCE

- A. Contractor must submit DVDs or USB Flash Drives with logs for quality review and comment to the Commissioner within 24 hours after the first days' work has been completed. Tapes and logs must be submitted on a routine basis within seven (7) days after completing each tape. Picture quality and definition shall be to the satisfaction of the Commissioner. Inspection equipment that fails to produce satisfactory inspection quality shall be removed.

PART 2 – PRODUCTS

2.1 EQUIPMENT

- A. Inspection Equipment:
 - 1. Monitoring Studio:
 - a. Temperature controlled.
 - b. Size: Sufficient to allow seating for two people in addition to operating technician.
 - c. Secure cable, chains, and other devices used with camera so as not to obstruct camera view or otherwise interfere with proper documentation of house drain conditions
 - 2. Television Monitor:
 - a. Locate in monitoring studio.
 - b. Color video picture.
 - c. Resolution capability of no less than 350 lines.
 - d. Continuous display during survey:
 - i. Date of survey.
 - ii. Continuous forward and reverse readout of cameral distance from the house reference.
 - 3. Cables: 600 feet long, minimum.
 - 4. Power source.
 - 5. Lights.
 - 6. Television Camera:
 - a. Explosion proof.

- b. Resolution capability: Minimum of 460 lines of horizontal resolution and 400 lines of vertical resolution.
- c. 360-degree pan and tilt unit, with adjustable supports specifically designed and constructed for operation in connection with pipe inspection. Lights shall be mounted on and turn in the direction of the camera head.
- d. 65-degree viewing angle, minimum, and either automatic or remote focus and iris controls. Remote control adjustment for focus and iris shall be located in the monitoring studio.
- e. Operative in 100 percent humidity conditions.
- f. Mounted on a device, sized for each pipe diameter, that is capable of performing work as described in this section. (Unless some significant impassable condition arises, in which case the Contractor must contact the Commissioner for direction on how to proceed.)
- g. Equip with tag line suitable for pulling camera backwards.
- h. Ability to achieve proper balance of tint and brightness.
- i. Equip with winch, power winch, TV cable, powered rewind, or other devices used to move camera through pipe.
- j. Focal Distance: Adjustable through range from 6 inches to infinity.
- k. Camera Lighting:
 - i. Minimize reflective glare.
 - ii. Remote variable intensity control.
 - iii. Lighting quality to provide clear, in-focus picture of entire inside periphery of pipe.
- l. Sufficient for 6–inch diameters.
- m. Remote Reading Footage Counter:
 - i. Accuracy: two-tenths of one foot over length of section being inspected.
 - ii. Mounted over television monitor.
 - iii. Marking on cable will not be allowed.

iv. Calibration: Each day prior to setup.

2.2 RECORDING OF DOCUMENTATION

A. Media:

1. DVD-R or USB Flash Drive.
2. DVD disc must be recorded in format compatible with standard DVD video players.
3. Opening Screen:
 - a. Date of inspection.
 - b. Pipe structure identification number.
 - c. Upstream and downstream node identification numbers.
 - d. Street address.
 - e. Pipe size.
 - f. Normal (upstream to downstream) or reverse (downstream to upstream) pull.
4. Continuous View:
 - a. Current distance along reach (tape counter footage).
 - b. Do not include pipe structure identification number along active tape (only on opening screen).
5. Audio (voice over):
 - a. Description of inspection setup, including related information from log form.
 - b. Unusual conditions.
 - c. Operation changes (e.g., remove roots and restart inspection at footage prior to root removal).
 - d. Verbal (voice over) description and location of each defect.
 - e. Verbal description and location of each service connection.
6. DVD Labeling:

- a. Contractor must provide printed label on the inside face of the actual diskette that indicates the following:
 - i. Name of Owner.
 - ii. Project Title.
 - iii. Date of Inspection.
 - iv. Inspection Company.
 - v. Tape Number.
7. USB Flash Drive Labeling:
- a. Contractor must provide a name tag attached to the USB Flash Drive body with a printed label that indicates the following:
 - i. Name of Owner.
 - ii. Project Title.
 - iii. Date of Inspection.
 - iv. Inspection Company.

PART 3 - EXECUTION

3.1 GENERAL

- A. No additional working days will be allowed due to delays in securing the video inspection services of a private vendor.
- B. All video inspections shall be as directed by the Commissioner. If a pre-water service construction house drain video is authorized, the initial video of the house drain(s) must be made prior to the start of construction, unless directed otherwise by the Commissioner. If a post water service construction video is authorized, this video inspection of house drains must be conducted after all water service and surface restoration is completed.
- C. Any out of focus video or distorted audio on any portion of the video will be cause for rejection and require a new DVD or Flash Drive of the inspection to be submitted at no additional cost to the City.

3.2 TELEVISION PROCEDURES

- A. Camera must be set so axis is at centerline of pipe.

- B. Continuous footage reading must be shown on tape image. It must be placed on screen where it is clearly visible (e.g., if black font, it must not be placed on dark background, if white font, it must not be placed on light background).
- C. Camera lens must be kept clean, and clear. If material or debris obscures image or causes reduced visibility, lens must be cleaned or replaced prior to proceeding with recording operation.
- D. Camera lens shall remain above visible water level and may submerge only while passing through clearly identifiable line sags (or vertical misalignments).
- E. Contractor must record inside of each lateral, and connection of lateral to pipeline.
- F. Recordings shall clearly show cracks and fractures, and their severity, in addition to obvious features, i.e., laterals and joints.
- G. Obstructions that restrict flow and cause inspection to be interrupted must be reported immediately to the Commissioner. Contractor must document condition with still photograph, and begin inspections of other pipelines.
- H. Camera Operation:
 - 1. Speed: 30 feet per minute, maximum, during inspection.
 - 2. Contractor must stop, for a minimum of 5 seconds, at every lateral, broken pipe, root intrusion, or other defect or adversity.
 - 3. Contractor must pan entire diameter or area of pipe at each defect.
 - 4. Lens, lighting, and focus shall be readjusted in order to ensure clear, distinct, and properly lighted image of defect.
- I. 5-second blank space must be inserted between line segments to clearly mark end of one televised line and beginning of another.
- J. Loss of color or severe red or green color will be cause for rejection of inspection.
- K. Recordings shall be without distortion or outside interference.
- L. Line segments shall be televised complete from structure-to-structure on same DVD in continuous run. Video must clearly show camera starting and ending at structure, unless defect does not allow it. Contractor must not perform partial televising on one DVD and then complete run on another DVD. If line is partially televised, due to excusable condition, i.e., collapsed line, televised length shall be viewed by Commissioner for acceptability. If a USB Flash

Drive is used, the USB Flash Drive shall be of sufficient memory size to download the entire video(s) of the televised inspection.

- M. All measurements must be recorded in English units.
- N. Pipe diameter must be obtained by physical measurement in upstream (or downstream) access structure.
- O. Pipe material (e.g., RCP, VCP, CMP) and surface lengths must be verified.
- P. Calipers or measuring rod must be used to determine diameter of inlet and outlet pipe.
- Q. Footage measurements shall begin at centerline of upstream house, unless the Commissioner approves otherwise.
- R. Continuous Footage Readings:
 - 1. Used to identify location of defects.
 - 2. Accurate to within plus or minus 2 percent tolerance.
 - 3. Defect identifications are to be called out and recorded to the nearest 1 foot.
 - 4. Line segment recording will be unacceptable if continuous footage meter is inaccurate, or identified defects or features leave doubt as to accuracy of locations or total length.
- S. For measurement of distance to defects, a marker flag must be attached to top of camera yoke. Measurements recorded in log shall be zeroed in alignment with marker rather than camera itself. Measurement shall be zeroed after each segment inspected.
- T. Contractor must check accuracy of measurement meters daily by use of walking meter, roll-a-tape, or other suitable device.

3.3 RECORDED INFORMATION FOR HOUSE DRAIN INSPECTIONS

- A. Audio and written documentation must accompany all DVD's or USB Flash Drives submitted to the Commissioner.
- B. The voice narrations on the recording must provide brief but informative comment on data of significance, i.e., the distance traveled within the house drain, location of any unusual conditions or damage, collapsed pipe sections, blockages, or other discernible features.
- C. The DVD or USB Flash Drive recording(s) must include the following information:

1. Data View:
 - a. Address of the house drain being televised.
 - b. Report or videotape number.
 - c. Date of TV inspection.
 - d. Current distance of travel (tape counter distance).
2. Printed labels on DVD container or USB Flash Drive must include location, date, format, and other descriptive reference information.

D. Work Product:

1. DVD diskettes or USB Flash Drives and completed inspection log sheets,
2. Inspection Log Sheet:
 - a. A single and complete log for each house drain will be submitted.
 - b. Separate logs for normal and reverse setups of same segment must be provided.
 - c. Other data of significance, including those defects listed on table at end of this section shall be recorded on videotape.
 - d. Subject to audits against tapes.

END OF SECTION 01 32 36

SECTION 01 40 00

QUALITY CONTROL

PART 1 - GENERAL

1.1 SCOPE

- A. This section includes requirements for the implementation of the Contractor's quality control program.

1.2 SITE INVESTIGATION AND CONTROL

- A. The Contractor shall check and verify all dimensions and conditions in the field continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work due to the Contractor's failure to comply with this requirement.
- B. The Contractor shall inspect related and appurtenant Work and report in writing to the Commissioner any conditions that will prevent proper completion of the Work. Failure to report such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor solely and entirely at the Contractor's expense.

1.3 INSPECTION OF THE WORK

- A. All Work performed by the Contractor shall be inspected by the Contractor and non-conforming Work and any safety hazards in the site of the Work shall be noted and promptly corrected. The Contractor shall be responsible for the Work to be performed safely and in conformance to the Contract Documents.
- B. The Work shall be conducted under the general observation of the Commissioner and is subject to inspection by representatives of the City acting on behalf of the City to ensure strict compliance with the requirements of the Contract Documents. Such inspection may include mill, plant, shop, or field inspection, as required. The Commissioner or any inspector(s) shall be permitted access to all parts of the Work, including plants where materials or equipment are manufactured or fabricated.
- C. The presence of the Commissioner, or any inspector(s), however, shall not relieve the Contractor of the responsibility for the proper execution of the Work in accordance with all the requirements of the Contract Documents. Compliance is the responsibility of the Contractor. No act or omission on the part of the Commissioner, or any inspector(s) shall be construed as relieving the Contractor of this responsibility. Inspection of Work later determined to be non-conforming shall not be cause or excuse for acceptance of the non-conforming Work. The

City may accept non-conforming Work when adequate compensation is offered and it is in the City's best interest as determined by the City.

- D. All materials and articles furnished by the Contractor shall be subject to rigid documented inspection, by qualified personnel, and no materials or articles shall be used in the Work until they have been inspected and accepted by the Commissioner or other designated representative.

1.4 SAMPLING AND TESTING

- A. The Contractor shall retain and pay for an independent materials testing laboratory approved by the Commissioner and the City. This independent testing agency will develop and submit a testing plan for quality assurance on each type of work activity. The testing laboratory shall document the processes and procedures utilized to verify and maintain quality work. When not otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the most current standards, as applicable to the class and nature of the article or materials considered. However, the Commissioner reserves the right to use any generally accepted system of inspection which, in the opinion of the Commissioner, will assure the Commissioner that the quality of the workmanship is in full accord with the Contract Documents.
 - 1. The Contractor may retain and pay for a qualified testing materials laboratory (approved by CDOT and IDOT); subject to the review and approval of the Commissioner, in lieu of using an independent testing agency. The qualified testing materials laboratory shall meet all CDOT and IDOT standards as a testing materials laboratory, and all applicable criteria within this specification section.
- B. The City reserves the right to abbreviate, modify the frequency of, or waive tests or quality assurance measures, but waiver of any specific testing or other quality assurance measure, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial work, shall not be construed as a waiver of any technical or qualitative requirements of the Contract Documents.
- C. Notwithstanding the existence of such waiver, the City shall reserve the right to make independent investigations and tests as specified in the following paragraph and failure of any portion of the Work to meet any of the qualitative requirements of the Contract Documents, shall be reasonable cause for the City to require the removal or correction and reconstruction of any such Work.
- D. In addition to any other inspection or quality assurance provisions that may be specified, the City shall have the right to independently select, test, and analyze, at the expense of the City, additional test specimens of any or all of the materials

to be used. Results of such tests and analyses shall be considered along with the tests or analyses made by the Contractor to determine compliance with the applicable specifications for the materials so tested or analyzed, provided that wherever any portion of the Work is discovered, as a result of such independent testing or investigation by the Commissioner, which fails to meet the requirements of the Contract Documents, all costs of such independent inspection and investigation and all costs of removal, correction, reconstruction, or repair of any such Work shall be borne by the Contractor.

1.5 CONTRACTOR'S QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

A. Inspection and Tests:

1. The Contractor shall maintain and provide to the Commissioner, within two (2) working days of completion of each inspection and test, adequate records of all such inspections and tests. Inspection and test results shall be documented and evaluated to ensure that requirements have been satisfied.
2. The Contractor shall provide verification and control of all testing provided including, but not limited to:
 - a. Individual test records will contain the following information:
 - i. Item tested: item number and description.
 - ii. Test results.
 - iii. Test designation.
 - iv. Test work sheet including location sample was obtained.
 - v. Acceptance or rejection.
 - vi. Date sample was obtained.
 - vii. Retest information, if applicable.
 - viii. Control requirements.
 - ix. Tester signature.
 - b. Maintaining copies of all test results.
 - c. Ensuring that the Commissioner receives independent copies of all tests.

- d. Ensuring that testing laboratories are functioning independently and in accordance with the requirements of these Specifications.
 - e. Ensuring re-tests are properly taken and documented.
- B. Control of Measuring and Test Equipment: Measuring and/or testing instruments shall be adequately maintained, calibrated, certified and adjusted to maintain accuracy within prescribed limits by the Contractor. Calibration shall be performed at specified periods against valid standards traceable to nationally recognized standards and documented.
- C. Supplier Quality Assurance: The Contractor shall insure that procured products and services conform to the requirements of these Specifications. Requirements of these procedures shall be applied, as appropriate, to lower-tier suppliers and/or subcontractors. QC inspections and certifications may not be deferred to the Contractor's subcontractors or suppliers.
- D. Deficient, Defective, and Non-conforming Work Corrective Action:
 - 1. The contractor shall investigate the cause of conditions that adversely effect the quality be determine and documented and measures implemented to prevent recurrence. In addition, at a minimum, this procedure shall address:
 - a. Personnel responsible for identifying deficient and non-complying items within the Work.
 - b. Tracking processes and tracking documentation for deficient and non-compliant items.
 - c. Personnel responsible for achieving resolution of outstanding deficiencies.
 - d. Once resolved, how the resolutions documented and by whom.

1.6 TESTING SERVICES

- A. All tests which require the services of a laboratory to determine compliance with the Contract Documents shall be performed by an independent commercial testing firm acceptable to Commissioner. The testing firm's laboratory shall be staffed with experienced technicians, properly equipped and fully qualified to perform the tests in accordance with the specified standards. All standard quality assurance testing and installation verification testing will be at the expense of the Contractor.
- B. The Contractor's independent testing laboratory shall be accredited by the American Association of State Highway and Transportation Officials (AASHTO) for the tests they will perform and as appropriate to the construction work being

performed. The Contractor's laboratory shall also be AASHTO accredited in accordance with the requirements of ASTM C1077-92, "Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation"; ASTM D3740, "Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design/Construction"; and ASTM D3666, "Specifications for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials"; ACI, American Concrete Institute standards, and specified industry standards, for sewers, waterlines, sidewalks, curbs, and other applicable work. The independent testing laboratory shall be submitted to CDOT for approval.

- C. Testing, when required, will be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).
- D. The Commissioner shall have the right to inspect work performed by the independent testing laboratory both at the project and at the laboratory.
- E. The Contractor shall obtain the Commissioner's acceptance of the testing firm before having services performed, and shall pay all costs for these testing services.
- F. Testing services provided by City, if any, are for the sole benefit of City, however, test results shall be available to the Contractor. Testing necessary to satisfy the Contractor's internal quality control procedures shall be the sole responsibility of the Contractor.
- G. Laboratory Duties:
 - 1. Cooperate with the Commissioner and the Contractor.
 - 2. Provide qualified personnel promptly on notice.
 - 3. Perform specified inspections, sampling and testing of materials and methods of construction.
 - 4. Comply with specified standards and other recognized authorities and as specified.
 - 5. Ascertain compliance with requirements of the Contract Documents.
 - 6. Promptly notify the Commissioner and the Contractor of irregularity or deficiency of Work, which are observed during performance of services.
 - 7. Perform additional services as required.
 - 8. Promptly submit two (2) written copies and one (1) electronic copy of the report for each test to the Commissioner. Transmit to the Commissioner

within three (3) workdays after each test is completed. Each report for each type of test shall be consecutively numbered. Each report shall include:

- a. Date issued.
 - b. Project title and number.
 - c. Testing laboratory name and address.
 - d. Name and signature of inspector.
 - e. Date of inspection or sampling.
 - f. Record of temperature and weather.
 - g. Date of test.
 - h. Identification of product and Specification section.
 - i. Location of Project.
 - j. Type of inspection or test.
 - k. Results of test.
 - l. Observations regarding compliance with the Contract Documents.
9. Laboratory is not authorized to:
- a. Release, revoke, alter or enlarge on requirements of the Contract Documents.
 - b. Approve or accept any portion of the Work.

H. Testing Services Furnished by the Contractor

I. Unless otherwise specified, and in addition to all other specified testing requirements, the Contractor shall provide all testing services as required for the Commissioner's review:

1. Concrete strength tests.
2. Moisture-density and relative density tests on embankment, fill, and backfill materials.
3. In-place field density test on embankments, fills, and backfill.
4. Other materials and equipment as specified in this section.

5. Concrete materials and mix designs.
6. Embankment, fill, and backfill materials, density, optimum moistures, and compaction.
7. All other tests and Engineering data required for the Commissioner's review of materials and equipment proposed to be used in the Work
8. Testing, including sampling, shall be performed by the Contractor's testing firm's laboratory personnel, in general manner and frequency indicated in these Specifications. The Commissioner and/or the City shall have the right to stipulate the location of the confirmation tests. The Contractor shall provide preliminary representative samples of materials to be tested to the laboratory, in required quantities.
9. The testing firm's laboratory shall perform all laboratory tests within a reasonable time consistent with the specified standards and will furnish a written report of each test.
10. The Contractor shall furnish all sample materials and cooperate in the testing activities, including sampling. The Contractor shall interrupt the Work when necessary to allow testing, including sampling to be performed. The Contractor shall have no claim for an increase in Contract Price or Contract Times due to such interruption. The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.
11. When testing activities, including sampling are performed in the field by the test firm's laboratory personnel, the Contractor shall furnish required labor and facilities:
 - a. To provide access to Work to be tested.
 - b. To obtain and handle samples at the site of the Work.
 - c. To facilitate inspections and tests.
 - d. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.
12. Where such inspection and testing are to be conducted by an independent laboratory agency, the sample or samples shall be selected by such laboratory or agency or the Commissioner and shipped to the laboratory by the Contractor at the Contractor's expense.
13. Contractor shall notify laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.

14. The Contractor shall be responsible for furnishing all materials necessary for testing.
- J. Transmittal of Test Reports: Written reports of tests and Engineering data furnished by the Contractor for the Commissioner's review of materials and equipment proposed to be used in the Work shall be submitted as specified for Shop Drawings. Final transmittal of all Project testing records will be required as a final close-out submittal for the release of retainage.
 1. The Contractor shall promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the Work.
- K. The Contractor shall provide copies of all correspondence between the Contractor and testing agencies to the Commissioner.
- L. Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.
- M. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.
- N. Schedules For Testing:
 1. Establishing Schedule:
 - a. The Contractor shall, by advance discussion with the testing laboratory determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site of the Work to provide the required testing.
 - b. The Contractor shall provide all required time within the construction schedule.
 - c. When changes of construction schedule are necessary during construction, the Contractor shall coordinate all such changes of schedule with the testing laboratory as required.

END OF SECTION 01 40 00

SECTION 01 42 00

REFERENCES, DEFINITIONS AND ABBREVIATIONS

PART 1 – GENERAL

1.1 FORM OF SPECIFICATIONS

- A. Wherever used in the Specifications, the following terms have the meanings indicated which are applicable to both the singular and plural form of the word.
- B. Where "as shown," "as indicated," and "as detailed," or words of similar import are used, it is understood that reference to the Drawings is made unless stated otherwise. Where "as directed," "as permitted," "approved," or words of similar import are used, it is understood that the direction, requirements, permission, approval, or acceptance of the City is intended unless stated otherwise.

1.2 DEFINITIONS

- A. Addenda: Written or graphic instruments issued prior to the opening of bids, which clarify, modify, or interpret the Contract Documents.
- B. Agreement: The written Contract, which is evidence of the agreement between the City and the Contractor covering the Work.
- C. Arterial Streets: Major streets where special construction techniques may be required by CDOT.
- D. Chief Procurement Officer: The Chief Procurement Officer of the City of Chicago.
- E. City: The City of Chicago.
- F. Commissioner: The Commissioner of the City of Chicago Department of Water Management or the Commissioner's duly authorized representative.
- G. Completion: All tests performed and accepted, water services transferred, connections made, and abandonment's completed.
- H. Comptroller: The City Comptroller of the City of Chicago or the Comptroller's successor or successors upon whom the Comptroller's duties are transferred.
- I. Contract: The entire and integrated written agreement between the City and the Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

- J. Contract Documents: The Agreement, Addenda, Contractor's bid, and related documentation when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, the General Conditions, the Special Conditions, the Specifications and the Drawings, together with all Written Orders which completely describe the technical requirements of the Project including bid, Contract, and construction procedures.
- K. Contract Notice: A written notice from the Chief Procurement Officer mailed to the Contractor at the address designated in the Contractor's proposal or to such other address as the Contractor may designate in writing as Contractor's official place of business, transmitting to the Contractor an executed copy of the Contract.
- L. Contractor: The person, firm, or corporation with whom the City has executed the Contract, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.
- M. Defective: An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty, or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to final acceptance.
- N. Department: The City of Chicago Department of Water Management.
- O. Drawings or Plans: The part of the Contract Documents, which shows the characteristics, and scope of the work to be performed and which have been prepared and approved by the Engineer.
- P. Engineer: The Deputy Commissioner of the Bureau of Water Engineering Services or the Deputy Commissioner's duly authorized representative.
- Q. Force Account: The method of payment for extra work performed.
- R. Furnish: Furnish means supply and deliver to the Work area, ready for unloading, unpacking, assembly, installation, and similar operations.
- S. Install: Install means the actual unloading, packing, assembly, erection, constructing, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- T. Municipal Code: The Municipal Code of the City of Chicago.
- U. Neat Lines: The required clear width of a trench or excavation. In sheeted trenches, the required width is measured to the outside of the sheeting. Unless noted elsewhere on the Plans, neat line clear width is equal to:

1. the sum of the outside diameter of the pipe plus 2-feet for water main construction.
 2. the sum of the outside diameter of the pipe plus 8-feet for sewer construction.
 3. the sum of the outside diameter or edge plus 4-feet for structure construction
- V. Notice to Bidders: The advertisement for bids, the official notice inviting bids for the work to be done.
- W. Product Data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work.
- X. Project: The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents. Refer to the definition, terms and conditions for “Project” in Book 1 of the Contract Documents.
- Y. Provide: Furnish and Install as required.
- Z. Samples: Physical examples which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.
- AA. Shop Drawings: All drawings, diagrams, illustrations, brochures, schedules, and other data, which are prepared by the Contractor, Subcontractor, manufacturer, supplier, or distributor, which illustrates how specific portions of the Work are proposed to be fabricated or installed.
- BB. Site and/or Work Area: The lands and other places on, under, in, or through which the Work is to be executed or carried out and any other lands or places provided by the City for the purposes of the Contract, together with such other places as may be specifically designated in the Contract Documents as forming part of the Site and/or Work Area.
- CC. Specifications: A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards, and workmanship.
- DD. State: The State of Illinois.
- EE. Subcontractor: An individual, firm, or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the Site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative.

- FF. Sub-Order: A project (within this Term Agreement) for total construction of the Work to be performed in whole, or part as indicated elsewhere in the Contract Documents. “Sub-Order” shall be synonymous and interchangeable with the term “Project”, including all “Project” terms and conditions as defined in Book 1 of these Contract Documents.
- GG. Supplier: Any person, supplier, or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the Site. A supplier is not a Subcontractor who purchases an item or equipment from a manufacturer or supplier.
- HH. Unit Price: A cost per unit of work or measurement of material, for a bid item.
- II. Work: All labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction. Work is also used to mean the same as Project.
- JJ. Written Order: A directive, written and signed by the Commissioner, delivered to the Contractor at the address designated in the Contractor’s bid or to such other address as the Contractor may designate in writing as Contractor’s official place of business.

1.3 CITATION OF OTHER SPECIFICATIONS

- A. Commonly used abbreviations have the meanings as specified in this Section. The plans may contain a list of additional abbreviations applicable thereto. Whenever the Contract Documents refer to the specifications of any society, institute, association, or governing organization, the specifications cited will become a part of this Contract as if written herein in full.

1.4 ABBREVIATIONS

- A. AASHTO: American Association of State Highway & Transportation Officials.
- B. ACI: American Concrete Institute.
- C. AISC: American Institute of Steel Construction.
- D. ANSI: American National Standards Institute.
- E. APWA: American Public Works Association.
- F. ASCE: American Society of Civil Engineers.
- G. ASME: American Society of Mechanical Engineers.
- H. ASTM: American Society for Testing and Materials.

- I. AWS: American Welding Society.
- J. AWWA: American Water Works Association.
- K. CCD: Chicago City Datum.
- L. CDOT: City of Chicago Department of Transportation.
- M. CRSI: Concrete Reinforcing Steel Institute.
- N. FS: Federal Specification Board.
- O. HUD: U.S. Department of Housing and Urban Development.
- P. IDOT: Illinois Department of Transportation.
- Q. IDPH: Illinois Department of Public Health.
- R. IEPA: Illinois Environmental Protection Agency.
- S. ISO: Insurance Services Office of Illinois.
- T. MWRD: Metropolitan Water Reclamation District of Greater Chicago.
- U. NBFU: National Board of Fire Underwriters.
- V. NBS: National Board of Standards.
- W. NCMA: National Concrete Masonry Association.
- X. NCPWB: National Certified Pipe Welding Bureau.
- Y. NEMA: National Electric Manufacturers Association.
- Z. NPT: National Pipe Thread.
- AA. OSHA: Occupational Safety and Health Act.
- BB. PCA: Portland Cement Association.
- CC. SSRBC: Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction.
- DD. UL: Underwriters' Laboratory.

PART – 2 – PRODUCTS

(Not Applicable)

PART - 3 – EXECUTION

(Not Applicable)

END OF SECTION 01 42 00

SECTION 01 55 26

TRAFFIC CONTROL

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements for the furnishing, installing, maintaining, relocating, and removing all traffic control devices used for the purpose of regulating, warning, or directing vehicular and pedestrian traffic within and around the project site.

1.2 REFERENCES

- A. CDOT Rules and Regulations for Construction in the Public Way (CDOT Specifications), latest edition.
- B. IDOT Standard Specifications for Road and Bridge Construction (SSRBC), latest edition.
- C. IDOT Supplemental Specifications and Recurring Special Provisions (SSRSP), latest edition.
- D. IDOT Manual on Uniform Traffic Control Devices, latest edition.
- E. IDOT Highway Standards, latest edition.
- F. Applicable highway standards of governmental agencies under whose jurisdiction work is being performed, latest edition.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Permits: Contractor must comply with Book I - Terms and Conditions for Construction, for requirements on permitting and highway permit bonds.
 - 2. Contractor must comply with latest requirements of the Chicago Department of Transportation (CDOT) and Illinois Department of Transportation (IDOT) standards for traffic control and permitting that are applicable to the agency having jurisdiction over the roadway right-of-way.

PART 2 - PRODUCTS

2.1 TRAFFIC CONTROL DEVICES

- A. All traffic control devices must conform to the drawings, specifications, and traffic control standards of applicable governmental agencies, Chapter 7 of the CDOT Specifications, Division 700 of the SSRBC, the IDOT Manual on Uniform Traffic Control Devices, and the IDOT Highway Standards. No modification of these requirements will be allowed without prior approval of the Commissioner.
- B. No Parking signs must provide working hours, working dates, and be taken down when inactivity on the site exceeds 24 hours.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor is responsible for the proper location, installation, arrangement, and maintenance of all traffic control devices including: signs and their supports, signals, pavement markings, barricades with sand bags, channelizing devices, warning lights, arrow boards, flaggers, or any other device used for the purpose of regulating, warning, or guiding traffic.
- B. Maintenance of traffic must be provided by Contractor as shown on the drawings, CDOT Specifications, SSRBC, applicable highway standards, as specified here, and as directed by the Commissioner.
- C. Maintenance of traffic provisions to be provided by Contractor shall cover any and all streets impacted by and a part of the suborder or project, regardless of whether the new water main is a continuous alignment, with intersecting alignments, connections, "Y" or Tee branches, increasing or decreasing pipe size, etc.; or if water main pipe alignment is discontinuous, with separate new water mains in adjacent, intersecting, parallel, diagonal, dead end, or non-adjacent streets, etc. as shown on the project plans and specifications.

3.2 CONTRACTOR'S EQUIPMENT AND VEHICLES

- A. When traveling in lanes open to public traffic, the Contractor's equipment and vehicles must enter or leave work areas in a manner which will not be hazardous to, or interfere with, traffic and must not park or stop except within designated work areas. Personal vehicles owned by the Contractor or the Contractor's employees must not park within the right of way except in specific areas designated by the Commissioner.

3.3 MAINTAINING ACCESS TO PROPERTY

- A. It is the responsibility of the Contractor to maintain adequate access to private property, public streets, and alleys during the construction period. The Contractor must place temporary pavement as soon as the trench is backfilled, unless otherwise directed by the Commissioner. All active trench cuts or excavations open to traffic including vehicles, pedestrians, bicycles, etc., must have temporary pavement which consists of HMA or asphalt cold patch to provide a smooth and level surface. Compacted crushed stone fill will be allowed as temporary pavement in active trench cuts or excavations located in permitted closed work zones to allow for temporary parking relief as directed by the Commissioner and must meet the requirements of Section 351 of the SSRBC. The Contractor must maintain the temporary pavement until the street is repaved.

3.4 MAINTENANCE

- A. The Contractor must ensure that all traffic control devices installed under this Contract are operational twenty-four (24) hours a day, including Sundays and holidays. Traffic control devices must include all signs, markings, barricades, arrow boards, lights, and other traffic control devices to maintain traffic, protect the public, and maintain the detour route as directed by CDOT / IDOT. All traffic control devices must remain in place until specific authorization for relocation or removal is received from the Commissioner.

3.5 REMOVAL

- A. When directed by the Commissioner, the Contractor must remove all traffic control devices, which were furnished, installed, and maintained under this Contract, and such devices will remain the property of the Contractor.

END OF SECTION 01 55 26

SECTION 02 60 00

SPECIAL SOILS EXCAVATION AND DISPOSAL

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements for the excavation and disposal of soil classified as Special Soils Waste.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 31 23 19 – Dewatering Excavations.

1.3 DEFINITIONS

- A. Special Soils Waste - excavated soil containing contaminants that exceed the most stringent Tier 1 Soil Remediation Objectives for Residential Properties in Illinois Administrative Code (IAC), Title 35, Section 742, Appendix B, Table A. Such soils may contain gasoline, petroleum products, polynuclear aromatic substances (PNAs), and heavy metals such as mercury, chromium and similar metals.

1.4 SUBMITTALS

A. Work Plan

1. Contractor must submit a Work Plan for the removal of Special Soils Waste. Work Plan must be submitted to the Commissioner within thirty (30) days of start of excavation operations.
2. The Work Plan must provide a list of all proposed subcontractors, indicating the service each is to provide. The Contractor and subcontractors must provide a Statement of Qualifications demonstrating their capabilities to provide services as indicated in the Work Plan.
3. The Work Plan must describe the intended dust control measures for the removal of Special Soils Waste.

B. Documentation

1. The Contractor shall provide the Commissioner with copies of all environmental permits, records and reports as specified. The Contractor must provide the Commissioner with the results of any laboratory analyses necessary for permit acquisition.

C. Health and Safety Plan

1. The Contractor must develop a location specific Health and Safety Plan and submit the plan to the Commissioner a minimum of two weeks before beginning construction activities. The Contractor has full responsibility for health and safety on the Site.

D. Report

1. At the end of the Work, the Contractor must prepare a technical report on the activities conducted during the duration of the Work and submit three copies to the Commissioner. The technical report must include all pertinent information regarding the Work including, but not limited to:
 - a. Measures taken to monitor, handle, and dispose of Special Soils Waste, prevent further migration of contaminants and to protect workers.
 - b. Cost for monitoring, handling, and disposing of Special Soils Waste.
 - c. Reduced scale drawing(s) showing area(s) of Special Soils Waste removed.
 - d. Contractors and subcontractors hourly records broken down by project.
 - e. Waste manifests and/or landfill tickets (identified by project) for Special Soils Waste disposal.

1.5 PERMITS AND FEES

- A. The Contractor must include in his unit price bid the cost associated with obtaining all permits and landfill disposal fees required for disposal of Special Soils Waste.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 – EXECUTION

3.1 DUST CONTROL.

- A. Contractor must control and minimize the release of dust during Special Soils Waste removal activities, by use of water or an acceptable chemical application.

3.2 EXCAVATION AND DISPOSAL

A. Restrictions

1. Soil and other material removed from an excavation determined to have Special Soils Waste must not be reused and placed as trench backfill material, unless directed otherwise by the Commissioner.

B. Dewatering

1. Contractor shall dewater excavations in accordance with Section 31 23 19 – Dewatering Excavations.

C. Backfill Plugs

1. When excavation occurs in areas with a high groundwater table and excavated material has been classified as Special Soils Waste, the Contractor must install backfill plugs to isolate the area from the remainder of the excavation. Backfill plugs must be installed at intervals not to exceed 50 feet, and must be a minimum of 4 feet in length (measured parallel to the trench), and of full width and depth of the trench. Plugs must be constructed only from non-porous materials such as clay soils, concrete, or equivalent material approved by the Commissioner.

D. Transporting and Disposal of Special Soils Waste.

1. Due care must be used by the Contractor in transporting Special Soils Waste material from the area of origin to the disposal area. The Contractor is responsible for the clean up of any release of soil containing contaminants into the environment, at no additional cost to the City. Clean up includes, but is not be limited to, sampling beneath the material staging area to determine complete removal of the spilled material.
2. The Contractor must transport and dispose of all material classified as a Special Soils Waste from the job site to an appropriately permitted landfill facility. The Contractor shall prepare all manifests required for the transport of Special Soils Waste.
3. The equipment used to haul Special Soils Waste material to the permitted landfill facility shall be lined by the Contractor with a six (6) mil polyethylene liner and provide secure cover during transportation. The Contractor must obtain all documentation including any permits and/or licenses required to transport the Special Soils Waste material to the permitted landfill facility.

4. The Contractor shall make all arrangements for testing and waste disposal approval with the permitted landfill facility. Subsequent to the Contractor completing these activities and upon receipt of authorization from the Commissioner, the Contractor must initiate the disposal process.
5. Contractor shall schedule and arrange the transport and disposal of each load of Special Soils Waste material produced. The Contractor must make all transport and disposal arrangements to ensure no Special Soils Waste material remains within the Work area at the close of business each day. The Contractor is responsible for all other pre-disposal/transport preparations necessary on a daily basis to accomplish management activities.

3.3 TEMPORARY STAGING

- A. The Contractor must excavate and dispose of all waste material without temporary staging. If circumstances require the use of temporary staging, the Contractor must request approval from the Commissioner.

END OF SECTION 02 60 00

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section includes requirements for material and installation of reinforcing steel for cast-in-place concrete structures, pavement reinforcing, and steel dowel bars.

1.2 REFERENCES

- A. American Concrete Institute (ACI), latest edition:
 - 1. ACI 315 - Details and Detailing of Concrete Reinforcement.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
- B. American Society for Testing and Materials (ASTM), latest edition:
 - 1. ASTM A370 - Test Methods and Definitions for Mechanical Testing of Steel Products.
 - 2. ASTM A615 - Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
 - 3. ASTM A706 - Specification for Low Alloy Steel Deformed Bars for Concrete Reinforcement.
 - 4. ASTM A775 - Specification for Epoxy-Coated Reinforcing Steel Bars.
 - 5. ASTM A884 - Specification for Epoxy Coated Steel Wire and Welded Wire Fabric for Reinforcement.
 - 6. ASTM D3963 - Specification for Epoxy Coated Reinforcing Steel.
- C. Illinois Department of Transportation – Standard Specifications for Road and Bridge Construction (SSRBC), latest edition.
- D. IDOT Supplemental Specifications and Recurring Special Provisions (SSRSP), latest edition.
- E. Concrete Reinforcing Steel Institute – CRSI Manual, latest edition.

1.3 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 03 30 00 – Cast-In-Place Concrete.

- B. Section 32 13 13 – Concrete Pavement.
- C. Section 32 16 21 – Concrete Curb, Curb and Gutter and Sidewalk.

1.4 SUBMITTALS

- A. Refer to Book I – Terms and Conditions for Construction for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.

- B. Reinforcing Steel.

Contractor shall submit shop drawings detailing reinforcing steel in accordance with the requirements of ACI 315 and indicating and including the following details and requirements:

- 1. Bar lists including weights.
 - 2. Bending diagrams and schedules.
 - 3. Placement plans and details.
- C. Certificates: Contractor must provide mill affidavits or test reports indicating certification or compliance certifying the grades and physical and chemical properties of the reinforcing steel. Contractor is required to certify compliance with applicable ASTM Specifications including ASTM A370, ASTM A775 and ASTM D3963.

1.5 QUALITY ASSURANCE

- A. Tolerances:
 - 1. Reinforcing Steel Tolerances: Contractor is required to comply with the requirements of ACI 301, ACI 318 and the CRSI Manual of Standard Practice for fabrication and placement tolerance for reinforcing steel.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforcing Steel:
 - 1. Epoxy coated reinforcing steel bars and steel dowel bars must conform to ASTM A706 or ASTM A615, as applicable; and epoxy-coated steel bars in accordance with ASTM A775 and ASTM D3963. Coating material color must be green.

2. Welded Wire Steel Fabric must be epoxy coated conforming to the requirements of ASTM A884.
3. Accessories: Contractor shall provide steel bar supports, spacers, hangers, chairs, ties, and similar items as required for spacing, assembling and supporting reinforcement in place. All steel accessories must be nylon-, epoxy- or plastic-coated.
4. Tie Wire: Contractor must provide No. 16 gage or heavier steel wire, nylon-, epoxy- or plastic coated.
5. Dowel bar adhesive shall be Hilti HIT-HY 100, Prime Rez 1600 Injection Gel, Superior Epoxies & Coatings DBA-5, or a Commissioner approved equal.

2.2 SIZES AND WEIGHTS

- A. The minimum cross-sectional areas and the weights per lineal foot of the steel reinforcing bars used by the Contractor in the Work shall be as shown in Table 1 based on nominal sizes and shapes:

Table 1. Cross-Sectional Area & Weight/Foot of Rebars

| BAR DESIGNATION NUMBER | UNIT WEIGHT IN POUNDS PER FOOT | NOMINAL DIAMETER IN INCHES | CROSS SECTIONAL AREA IN SQUARE INCHES |
|-------------------------------|---------------------------------------|-----------------------------------|--|
| 2 | 0.167 | 0.250 | 0.05 |
| 3 | 0.376 | 0.375 | 0.11 |
| 4 | 0.668 | 0.500 | 0.20 |
| 5 | 1.043 | 0.625 | 0.31 |
| 6 | 1.502 | 0.750 | 0.44 |
| 7 | 2.044 | 0.875 | 0.60 |
| 8 | 2.670 | 1.000 | 0.79 |
| 9 | 3.400 | 1.128 | 1.00 |
| 10 | 4.303 | 1.270 | 1.27 |
| 11 | 5.313 | 1.410 | 1.56 |

2.3 STEEL DOWEL BARS AND PAVEMENT REINFORCING

- A. Steel pavement fabric, steel reinforcing bars, epoxy coated steel tie bars, and epoxy coated steel dowel bars for pavement construction, must conform to the requirements of Section 1006.10 of the SSRBC specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. The Contractor shall notify the Commissioner giving sufficient time in advance of excavating, erecting formwork and placing reinforcement and concrete to permit a thorough inspection.

3.2 PLACEMENT OF REINFORCING STEEL

- A. Contractor must place reinforcement as shown on the Contract Drawings, or on approved Shop Drawings, and in accordance with the applicable requirements of ACI 301, ACI 318 and the CRSI Manual. Contractor must install reinforcement accurately and secure against movement.
- B. All reinforcement must be supported on metal chairs, spacers and hangers, accurately placed and securely fastened to steel reinforcement in place. Hoops and stirrups must be accurately spaced and wired to the reinforcement.
- C. Reinforcing steel must be installed in place, spaced and securely tied with steel tie wires at all splices and at all intersections, except where the center to center dimension is less than one foot (1 ft) in each direction, in which case alternate intersections must be tied. The placement must comply with the requirements of CRSI Manual 'Placing Reinforcing Bars'. Bending of bars on the jobsite to fit differing conditions is not permitted. Point end of wire ties away from adjacent form surfaces.
- D. Center-to-center distance between parallel bars must be in accordance with ACI 318 unless indicated otherwise on the Contract Drawings.
- E. Splices: Laps of splices must be securely tied together to maintain the alignment of the bars, to provide the required minimum clearances and to transfer stress by bond. Lapped splices and development lengths not shown must be detailed to develop Class B lapping length and develop lengths in tension, respectively, in accordance with ACI 318.
- F. Prior to the placement of concrete, the Contractor must remove all mortar and any foreign material from the reinforcement. Placement of concrete must not commence until the Commissioner has verified that all reinforcement has been placed in the areas designated on the plans, but does not relieve the Contractor of his responsibility for properly placing, supporting and securing the reinforcement.

END OF SECTION 03 20 00

SECTION 05 10 00

STRUCTURAL AND MISCELLANEOUS STEEL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes requirements for structural and miscellaneous steel, including all ferrous metals, whether wrought, rolled, fabricated or assembled, except construction castings (frames, grates, solid lids, & steps), pipe (ductile or steel) and steel plates. The classification includes steel angles and bracing, steel sheet piling, inserts, pins, bolts, nuts, washers, and similar items used for constructing temporary or permanent supports for excavations or work specified in other sections of this specification.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM) and American Institute of Steel Construction, Inc. (AISC), latest edition:
1. AISC Steel Construction Manual.
 2. ASTM A36 – Carbon Structural Steel.
 3. ASTM A195 – Alloy-Steel and Stainless Steel Bolting Materials.
 4. ASTM A194 – Carbon and Alloy Steel Nuts for Bolts
 5. ASTM A276 – Stainless Steel Bars and Shapes.
 6. ASTM A307 – Carbon Steel Bolts and Studs.
 7. ASTM A325 – Structural Bolts
 8. ASTM A328 – Steel Sheet Piling.
 9. ASTM A500 – Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 10. ASTM A529 – High-Strength Carbon-Manganese Steel of Structural Quality
 11. ASTM A572 – High Strength Low Alloy Columbium-Vanadium Structural Steel.
 12. ASTM A992 – Structural Steel Shapes

1.3 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. Complete data on date of manufacture, date(s) of initial installation and extraction, and service for used sheet piling, must be furnished to the Commissioner for all sheet piling used in the Work.

PART 2 - PRODUCTS

2.1 STRUCTURAL AND MISCELLANEOUS STEEL

- A. Structural and miscellaneous steel must meet the requirements of the following standards, except as specified otherwise:
 - 1. Structural Steel Shapes and Plate - ASTM A36
 - 2. Bolting material for flanges and fittings – ASTM A193
 - 3. Nuts – ASTM A194
 - 4. Stainless Steel Anchor - ASTM A193 Bolts Type 304, ASTM A194 Nuts, ASTM A276 Bars and Shapes
 - 5. Standard Bolts - ASTM A307
 - 6. High Strength Bolts – ASTM A325
 - 7. Steel Sheet Piling - ASTM A328, A572 Grades 45, 50 and 55
 - 8. Structural Tubing and Shapes – ASTM A500,
 - 9. Rectangular Grade B
 - 10. W Shapes – ASTM A992

2.2 BOLTS AND NUTS

- A. Bolts and nuts must be of the best quality mild steel, except where bronze, aluminum, stainless steel, or other materials are shown or required.
- B. Bolts must have hexagonal nuts.
- C. Threads must be clean cut of American Standard size.

2.3 SHEET STEEL PILING

- A. All piling must be new or good quality used material approved by the Commissioner.
- B. All sheet piling must be true and straight with undamaged interlocks or ends.
- C. Used sheet piling must have been driven only one (1) time before being offered for use on this project.
- D. Used sheet piling must be made available for inspection by the Commissioner before it is shipped to the job Site.

2.4 ANCHORS

- A. Anchors must be designed for rigid fastening to the structures, whether directly or through brackets.
- B. The design of all anchors is subject to the approval of the Commissioner.
- C. Anchors for piping must be of the cast iron chair type with steel straps, except where anchors form an integral part of pipe fitting, or where an anchor of special design is required.

2.5 INSERTS

- A. Inserts must be designed to permit the rods to be adjusted horizontally in one (1) plane and to lock the rod nut or head automatically.
- B. Inserts must be recessed near the upper flange to receive reinforcing rods.
- C. Inserts must be so designed that they may be held in position during concrete pouring operations.
- D. Inserts must be designed to carry safely the maximum load that can be imposed by the rods, which they engage.
- E. Inserts for concrete must be galvanized.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. The design, workmanship, and erection must conform to the requirements of the AISC Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings, unless otherwise shown, specified, or required.

- B. The Contractor is responsible for the correctness of all shop and field fabrication and fit. Members must be straight, must fit closely together, and the finished work must be free from burrs, twists, bends, and open joints.
- C. Where shop assembly of field connections is shown, specified or required, the unmatched holes must be reamed and the pieces match marked before disassembly. No drifting will be allowed.
- D. In case the eccentricity is too great for good work or the strength of the joint is liable to be weakened by reaming, the piece will be rejected and a new satisfactory one must be provided at the Contractor. This process is considered incidental to the construction and no additional payment will be allowed.

3.2 FIELD CONNECTIONS

- A. Weld or bolt all field connections as hereinafter specified unless riveted connections are approved by the Commissioner.

3.3 WELDING

- A. Welding must be performed by qualified welders in accordance with the requirements of the AISC Specifications.
- B. In assembling and during welding, the component parts of built-up members must be supported and held by sufficient clamps and other adequate means to hold the parts in proper relations for welding.

3.4 STEEL SHEET PILING

- A. Contractor must drive steel sheet piling to depth as shown, or as approved by the Commissioner.
- B. Contractor must drive all sheet piling plumb and tight to the lines and grades shown and as directed.
- C. The driven sheet piling must be stiffened horizontally, as necessary to meet the requirements of Section 31 23 10 – Excavation, Trenching and Backfilling.

3.5 NUTS, BOLTS, AND ANCHORS

- A. Anchors must be furnished and installed when specified, shown, or required for holding the pipelines and equipment in position or alignment.
- B. Contractor must set anchor bolts accurately set to maintain elevation and location, and if placed after concrete is cast, all necessary drilling and grouting

must be considered incidental to the construction process and no additional payment will be allowed.

- C. Anchor bolt threads must be coated heavily with grease while concreting.
- D. Self-Drilling bolt anchors must be of the sizes indicated or approved.
- E. All anchor bolts and nuts submerged or subject to periodic wetting must be of stainless steel unless shown or specified otherwise.

3.6 INSERTS

- A. Contractor must install inserts in the concrete structures where required for fastening supporting devices.

END OF SECTION 05 10 00

SECTION 31 23 10

EXCAVATION, TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This specification includes the requirements for excavation, bedding, backfilling and compaction, of utility trenches for water and sewer mains, water services, house drains, and associated appurtenances.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 01 55 26 - Traffic Control.
- B. Section 02 60 00 - Special Soils Excavation and Disposal.
- C. Section 05 10 00 - Structural and Miscellaneous Steel.
- D. Section 31 23 19 - Dewatering Excavations.
- E. Section 32 90 00 - Landscape Restoration.

1.3 REFERENCES

- A. CDOT Rules and Regulations for Construction in the Public Way (CDOT Specifications), latest edition.
- B. IDOT Standard Specifications for Road and Bridge Construction (SSRBC), latest edition.
- C. IDOT Supplemental Specifications and Recurring Special Provisions (SSRSP), latest edition.
- D. ASTM D1557 - Laboratory Compaction Characteristics of Soil, latest edition.
- E. Department of Labor, Occupational Safety and Health Administration 29 CFR Part 1926, Occupational Safety and Health Standards – Excavations; Final Rule (OSHA), latest edition.

1.4 DEFINITIONS

- A. Soil types are defined as follows:
 - 1. Trench Excavation. Excavation of soil for the purpose of installing water and sewer mains, water services, house drains, their appurtenances, and for the restoration of surface features. The

excavated material may be classified as either clay or sandy soil, a mixture of each, and may contain varying amounts of loam, silt, gravel, organic material, or rock fragments less than one (1) cu yd. in volume. Trench excavation excludes all material defined as Rock Excavation and Unsuitable Soil.

2. Rock Excavation. Excavation of naturally occurring deposits of limestone, sandstone, shale or other indigenous rock occurring as bedrock, rock ledges, outcroppings, or boulders, one (1) cu yd or larger in volume necessitating removal by the use of systematic drilling, expansive jacks, or backhoe mounted pneumatic hole punchers or rock breakers.
3. Unsuitable Soil Materials. This soil material includes varying amounts of material classified as slag, cinders, trash, debris and rubble; organic or contaminated soil and material; asphalt and concrete pavements (including aggregate sub-base); sidewalks and curbs; concrete slabs concrete or masonry foundations; metal beams, bracing, and sheet piling; or similar matter.

1.5 SUBMITTALS

- A. Submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples must be submitted by the Contractor in accordance with Book I – Terms and Conditions for Construction, latest edition, issued by the City of Chicago, Department of Procurement Services.
- B. Contractor must provide copies of all contractual agreements, permits and / or licenses for proposed disposal sites for all material and waste removed from the job site to the Commissioner.
- C. Contractor shall submit Shop Drawings and supporting calculations for excavation support systems to the Commissioner for review and approval.
 1. Excavation Support Systems:
 - a. Contractor must prepare and submit a written schedule and procedure, along with detailed drawings, of the proposed excavations and excavation support systems.
 - b. Contractor must include installation procedures; method of concrete placement; excavation sequence; interface details; protection measures for existing structures and facilities; instrumentation and monitoring procedures to check performance, sequence, and method of removal; and contingency plans for excessive wall or foundation movements.

- c. The program must take into account that excavations cannot extend beyond the right-of-way into adjacent properties above or below grade, unless otherwise indicated. Where Contractor requires the installation of part of excavation protection system on private property, the Contractor will be solely responsible for securing permission from adjacent property owners to install such temporary and permanent systems.
 - i. Any such permission from adjacent property owners must be in writing, and the owner's signature, granting such permission, must be witnessed and properly notarized. Certified copies of all such permissions must be submitted to the Commissioner for record purposes.
2. Shop Drawings: Contractor must submit Shop Drawings and specifications for support systems, lagging, and internal bracing. Include the following:
 - a. Specific description of field quality control measures.
 - b. Details of interface with permanent structures.
 - c. Details of bracing struts and wales, if used, and the proposed installation procedures, including method and sequence of preloading.
 - d. Details of required preloading systems, pre-stressing systems, load measuring facilities, systematic schedule of preloading and pre-stressing operations, and sequence of construction.
 - e. Method and details for securing lagging in support system openings.
 - f. Proposed method of providing for utility penetrations.
 - g. Assembly and erection details of members and connections for the system.
3. Plating of Excavations: When requested, the Contractor shall submit design calculations stamped by a Structural Engineer Licensed in the State of Illinois as proof of the structural integrity of the plating provided.
4. Calculations: Contractor must submit appropriate design calculations to support Shop Drawings. Maximum theoretical deflections of supporting members are to be included. Contractor must also include calculations indicating the expected magnitude of vertical and lateral movement.

5. Professional Engineer's Certification: The excavation support systems program, Shop Drawings, calculations, and test reports provided by the Contractor must be prepared, sealed, and signed by a Structural Engineer Licensed in the State of Illinois:
 - a. Where CTA/METRA or other private railroad company approval for excavation support or shoring is required, Contractor must submit calculations and related documents prepared, signed, and sealed by a Structural Engineer Licensed in the State of Illinois.
- D. The Contractor, before starting work, must submit to the Commissioner for approval, a layout of his construction procedures and the equipment to be used in maintaining the trees in place without damage.
- E. Contractor is required to provide for CLSM (Flowable Fill) backfill quality control (QC) and quality assurance (QA) in accordance with the IDOT SSRSP, Check Sheet #31 "Quality Control Quality Assurance of Concrete Mixes".

PART 2 – PRODUCTS

2.1 GENERAL

- A. Pipe bedding and trench backfill material must conform to the requirements and gradation specified in Section 1003, Fine Aggregates (FA), or Section 1004, Coarse Aggregates (CA), of the SSRBC.
- B. Coarse Aggregate (CA) material classified, as Chert or Novaculite Gravels, or Slag from any source, are not permitted for use as bedding or backfill material.
- C. Fine Aggregate (FA) material classified as Silica Sand, Slag Sand from any source, or Construction Debris Sand, are not permitted for use as bedding or backfill material.
- D. All material must be dry and free of organic matter, clay, garbage, paper, wood or similar material, boulders or large particles of frozen material.

2.2 PIPE BEDDING

- A. Pipe Bedding for Water Main and Water Services Construction:
 1. Coarse aggregate (CA) material classified as mechanically crushed gravel, mechanically crushed stone, mechanically crushed limestone, or mechanically crushed recycled concrete conforming to IDOT gradation CA-16 for water mains 16 inches in diameter or smaller, CA-11 for water mains larger than 16 inches in diameter, unless

otherwise authorized by the Commissioner. Material must be washed, angular, have uniform properties, and non-corrosive. Material must have a pH range between 7.5 and 10.

B. Pipe Bedding for Sewer Main and House Drain Construction:

Coarse aggregate (CA) material classified, as crushed gravel, crushed stone or crushed concrete must conform to gradation CA-11, unless directed otherwise by the Commissioner. Material must have a pH range between 7.5 and 10.

2.3 BACKFILL MATERIAL

A. Backfill Material for Water Main and Water Service Construction:

1. Coarse aggregate (CA) material classified as mechanically crushed gravel, mechanically crushed stone, mechanically crushed limestone, or mechanically crushed concrete conforming to IDOT gradation CA-16 unless authorized otherwise. Material must be washed, angular, have uniform properties, and non-corrosive. Material must have a pH range between 7.5 and 10.

B. Backfill for Sewer and House Drain Construction:

1. Fine aggregate (FA) material classified as sand, crushed concrete sand or stone sand must conform to gradation FA 6 unless directed otherwise by the Commissioner.

C. Controlled Low Strength Material, CLSM (Flowable Fill Material):

1. Materials for Flowable Fill must meet requirements of IDOT SSRBC Sections 593 and 1019 for Controlled Low Strength Material, CLSM:
 - a. Flowable fill material placed adjacent to water mains or water services must be of a non-fly ash type mix design, mix # 2.

2.4 GEOTEXTILE FABRIC

A. Geotextile fabric must be Fabric for Silt Filter Fence and must conform to the requirements of Section 1080.02 in the SSRBC.

2.5 AGGREGATE FOR STABILIZATION OF TRENCH BOTTOMS

A. When required aggregate used to stabilize trench bottoms must have an aggregate such that the majority of the material passes a 1½ to 2½-inch sieve, with no more than 10% of the material passing the No. 16 sieve. The quality of the aggregate must meet requirements established for aggregate bedding.

PART 3 - EXECUTION

3.1 WORK AREA PREPARATION

A. Existing Work Area Condition:

1. All information on subsurface exploration available to the Department, if any, will be made available to the Contractor for examination. However, the Department in no way takes responsibility for, the interpretation, accuracy, or thoroughness of the information. It will be the responsibility of the Contractor to make such subsurface explorations as deemed necessary, to supplement information provided by the Department, at no additional cost to the Department.
2. Prior to excavating, the Contractor must thoroughly investigate the limits of the proposed trench to ascertain the existence and location of any underground structures, existing utilities or other items that might interfere with the pipe installation. The Contractor must notify the Commissioner of any obstructions that will prevent the installation of the pipe or appurtenances as indicated on the Drawings.

B. Clearing Work Area:

1. Before starting trench excavation, all obstructions, which must be removed or relocated, must be cleared by the Contractor. Pavement, curbs, walks, trees, shrubs, utility poles, and other structures, which are to be preserved, must be properly braced and protected by the Contractor. Unless otherwise shown or directed by the Commissioner, all trees and large shrubs must be preserved with minimal damage inflicted on the root structure. When required, small trees and shrubs may be removed and replaced with equivalent specimens if approved in advance by the Commissioner.

C. Segregation and Disposal of Soil Material:

1. Topsoil suitable for final grading and landscaping, and excavated material suitable for backfilling, as described in Section 32 90 00, - Landscape Restoration, may be stockpiled separately within the Work Area if approved by the Commissioner.
2. Surplus excavated material and excavated material unsuitable for backfilling, final grading, and landscaping, must be transported off of the Site and disposed of in disposal areas obtained by the Contractor and approved by the Commissioner.
3. Excavated material must not be stockpiled along the route of the work unless authorized beforehand by the Commissioner.

D. Pavement Removal:

1. The Contractor must saw cut all concrete and asphalt pavements to their full depth prior to breaking and removing the pavement. On pavements consisting of an asphalt overlay on a concrete base, the Commissioner reserves the right to order the removal of up to 6 additional inches beyond the edge of the concrete base. This additional asphalt removal must be removed to a neat saw cut edge and will be considered incidental to the Work.
2. Utilizing drop weight equipment for the purpose of breaking the pavement is not permitted.

E. Protection or Removal of Existing Trees:

1. Contractor is required to comply with CDOT Specifications Chapter 4, "Excavation Requirements" for protection of trees, shrubs, and other improvements.
2. The Contractor is not permitted to remove trees beyond the limits of the trench excavation except as specified in these Specifications, or as shown on the Plans, or as ordered by the Commissioner.
3. The Contractor must arrange his construction operations and use the necessary equipment required, so as not to remove or damage any existing trees due to the Work to be performed under this Contract.
4. To protect the trunks of existing trees from damage, the Contractor must place 2" x 4" boards, six (6) feet long, vertically and about 6 inches apart around all trees located in the parkways along the route of the work. The boards must be held in place by wire looped around the circumference of the tree trunk. After completion of all work, the protective boards and wires must be carefully removed by the Contractor.
5. Any pruning of trees and roots required to permit the operation of the Contractor's equipment must be kept to a minimum, subject to the approval of the Commissioner, and must be done symmetrically by a licensed arborist. The arborist is required to obtain a permit from the City of Chicago, Bureau of Forestry, Plans and Permits Section of the Department of Streets and Sanitation, to trim and spray or in any way affect the general health or structure of trees in the public way. Prior to this approval, the Bureau will conduct an investigation at the sites of the proposed water main and water services. They will work with the Commissioner and the Contractor, and request 48-hour notice prior to starting any tree work.

- F. Trench Excavations Over 12-feet Deep:
1. Contractor is required to comply with CDOT Specifications Chapter 4, "Excavation Requirements" for trenches over twelve (12) feet deep.
- G. Excavating Over or Adjacent to Existing Utilities:
1. The Contractor must verify the location of existing utilities in the vicinity of the work before starting construction. The Contractor is responsible for protecting, and repairing utilities damaged by the work under of this contract, at no additional cost to the City. The Contractor must coordinate all work with the owner of the utility.
- H. Erosion Control:
1. Contractor must install geotextile fabric under each storm inlet, catch basin and sewer manhole cover to prohibit dirt, debris and backfill material from entering the sewer system, but to permit drainage. The geotextile fabric is to be maintained until restoration is completed. After restoration is completed, Contractor must remove the geotextile fabric.
- I. Plating of Excavations:
1. Unattended excavations in public streets, alleys, driveways, and walkways necessitated by the work must be plated by the Contractor, if the excavation has not been backfilled, or a temporary paved surface has been provided, or specifically authorized otherwise by the Commissioner. Open excavation(s) that are considered unattended excavation(s) include, but are not limited to, the following:
 - a. Open excavations not attended by Contractor personnel during Contractor's working hours.
 - b. Open excavations during Contractor's non-working and overnight hours.
 - c. Any other condition determined by the Commissioner as unattended excavation(s) requiring Plating in accordance with these specifications.
 2. Steel Plate(s) must be large enough to safely span the excavation with sufficient overlap beyond the edge of the excavation to provide firm support as appropriate for the type of pavement and soil encountered. Plate(s) must be firmly bedded and secured to the adjacent pavement to prevent rocking or movement, and of adequate thickness to carry anticipated loads. When plating is left in place during off-work periods, or if the Commissioner feels vehicular or pedestrian safety

may be compromised, a bituminous ramp is to be provided at the perimeter of the plate(s) as appropriate to provide a smooth transition between the surface of the plate(s) and the adjacent pavement or walkway.

3. Plating subjected to vehicular traffic must be capable of carrying AASHTO H-20 traffic loading without movement or excessive deflection. The plating must be secured to the adjacent paved surface in such manner so as to prevent rocking or other movement which could expose the excavation. The name of the Contractor must be indicated on both sides of the plating.
4. When steel plates are used and left in place beyond normal working periods, a bituminous ramp must be provided at the perimeter of the plate(s), to provide a smooth transition between the surface of the plate(s) and the adjacent street pavement or walkway, unless authorized otherwise.
5. Plating of excavations is not intended as a substitution for providing traffic control, which must be provided by the Contractor in accordance with Section 01 55 26 of these specifications.

J. Protection of Existing Water Main from Contamination:

The Contractor must protect existing water mains from contamination by groundwater, dirt, debris, or other foreign material:

1. Contractor shall prevent groundwater and surface water, dirt, debris, and other foreign material from entering the open pipe.
2. Contractor shall provide water tight temporary closure of pipe before leaving work site at the end of the work day.
3. Equipment, cables, hoses, supports and all appurtenant equipment placed in the water main must be thoroughly cleaned of dirt and debris, and disinfected with chlorine solution with a chlorine concentration of at least fifty (50) parts per million by the Contractor.
4. Workers entering pipe must wear clean temporary disposable coveralls.
5. Contractor must install foot bath and brush and have workers entering the pipe clean footwear with chlorine solution with a chlorine concentration of at least fifty (50) parts per million.

3.2 EXCAVATION PROTECTION

A. General Requirements:

1. Excavations must be protected in accordance with applicable rules, laws and regulations of Federal, State and City ordinances applicable to underpinning, shoring of excavations, and other work affecting adjoining property and the safety of worker, but must not be less than the standards and regulations established by OSHA.
2. Structural support systems are required from the Contractor for all excavations exceeding five (5) feet in depth. Structural support systems are to be used in all excavations in soils that are determined to be unstable or subject to cave-ins, regardless of the depth of the excavation.
3. Protective systems for any excavation exceeding ten (10) feet in depth must be designed and approved by a Structural Engineer Licensed in the State of Illinois.
4. The Contractor must remove and replace, or provide the means to support any surface features when their location poses a hazard to workers in the excavation.
5. Whenever excavations cross the location of an existing underground utility, the Contractor must proceed with caution and use appropriate methods of excavation to avoid damaging the utility. The Contractor is responsible for coordinating all work with the owner of the utility.
6. Contractor must provide ramps, runways or ladders for ingress and egress by workers from excavations exceeding four (4) feet in depth in accordance with OSHA.
7. Surface or ground water entering excavations must be controlled by the use of appropriate equipment. If the trench interrupts the natural flow of surface water, diversion ditches or dikes must be used.

B. Protection of Adjacent Structures:

1. When the stability of adjoining buildings, walls, sidewalks, pavements or other structures are endangered by the excavation operations, structural support systems such as shoring, bracing or underpinning must be used by the Contractor to ensure the stability of the structure.
2. The Contractor is responsible for posting and issuing all notices required to inform adjacent or adjoining property owners or other parties and such notice or notices must be served in sufficient time as not to delay the progress of the Work under this Contract.

3. Excavation below the foundation of an adjacent structure requires either of the following:
 - a. A Structural Engineer or Professional Engineer Licensed in the State of Illinois has determined that the structure is located far enough away from the excavation so as to be unaffected, or
 - b. A Structural Engineer Licensed in the State of Illinois has designed and approved a structural support system to provide adequate protection to the existing structure.

C. Structural Support Systems:

Structural support systems may consist of pre-engineered systems such as aluminum hydraulic shoring, trench shields, trench boxes, or systems constructed on the job site such as timber or steel shoring or steel sheet piling.

1. Pre-Engineered System:
 - a. Pre-engineered structural support systems installed in accordance with the manufacturer's recommendations do not require certification by a Structural Engineer when trench depth is less than twenty (20) feet. However, the Commissioner, at his sole discretion, may require a manufacturer's certification indicating the support system is suitable for the intended use and site conditions.
 - b. Pre-engineered structural support systems will require analysis and certification by a Structural Engineer Licensed in the State of Illinois, when trench depth exceeds twenty (20) feet.
2. Site Constructed Systems:
 - a. Construct steel sheet piling system in accordance with Section 05 10 00 – Structural and Miscellaneous Steel.
 - b. Structural support systems built in place and made of timber constructed in accordance with OSHA Standards, do not require certification by a Structural Engineer licensed in the State of Illinois, provided trench depths shown in the OSHA Standard, relative to the soil type at the site, are not exceeded.
 - c. If the OSHA Standard is not followed for timber shoring and the depths of trenches exceed those in the tabulated data; or soil conditions have been determined to be substantially different than those given in the OSHA Standard; the design must be performed and certified by a Structural Engineer Licensed in the State of Illinois.

- d. A structural support system built in place and consisting of materials other than a timber shoring systems will require design and certification by a Structural Engineer Licensed in the State of Illinois.
 - e. When close-sheeting is used, it must be driven so as to prevent adjacent soil from entering the trench either below or through such sheeting. Tight-sheeting must be used in that portion of the excavation in or along streets or alleys below the intersection of a 1 to 1 slope line from the nearest face of the excavation to the edge of the pavement.
 - f. Sheeting must not be in contact with existing pavement but must bear uniformly against the sides of the excavation.
3. Where structural support systems, such as steel or wood sheeting are used for stabilizing excavations, the width of the trench may be increased as necessary to accommodate installation of the work. When soils in the lower limits of the excavation have been determined to have adequate stability; the Contractor may end the shoring elements above the bottom of the excavation. If soil begins moving into the excavation below the shoring during construction, the Contractor is solely responsible for making corrections to the excavation and for lowering the shoring, at his own expense.
 4. When structural support systems are required to be left in place, they must be cut off by the Contractor at the same elevation as the bottom of the water main, unless otherwise directed by the Commissioner. Bracing that is to remain in place must be driven up tight by the Contractor. The right of the Commissioner to request sheeting and bracing to be left in place, is not meant to construe any liability or obligation on behalf of the Commissioner to issue such orders.
 5. Structural support systems that are not to be left in place may be removed only when the excavation has been backfilled to such an elevation so as to prevent the collapse of the sides of the excavation. Any voids created by the removal of the structural support system members, must be filled and compacted by the Contractor in an acceptable manner.

3.3 EXCAVATION

A. Trench Excavation (Open Cut):

1. The width of the trenches must provide adequate space for workers to place and join the pipe properly, and must be kept by the Contractor to the minimum practical width. Unless otherwise approved by the Commissioner, the total clear width of the trench at the level of the top

of the pipe and at grade must be at the Neat Lines as detailed on the Drawings.

2. The Contractor must excavate a minimum of 6-Inches below the bottom of the pipe unless otherwise shown, specified, or directed, so bedding material can be placed in the bottom of the trench and shaped to provide a continuous firm bearing for the pipe barrel. Bell holes must be provided for proper make-up of the joints.
3. The open excavated trench preceding the pipe laying operation and the unfilled trench with pipe in place must be kept by the Contractor to a minimum length causing the least disturbance. The maximum length of open trench must not exceed 300-feet unless otherwise directed by the Commissioner. Contractor is required to comply with Article 4G, CDOT Specifications, for other trench opening length requirements within the public right-of-way.
4. Excavation in Arterial Streets. Contractor is required to comply with Article 4C, CDOT Specifications, for protection requirements when working within arterial streets.
5. Contractor must saw cut existing pavement prior to excavating. Width of saw cut pavement must be such that any sheeting provided for excavation protection is not in contact with the pavement.
6. Where water is encountered in the excavation, the excavation must be dewatered by the Contractor in accordance with Section 31 23 19 – Dewatering Excavations of these specifications.
7. Wherever the nature of the ground will permit, the bottom of the excavation for monolithic and brick sewers must have the shape and dimensions of their outside invert and for pipe sewers the shape and dimensions of the outside of their lower quarter. If the bottom of the trench cannot be shaped to the required form and maintained until a section of the sewer is safely constructed, then the bottom and sides of the trench must be made to conform as nearly as possible to the external shape and dimensions of the sewer, and the space between the outer surface of the sewer and the bottom and sides of the trench must be filled with suitable material for stabilization of the trench bottom.

B. Rock Excavation (open cut):

1. Whenever rock, stone, masonry or other hard, unyielding material is encountered at or above the required trench bottom elevation, the Contractor must remove it to provide a clearance of no less than 6-inches below and on each side of pipes and associated fittings, valves and other appurtenances. Contractor must backfill the over excavated area with granular bedding material.

2. Removal of Rock by blasting or by use of a drop hammer is not permitted under this contract.
3. The Contractor shall excavate rock as near as practicable to the outside shape of the work as shown on the Plans. Solid rock, not loosened from the adjacent solid rock, may extend within the neat outside surfaces of these shapes no more than two (2) inches, provided no single projection exceeds one and one-half (1.5) square feet in area at the neat surfaces of the excavation and provided that on any ten (10) foot section of the excavation the total area of such projection at the neat outside surfaces of the section does not exceed twenty (20) percent of the area of the section.
4. The Contractor is required to remove all loose rock and other material from the excavation and in the event that the excavation is enlarged beyond the outside shape of the sewer or sewer structures as shown on the Plans, the Contractor will not be entitled to any payment for the additional Class SI concrete needed to fill the voids caused by such over-breakage.
5. Where rock is encountered, the Contractor must excavate to eight (8) inches below the bottom of the pipe for bedding placement.

C. Trench Excavation (Short Tunnel Construction):

1. In some instances, trees, fire hydrants, sidewalks, and other obstructions may be encountered, the proximity of which may be a hindrance to open cut excavation. In such cases, the Contractor must excavate by means of short tunnels in order to protect such obstructions against damage. Short tunnel work will be considered incidental to the construction and no additional payment will be allowed.

D. Additional Trench Excavation:

1. If the soils encountered at the elevations specified are not suitable, or it is determined necessary to go to an additional width and depth, or required to fill designated areas for work done under Section 02 60 00 - Special Soils Excavation and Disposal, the excavation must be carried by the Contractor to such additional width and/or depth and must fill such excavated areas with approved backfill material as required or directed by the Commissioner.

E. Unauthorized Excavation:

1. Wherever the excavation is carried beyond or below the lines and grades shown on the Drawings all such excavated space must be refilled with select fill materials and in such manner as may be

directed in order to insure the stability of all affected structures. Beneath all structures, space excavated without authority must be refilled by the Contractor with approved backfill materials and will be considered incidental to the construction and no additional payment will be allowed.

F. Trenching Across or Over Existing Excavations or Utility Trenches:

1. In the event that the trench passes over or through a previous excavation, the Contractor must carefully compact and stabilize the bottom of the new trench or excavation to a density equal to or greater than 95% of the maximum dry density as determined by ASTM D1557. The Contractor shall perform this compaction carefully to avoid damaging the existing utility or structure.

G. Special Excavation:

1. The Contractor must remove unsuitable materials to provide two (2) feet minimum horizontal and vertical clearance around water mains, water services or related structures as applicable, unless otherwise directed by the Commissioner.

H. Excavation in Tunnel:

1. The tunnel must be excavated and trimmed by the Contractor to such size and shape as will allow the placing of the full section of the pipe as shown on the Plans after all lining is in place.
2. The Contractor must excavate the tunnel and support the surrounding earth so there is no movement of the earth over or adjacent to the work at any time. The Contractor must excavate the tunnel and support the surrounding earth so at no time there is more than 5 feet, measured horizontally, unsupported by bracing as approved by the Commissioner.
3. The Contractor must use extreme care in excavating and trimming to insure that a full section will be placed without materially deviating from the correct lines and grades of the finished structure.
4. In case, due to bad soil conditions, the Contractor requests that the outside outline of the sewer be changed to a minor extent to accommodate his method of construction, such a change will be allowed provided the strength of the structure is not impaired. Any such modification will not alter the price per foot specified to be paid for the completed sewer, whether such minor modification results in a minor addition or subtraction from the theoretical quantity for the section herein specified.

5. If permission is given to the Contractor to excavate the tunnel for a specified distance without immediately placing the concrete lining, the proposed method of bracing the tunnel and the extra bracing necessary must be submitted for approval.
6. No additional payment or allowance of any nature will be made for timber cants, steel plates or other forms of tunnel lining used for supporting the earth during construction. All such tunnel lining must be left in place.

3.4 PLACEMENT OF PIPE BEDDING

A. Pipe Bedding:

1. Pipe laid in trenches must be bedded by the Contractor in accordance with the details shown on the Drawings. Bedding material must consist of compacted; well-graded crushed stone fill material as shown and as specified, or as directed by the Commissioner.
2. Existing underground structures, tunnels, conduits, and pipes crossing the excavation must be bedded by the Contractor with compacted sand. Bedding material must be placed under and around each existing underground structure, tunnel, conduit, or pipe as required to stabilize the excavation.
3. At each joint, enough depth and width must be provided by the Contractor around the pipe so that joints can be properly made up.

B. Bedding Placement – Vaults and Structures:

1. Pipe bedding beneath precast bases, cast-in-place bases and other foundations must be 6-Inches in thickness and thoroughly compacted in place by the Contractor to not less than 95% of the maximum dry density as determined by ASTM D1557.

C. Bedding and Backfill for Short Tunnel:

1. Pipes placed in short tunnels must be bedded in sand by the Contractor. The annular space between the pipe and undisturbed earth must be completely filled with compacted sand fill material. Pipelines in short tunnels must be supported to permit the placement of backfill.

3.5 BACKFILLING EXCAVATIONS

A. General:

1. All excavations must be backfilled by the Contractor to the original surface of the ground or to such other grades shown on the Drawings

or as directed by the Commissioner. For areas to be covered by topsoil, backfill must be left 6-inches below the finished grade or as shown on the Drawings, or directed by the Commissioner. All backfilling must be done as soon as possible after water main or water service piping has been installed and inspected, and as soon as mortar for masonry or thrust blocks have sufficiently set, unless directed otherwise by the Commissioner.

2. The Contractor must use crushed stone fill material for trench and structure backfill and other areas as shown, specified, or ordered by the Commissioner.
3. Unsuitable material and material rejected by the Commissioner must immediately be removed from the Site and disposed of by the Contractor at his expense.
4. Construction equipment used by the Contractor to backfill against and over cast-in-place concrete structures must not be permitted to travel over these structures until the designated concrete strength has been obtained, as verified by concrete test cylinders. In special cases where conditions warrant, as determined by the Commissioner, the above restriction may be modified if the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.

B. Backfill Procedure:

1. Crushed stone fill material must be used by the Contractor for backfill where roadways, driveways, sidewalks or other pavements are to be placed on the backfill or where the edge of the trench excavation is 5 feet or less from any county or state highway, any city or village street pavement, and in any trenches crossing pavements or sidewalks from a distance beyond the edge of the pavement or sidewalk equal to the depth of the trench. Crushed stone fill material must be used as backfill in trenches parallel to roadways, driveways or other pavements from the top of the bedding to a depth below the ground surface equal to the distance between the inner face of the trench and the closest edge of the pavement.
2. Where pavements and appurtenances for streets are to be placed over the trenches, the backfill material must be placed in uniform layers not greater than 6-inches in thickness and compacted in place. Each layer must be compacted to or not less than 95% of the maximum dry density as determined by ASTM D1557.
3. All pipe sewers must be surrounded and covered by trench backfill above the granular embedment as soon as they are laid. The trench

backfill must be properly compacted and tamped to a depth of at least one foot above the top of the pipe prior to placing the remainder of backfilling.

4. For sewer pipe construction with FA 6 backfill, the Contractor must water jet the backfill to the depth of approximately two-thirds of the depth of cover over the sewer. The distance between jetting holes must not exceed 10 foot along the length and width of the trench, or as directed by the Commissioner. Water jetting of the trench backfill must proceed as soon as practicably, as determined by the Commissioner. The Contractor, in this manner, must place and compact the trench backfill to the level of the sub-grade.
5. Excavated material can be re-used by the Contractor as backfill only if directed or approved by the Commissioner.
6. Where railroad tracks or pavements for highways are to be placed over trenches, the backfill must be placed by the Contractor in conformance with the standards set forth by the respective agency having jurisdiction over the railroad or highway.
7. Trench backfilling work must be done by the Contractor in such a way so as to prevent damage to any pipe, utility, or structure.
8. On monolithic concrete sewers and structures cast-in-place, trench backfill must not be placed until the concrete has attained a compressive strength of 2,000 psi.

C. Backfill under a Supported Water Main:

1. The Contractor must backfill the open trench under the water main or water service and 10 feet beyond the water main or water service sides with approved material up to a level of 1-foot below the invert of the supported water main. The backfill material must be placed by the Contractor in layers of 12-Inches with each layer mechanically compacted to 95% of the maximum dry density as determined by ASTM D1557.
2. The Contractor must place pipe bedding material from 1-foot below the water main or water service invert to the water main or water service centerline and compact to achieve 95% of the maximum dry density as determined by ASTM D1557.
3. The Contractor shall remove the water main pipe and water service support systems, supporting beams, and pipe support straps; and cut-off and remove soldier piles to a level at least four (4) feet below finished grade.

4. The water main pipe and water service must be inspected for leakage and joint integrity and repaired if necessary, prior to backfilling above the water main.
5. After approval by the Commissioner, the Contractor shall continue backfilling with approved material. The open trench must be backfilled up to the required sub grade level. The backfill material must be placed in layers of 12-Inches with each layer mechanically compacted to 95% of the maximum dry density as determined by ASTM D1557.

D. Backfilling with Controlled Low Strength Material (CLSM) - Flowable Fill:

1. Contractor shall not place the mix on frozen ground, in standing water, or during wet weather conditions. Mixing and placing may begin only if the air temperature is 35 °Fahrenheit minimum and rising. At time of placement, the material temperature must be 40 °Fahrenheit minimum. Mixing and placing must stop when the air temperature is 40 °Fahrenheit and falling.
2. The Contractor must place the mix directly from the chute into the space to be filled. Other placement methods may be approved by the Commissioner if the mix design is appropriate.
3. When backfilling against structures, the Contractor must place the mix in layers to prevent damage by lateral pressures. Side slopes must be stepped or serrated to prevent wedging action of the backfill against the structure. Contractor shall allow each layer to harden prior to placing the next layer.
4. When backfilling pipe trench, the Contractor must distribute the mix evenly on each side of the pipeline to prevent movement.
5. The mix must not be exposed to freezing temperatures or wet weather conditions during the first twenty (24) hours after placement.
6. The mix may be subjected to loading upon approval by the Commissioner, or when a penetration of 39 mm / blow or less has been obtained with the Dynamic Cone Penetrometer test.
7. Polyethylene encasement material shall be used as a bond breaker between the water main pipe and CLSM flowable fill. Polyethylene must be either 8-mil, low density or 4-mil, cross-laminated, high density polyethylene tubing in accordance with AWWA C105.

3.6 FINISH GRADING

- A. Finish grading must be performed in accordance with the completed contour elevations and grades shown and must be made to conform to the existing ground surface. All finished graded surfaces must be left smooth and firm and graded to permit positive drainage.
- B. All active trench cuts or excavations open to traffic including vehicles, pedestrians, bicycles, etc., must have temporary pavement which consists of HMA or asphalt cold patch to provide a smooth and level surface. Compacted crushed stone fill will be allowed as temporary pavement in active trench cuts or excavations located in permitted closed work zones to allow for temporary parking relief as directed by the Commissioner and must meet the requirements of Section 351 of the SSRBC.

3.7 TEST PITS

- A. Water service must be turned off at the meter before any excavation near lead or galvanized iron/steel service lines, including test pits.
- B. The test pit shall be of sufficient dimensions and depths to definitely determine existing pipe materials, locate utilities, or provide other information on the existing subsurface conditions that may be needed for planning by the Contractor.
- C. The Commissioner may request test pits for locating underground utilities or structures as an aid in establishing the precise location of new work. Contractor test pits shall be made via vacuum excavation approximately 8-inches in diameter to minimize disturbance to lead or galvanized iron/steel service lines.
- D. Contractor test pits shall be backfilled as soon as the desired information has been obtained. In roadway, flowable fill shall be used to ensure required compaction and strength are achieved. The backfilled surface shall be maintained in a satisfactory condition for travel until resurfaced as specified.
- E. Contractor shall provide the Customer with a flier on flushing instructions after any test pit or excavation conducted within 5-feet of a lead or galvanized iron/steel service line that is not replaced.

3.8 TRAFFIC CONTROL

- A. The Contractor is responsible for traffic control and the protection of vehicular and pedestrian traffic from the work. For detailed requirements see Section 01 55 26 Traffic Control.

END OF SECTION 31 23 10

SECTION 31 23 19

DEWATERING EXCAVATIONS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes requirements for dewatering excavations when necessary to provide a safe working environment and protect the Work so as to provide a satisfactory installation.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 01 11 00 – Summary of Work.

1.3 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. Prior to commencing excavation work at the project site, the Contractor must submit to the Commissioner for review and comment a method for removing water which has entered the excavation either from groundwater sources, surface drainage, or other source such as the dewatering of a new or existing water or sewer main. The submittal must include a description of the source of the water, equipment to be used to dewater the excavation, the arrangement of the equipment, time needed to dewater the excavation, method of disposal, and discharge rate of the equipment expressed in gallons per minute. No excavation is to be started until authorization has been given by the Commissioner to proceed with the excavation work.
- C. When applicable for sewer projects, the Contractor is to submit the proposed method for by-pass pumping and fluming of sewage to the Commissioner for review and comment.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Capacity of Facilities
 - 1. Facilities for the removal and disposal of water must be of sufficient capacity to keep the excavation dry under all circumstances.

B. Standby Facilities

1. Adequate standby facilities must be provided to insure that the excavation will be kept dry in the event of power failure or mechanical breakdown.

C. Well Points

1. If well points are used, the Contractor must make provisions for removing and resetting individual well points without taking any part of the dewatering system out of service.

3.2 CONSTRUCTION

A. Dewatering

1. At all times during the excavation period and until completion of the Work and acceptance at final inspection, ample means and equipment must be provided with which to promptly remove and properly dispose of all water entering any excavation including leakage from the existing water main which is to be replaced. All excavations associated with the Work must be kept dry. Water must not be allowed to rise over, or to come in contact with, masonry and concrete until the concrete and mortar has attained a set satisfactory to the Commissioner and, in any event, no sooner than twelve (12) hours after placing the masonry or concrete.

B. Groundwater Levels

1. The Contractor must maintain the groundwater level at least 12-Inches below the bottom of the excavation until the Work has been completed and the excavation has been backfilled.

C. Water Management

1. Water pumped or drained from the Work must be disposed of in a suitable manner without damage to adjacent property, other Work under construction, street pavement, and parks. Water must not be discharged onto streets without adequate protection at the point of discharge. No water containing settleable solids may be discharged into sewers.
2. All damages caused by dewatering the Work shall be the responsibility of the Contractor and must be promptly repaired at the Contractor's expense.

3. Limit dewatering flow rates to current operating capacity of City sewers. See Section 01 11 00 – Summary of Work for any limitations on discharge rates.

D. Pumping, Bailing and Diversion

1. The Contractor must at all times during construction provide and maintain ample means and devices for the temporary diversion of flow in existing sewers and drains and the prompt removal and proper disposal of all water or sewage entering the tunnels, trenches or other parts of the work, and must keep said excavations as dry as practicable until the structures to be built therein is completed. All water pumped or drained from the work and from existing sewers must be disposed of in a suitable manner without damage to adjacent property, or to sewers, pavements, electrical conduits or other work or property. The Contractor must provide all temporary flumes or pipe lines and pumping equipment required for the proper diversion of sewage and removal of drainage from the work.
2. Whenever the Contractor removes an existing bulkhead, he must install a screen suitable for the purpose of preventing construction debris from floating into the completed portions of the sewer system. As work progresses, Contractor must clean the completed portions of the sewer by removing rails, jacks, lumber, sandbags and all other construction equipment, excess material and debris.
3. The Contractor must place and maintain all temporary dams, flumes, bulkheads or other structures necessary to prevent water from adjacent sections of the sewer system from entering the work under this Contract in such a manner as to injure it, and must completely remove all such temporary structures from the completed portion of the work as rapidly as practicable. The Contractor must not place a dam, flume or bulkhead in any sewer without first obtaining the approval of the Commissioner. The Contractor must ascertain the possibility of sewage backing up into basements and causing damage and he will be held responsible for any such damage.
4. The City does not assume responsibility for providing the Contractor with an outlet for any storm water or sewage which must be disposed of during the construction work under this Contract. Until the acceptance of the work, the Contractor will, if so ordered by the Commissioner, keep the entire work pumped free of water and sewage and before the acceptance of any part of the work. Contractor must clean the entire length of such finished part of the work to the satisfaction of the Commissioner.

5. Water must not be allowed to flow over or stand on the pipe or structure invert in such a manner as to cause scouring of the surface.
6. The Contractor must route all water pumped from trenches or other excavations to settling basins (five feet by ten feet by two feet deep with three compartments) before entering the City of Chicago sewer system. Discharge from the settling basin must be by gravity to the catch basin.

END OF SECTION 31 23 19

SECTION 32 12 16

ASPHALT PAVEMENT

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes requirements for the restoration of Hot – Mix Asphalt (HMA) Pavement.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 01 55 23 – Traffic Control.

1.3 REFERENCES

- A. CDOT Rules and Regulations for Construction in the Public Way (CDOT Specifications), latest edition.
- B. IDOT Standard Specifications for Road and Bridge Construction (SSRBC), latest edition.

1.4 MATERIAL TESTING, INSPECTION AND SUBMITTALS

- A. All materials and workmanship are subject to inspection, testing and approval by the Commissioner.
- B. All tests must be conducted according to current CDOT and IDOT requirements, unless otherwise directed by the Commissioner.
- C. The Contractor must notify the Commissioner of all HMA placements no later than 2:00 pm on the working day prior to the planned work.
- D. All work that is not inspected due to a lack of timely notification or work that does not pass the required tests may be rejected. Rejected work is subject to removal and replacement or other corrective action as directed by the Commissioner, at no cost to the City.
- E. The Contractor shall submit a load ticket to the Commissioner for all material delivered to the work site in accordance with Article 406.13(b) of the SSRBC.
- F. All costs associated with the required material tests, inspections, submittals and samples shall be included in the bid price of the items involved. No additional payment will be made.

1.5 QUALITY CONTROL/QUALITY ASSURANCE (QC/QA)

- A. Quality Control/Quality Assurance of Hot – Mix Asphalt shall be in accordance with CDOT Specifications and Article 1030.05 of the SSRBC, except as herein modified.
- B. In the event that a conflict exists between the CDOT Specifications and Article 1030.05, the CDOT Specifications shall govern.
- C. All costs associated with the QC/QA requirements shall be included in the cost of the bid items involved. No additional payment will be made.

PART 2 – PRODUCTS AND MATERIALS

2.1 HOT MIX ASPHALT (HMA)

- A. Materials for HMA Binder and Surface Course shall be in accordance with Article 406.02 of the SSRBC and the current version of the IDOT District 1 Special Provision for Reclaimed Asphalt Pavement and Reclaimed Asphalt Shingles (D-1), except as herein modified.

When RAP is incorporated in the HMA mix design, the use of FA 21 will not be permitted.

- B. Materials for HMA Base Course shall be in accordance with Article 355.02 of the SSRBC.

2.2 TACK COAT AND PRIME COAT

- A. Bituminous materials for Tack Coat and Prime Coat shall be in accordance with Article 406.02 of the SSRBC, except as herein modified.
- B. Tack coat for application over concrete or bituminous base must be SS-1, unless directed otherwise by the Commissioner.
- C. Prime coat for application over aggregate base must be MC-30.
- D. Aggregate materials for tack coat for streets open to traffic must be in accordance with Article 1003.03 of the SSRBC, except as herein modified.

2.3 REFLECTIVE CRACK CONTROL TREATMENT

- A. Materials for Reflective Crack Control Treatment shall be in accordance with Article 443.02 of the SSRBC, except as herein modified.
- B. The Reflective Crack Control Treatment used shall be System A.

PART 3 – EXECUTION

3.1 GENERAL

- A. If the trench width and/or the edge of the cut lines are exceeded during excavation, the restoration limits must be extended accordingly.
- B. The width of the pavement removal and restoration may be adjusted as directed by the Commissioner.
- C. Pavement restoration work on IDOT jurisdiction roadways must conform to the applicable Sections of the SSRBC, IDOT permit requirements and IDOT standard details. The proposed pavement must match the existing pavement cross-section, unless changes have been approved in writing by IDOT and/or the Commissioner.
- D. All unattended openings in streets, alleys or driveways resulting from the work under this contract must be covered with steel plates in accordance with Section 31 23 10, Part 3.1(I).

3.2 HOT - MIX ASPHALT SURFACE REMOVAL

- A. Hot – Mix Asphalt (HMA) Surface Removal shall be performed in accordance with Section 440 of the SSRBC, except as herein modified.
- B. The existing pavement surface shall be removed to a sufficient depth to accommodate resurfacing the pavement with HMA Surface Course and HMA Binder or Leveling Binder Course, as specified in the pavement restoration note included in the plans or as directed by the Commissioner.
- C. All pavement restoration including but not limited to final HMA Surface Course and permanent pavement markings must be completed within seven (7) calendar days of commencing milling operations.
- D. Prior to the start of grinding operations, all open lid structures shall be protected to prevent grinding debris from entering the structure.
- E. When the vertical difference between the milled pavement surface and adjacent pavement exceeds 2¼ inches, a stepped milled wedge longitudinal joint must be provided. Each step is to be a minimum of 9 inches in width for each 1 inch differential in height.
- F. Temporary ramps shall be constructed and maintained at the transverse joints between milled and existing pavement at both the upstream and downstream ends of the surface removal area immediately upon completion of the surface removal operation.

- G. The Contractor shall provide a temporary bituminous ramp around utility structures.
- H. After cold milling a traffic lane, the pavement must be swept by a mechanical broom to prevent re-compaction of the cuttings onto the pavement. All loose material must be removed from the roadway to the satisfaction of the Commissioner.
- I. All bituminous and portland cement concrete materials resulting from removal operations are to be legally disposed of by the Contractor at a recycling facility, unless otherwise directed by the Commissioner.

3.3 TACK COAT AND PRIME COAT

- A. Tack Coat shall be applied to all milled and unmilled HMA and PCC bases in accordance with Article 406.05(b)(1) of the SSRBC, except as herein modified.
- B. Prime Coat shall be applied to all prepared aggregate bases in accordance with Article 406.05(b)(2) of the SSRBC, except as herein modified.
- C. When directed by the Commissioner, the Tack Coat or Prime Coat must be covered immediately following its application with fine aggregate mechanically spread at a uniform rate of 2 to 4 lbs. per sq. yd.
- D. “Fresh Oil” signs must be posted at the ingress to all areas where Tack Coat or Prime Coat has been applied.

3.4 HMA BINDER COURSE AND HMA SURFACE COURSE

- A. All work to construct HMA Binder Course and HMA Surface Course shall be in accordance with Section 406 of the SSRBC, except as herein modified.
- B. The type and thickness of the HMA Binder and Surface Courses shall be in accordance with the pavement restoration note included in the plans or as directed by the Commissioner.
- C. When the thickness of the existing HMA overlay on a PCC or brick base is less than the total thickness of the proposed binder and surface courses, the thickness of the binder course shall be reduced accordingly. If it is necessary to reduce the thickness of the binder course to less than $\frac{3}{4}$ inch, the binder course shall be omitted and the thickness of the surface course shall be increased accordingly, unless otherwise directed by the Commissioner.
- D. “Flow Boy” trailers must be used at all locations where vertical clearance prevents the use of normal dump trucks or trailers. Any additional cost for “Flow Boy” trailers shall be included in the bid price of the HMA items involved. No additional payment will be made.

- E. The Contractor must provide additional traffic control devices and certified flaggers when placing HMA Binder and Surface Courses on roadways open to traffic. THE USE OF AT LEAST TWO CERTIFIED FLAGGERS AT ALL TIMES IS MANDATORY. The cost of any additional traffic control devices and certified flaggers must be included in the bid price of the HMA items involved. No additional payment will be made.
- F. The Contractor must furnish the name(s) of the Quality Control (QC) Manager and Level I Technician assigned to the project at the time of the preconstruction meeting.

3.5 REFLECTIVE CRACK CONTROL

- A. All work to construct Reflective Crack Control Treatment shall be in accordance with Section 443 of the SSRBC, except as herein modified.
- B. The Reflective Crack Control Treatment used shall be System A and be constructed at locations determined by the Commissioner or the agency having jurisdiction over the roadway.

3.6 TRAFFIC CONTROL

- A. The Contractor is responsible for the control and protection of vehicular and pedestrian traffic in the work zone. For detailed requirements see Section 01 55 26.

3.7 FIELD QUALITY CONTROL

- A. Field testing shall be in accordance with Article 1030.05(d)(3) of the SSRBC, except as herein modified.
- B. The Contractor must obtain and test core samples of the compacted HMA lifts for the purpose of acceptance and/or correlation with nuclear density results. Core densities shall be determined according to Article 1030.05(d)(3). No less than four or more than 20 cores per day will be required. All core holes must be filled immediately with a bituminous mixture meeting these specifications, compacted and finished to the satisfaction of the Commissioner. All costs associated with this work shall be included in the bid unit price of the HMA items involved. No additional payment will be made.

END OF SECTION 32 12 16

SECTION 32 13 13

CONCRETE PAVEMENT

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements for the construction of Portland Cement Concrete Roadway Pavement, Portland Cement Concrete Driveway and Alley Pavement and Portland Cement Concrete Base Course.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 10 55 26 – Traffic Control
- B. Section 03 20 00 – Concrete Reinforcing
- C. Section 31 23 10 – Excavation, Trenching and Backfilling

1.3 REFERENCES

- A. CDOT Rules and Regulations for Construction in the Public Way, latest edition.
- B. IDOT Standard Specifications for Road and Bridge Construction (SSRBC), latest edition.
- C. IDOT Supplemental Specifications and Recurring Special Provisions (SSRSP), latest edition
- D. American Concrete Institute (ACI) 305R – Hot Weather Concreting

1.4 MATERIAL TESTING, INSPECTION AND SUBMITTALS

- A. All materials and workmanship are subject to inspection, testing and approval by the Commissioner.
- B. All tests must be conducted according to current CDOT and IDOT requirements, unless otherwise directed by the Commissioner.
- C. The Contractor must notify the Commissioner of all PCC placements no later than 2:00 pm on the working day prior to the planned work.
- D. All work that is not inspected due to a lack of timely notification or work that does not pass the required tests may be rejected. Rejected work is subject to removal and replacement or other corrective action as directed by the Commissioner, at no cost to the City.

- E. The Contractor shall submit a delivery ticket to the Commissioner when the PCC is delivered to the work site in accordance with Article 1020.11(a) (7).
- F. All costs associated with the required material tests, inspections, submittals and samples shall be included in the bid price of the items involved. No additional payment will be made.

1.5 QUALITY CONTROL/QUALITY ASSURANCE (QC/QA)

- A. Quality Control/Quality Assurance of Portland Cement Concrete shall be in accordance with the IDOT Special Provision for Quality Control/Quality Assurance of Concrete Mixtures found in the SSRSP, except as herein modified.
 - 1. The frequency of CONTRACTOR JOBSITE SAMPLING & TESTING shall be as follows:

| Item | Measured Property | Random Sample Testing Frequency per Mix Design and per Plant | IL Modified AASHTO, IL Modified ASTM, or Illinois Test Procedure |
|-----------|----------------------|--|--|
| ALL ITEMS | Slump | 1 per 50 cu yd. or minimum 1/day | R 60 and T 119 |
| | Air Content | 1 per 50 cu yd. or minimum 1/day | R 60 and T 152 or T 196 |
| | Compressive Strength | 1 set of at least four cylinders per 100 cu yd. or minimum 1 set/day | R 60, T 22 and T 23 |

- 2. Compressive strength tests of field cured specimens shall be performed as follows:

| Class of Concrete | Concrete Age at Time of Cylinder Break | |
|-------------------|--|--------------------------|
| | 1 st set of two | 2 nd set of 2 |
| PV-HES | 3 days ¹ | 7 days |
| PP-1 | 3 days ¹ | 7 days |
| PP-5 | 4 hours ¹ | 3 days |

Note 1. Additional strength testing to determine early pavement opening to traffic or to monitor concrete strength is at the discretion of the Contractor. The contractor must ensure that a sufficient number of samples is prepared at the time of placement to account for any additional testing.

- 3. Concrete temperature shall be tested on each random sample and on each truck load delivered to the jobsite when the air temperature is at or below

40 degrees Fahrenheit or at or above 80 degrees Fahrenheit. Concrete temperature shall be determined according to ASTM C 1064.

4. Test results shall be reported in writing to the Commissioner within forty-eight (48) hours of testing. Reports of compressive strength tests shall contain contract number, project number, project location, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in the work, design compressive strength at twenty-eight (28) days, concrete mixture proportions and materials, compressive break strength and type of break for all tests.

B. All costs associated with the QC/QA requirements shall be included in the cost of the bid items involved. No additional payment will be made.

1.6 QUANTITY ADJUSTMENT FOR FAILURE TO ATTAIN CONCRETE STRENGTH AT THE SPECIFIED TIME

A. The Mix Design Compressive Strength of Class PV-HES and Class PP-1 concrete shall be a minimum of 3500 psi at 3 days. If test results at 3 days indicate a compressive strength of less than 3500 psi but greater than or equal to 3200 psi, the Contractor will be allowed to perform additional tests at 7 days to determine if the concrete attains the minimum compressive strength of 3500 psi.

B. Concrete with a minimum compressive strength of 3200 psi at 3 days and 3500 psi at 7 days will be subject to an adjustment to the pay quantity. This Quantity Adjustment, as well as other actions resulting from the compressive strength test results, are indicated in the following table:

| Concrete Age When Tested | Compressive Strength | Resulting Action |
|---------------------------------|--|--|
| 3 days | Greater than or equal to 3500 psi | Pay 100% of measured quantity. |
| 3 days | Less than 3200 psi | Work rejected. Contractor must remove and replace. |
| 3 days | Less than 3500 psi but greater than or equal to 3200 psi | Retest at 7 days if specimens are available. If no specimens are available, work rejected. Contractor must remove and replace. |
| 7 days | Greater than or equal to 3500 psi | Pay 85% of measured quantity. |
| 7 days | Less than 3500 psi | Work rejected. Contractor must remove and replace. |

C. The Contractor is responsible for preparing a sufficient number of specimens at time of placement in order to perform the additional testing.

- D. Work that is rejected by the Commissioner shall be removed and replaced at no additional cost to the City.

PART 2 – PRODUCTS AND MATERIALS

2.1 COARSE AGGREGATE FOR GRANULAR SUBBASE, AGGREGATE BASE COURSE AND TEMPORARY STONE

- A. Materials for Sub-Base and Temporary Stone shall be in accordance with Article 311.02 of the SSRBC, except as herein modified.
- B. Materials for Aggregate Base Course shall be in accordance with Article 351.02 of the SSRBC, except as herein modified.
 - 1. Only mechanically crushed stone or mechanically crushed concrete may be used.
 - 2. Aggregate gradation for Sub-Base Type A, Sub-Base Type B, Aggregate Base Course and Temporary Stone shall be CA-6.

2.2 PORTLAND CEMENT CONCRETE

- A. Portland Cement Concrete for Roadway Pavement and Driveway & Alley Pavement shall be Class PV-High Early Strength (HES). Portland Cement Concrete for Base Course shall be Class PV-HES, PP-1 or PP-5, as directed by the Commissioner. All concrete mixes shall conform to the requirements of Section 1020 of the SSRBC, except as herein modified.
 - 1. For Class PV-HES concrete, the Mix Design Criteria shall meet the requirements for Class PV Concrete in Table 1 of Article 1020.04 of the SSRBC except that the Mix Design Cement Factor shall be a minimum of 6.50 cwt/cu yd., the Mix Design Compressive Strength shall be a minimum of 3500 psi at 3 days and Type III cement will not be permitted.
 - 2. For Class PP-1 concrete, the Mix Design Criteria shall meet the requirements for Class PP-1 Concrete in Table 1 of Article 1020.04 of the SSRBC except that the Mix Design Compressive Strength shall be a minimum of 3500 psi at 3 days and Type III cement will not be permitted.
 - 3. **Fly ash must not be used in concrete mixes that will be in contact with water main pipe and/or other exposed metals such as for thrust restraint systems and appurtenances.**
 - 4. The curing method for all concrete items constructed under this Section shall be according to Article 1020.13(a) (4) Membrane Curing Method. Waterproof Paper, Polyethylene Sheeting, Wetted Burlap or Wetted Cotton Mat will not be allowed.

2.3 DOWEL BARS, TIE BARS AND PAVEMENT REINFORCEMENT

- A. Materials for Dowel Bars, Tie Bars and Pavement Reinforcement must meet the requirements of Section 03 20 00 – Concrete Reinforcing.

2.4 JOINT FILLER

- A. Materials for preformed expansion joint filler shall be in accordance with Section 1051 of the SSRBC.

2.5 MEMBRANE CURING COMPOUND

- A. Materials for Membrane Curing shall be in accordance with Article 1022.01 of the SSRBC except as herein modified.
 - 1. Linseed Oil Emulsion in accordance with Article 1022.01(d) shall be used for all Roadway Pavement and Driveway & Alley Pavement constructed between November 1 and April 15.

PART 3 – EXECUTION

3.1 GENERAL

- A. The pavement removal limits for trench restoration shall be in accordance with the Construction Details contained in Appendix A of these specifications, or as directed by the Commissioner.
- B. All work on IDOT jurisdiction roadways must conform to the applicable IDOT Standard Details and to the requirements of the IDOT permit.
- C. All unattended openings in streets, alleys and driveways resulting from work under this contract must be covered with steel plates in accordance with Section 31 23 10, Part 3.1 (I) of these specifications.

3.2 SUBBASE, AGGREGATE BASE COURSE AND TEMPORARY STONE

- A. Work to construct Sub-Base Type A and Sub-Base Type B shall be performed in accordance with Section 311 of the SSRBC and match the existing pavement cross-section to the line and grade shown on the plans or as directed by the Commissioner.
- B. Work to construct Aggregate Base Course shall be performed in accordance with Section 351 of the SSRBC, except as herein modified.

The Aggregate Base Course shall be Type B and match the existing pavement cross-section to the line and grade shown on the plans or as directed by the Commissioner.

C. Temporary Stone

1. Work to construct temporary pavement using Temporary Stone shall be performed in accordance with Section 351 of the SSRBC, except as herein modified.
 - a. Temporary Stone pavement shall be constructed at locations as directed by the Commissioner and compacted in accordance with Article 351.05(b).
 - b. The Contractor must maintain the Temporary Stone pavement in a passable and safe condition for traffic and surface drainage.
 - c. When directed by the Commissioner, the Contractor shall apply MC-30 prime coat to the surface of the Temporary Stone pavement and a 1/4- inch thick layer of aggregate screening over the asphalt treated surface in accordance with Article 406.05, except as herein modified. The application rate of the MC-30 prime coat shall be 0.10 to 0.25 gal per sq. yd. The Commissioner shall specify the application rate.
2. Temporary Stone for sidewalk areas disturbed as a result of the work under this contract shall be placed at a thickness of four inches and compacted to the satisfaction of the Commissioner.

3.3 PORTLAND CEMENT CONCRETE ROADWAY PAVEMENT

- A. Work to construct Portland Cement Concrete (PCC) Roadway Pavement shall be performed in accordance with Section 420 of the SSRBC.
- B. PCC Roadway Pavement shall be constructed at the location and thickness indicated on the plans and in accordance with the Construction Details contained in Appendix A of these specifications, or as directed by the Commissioner.

3.4 PORTLAND CEMENT CONCRETE DRIVEWAY AND ALLEY PAVEMENT

- A. Work to construct Portland Cement Concrete (PCC) Driveway and Alley Pavement shall be performed in accordance with Section 423 of the SSRBC.
- B. PCC Driveway and Alley Pavement shall be constructed at the locations indicated on the plans and in accordance with the Construction Details contained in Appendix A of these specifications, or as directed by the Commissioner.

3.5 PORTLAND CEMENT CONCRETE BASE COURSE

- A. Work to construct Portland Cement Concrete (PCC) Base Course shall be in accordance with Section 353 of the SSRBC.

- B. PCC Base Course shall be constructed at the location and thickness indicated on the plans and in accordance with the Construction Details contained in Appendix A of these specifications, or as directed by the Commissioner.

3.6 DOWEL BARS, TIE BARS AND PAVEMENT REINFORCEMENT

- A. Dowel Bars and Tie Bars shall be installed to connect the existing PCC pavement, base course and curb & gutter to the proposed work. The size, location, spacing and anchoring method of the dowel bars and tie bars shall be in accordance with the Construction Details contained in Appendix A of these specifications, or as directed by the Commissioner.
- B. Pavement Reinforcement fabric shall be installed in accordance with the Construction Details contained in Appendix A of these specifications, IDOT Standard Details or as directed by the Commissioner.

3.7 CONCRETE PRODUCTION DURING EXTREME TEMPERATURES

- A. During periods of extreme hot or cold weather, concrete shall be produced in accordance with Article 1020.14(c) of the SSRBC.
- B. All costs associated with this requirement shall be included in the bid price of the items involved. No additional payment will be made.

3.8 LOW AIR TEMPERATURE CONCRETE PROTECTION (WINTER PROTECTION)

- A. All concrete shall be placed and protected during periods of low air temperatures in accordance with Articles 1020.13 and 1020.14 of the SSRBC, except as herein modified.
 - 1. Insulated blankets with minimum thermal resistance value (R value) of R6 shall be used at temperatures below 25 degrees Fahrenheit. The use of straw will not be permitted.
 - 2. Low Air Temperature Concrete Protection (Winter Protection) shall not be considered as a substitute for membrane curing. The appropriate membrane curing compound shall be applied to all concrete work before the Low Air Temperature Concrete Protection (Winter Protection) is placed.
 - 3. Low Air Temperature Concrete Protection (Winter Protection) will be paid at the contract unit price per square yard for Winter Protection of New Concrete.

3.9 HIGH AIR TEMPERATURE CONCRETE PLACEMENT

- A. Concrete placement during periods of extremely high temperatures shall be in accordance with the applicable requirements of ACI 305R.

- B. Do not place concrete when the rate of evaporation of surface moisture exceeds 0.2 pounds per square foot as indicated in Figure 2.1.5 of ACI 305R.
- C. All costs associated with these requirements shall be included in the bid price of the items involved. No additional payment will be made.

END OF SECTION 32 13 13

SECTION 32 16 21

CONCRETE CURB, CURB & GUTTER AND SIDEWALK

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements for the construction of Portland Cement Concrete Curb, Curb & Gutter, Sidewalk, ADA Ramps and Miscellaneous Concrete.
- B. The Contractor shall install concrete curbs, gutters, sidewalks, and ADA ramps only in areas where the existing structure was specifically impacted by the Work. For sidewalk panels, if any portion of a sidewalk panel is impacted by the work, the full panel shall be replaced. Panels adjacent to the work shall be left as-is.
- C. Contractor shall minimize the impact of the work on concrete curbs, gutters, and sidewalks.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 03 20 00 – Concrete Reinforcing.
- B. Section 32 13 13 – Concrete Pavement.

1.3 REFERENCES

- A. CDOT Rules and Regulations for Construction in the Public Way, latest edition.
- B. IDOT Standard Specifications for Road and Bridge Construction (SSRBC), latest edition.
- C. IDOT Supplemental Specifications and Recurring Special Provisions (SSRSP), latest edition

1.4 MATERIAL TESTING, INSPECTION AND SUBMITTALS

- A. All materials and workmanship are subject to inspection, testing and approval by the Commissioner.
- B. All tests must be conducted according to current CDOT and IDOT requirements, unless otherwise directed by the Commissioner.
- C. The Contractor must notify the Commissioner of all PCC placements no later than 2:00 pm on the working day prior to the planned work.

- D. All work that is not inspected due to a lack of timely notification or work that does not pass the required tests may be rejected. Rejected work is subject to removal and replacement or other corrective action as directed by the Commissioner, at no cost to the City.
- E. The Contractor shall submit a delivery ticket to the Commissioner when the PCC is delivered to the work site in accordance with Article 1020.11(a) (7).
- F. All costs associated with the required material tests, inspections, submittals and samples shall be included in the bid price of the items involved. No additional payment will be made.

1.5 QUALITY CONTROL/QUALITY ASSURANCE (QC/QA)

- A. Quality Control/Quality Assurance of Portland Cement Concrete shall be in accordance with the IDOT Special Provision for Quality Control/Quality Assurance of Concrete Mixtures found in the SSRSP, except as herein modified.
 - 1. The frequency of CONTRACTOR JOBSITE SAMPLING & TESTING shall be as follows:

| Item | Measured Property | Random Sample Testing Frequency per Mix Design and per Plant | IL Modified AASHTO, IL Modified ASTM, or Illinois Test Procedure |
|-----------|----------------------|--|--|
| ALL ITEMS | Slump | 1 per 50 cu yd. or minimum 1/day | R 60 and T 119 |
| | Air Content | 1 per 50 cu yd. or minimum 1/day | R 60 and T 152 or T 196 |
| | Compressive Strength | 1 set of at least four cylinders per 100 cu yd. or minimum 1 set/day | R 60, T 22 and T 23 |

- 2. Compressive strength tests of field cured specimens shall be performed as follows:

| Class of Concrete | Concrete Age at Time of Cylinder Break | |
|-------------------|--|--------------------------|
| | 1 st set of two | 2 nd set of 2 |
| SI | 7 days | 14 days |

- 3. Concrete temperature shall be tested on each random sample and on each truck load delivered to the jobsite when the air temperature is at or

below 40 degrees Fahrenheit or at or above 80 degrees Fahrenheit. Concrete temperature shall be determined according to ASTM C 1064.

4. Test results shall be reported in writing to the Commissioner within forty-eight (48) hours of testing. Reports of compressive strength tests shall contain contract number, project number, project location, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in the work, design compressive strength at twenty-eight (28) days, concrete mixture proportions and materials, compressive break strength and type of break for all tests.
- B. Hand mixing of concrete shall not be allowed.
- C. All costs associated with the QC/QA requirements shall be included in the cost of the bid items involved. No additional payment will be made.

PART 2 – PRODUCTS AND MATERIALS

2.1 PORTLAND CEMENT CONCRETE

- A. Portland Cement Concrete for Curb, Curb & Gutter, Sidewalk, ADA Ramps and Miscellaneous Concrete shall be Class SI and conform to the requirements of Section 1020 of the SSRBC, except as herein modified.
1. The Mix Design Criteria shall meet the requirements for Class SI concrete in Table 1 of Article 1020.04 except that the Mix Design Compressive Strength shall be 3500 psi at 7 days.
 2. **Fly ash must not be used in concrete mixes that will be in contact with water main pipe and/or other exposed metals such as for thrust restraint systems and appurtenances.**
 3. The curing method for all concrete items constructed under this Section shall be according to Article 1020.13(a)(4) Membrane Curing Method. Waterproof Paper, Polyethylene Sheeting, Wetted Burlap or Wetted Cotton Mat will not be allowed.

2.2 DETECTABLE WARNING UNITS

- A. Detectable Warning Tiles shall be cast gray iron with an untreated natural surface finish and shall be obtained from a CDOT approved manufacturer. A list of approved manufacturers of cast iron detectable warning tiles is available on the CDOT website under Construction Guidelines/Standards.

2.3 JOINT FILLER

- A. Materials for preformed expansion joint filler shall be in accordance with Section 1051 of the SSRBC.

2.4 DOWEL BARS, TIE BARS AND PAVEMENT REINFORCEMENT

- A. Materials for Dowel Bars, Tie Bars and Pavement Reinforcement shall be in accordance with Section 03 20 00 – Concrete Reinforcing.

2.5 MEMBRANE CURING COMPOUND

- A. Materials for Membrane Curing shall be in accordance with Article 1022.01 of the SSRBC except as herein modified.
 - 1. Linseed Oil Emulsion in accordance with Article 1022.01(d) shall be used for all concrete items constructed under this Section between November 1 and April 15.

PART 3 – EXECUTION

3.1 SIDEWALK AND ADA RAMPS

- A. Work to construct Portland Cement Concrete (PCC) Sidewalk and ADA Ramps shall be performed in accordance with Section 424 of the SSRBC.
- B. PCC Sidewalk and ADA Ramps shall be constructed at the location and thickness indicated on the plans, or as directed by the Commissioner and in accordance with the Americans with Disabilities Act (ADA) and the current CDOT Rules and Regulations for Construction in the Public Way, Appendix B, ADA Standards. The Contractor is solely responsible for construction of compliant ramps.
- C. All ADA Ramps are subject to Quality Control and Quality Assurance inspections by the Commissioner to confirm that the work is compliant with CDOT ADA Standards. All non-compliant work must be corrected by the Contractor in a timely manner at no cost to the City.
- D. All areas impacted by the Contractor as a result of the construction of proposed sidewalk and ADA ramps shall be restored to original condition. This includes but is not limited to parkways of all types including brick, landscape and asphalt, sidewalk, curb & gutter, concrete base and pavement.

3.2 DETECTABLE WARNING UNITS

- A. Installation of Detectable Warning Units shall be performed in accordance with Article 424.09 of the SSRBC and the current CDOT Rules and Regulations for Construction in the Public Way, Appendix B, ADA Standards.

3.3 CONCRETE CURB AND COMBINATION CURB & GUTTER

- A. Work to construct Portland Cement Concrete (PCC) Curb and Combination Curb & Gutter shall be performed in accordance with Section 606 of the SSRBC.
- B. PCC Curb and Combination Curb & Gutter shall be constructed at the locations indicated on the plans or as directed by the Commissioner and in accordance with the Construction Details contained in Appendix A of these specifications.

3.4 DOWEL BARS AND TIE BARS

- A. Dowel Bars and Tie Bars shall be installed to connect the existing PCC pavement or base course to the proposed work. The size, location, spacing and anchoring method of the dowel bars and tie bars shall be in accordance with the Construction Details contained in Appendix A of these specifications, or as directed by the Commissioner.

3.5 CONCRETE PRODUCTION DURING EXTREME TEMPERATURES

- A. During periods of extreme hot or cold weather, concrete shall be produced in accordance with Article 1020.14(c) of the SSRBC.
- B. All costs associated with this requirement shall be included in the bid price of the items involved. No additional payment will be made.

3.6 LOW AIR TEMPERATURE CONCRETE PROTECTION (WINTER PROTECTION)

- A. All concrete shall be placed and protected during periods of low air temperatures in accordance with Articles 1020.13 and 1020.14 of the SSRBC, except as herein modified.
 - 1. Insulated blankets with minimum thermal resistance value (R value) of R6 shall be used at temperatures below 25 degrees Fahrenheit. The use of straw will not be permitted.
 - 2. Low Air Temperature Concrete Protection (Winter Protection) shall not be considered as a substitute for membrane curing. The appropriate membrane curing compound shall be applied to all concrete work before the Low Air Temperature Concrete Protection (Winter Protection) is placed.
 - 3. Low Air Temperature Concrete Protection (Winter Protection) will be paid at the contract unit price per square yard for Winter Protection of New Concrete.

3.7 HIGH AIR TEMPERATURE CONCRETE PLACEMENT

- A. Concrete placement during periods of extremely high temperatures shall be in accordance with the applicable requirements of ACI 305R.
- B. Contractor shall not place concrete when the rate of evaporation of surface moisture exceeds 0.2 pounds per square foot as indicated in Figure 2.1.5 of ACI 305R.
- C. All costs associated with these requirements shall be included in the bid price of the items involved. No additional payment will be made.

END OF SECTION 32 16 21

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements for installing temporary and permanent pavement markings. This Section also includes the requirements for installing decorative crosswalk surfacing consisting of a durable imprinted aggregate reinforced preformed thermoplastic pavement marking system (herein “System”) that provides a textured, highly attractive and durable topical treatment to the surface of asphalt pavement.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 01 55 26 – Traffic Control.

1.3 REFERENCES

- A. IDOT Standard Specifications for Road and Bridge Construction (SSRBC), latest edition.
- B. CDOT Rules and Regulations for Construction in the Public Way, latest edition.
- C. CDOT Bike Lane design Guide, latest edition.

PART 2 – PRODUCTS AND MATERIALS

2.1 PAVEMENT MARKINGS

- A. Materials for Thermoplastic Pavement Markings shall be in accordance with Article 1095.01 of the SSRBC.
- B. Materials for Temporary Pavement Marking paint shall be in accordance with Article 1095.02 of the SSRBC. Materials for Temporary Pavement Marking tape shall be in accordance with Article 1095.06 of the SSRBC.
- C. Materials for Raised Reflective Pavement Markers shall be in accordance with Article 1096.01 of the SSRBC.

2.2 CROSSWALK SURFACING SYSTEM

- A. Preformed Thermoplastic Materials for Crosswalk Surfacing System must be composed of an ester modified rosin impervious to degradation by motor fuels, lubricants, etc. in conjunction with aggregates, pigments, binders, and anti-skid/anti-slip elements. Pigments and anti-skid/anti-slip elements must be

uniformly distributed throughout the material. The material shall conform to AASHTO designation M249, with the exception of the relevant differences due to the material being supplied in a preformed state, being non-reflective, and potentially being of a color different from white or yellow.

1. Pigments:
 - a. White: The material shall be manufactured with sufficient titanium dioxide pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected.
 - b. Other Colors: The pigment system must not contain heavy metals nor any carcinogen, as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.
2. Skid Resistance: The surface of the material shall contain a minimum of thirty percent (30%) intermixed anti-skid/anti-slip elements. These anti-skid/anti-slip elements must have a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum skid resistance value of 60 BPN when tested according to ASTM E 303.
3. Slip Resistance: The surface of the material shall contain a minimum of thirty percent (30%) intermixed anti-skid/anti-slip elements. These anti-skid/anti-slip elements must have a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum static friction of coefficient of 0.6 when tested according to ASTM C 1028 (wet and dry), and a minimum static coefficient of friction of 0.6 when tested according to ASTM D 2047.
4. Thickness: The material must be supplied at a minimum thickness of 150 mil (3.8mm).
5. Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline. The System must be able to be applied in temperatures down to 45°F (7°C) without any special storage, preheating, or treatment of the material before application.
6. Storage Life: The material may be stored for 12 months, if stored indoors and protected from the elements.

2.3 PAINT FOR TOP AND FACE OF CURB

- A. Primer and finish coat paint for top and face of curb shall be commercial grade, suitable for exterior concrete surfaces and wear resistant. The finish coat color shall be Safety Yellow.

PART 3 – EXECUTION

3.1 GENERAL

- A. The Contractor is responsible for the control and protection of vehicular and pedestrian traffic in the work zone. For detailed requirements see Section 01 55 26.

3.2 PAVEMENT STRIPING

- A. Temporary Pavement Markings shall be installed on milled, primed, paved HMA or portland cement concrete surfaces in accordance with Section 703 of the SSRBC at locations shown on the plans or as directed by the Commissioner.
- B. Thermoplastic Pavement Markings shall be installed on the final wearing surface in accordance with Section 780 of the SSRBC.
- C. The Contractor must ensure that the locations and dimensions of permanent pavement markings on arterial streets are in accordance with the current CDOT pavement marking plans and with the pavement marking details contained in the CDOT Rules and Regulations for Construction in the Public Way or as directed by the Commissioner.

3.3 RAISED REFLECTIVE PAVEMENT MARKERS

- A. Raised Reflective Pavement Markers shall be installed in accordance with Section 781 of the SSRBC.
- B. Raised Reflective Pavement Markers shall be installed at locations where existing raised reflective pavement markers were removed as a result of the work under this contract. The Contractor shall document the locations of the existing raised reflective pavement markers before the contract work begins.

3.4 PREFORMED PLASTIC PAVEMENT MARKINGS

- A. Preformed Plastic Pavement Markings shall be installed by the standard application method in accordance with Article 780.07 of the SSRBC.
- B. Preformed Plastic Pavement Markings shall be used for chevron markings on speed humps or as directed by the Commissioner.

3.5 PREFORMED THERMOPLASTIC CROSSWALK SURFACING SYSTEM

- A. Preformed Thermoplastic Crosswalk Surfacing System shall be installed on HMA surfaces at locations shown on the plans or as directed by the Commissioner.

B. Installation of Preformed Thermoplastic Crosswalk Surfacing System shall be in accordance with the following.

1. The System must only be applied to a stable, high quality asphalt pavement substrate over a stable base that is free of defects, as per the manufacturer published Substrate Guide. The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.
2. The System must be applied to asphalt pavement using reciprocating infrared heating equipment. A two- part epoxy sealer specified by the manufacturer must be applied to the substrate prior to the preformed thermoplastic application. Immediately following sealer application, the panels of aggregate reinforced preformed thermoplastic are positioned properly on the asphalt substrate with the aggregate side facing up. The preformed thermoplastic is then heated to the required melting temperature. Additional aggregate may be applied to the preformed thermoplastic surface as needed following the melting process. As the material is cooling, it is imprinted with a stamping template made from 3/8 in. (9.5 mm) flexible wire rope in the specified design using a vibratory plate compactor. The preformed thermoplastic material is then allowed to cool thoroughly before being opened to vehicle or pedestrian traffic.

The System shall not be applied to Portland Cement Concrete.

3. Transverse lines to supplement system application shall be white, retroreflective preformed thermoplastic line stripe material in 90 mil (2.3 mm) or 125 mil (3.2 mm) thicknesses in 12 in. (.30m) widths. This preformed thermoplastic material may be supplied and applied by the certified applicator in conjunction with the system.
4. A wire rope stamping template is required in the execution of the System. The template is used for imprinting the defined pattern once the preformed thermoplastic has been applied. The wire rope diameter for the imprinting template used for the specified pattern is 3/8 in. (9.5mm). The stamping templates shall be distributed by the System manufacturer.
5. The System manufacturer shall distribute reciprocating infrared heating equipment designed specifically to elevate the temperature of the preformed thermoplastic material and asphalt pavement without adversely affecting it. The primary heating unit must employ a bank of propane-fired infrared heaters, mounted on a track device that allows the heater bank to reciprocate back and forth over a designated area, thereby allowing the operator to monitor the temperature of the

preformed thermoplastic at all times during the pavement heating process.

- a. A smaller, mobile infrared heater may be used to specifically to heat areas such as borders and narrow areas that are inaccessible to the primary heaters. This secondary heater also allows the operator to monitor the temperature of the preformed thermoplastic at all times during the heating process.
 - b. An approved hand-held propane heat torch shall be used to heat isolated areas of the preformed thermoplastic.
6. A two-part epoxy sealer specified by the manufacturer of the preformed thermoplastic material must be applied to the substrate prior to thermoplastic material application to ensure proper adhesion, and to provide reinforcement for larger volumes of material.
 7. Supplemental anti-skid/anti-slip elements to be applied to the surface of the molten thermoplastic as needed, if the factory applied anti-skid/anti-slip elements embed too deeply into the surface of the molten thermoplastic material during the heating process.
 8. The System must be able to be applied to asphalt surfaces without preheating the application surface to a specific temperature.
 9. The System shall utilize standard colors and patterns, as approved by the Commissioner.
- C. Quality Assurance: The System manufacturer must be ISO 9001:2008 certified for design, development and manufacturing of preformed thermoplastic, and provide proof of current certification.
1. The System shall be supplied and applied only by an applicator certified by the System manufacturer. The applicator shall provide proof of current certification before commencing work. The Certified Applicator shall follow the System manufacturer's current published application procedures.
 2. Technical services: The successful bidder shall provide technical services as required.
- D. Warranty: Provide certification from the manufacturer that the imprinted texture, coating and coloring materials have a minimum three year warranty from Final Acceptance of the project.
1. Performance measures for the imprinted textures at the end of three years of the project:

- a. The imprint must maintain a depth of 50% of the original installed depth and width.
 - b. The crosswalk should be uniform in color with no chips, spalling, or pieces of material missing. Original color values will be measured at the time of acceptance.
- E. Submittals: Contractor must submit product data and cut sheets for all materials for approval from the Commissioner prior to ordering any material.

Contractor must submit installer qualifications and proof of current certification.
- F. Shop Drawings: Prior to ordering any material, Contractor shall receive Commissioner approval on Contractor submitted shop drawings which show complete information for layout and installation.

3.6 CURB PAINTING

- A. Work to paint the top and face of curb shall be performed in accordance with Article 780.06 of the SSRBC, except as herein modified.
 - 1. When directed by the Commissioner, the top and face of the curb shall be painted yellow for 15 feet each side of fire hydrants, except where the 15 foot dimension intersects a crosswalk, driveway or similar feature.
 - 2. A coat of primer suitable for exterior concrete surfaces and compatible with the finish coat shall be applied before application of the finish coat.
 - 3. The paint shall be applied with neat straight edges along the back of curb and vertically up the curb face.
 - 4. Glass beads are not required.

3.7 CURB PAINTING REMOVAL

- A. Any yellow paint on existing curb that does not conform to new fire hydrant locations shall be removed by scraping or mechanical wire brushing. The method of removal must not damage the surface or texture of the concrete. With the approval of the Commissioner, very small particles of tightly adhering paint may remain in place if complete removal of the paint will result in surface damage. Any damage to the curb caused by the paint removal shall be repaired by the Contractor at no cost to the City.

END OF SECTION 32 17 23

SECTION 32 90 00

LANDSCAPE RESTORATION

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes the requirements for restoring landscaped areas that have been disturbed by the repair and/or construction of water service lines and house drains. The work includes, but is not limited to grading, placing topsoil, tilling soil, fertilizing, seeding, mulching, and watering in areas indicated on the plans or as directed by the Commissioner.
- B. Property Owner must sign off on all planned demolition and restoration as part of the pre-construction meeting between the Contractor, Commissioner, and Property Owner.

1.2 REFERENCES

- A. IDOT Standard Specifications for Road and Bridge Construction (SSRBC), latest edition.
- B. American National Standards Association, “American Standard for Nursery Stock”, ANSI Z60.1-2014, (or latest edition).
- C. CDOT Rules and Regulations for Construction in the Public Way, latest edition.
- D. Chicago Department of Streets and Sanitation, Bureau of Forestry Manual of Tree Planting Standards.

1.3 SUBMITTALS

- A. The Contractor must provide certified test results and inspection reports from an approved testing laboratory certifying all materials used in the work are in accordance with the specifications.
- B. The Contractor must provide supplier’s certification for all grass seed. The certification must provide the composition of the seed mixture, percentage of purity from weed seeds and anticipated rate of germination of each variety of seed in the mixture.
- C. Fourteen (14) days prior to delivering topsoil to the project site, the Contractor must submit certified written documentation as to the source of the topsoil, plants previously grown in the soil and its composition. Any unapproved topsoil placed without the Commissioner’s approval shall be removed and replaced at no additional cost.

1.4 BUREAU OF FORESTRY REQUIREMENTS

- A. The Contractor shall not remove any trees on public or private property without first obtaining written approval from the Commissioner. If a tree needs to be removed or trimmed, the Contractor is responsible for these costs as incidental to the water service or house drain work.
- B. The Contractor must obtain all necessary permits and provide forty-eight (48) hour notice to the Chicago Department of Streets and Sanitation, Bureau of Forestry for all work that involves removal, planting, trimming, spraying, root pruning or in any way affects the general health or structure of trees in the public right-of-way. A two (2) week notice is required for planting of new trees. All work must be done in accordance with the Bureau of Forestry Manual of Tree Planting Standards.
- C. The Contractor shall not be responsible for planting new trees or the costs associated with planting the new tree.

PART 2 – PRODUCTS AND MATERIALS

2.1 SEEDED AREAS

- A. Materials used for preparation and planting of seeded areas shall meet the following requirements.
 - 1. Fertilizer shall be in accordance with Article 1081.08 of the SSRBC and consist of 10% nitrogen (½ organic, ½ inorganic), 6% phosphoric acid and 4% potash with trace elements.
 - 2. Grass seed shall be in accordance with Article 1081.04 of the SSRBC. Seeding mixtures shall be Class 1 Lawn Mixture or Class 1A Salt Tolerant Lawn Mixture. Mixture composition and application rate shall meet the requirements of Article 250.07 of the SSRBC.
 - 3. Mulch.
 - a. Mulch for mechanically seeded areas shall be knitted straw mat in accordance with Article 1081.10(b) of the SSRBC.
 - b. Hydraulic mulch shall be in accordance with Article 1081.06(a) (2) of the SSRBC.
 - 4. Topsoil shall be in accordance with Article 1081.05(a) of the SSRBC and shall be free from weeds and weed seeds.

PART 3 – EXECUTION

3.1 GENERAL

- A. All material furnished by the Contractor must be approved before being incorporated into the work. All rejected materials shall be removed from the site.
- B. The Contractor shall furnish all certificates of inspection that may be required by Federal, State or Local authorities in addition to those stated here.
- C. During the progress of the work, the Contractor must keep the work site clean. All debris and surplus material must be removed from the project site on a regular basis.
- D. Upon completion of the work or portions thereof, the Contractor must remove all equipment, surplus material and debris to the satisfaction of the Commissioner.

3.2 SEEDING

- A. This work shall consist of preparing the seed bed and placing seed, mulch and other materials required in seeding operations in parkways, medians or other locations as shown on the plans or as directed by the Commissioner.
 - 1. Preparation
 - a. The Contractor must remove and dispose of the existing material in the area to be seeded to a uniform depth of 4 inches. The resulting subgrade surface shall be relatively smooth and level.
 - b. The Contractor must furnish and place a minimum of 4 inches of topsoil on the prepared subgrade.
 - c. The Contractor shall apply commercial fertilizer (10-6-4) at the rate recommended by the manufacturer.
 - 2. Seeding
 - a. Seed shall be Class 1 Lawn Mixture except where Class 1A Salt Tolerant Lawn Mixture is specified by the Commissioner. The composition of each seed mixture and the seed mixture application rate shall be in accordance with Article 250.07 of the SSRBC.
 - b. The seeding method shall be mechanical or hydraulic as specified by the bid item and shall be in accordance with Article 250.06 of the SSRBC. When hydraulic seeding is specified, seed, fertilizer and mulch may be applied in one

operation. Hydraulic seeders shall meet the requirements of Article 1101.08(c) of the SSRBC.

3. Mulch

- a. Knitted straw mat shall be placed on areas that have been mechanically seeded in accordance with Article 251.04 of the SSRBC.

4. Maintenance

- a. All seeded and mulched areas must be protected from damage by the Contractor's activities as well as vehicular and pedestrian traffic in accordance with Article 107.30 of the SSRBC. All damage shall be repaired or replaced immediately at no cost to the City.
- b. All seeded and mulched areas must be maintained by watering, mowing, fertilizing and reseeded as necessary for a minimum of sixty (60) days of growing weather or until a uniform stand of grass is established and accepted by the Commissioner.

3.3 FINAL INSPECTION

- A. All seeded areas must be guaranteed for a period of two (2) years following the completion of all plantings and initial acceptance.
- B. All newly planted areas must be alive and in vigorous growth at the end of the maintenance and guarantee period. The Commissioner will make inspections periodically during the guarantee period.
- C. If any discrepancies are found by such inspections, the Contractor will be so informed and he must make whatever corrections necessary to the satisfaction of the Commissioner. The cost of all corrective actions, if any, shall be included in the bid price of the items involved. No additional payment will be made.
- D. At the end of the maintenance and guarantee periods, final inspection will be made by the City upon written notice to the Commissioner requesting such inspection at least ten (10) days before the anticipated date.
- E. Any newly planted area that is dead or not in a healthy, vigorous condition, as determined by the Commissioner, must be replanted by the Contractor.
- F. After inspection, the Contractor will be notified by the Commissioner in writing of the acceptance of all work, or of any required replacement of plant material, or of any other deficiencies in the work.

END OF SECTION 32 90 00

SECTION 33 05 22

REPLACEMENT OF HOUSE DRAINS AND STRUCTURES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements associated with the replacement of existing house drains (also referred to as private drains) to comply with Chicago Municipal Code 18-29-600 and Illinois Plumbing Code, Title 77 Illinois Administrative Code water and sewer separation requirements. The Contractor must have the Commissioner's approval prior to replacing the house drain in lieu of providing the separation of 10-feet horizontal and/or 18-inches vertical below the new water services.
- B. All house drains that are located within 10-feet horizontally and/or less than 18-inches vertically below a new water services shall be replaced with watermain quality ductile iron pipe to the extents shown on the Drawings to comply with the Chicago Municipal Code 18-29-600 and Title 77 Illinois Administrative Code. The Contractor shall replace existing house drains, in accordance with the Contract Documents and local and state guidelines and regulations.
- C. All plumbing system installations and design shall comply the Illinois Plumbing Code, Title 77 Illinois Administrative Code unless a written variance has been granted by the Department in accordance with Title 77 Illinois Administrative Code Section 890.140 b).
- D. The existing sewer systems, including piping and equipment, shall remain in operation until the house drain is in service. All systems shall be maintained without interruption. The demolition and removal work shall be coordinated with the Commissioner, Customer and construction schedule for the new house drain.
- E. The Contractor may encounter different sewer pipe materials such as Asbestos Cement, Cast Iron, Ductile Iron, PVC, PCCP, and Steel. Any information that is provided is per the City of Chicago's records. This information is not guaranteed to be correct and shall be verified by the Contractor.
- F. The Contractor is responsible for applying for all applicable permits and paying for all applicable permit fees.
- G. Replacement work within private property shall be coordinated with the Commissioner and Property Owner prior to starting any work.

- H. Ductile iron pipe, including bends, branches and other fittings, used in the construction of drain connections must be furnished and placed in accordance with the following specifications, supplemented by the specifications given under other headings.
- I. Polyethylene encasement must be installed around all buried pipe. Encasement material must be 4-mil, cross-laminated, high-density polyethylene tubing. The tubing must comply with AWWA C105.
- J. Clay pipe shall not be used for house drain replacements.
- K. Jointing of dissimilar house drains and/or building sewer pipes shall be done in accordance with the latest edition of the Standard Specifications for Water and Sewer Construction in Illinois.
- L. The new house drain shall extend to the building foundation, as shown on the Drawings, and then connect to the existing house drain.
- M. The installation of the new house drain for each property has not been individually detailed. The house drain connection details were developed to illustrate to the Contractor the required plumbing elements and the required order of the plumbing elements to be used. The piping and equipment shown on the water service line connection details are not to scale and do not show every offset or fitting, nor every hanger or support, or structural difficulty that may be encountered. To carry out the intent and purpose of the water service line connection, Contractor shall field verify all piping and plumbing systems to ensure all necessary plumbing parts are installed to provide a complete and safe transfer of the domestic drainage service without extra charge to the Commissioner or Property Owner. The Contractor shall be responsible to coordinate the system installation and routing with the work of all trades.
- N. The Contractor shall maintain an on-site supply of anticipated specialty fittings such that the work proceeds without impacting the execution of the work and causing a delay in connecting the service.
- O. Dewatering shall be in accordance with Section 31 23 19. Dewatering cost shall be included in replacement Bid Items. If during the course of work an existing connection becomes dislodged from the sewer main for any reason the contractor shall be responsible for dewatering the excavation to perform a new sewer service connection in the dry, all work and dewatering shall be included in new water connection Bid Item.
- P. All plumbing demolition and installation work shall be performed by a Chicago Licensed Plumber.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 31 23 10 – Excavation, Trenching and Backfilling.

- B. Section 33 39 13 – Sewer Manholes, Catch Basins, Inlets and Special Structures.

1.3 REFERENCES

- A. City of Chicago, Department of Water Management, Standard Specifications for Sewer Construction, latest edition.
- B. Follow the latest edition of the following references.
 - 1. AWWA C151 - Ductile Iron Pipe, Centrifugally Cast for Water.
 - 2. ASTM A48 - Gray Iron Castings.
 - 3. Chicago Municipal Code 18-29-600.
 - 4. Chicago Municipal Code 18-29-700.

1.4 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples. Submit shop drawings and schedules of all installation equipment, pipe fittings, pipe hanger and supports, and appurtenances required and detailed procedure for installing the pipe.
- B. Submit, within 10 days after signing the contract a list of materials to be furnished, the name of suppliers and the date of delivery of materials on the job site. The Contractor shall submit means and methods for repairing and sealing pipe penetrations through all types of building foundations during the shop drawing submittals. All proposed means and methods for repairing and sealing pipe penetrations through building foundations shall be reviewed and approved by the Commissioner.
- C. Submit, prior to the start of work a drawing showing the size and location of all proposed pits and excavations required to complete the work. Include in this submittal any Property Owner property (for example, fences, landscaping, dry wall, etc) that will be demolished in the course of the work and the planned extent of restoration.
- D. Submit detailed procedures for installing the new house drain pipe including plans and procedures for supplying temporary drain service to home if work is not completed in allotted time.
- E. The Contractor must use a digital camera to record site conditions both before and after the house drain installation. The photos must show all of the work performed including the complete meter installation, valves, piping or other work needed to complete the installation. With each pay application, the Contractor must submit a cumulative electronic collection of all photo files

created for the Contract to date. The photos must be electronically submitted in EAM. Digital photos must be a minimum of three (3) megapixels and must be “stamped” with the date and time. The photos must be indexed by address, meter number, premise number, date taken and photographer name

- F. The Contractor must provide the Commissioner, prior to the use of any materials in this section, certified test and inspection reports from an approved testing laboratory, or at the point of manufacture, that all materials and/or equipment to be utilized in this work are in accordance with the Contract Documents.
- G. All tests as specified are to be performed at the point of manufacture. The cost of testing is considered incidental to the construction and no additional payment will be allowed.
- H. Each individual unit must be pressure tested and guaranteed for service at pressures minimally equal to pressure ratings specified for design purposes in AWWA C151. The Contractor must provide an affidavit that materials furnished comply with the above standards.

1.5 DELIVERY, STORAGE AND HANDLING

- A. All materials shall be inspected for size, quality, and quantity against approved shop drawings upon delivery.
- B. Delivery schedule of all equipment shall be coordinated with the Contractor. Equipment ready for shipment prior to the agreed-on shipping date shall be stored without cost to the Commissioner by the manufacturer.
- C. All materials shall be suitably packed for shipment and long-term storage. Each package shall be labeled to indicate the project and the contents of each package. Where applicable, equipment numbers shall be marked on the container.
- D. All equipment shipped that is exposed, such as on a flatbed truck, shall be protected during transit. The equipment shall be protected from moisture, road salt, dirt, stones or other materials thrown up from other vehicles. Electrical components shall be protected as above, but with special attention to moisture. The method of shipment protection shall be defined in the submittals.
- E. All materials shall be stored in a covered dry location off of the ground with all pipe ends capped. When required to protect the materials, they shall be stored in a temperature-controlled location.

1.6 QUALITY ASSURANCE

- A. The Work necessary for the installation of new, or modification to existing services, must be performed by a plumber licensed in the State of Illinois or the City.
- B. The Contractor shall also be capable of providing crews as needed to complete the work without undue delay.
- C. All products of a given type included in this Section shall be furnished by or through a single manufacturer. All materials shall be new and unused.
- D. Install piping to meet requirements of local codes.
- E. The piping manufacturer shall furnish an affidavit of compliance certifying that all materials used and work performed complies with the specified requirements. Provide copies of mill test confirming the type of material used in the various components.
- F. All valves and appurtenances shall be the product of well-established firms who are fully experienced, reputable and qualified in the manufacture of the equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with this Section as applicable.
- G. The Commissioner reserves the right to sample and test any materials after delivery and to reject all components represented by a sample that fails to comply with the specified requirements.

1.7 WARRANTY

- A. The Contractor shall warranty the WORK against defects for one (1) year from the date of Substantial Completion of the Project or end of Term Agreement whichever is later. During this period, all serious defects discovered by the Customer or the Commissioner shall be removed and replaced in a satisfactory manner at no cost to the Commissioner.

1.8 COORDINATION

- A. Project details indicates the extent and general arrangement of the systems. If any departures from the details or specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted as soon as practical for review. No such departures shall be made without the prior written concurrence of the Commissioner.
- B. The Contractor shall assume full responsibility for coordination of the individual property plumbing systems, including scheduling and verification that all structures, piping and the mounting of equipment are compatible.

PART 2 - PRODUCTS AND MATERIALS

2.1 PIPE AND FITTINGS

- A. Water main quality pipe used for sewer pipe shall be in conformance with: *Environmental Regulations for the State of Illinois, Title 35 of the Illinois Administrative Code, Subtitle F: Public Water Supplies, Chapter II: Environmental Protection Agency, Part 653: Design, Operation and Maintenance Criteria, October 23, 1985.* Ductile iron water main quality pipe is per the following:

DUCTILE IRON PIPE

1. Ductile iron pipe must conform to the requirements of AWWA C151, Class 52 and with the additions or substitutions specified in this Section. Fittings 12" and larger must be gray or ductile iron conforming to ASTM C110. Fittings 10" and smaller must be gray or ductile iron conforming to ASTM C153.
2. Bells must be designed to provide a watertight joint without any leakage and be capable of withstanding pressures exceeding those that will rupture pipe of this class and thickness without requiring additional jointing material.
3. All pipe must be manufactured so that where a cut is made at any point along the barrel, the cut end will fit properly into a standard mechanical joint bell and be drip tight at hydrostatic test pressure.
4. Exterior of pipe and fittings must be coated with a petroleum asphaltic material in conformance with AWWA C110, Section 10-10. Interior of pipe must be cement mortar or ceramic lined in accordance with AWWA C104.

B. Joints for Drains

1. Pipe joints must be push-on type joints with rubber gaskets unless otherwise shown on the Drawings, specified, or directed by the Commissioner. Push-on type joints must conform to AWWA C111.
2. Flanged fittings shown on the Plans must conform to the requirements of AWWA Specifications as to dimensions and thickness of material and must have "American Standard, Class 125" flanges except where short radius fittings are shown on the Plans, and in such cases, fittings must conform to "American Standard Flanged Fitting, Class 125." The body of flanged fittings, other than the aforementioned short radius fittings, must be Class D of the AWWA Standard Specifications for all sizes less than 14 inches in diameter, and Class B for all sizes 14 inches in diameter and larger.

3. Pipe joints must be made secure and watertight, employing appropriate equipment to draw the sections of the pipe tightly together. Apply lubricant to rubber gaskets immediately before joining pipe sections.
4. All pipe and fittings must be thoroughly examined for defects and no piece may be installed which is known to be defective. If defects are discovered after pipe or fittings have been installed, the defective pipe or fitting must be replaced with a sound one in a satisfactory manner.
5. For joining pipes of dissimilar materials 15-inches and smaller in diameter, connect pipe of dissimilar material together with manufactured flexible transition couplings specifically made for this purpose, conforming to ASTM C 1173. Transition couplings are to be modeled from synthetic elastomeric materials fitted with attached adjustable stainless steel band type clamps to stabilize and seal the joint. Acceptable products are “Band Seal Couplings” made by Naylor Inc., “Mission Couplings” made by Mission Rubber Co, “Fernco Couplings” made by Fernco Systems, Inc., or approved equal.

2.2 MORTAR AND GROUT

- A. Portland Cement Mortar for sealing pipe connections, structures, manholes and catch basin frames must conform to ASTM C150, and be composed of one (1) part Portland cement and one (1) part sand, and minimal amount of water to make a workable mix.
- B. Grout: Portland cement, Admixtures, and Sand must meet the requirements of Section 03 30 00 – Cast-In-Place Concrete Structures.

PART 3 - EXECUTION

3.2 GENERAL

- A. Separation between water and sewer:
 1. Water service line and sewer separations shall be in compliance with **IL Pollution Control Board**, *Environmental Regulations for the State of Illinois, Title 35 of the Illinois Administrative Code, Subtitle F: Public Water Supplies, Chapter II: Environmental Protection Agency, Part 653: Design, Operation and Maintenance Criteria*, October 23, 1985 and with the Chicago Municipal Code Chapter 18-29-600.
 2. At a minimum, all new water services must be installed a minimum of 10-foot horizontal or a minimum of 18-inch vertical separation above all house drains. In locations where this separation is not possible, the full house drain must be replaced from the house interior to the sewer with watermain quality pipe. In locations where the water main is closer to the house than the sewer and the sewer is located more than

ten feet past the water main, the replacement may connect to the existing house drain ten feet past the water main rather than continuing to connect to the sewer. Final connection to the existing interior house drain to be made with a Fernco standard flexible coupling (Fernco Inc., Davison, MI). Installation of the house drain shall be as indicated herein and as shown in the attached Drawings.

- B. Existing sewer facilities disturbed or damaged by the Contractor's operation must be promptly reported to the Department of Water Management, (Sewers Engineering Section) and repaired by the Contractor. All repairs must be done using a licensed drain layer, in conformance with Department requirements, and are considered incidental to the Work of the operation. No additional payment will be allowed for this work.
- C. Sewer pipe used in the repair or adjustment of sewers and sewer structures must be of the same diameter and pipe material as the existing sewer, with the exception of the conditions listed hereafter, unless otherwise directed by the Commissioner.
- D. It is the contractor's responsibility to verify the size and location of each service connection prior to the proposed work.
- E. Unless otherwise approved or directed by the Commissioner, all work shall be performed with sewer live and in service. Sewer mains shall not be shut down to facilitate house drain replacements unless otherwise approved or directed by the Commissioner.
- F. Do not install any equipment or materials until the Commissioner has approved all submittals. If any equipment or materials are installed prior to approval of the submittals it shall be at the Contractor's risk.

3.3 LAYING SEWERS

- A. Trenches must be kept free from excess water until the sewer has been installed and mortar joints, if used, have set.
- B. Each pipe and fitting must be inspected for soundness and damage immediately before being laid, and any pipe or fitting not conforming to the requirements of this Section, is rejected and must be removed from the Site at the Contractor's expense.
- C. Each pipe must be laid to the line and grade to match the existing condition unless directed otherwise by the Commissioner. Pipe must be laid on even firm bedding along the entire bed of the pipe with bedding material shaped to conform to pipe bells or joint sleeves, and so not to bear on pipe bells or joints. Bedding must conform to the requirements of Section 31 23 10 – Excavation, Trenching and Backfilling.

- D. The socket end of the pipe must be laid upgrade.
- E. Pipe must not be trimmed or clipped in order to fit in the socket.
- F. The face of the spigot must be brought into contact with the shoulder of the socket.
- G. The joints must be sealed in accordance with the manufacturer's specifications.
- H. Whenever pipe laying is discontinued, the unfinished end of the sewer must be protected from displacement, cave in, or other injury and a suitable stopper or dam must be placed in the end socket.

3.4 MORTAR JOINTS FOR DRAIN CONNECTIONS

- A. Mortar joints used for connections to existing sewer pipes or house drains may be used only when connections cannot be made using gasketed joints as specified or the appropriate pipe adaptor as supplied or recommended by the pipe manufacturer, or as directed otherwise by the Commissioner.
- B. When mortar joints are required, they must be constructed using the following procedure:
 - 1. In joining pipe, the spigot must be centered in the socket by means of a non-shear mission coupling or shear mission coupling with mortar collar.
 - 2. After the pipe has been placed, the gasket must be caulked into the annular space and the remainder of the space must be filled with Portland cement mortar that has been beveled off with the outside of the socket.
 - 3. Mortar for pipe joints or fittings must be made of one (1) part Portland Cement and one (1) part sand. The cement and sand must be proportioned by volume and thoroughly mixed in a tight box. After the initial mixing, water must be added gradually and the mixing continued until the mortar is of proper consistency.
 - 4. Only a sufficient amount of mortar may be prepared for use within forty-five (45) minutes of application. Any mortar that has begun to set must not be used.
 - 5. As each joint is completed, the inside of the pipe must be thoroughly cleaned to remove all excess joint material.

3.5 FINAL ADJUSTMENT OF STRUCTURES

- A. To prevent debris from entering the sewers, 22 gauge galvanized steel plate must be placed beneath all perforated lids of all sewer structures prior to the placing of any type of surfacing material. Plates have to be maintained in place until the completion of all paving operation have been completed.
- B. After the base course and binder course have been placed, and prior to placing the surface course, the structures must be adjusted to match the final pavement elevation.
- C. Contractor must remove the binder and base course adjacent to and for a distance not exceeding 12-inches outside the base of the castings.
- D. The castings must be adjusted to final pavement elevation with adjusting rings set in mortar.
- E. Contractor must fill the space around the casting with Class SI concrete to the elevation of the surface of the binder course.

3.6 SEWER MAIN TAPPING

- A. The existing connection to the sewer shall be re-used where possible.
- B. Sewer main tapping and connection oriented as shown on Drawings but using water main quality materials. Clay pipe shall not be an acceptable water main quality material.
- C. Where the sewer main is more than ten feet (10-ft) past the water main and the extent of the water service line replacement, the house drain replacement may stop at ten feet past the water main and then connect to the existing house drain as shown in Drawings.

3.7 LEAK TESTING HOUSE DRAIN PIPING

- A. Test all pipelines for water tightness as specified herein. Furnish all labor, testing plugs or caps, pipe connections, gauges and all other equipment required.
- B. Testing shall be performed after the line has been constructed in the presence of the Commissioner's representative, and no backfilling of the access pits or trenches will be permitted until the leakage testing is satisfactorily completed.
- C. When the house drain has been installed prior to backfilling of the access pits or trenches, the valve shall be closed or testing plugs or caps installed as necessary. After all the air is expelled, a visual leakage test will be conducted on all exposed unions and connections. The final connection shall be made to the interior drainage piping and final visual leakage test under "system pressure" will commence for 10 minutes and be observed by Commissioner.

Repair faulty joints or remove defective pipe and fittings and replace as approved by the Commissioner. Retest until house drain passes.

END OF SECTION 33 05 22

SECTION 33 07 10

PVC ENCASUREMENT FOR WATER PIPE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section covers the requirements for PVC encasement of water mains and water service pipe and their appurtenances installed with less than the required minimum vertical clearance between a sewer as specified in CONSTRUCTION DETAILS D-50, detailed on the Drawings, or as directed by the Commissioner.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM), latest edition:
 1. ASTM D1784 – Standard Specification for Rigid PVC Compounds and CPVC Compounds.
 2. ASTM D1785 – Standard Specification for PVC Plastic Pipe, Schedules 40, 80, and 120.
 3. ASTM D2241 – Standard Specification for PVC Pressure-Rated Pipe (SDR Series).

PART 2 - PRODUCTS

- A. Use PVC pipe conforming to ASTM D1785 and materials designated Class 12454B (PVC 1120) or Class 12454C (PVC 1220).
- B. For copper carrier pipe, schedule 40 PVC pipe shall be used. For ductile iron carrier pipe, schedule 80 PVC pipe shall be used.
- C. All PVC pipe is required to have an SDR rating of 26 or less.
- D. The ends of the PVC casing pipe should be sealed with brick and mortar, rubber end-seal, or other appropriate method to provide a leak tight seal.

PART 3 - EXECUTION

- A. Contractor must provide PVC encasement where water main pipe used for distribution, water service pipe, and branch connections have less than the required minimum vertical clearance between a sewer as specified in CONSTRUCTION DETAILS, D-50 and D-51, detailed on the drawings, or as directed by the Commissioner.

- B. The “Proposed Cover At Sewer” is the depth of cover the proposed water main needs to meet sewer separation requirements. This is a calculated depth and may need to be adjusted due to field conditions. Any adjustments must still provide the specified sewer and water main clearance.
- C. When vertical bends are used, Contractor shall restrain all pipe joints between the outermost bends.
- E. After placement of the carrier pipe through the casing, the ends of the casing must be sealed with brick and mortar, rubber end-seal, or other appropriate method to provide a leak tight seal.
- F. When encasing copper carrier pipe, no pipe joints are allowed inside the casing. The copper pipe may rest directly on the inside of the bottom of the casing.
- G. When encasing ductile iron carrier pipe, only one joint is allowed within the casing and that joint must be restrained. When bends are used outside the ends of the casing, all joints between the bends, including the joint within the casing, must be restrained. Casing spacers are not required; however the pipe must be supported outside each end of the casing to prevent deflection of the restrained joint within the casing. Contractor must install an extra layer of polyethylene encasement around the bell at this joint.
- H. PVC casing pipe shall be installed in accordance with the following table:

| Carrier Pipe | PVC Casing Size |
|---------------------|------------------------|
| 1” Type K Copper | 2” |
| 1 ½” Type K Copper | 2 ½” |
| 2” Type K Copper | 3” |
| 4” Ductile Iron | 12” |
| 6” Ductile Iron | 14” |
| 8” Ductile Iron | 14” |
| 12” Ductile Iron | 20” |
| 16” Ductile Iron | 24” |

END OF SECTION 33 07 10

SECTION 33 12 13

WATER SERVICES 2-INCHES AND SMALLER

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes the requirements for the installation of water services 2-Inch and smaller in diameter as shown on the Drawings and specified here.
- B. Typical Water Service Connection Details are included in the Drawings. The Contractor shall replace existing lead or, galvanized iron/steel service lines, in accordance with the Contract Documents and local and state guidelines and regulations.
- C. Furnish all labor, materials, equipment, tools, and incidentals required to verify existing service line material, replace and test water service line to the limits shown in the Drawings or as directed by the Commissioner. Furnish all necessary labor and equipment to replace and test existing lead or, galvanized iron/steel, and install new rolled copper tubing, saddles on water mains (if required), corporation stops (if required), curb stops, curb box, meter pits (if required), adapters and fittings of the necessary size required, and restore the street, sidewalk, landscaped areas and any other areas disturbed by construction to their original condition. All materials that come into contact with potable water shall be NSF 61 certified.
- D. Contractor shall establish the location and extent of all existing utilities before the commencement of excavation by calling 811 or 312-744-7000 to reach 811 Chicago and obtaining a dig ticket. Contractor shall field verify all piping and plumbing systems to be removed and perform the removal work as required to provide complete and safe transfer of service.
- E. The existing plumbing systems, including piping and equipment, shall remain in operation until the new water service line is in service. All systems shall be maintained without interruption. The demolition and removal work shall be coordinated with the Commissioner, Customer and construction schedule for the new water service line.
- F. The Commissioner shall provide the Contractor with the Right of Entry forms signed by all Property Owners. The Contractor shall contact each Property Owner to schedule and review the water service installation work (including water service line route, location of access pits, installation method, extent of demolition, and extent of restoration) in order to confirm water service line entrance type and location and all underground utilities (including sprinkler lines, underground electric, septic tanks, leach fields, oil tanks, and natural gas lines, etc.), and document the existing conditions of the property as specified

within these Book 1, Book 2, and Book 3. The Contractor shall notify each Property Owner at least 72 hours in advance of the commencement of the work, providing each Property Owner with the date and start time of both external and internal work on their property. The Contractor shall provide a telephone number where Property Owners can call to be updated on the status of the work on their property and general project information. The Contractor shall minimize the time period for each water service installation to minimize the disruption to the Property Owner. The Contractor must coordinate and schedule the work with the Property Owner so that the water service to the home will be interrupted for less than eight (8) hours. The Contractor will not be reimbursed for any downtime associated with the water service line installation work and shall provide temporary water in any instance where the water is shut-off for more than eight (8) hours for the duration of the delay until the service line has been completed.

- G. Water service lines to be replaced in the Commissioner's distribution system have normal operating pressures of approximately 50 to 60 psi and a test pressure of 100 psi. The Contractor is responsible for verifying operating pressure at all locations before and after performing any work. Water mains shall not be shut down to facilitate service line replacements unless otherwise approved by the Commissioner.
- H. The Contractor may encounter different water main pipe materials such as Asbestos Cement, Cast Iron, Ductile Iron, PVC, PCCP, and Steel.
- I. The Contractor is responsible for applying for all applicable permits and paying for all applicable permit fees. Neither the Contractor nor Homeowner will be eligible for permit fee waivers under the Homeowner-Initiated LSLR program. The Contractor shall assume that a new water tap shall be required for each installation. The water tap permit fee includes the Commissioner's labor to install the new water main tap.
- J. The existing lead service line must be fully removed and properly disposed of if it is fully exposed. Where the water service is installed in a new alignment to meet current Plumbing Code, if the existing water service is not exposed, it may be disconnected from the house and water main and left in place with the permission of the Commissioner. The curb stop shall also be removed from water services left in place.
- K. Unless otherwise directed, the new curb stops shall be located 2-feet to 3-feet behind the back of curb. The Contractor shall be responsible for the removal of existing curb stops and/or installation of curb stops in the locations directed by the Commissioner.
- L. Any lead or galvanized iron/steel service piping removed shall be handled and disposed of in accordance with all local, state and federal laws and regulations.

- M. Replacement work within private property shall be coordinated with the Commissioner and Property Owner prior to starting any work.
- N. For water service line replacements from the water main into the building interior, there shall be no intermediate couplings or fittings, except for the necessary fittings for the curb stop. The alignment of the water service may not be changed without prior approval from the Commissioner. Contractor shall note when the requested alignment change is necessary to provide sufficient water/sewer separation.
- O. For service line replacements into the building, the Contractor may either expand the existing pipe penetration into the building or create a new penetration (through the floor or wall as appropriate) for the new water service line, as approved by the Commissioner. The new water service line shall extend into the building at the first shutoff valve or within five (5) feet of the foundation (whichever is shorter), and then the Contract shall connect into the existing interior plumbing. Contractor shall install new water meter per Section 33 12 14. The Contractor shall repair and provide a watertight seal of the pipe penetration through the building in accordance with this Section, the Drawings and as approved by the Commissioner.
- P. The installation of the new water service line for each property has not been individually detailed. The water service line connection details were developed to illustrate to the Contractor the required plumbing elements and the required order of the plumbing elements to be used. The piping and equipment shown on the water service line connection details are not to scale and do not show every offset or fitting, nor every hanger or support, or structural difficulty that may be encountered. To carry out the intent and purpose of the water service line connection, Contractor shall field verify all piping and plumbing systems to ensure all necessary plumbing parts are installed to provide a complete and safe transfer of the domestic water service without extra charge to the Commissioner or Property Owner. The Contractor shall be responsible to coordinate the system installation and routing with the work of all trades.
- Q. Existing water service lines constructed of pipe materials that contain lead or of a pipe material not designed for use in a potable water system shall be considered lead or galvanized iron/steel and replaced as such as directed by the Commissioner and paid for under associated Bid Item. These materials include but are not limited to brass and black iron.
- R. The Contractor shall maintain an on-site supply of anticipated specialty fittings, including but not limited to repair clamps, repair sleeves, repair saddles, corporation stops, curb stops, curb boxes, etc., such that the work proceeds without impacting the execution of the work and causing a delay in connecting the service.

- S. Dewatering shall be in accordance with Section 31 23 19. Dewatering cost shall be included in replacement Bid Items. If during the course of work an existing corporation stop becomes dislodged from the water main for any reason the contractor shall be responsible for dewatering the excavation to perform a new water service connection in the dry, all work and dewatering shall be included in new water connection Bid Item.
- T. All plumbing demolition and installation work shall be performed by a Chicago Licensed Plumber.

1.2 RELATED WORK

- A. Excavation, Trenching, Backfilling are included in Section 31 23 10.
- B. Meter Installation in Section 33 12 14.
- C. House Drain Installation in Section 33 05 22.
- D. PVC Encasement for Water Pipe in Section 33 07 10.
- E. Videotaping and Photographic Documentation in Section 01 32 33.

1.3 REFERENCES

- A. City of Chicago Plumbing Code, latest edition.
- B. Illinois Plumbing Code, Title 77 Illinois Administration Code
- C. Chicago Municipal Code 18-29-600
- D. AWWA C810-17 – Replacement and Flushing of Lead Service Lines
- E. ASTM B62 - Composition of Bronze or Ounce Metal Castings, latest edition.
- F. ASTM B63 - Resistivity of Metallically Conducting Resistance and Contact Materials, latest edition.
- G. ASTM B88 - Seamless Copper Water Tube, latest edition.
- H. ASTM B584 – Copper Alloy Sand Castings for General Applications, latest edition.
- I. ASTM B32- Solder Metals
- J. ASTM B813 – Liquid and Paste Fluxes for Soldering Applications of Copper and Copper Alloy Tube and Fittings
- K. AWWA C800 - Underground Service Line Valves and Fittings, latest edition.

- L. NSF / ANSI Standard 61 – Drinking Water System Components – Health Effects
- M. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.4 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples. Submit shop drawings and schedules of all installation equipment, pipe fittings, pipe hanger and supports, and appurtenances required and detailed procedure for installing the pipe.
- B. Submit, within 10 days after signing the contract a list of materials to be furnished, the name of suppliers and the date of delivery of materials on the job site. The Contractor shall submit means and methods for repairing and sealing pipe penetrations through all types of building foundations during the shop drawing submittals. All proposed means and methods for repairing and sealing pipe penetrations through building foundations shall be reviewed and approved by the Commissioner.
- C. Submit, prior to the start of work a drawing showing the size and location of all proposed pits and excavations required to complete the work. Include in this submittal any Property Owner property (for example, fences, landscaping, dry wall, etc) that will be demolished in the course of the work and the planned extent of restoration.
- D. Submit detailed procedures for installing the new water service line pipe including plans and procedures for supplying temporary water service to home if work is not completed in allotted time.
- E. The Contractor must use a digital camera to record site conditions both before and after the water service installation. The photos must show all of the work performed including the complete meter installation, valves, piping or other work needed to complete the installation. With each pay application, the Contractor must submit a cumulative electronic collection of all photo files created for the Contract to date. The photos must be electronically submitted in EAM. Digital photos must be a minimum of three (3) megapixels and must be “stamped” with the date and time. The photos must be indexed by address, meter number, premise number, date taken and photographer name
- F. The Contractor must provide the Commissioner, prior to the use of any materials in this section, certified test and inspection reports from an approved testing laboratory, or at the point of manufacture, that all materials and/or equipment to be utilized in this work are in accordance with the Contract Documents.

- G. All tests as specified are to be performed at the point of manufacture. The cost of testing is considered incidental to the construction and no additional payment will be allowed.
- H. Each individual unit must be pressure tested and guaranteed for service at pressures minimally equal to pressure ratings specified for design purposes in AWWA C800. Additionally, all materials must comply with NSF 61. The Contractor must provide an affidavit that materials furnished comply with the above standards.

1.5 DELIVERY, STORAGE AND HANDLING

- A. All materials shall be inspected for size, quality, and quantity against approved shop drawings upon delivery.
- B. Delivery schedule of all equipment shall be coordinated with the Contractor. Equipment ready for shipment prior to the agreed-on shipping date shall be stored without cost to the Commissioner by the manufacturer.
- C. All materials shall be suitably packed for shipment and long-term storage. Each package shall be labeled to indicate the project and the contents of each package. Where applicable, equipment numbers shall be marked on the container.
- D. All equipment shipped that is exposed, such as on a flatbed truck, shall be protected during transit. The equipment shall be protected from moisture, road salt, dirt, stones or other materials thrown up from other vehicles. Electrical components shall be protected as above, but with special attention to moisture. The method of shipment protection shall be defined in the submittals.
- E. All materials shall be stored in a covered dry location off of the ground with all pipe ends capped. When required to protect the materials, they shall be stored in a temperature-controlled location.

1.6 QUALITY ASSURANCE

- A. The Work necessary for the installation of new, or modification to existing services, must be performed by a plumber licensed in the State of Illinois or the City. This Work will include, but is not limited to, installing corporation cocks; cutting and flaring the ends of copper tubing; installing copper tubing, fittings, and roundway (curb stop) valves; and connecting new service tubing to existing services, as specified herein.
- B. The Contractor shall also be capable of providing crews as needed to complete the work without undue delay.
- C. All products and materials provided for potable water service application shall be certified "lead-free", by an ANSI certified, independent third-party

organization. The term “lead-free” shall refer to the wetted surface of the pipe, fittings, and fixtures in potable water systems that have a weighted average lead content less than or equal to 0.25 percent per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 and other equivalent state regulations.

- D. All products of a given type included in this Section shall be furnished by or through a single manufacturer. All materials shall be new and unused.
- E. Install piping to meet requirements of local codes.
- F. The piping manufacturer shall furnish an affidavit of compliance certifying that all materials used and work performed complies with the specified requirements. Provide copies of mill test confirming the type of material used in the various components.
- G. All valves and appurtenances shall be the product of well-established firms who are fully experienced, reputable and qualified in the manufacture of the equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with this Section as applicable.
- H. The Commissioner reserves the right to sample and test any materials after delivery and to reject all components represented by a sample that fails to comply with the specified requirements.

1.7 WARRANTY

- A. The Contractor shall warranty the WORK against defects for one (1) year from the date of Substantial Completion of the Project or end of Term Agreement whichever is later. During this period, all serious defects discovered by the Customer or the Commissioner shall be removed and replaced in a satisfactory manner at no cost to the Commissioner.

1.8 COORDINATION

- A. Project details indicates the extent and general arrangement of the systems. If any departures from the details or specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted as soon as practical for review. No such departures shall be made without the prior written concurrence of the Commissioner.
- B. The Contractor shall assume full responsibility for coordination of the individual property plumbing systems, including scheduling and verification that all structures, piping and the mounting of equipment are compatible.

PART 2 - PRODUCTS

2.1 COPPER TUBING

- A. Type "K" (soft) copper tubing, seamless annealed conforming to ASTM B88, with solder, flared or compression type fittings for above grade and flange, flare or compression type fitting for buried pipe. The name and trademark of the manufacturer shall be stamped along the pipe.
- B. Copper tubing shall be a minimum of 1-inch or shall match the existing service connection size in kind. Existing service lines to be replaced that are less than 1-inch shall be replaced with minimum 1- inch copper service pipe.

2.2 ROUNDWAY (CURB STOP)

- A. All roundways must be ball valve type with copper flare connections on both ends and Minneapolis type curb box threads. The roundway must conform to requirements of AWWA C800. Minneapolis thread size for 1-Inch roundway will be 1 ½-Inches; 1 ½-Inch and 2-Inch roundways will be 2-Inches.
- B. Roundways must be composed of bronze or ounce metal alloy conforming to the chemical and physical requirements of ASTM B62 and AWWA C800. Castings must be high grade, smooth, and free from sand, blowholes, shrinkage, or other foundry defects. No roundway can be plugged or filled in any manner. All threads must be cut full and without defects.
- C. Any brass part of the fitting or valve in contact with potable water shall be made of a "No-Lead Brass", defined as UNS Copper Alloy No. C89520 or C89833 in accordance with the chemical and mechanical requirements of ASTM B584 and AWWA C800. This "No-Lead Brass" alloy shall not contain more than one quarter of one percent (0.25% or less) total lead content by weight.
- D. Acceptable manufactures and products for roundway valves are A.Y. McDonald, model # 6104, Ford Meter Box, model # B22-M, or Mueller, model # B-25154.

2.3 SHUT-OFF BOX

- A. Shut-off boxes must conform to details for the "Plastic Shut-off Box - Type B" shown in the Drawings, as manufactured by C.P. Test Services-Valvco, Inc.
- B. The shut-off box is to be manufactured from ABS plastic, and be of a two (2) piece tubular design, employing sliding friction between the upper and lower tube sections to maintain length adjustments. A threaded bushing is to be bonded to the plastic of the bottom end section to enable attachment to a roundway (curb stop) shut-off valve. A cast iron lid and rim is to be bonded to the plastic of the top section of the unit. The lid is to have a removable pentagon head bolt for locking the lid into the rim. The letters "WATER" must be cast on the top of the lid. The total length of the plastic shut-off box must be a minimum of 72-Inch when fully extended.

2.4 BRASS CORPORATION COCKS

- A. Corporation cocks for water service connections must be of a plug type design conforming to ASTM B62 and AWWA C800. Corporation cocks shall be furnished with a 1/8-bend tailpiece coupling, inlet end swivel nut with female flare copper thread and gasket, and outlet end copper flare connection, as manufactured by A.Y. McDonald, model # 4701L, with model # 4750S couplings, or equivalent. Reference CONSTRUCTION DETAIL D-16, in Appendix A.
- B. 1-Inch corporation cocks used for test taps (Valves 8-Inch to 12-Inch) must be ordered without gasket, coupling nut and tailpiece, and be of type manufactured by A. Y. McDonald, model # 3120C, or equivalent. Reference CONSTRUCTION DETAIL D-13, in Appendix A.
- C. 2-Inch corporation cocks used for test taps (Valves 16-Inch and larger) must be ordered without gasket, coupling nut, and tailpiece, and be of type manufactured by A.Y. McDonald, model # 3131, or equivalent. Reference CONSTRUCTION DETAIL D-13, in Appendix A.
- D. Corporation cocks must be manufactured from composition bronze or ounce metal alloy conforming to ASTM B62 and AWWA C800. The valve castings must be high grade, smooth, and free from sand, blowholes, shrinkage, or other foundry defects. Castings must not be plugged or filled in any manner. All threads must be cut full and without defects. All gaskets, screws, or other parts necessary for proper installation and operation of the corporation stop must be supplied.

Any brass part of the fitting or valve in contact with potable water shall be made of a “No-Lead Brass”, defined as UNS Copper Alloy No. C89520 or C89833 in accordance with the chemical and mechanical requirements of ASTM B584 and AWWA C800. This “No-Lead Brass” alloy shall not contain more than one quarter of one percent (0.25% or less) total lead content by weight.

2.5 BRASS AND COPPER PIPE FITTINGS AND COUPLINGS

- A. Fittings and couplings must be manufactured from composition bronze or ounce metal alloy conforming ASTM B62 and AWWA C800. Castings must be high grade, smooth, and free from sand, blowholes, shrinkage, or other foundry defects. No coupling or fitting may be plugged or filled in any manner. All threads must be cut full and without defects.
- B. Any brass part of the fitting or valve in contact with potable water shall be made of a “No-Lead Brass”, defined as UNS Copper Alloy No. C89520 or C89833 in accordance with the chemical and mechanical requirements of ASTM B584 and AWWA C800. This “No-Lead Brass” alloy shall not

contain more than one quarter of one percent (0.25% or less) total lead content by weight.

C. Contractor shall furnish the appropriate number of brass and copper fittings and couplings listed below needed to connect the new water services to the water main.

1. 3/4-Inch FIP X 1-Inch flare.
2. 1-Inch FIP X 1-Inch flare.
3. 1 1/2-Inch FIP X 1 1/2-Inch flare.
4. 2-Inch FIP X 2-Inch flare.
5. 3/4-Inch MIP X 1-Inch flare.
6. 1-Inch MIP X 1-Inch flare.
7. 1 1/2-Inch MIP X 1 1/2-Inch flare.
8. 2-Inch MIP X 2-Inch flare.
9. 3/4-Inch FIP X 1-Inch MIP.
10. Unions, 1-Inch, 1 1/2-Inch, 2-Inch, three parts, flared both ends.
11. Tube nuts, 1-Inch, 1 1/2-Inch, 2-Inch.

D. Contractor shall furnish the appropriate number of brass and copper fittings and couplings listed below needed to connect the new water services to the interior plumbing.

1. Type CF-1, cast bronze, threaded adaptors, 150 lbs., screwed, ASTM B62, ANSI/ASME B16.15.
2. Type CF-2, brass tube solder type, ASTM B62, ASME B16.18.
3. Type CF-3, wrought copper, solder type, ASTM B75, ASME B16.22.
4. Type CF-6, 125 lbs., flared or compression type copper unions, ASME B16.26.
5. Type CF-7, soldered cast brass or wrought copper drainage pattern, ASME B16.29.

E. Contractor shall furnish fittings and couplings by A.Y. McDonald, Ford Meter Box, or Mueller.

2.6 BALL VALVES (INTERIOR PIPING)

- A. All valves and appurtenances shall have the name of the maker, flow directional arrows and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.
- B. The body and cap shall be of brass, ASTM B30, the ball and stem of Type 316 stainless steel, and the seats of the seals of TFE. The valves shall have full floating ball and shall be non-lubricated. Valve seats shall be easily accessible and replaceable. Valves shall be rated to 250 psi. Ball valves shall be quarter turn and complete with an integral bleeder valve on the side.
- C. Lead-free water valves 2-in and smaller shall be full port ball type equal to Watts LFFBV/LFFBVS; Apollo 77FLF-200; Nibco Inc. T/S 585-80-LF or Hammond UP8301A/UP8311A or equal
- D. Ball valves of the necessary size required shall be furnished and installed by Contractor within building interior upstream of meter and meeting all the requirements of the National Standard Plumbing Code.
- E. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.

2.7 SEALING AND PATCHES MATERIALS

- A. Mechanical seals shall consist of rubber links shaped to continuously fill the annular space between the pipe and the wall opening or sleeve. Link pressure plates shall be molded of glass reinforced nylon. Hardware shall be mild steel with a 60,000 psi minimum tensile strength and 2-part Zinc Dichromate coating per ASTM B-633 and Organic Coating, tested in accordance with ASTM B-117 to pass a 1,500-hour salt spray test. Links shall be colored throughout elastomer for positive material identification. Each link shall have permanent identification of the size and manufacturer's name molded into the pressure plate and sealing element. Completed sealing system shall be duty pressure rated for 20 psig differential pressure. Link material shall be EPDM "M" for all services except fire rated assemblies, fire rated seals shall use silicone link material. Mechanical seals shall be PSI-Thunderline/ Link-Seal as manufactured by Pipeline Seal & Insulator, Inc., Houston, TX, or pre-approved equal.
- B. Sealant shall be silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant, ASTM C 920, Type S, Grade NS, Class 25, Use NT such as Bostik 915 Polyurethane Sealant & Adhesive by Bostik, Inc. Wauwatosa, WI, www.bostik.com/us.
- C. Bonding compound shall be Sikadur Hi-Mod epoxy by Sika Corp.; Euco 452 by Euclid Chemical Corp.; Master Builders Company or equal.

- D. Non-shrink grout shall be Masterflow 713 by Master Builders Co.; Euco NS by Euclid Chemical Co.; Five Star Grout by U.S. Grout Corp. or equal.
- E. Class II Non-Shrink Grout:
1. Class II Non-Shrink grout shall be a high precision, fluid, extended working time grout. The minimum 28-day compressive strength shall be 7500 psi, when mixed at a fluid consistency.
 2. Grout shall have a maximum early age height change of 4.0 percent expansion, and shall have no shrinkage (0.0 percent) in accordance with ASTM C827.
 3. Grout shall have no shrinkage (0.0 percent) and a maximum of 0.3 percent expansion in the hardened state when tested in accordance with ASTM C1090.
 4. Class II grout shall have an extended working time of 30 minutes minimum when mixed to a fluid consistency as defined in ASTM C827 at temperature extremes of 45 to 90 degrees F in accordance with ASTM C1107.
 5. Class II Non-Shrink grouts shall meet the requirements of ASTM C1107; Grade B or C when tested using the amount of water needed to achieve fluid consistency per ASTM C939.
 6. The grout when tested shall not bleed or segregate at maximum allowed water.
 7. Provide certification that its non-shrink property is not based on gas production or gypsum expansion.
- F. Wall sleeve shall be steel pipe sleeves, ASTM A53, A 53M, Type E, Grade B, Schedule 40, galvanized, with plain ends and integral waterstop collar. Sleeves shall be 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- G. Materials for finish patching shall be equal to those of adjacent construction. Where existing materials are no longer available, use materials with equivalent properties and that will provide the same appearance. The materials are to be approved by the Commissioner prior to their use. Finished floor coverings, such as carpets, wood, or tile flooring, are the responsibility of the Property Owner.
- H. Stone Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching stone.
1. Products: Provide one of the following:

- a. Cathedral Stone Products, Inc.; Jahn Restoration Mortars.
 - b. Conproco Corporation;
 - c. Edison Coatings, Inc.; Custom System 45.
 - d. Or equal.
2. Use formulation that is vapor- and water permeable (equal to or more than the stone), exhibits low shrinkage, has lower modulus of elasticity than the stone units being repaired, and develops high bond strength to all types of stone.
 3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.
 4. Formulate patching compound in colors, textures, and grain to match stone being patched. Provide colors to enable matching each piece of stone, to the satisfaction of the Commissioner.

2.8 PIPE HANGERS, SUPPORTS AND RESTRAINTS

- A. All pipe and tubing shall be supported as required to prevent significant stresses in the pipe or tubing material, valves, fittings and other pipe appurtenances, and to support and secure the pipe in the intended position and alignment. All supports shall be designed to adequately secure the pipe against excessive dislocation due to thermal expansion and contraction, internal flow forces, and all probable external forces such as equipment, pipe and personnel contact.
- B. The absence of pipe supports in the details shall not relieve the Contractor of the responsibility for providing them.
- C. Pipe supports shall not induce point loadings but shall distribute pipe loads evenly along the pipe circumference.
- D. Supports shall be provided at changes in direction or as specified herein. No piping shall be supported from other piping or from stairs, unless specifically directed or authorized by the Commissioner.
- E. Materials of Construction for copper piping:
 1. Supports for copper pipe shall be copper plated or shall have a 1/16-in plastic coating.
 2. Support spacing for copper piping and tubing 2-in and smaller diameter shall not exceed 5- ft and greater than 2-in diameter shall not exceed 8-ft.

3. Where pipe supports come in contact with copper piping, provide protection from galvanic corrosion by: wrapping pipe with 1/16-in thick neoprene sheet material and galvanized protection shield; isolators similar to Elcen,; or copper-plated or PVC-coated hangers and supports.
- F. Anchoring Devices: select, size, and space support anchoring devices, including anchor bolts, inserts, and other devices used to anchor support, to withstand shear, and pullout loads imposed by loading and spacing on each particular support. Expansion anchors shall be equal to Kwik Bolt as manufactured by Hilti USA, Tulsa, Oklahoma; or Wej-it by Wej-it Expansion Products, Inc., Broomfield, CO. The length of expansion bolts shall be sufficient to place the wedge portion of the bolt a minimum of 1-in behind the steel reinforcement.

2.9 ELECTRICAL GROUNDING

- A. Wire shall be 6 AWG copper wire or conducting metal braid shall be woven from 240 strands of 30 AWG tinned copper wires and be capable of carrying fault current comparable to that of 6 AWG copper wire, 3M Corp., Scotchbrand 25, or equal.
- B. Water pipe ground clamps shall be cast bronze saddle type, and of the correct size for the pipe, as manufactured by Thomas & Betts Co. Cat. No. 2, similar by Burndy; O.Z. Gedney Co., or equal and 1-in size or the correct size for the pipe.

PART 3 - EXECUTION

3.1 PIPING GENERAL NOTES

- A. All dirt, scale, weld splatter, water and other foreign matter shall be removed from the inside and outside of all pipe and sub-assemblies prior to installing.
- B. All pipe joints and connections to equipment shall be made in such a manner as to produce a minimum of strain at the joint.
- C. Install piping in a neat manner with lines straight and parallel or at right angles to walls or column lines and with risers plumb. Run piping so as to avoid passing through ductwork or directly under electric light outlets and/or interference with other lines. All work shall be accomplished using recognized methods and procedures of pipe fabrication and in accordance with the latest revision of applicable ANSI Standards, ASME Codes and Pipe Fabrication Institute Standards.
1. Use full length of pipe except where cut lengths are necessary. Do not spring or deform piping to make up joints.

2. Pipe shall be cut square, not upset, undersize or out of round. Ends shall be carefully reamed and cleaned before being installed.
 - a. Pipe bending shall only be done with mechanical bending equipment only. The minimum radius of a bend for 1-inch copper type K tubing is 4-inches, minimum radius of a bend for 1¼ -inch copper type K tubing is 9-inches. Pipe of different materials or size shall follow trade/authoritative reference for all bends.
3. Do not use bushings except where specifically approved by the Commissioner. Reducers shall be eccentric to provide for drainage from all liquid-bearing lines and facilitate air removal from water lines.
4. Verify the locations and elevations of any existing piping and manholes before proceeding with work on any system. No claim for extra payment will be considered if the above provision has not been complied with.
5. Where lines of lower service rating tie into services or equipment of higher service rating the isolation valve between the two shall conform to the higher rating.
6. Mitering of pipe to form elbow is not permitted.
7. All piping interiors shall be thoroughly cleaned after installation and kept clean by approved temporary closures on all openings until the system is put in service. Closures should be suitable to withstand the hydrostatic test.
8. End caps on pre-cleaned pipe shall not be removed until immediately before assembly. All open ends shall be capped immediately after completion of installation.

3.2 WATER SERVICE GENERAL NOTES (EXTERIOR)

- A. It is the contractor's responsibility to verify the size and location of each service connection prior to the proposed work.
- B. It is the Contractor's responsibility to verify the location of all utilities. In cases where the water service does not meet the separation requirements under the Illinois and/or Chicago Plumbing code from the Property Owner's or neighboring sites' House Drains, the House Drain shall be replaced with water main quality pipe.

- C. Contractor shall remove frames and lids and meters from abandoned meter vaults and fill with CA-16 trench backfill material and restore the surface. Meters must be returned to DWM.
- D. Lead or, galvanized iron/steel service line, replacement, testing, and flushing shall be in strict accordance with AWWA 810. Water service must be turned off at the meter before any excavation, or test pits are commenced.
- E. If the any portion of the service line is lead or, galvanized iron/steel, it shall be replaced as a whole, no partial replacements will be accepted without approval from the Commissioner.
- F. Unless otherwise approved or directed by the Commissioner, all work shall be performed with water mains live and in service. Water mains shall not be shut down to facilitate service line replacements unless otherwise approved or directed by the Commissioner.
- G. All service connections shall be installed as shown in the Drawings and shall have a minimum of five and a half (5.5) feet of cover or as shown on the Drawings. Any new service connection that is not installed in the same location as the existing service and is installed in a new location must not be laid in the same trench as other utilities (i.e., gas, electric, sewer). Relocating the new service line alignment may only be done with prior approval by the Commissioner.
- H. Care shall be exercised when placing and laying copper tubing to be sure that the pipe does not have kinks or sharp bends and to assure against it being in contact with sharp stones or ledge which would cause damage to the pipe. At least 6-inches of sand shall be placed adjacent to and above the pipe in open cut locations.
- I. All valves shall be closed and kept closed until otherwise directed by the Commissioner.
- J. During the installation of all valves and appurtenances, verify that all items are clean, free of defects in material and workmanship and function properly.
- K. Buried valves shall be cleaned and manually operated to verify that all items are clean, free of defects in material and workmanship and function properly before installation. Buried valves and valve boxes shall be set with the stem vertically aligned in the center of the valve box. Valves shall be set on a firm foundation and supported by tamping pipe bedding material under the sides of the valve. The valve box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade.
- L. Water service lines shall be installed with a minimum vertical separation distance of 18-inches at all sewer and stormwater utility crossings. Where possible, water service lines shall be installed above sewer utilities in

accordance with the applicable Chicago and Illinois Plumbing Code. Where the vertical separation is not provide, the water service line shall have a PVC encasement per Section 33 07 10.

- M. Water service line replacements shall be performed in compliance with the separation requirements of Title 77 Illinois Administration Code Section 890.1150. Water service lines shall be installed with a minimum vertical separation distance of 18-inches or a minimum horizontal separation of 10-feet of all house drains running parallel. Where possible, water service lines shall be installed above house drains in accordance with the applicable Chicago and Illinois Plumbing Code.
 - 1. Where compliance with Title 77 Illinois Administration Code Section 890.1150 will result in undue hardship due to excessive structural or mechanical difficulty or impracticability, the house drains shall be replaced with water main quality material in accordance with applicable Chicago Plumbing Code and as specified in Section 33 05 22 to the extents shown in the Drawings WS-2 and WS-3.
 - 2. When in the Contractor's judgment, compliance with Title 77 Illinois Administration Code Section 890.1150 cannot be met, the Contractor must document why the separation requirement cannot be met, and submit documentation to the Commissioner for approval prior to performing the work.
- N. Contractor shall keep a record of the locations of all corporation stops installed. A copy of this record shall be given to the Commissioner at the completion of the work. Rolled copper tubing, curb stop, and necessary adapters and fittings shall be used to make connections between new corporation stops and new and existing service piping.
- O. Curb stops will, in most cases, be installed at the locations shown on the Drawings behind the curb line or pavement limit. Install the curb stops and boxes in a workmanlike manner as described herein and as directed by the Commissioner and place compacted pea gravel around and below the stop to permit ready draining of the pipe through the waste opening.
- P. The valve boxes shall be set center and plumb over the curb stop. If they are within the limits of the roadway or within limits where the plowing of snow will take place in the winter, the tops of the boxes shall be set about 1/2-inches below the top of the finished grade. In locations where these boxes are not likely to be disturbed, the tops shall be set flush with the adjoining ground.
- Q. Ball valve shall be installed within the interior of the building upstream of the water meter. Valves shall be supported per manufacture recommendation and the National Standard Plumbing Code.

3.3 WATER SERVICE GENERAL NOTES (INTERIOR)

- A. Install all piping, valves, hangers and appurtenances as specified herein and in the referenced Sections above.
- B. Do not install any equipment or materials until the Commissioner has approved all submittals. If any equipment or materials are installed prior to approval of the submittals it shall be at the Contractor's risk.
- C. If the Contractor is unable to perform work for any reason, the Contractor shall call the Commissioner regarding replacing the interior piping system and provide temporary water to the water meter before departing the site.
- D. Reductions in size shall be made using reducing fittings.
- E. Install all brackets, extension rods, guides, the various types of operators and appurtenances as shown in the details that are in masonry floors or walls and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, check all plans and figures which have a direct bearing on the proper location of these valves and appurtenances during the construction of the structures.
- F. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning and all nuts and bolts checked for tightness. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the Commissioner.
- G. After installation, the Contractor shall remove debris and excess material from the construction area. If miscellaneous objects had been relocated to obtain access to the meter, after Customer approval, those items shall be placed back in their original location prior to construction.
- H. Valves
 - 1. Install valves in locations grouped and located to be easily operated through access panels, doors, or adjacent to equipment.
 - 2. Install valves in a horizontal to upright position. Valves shall not be installed in down position from the horizontal.
 - 3. In making solvent cement connections, the solvent cement or primer shall not be spilled on valves. Any cement allowed to run from joints shall be cleaned from the pipe and fittings immediately.
- I. Soldering
 - 1. Piping shall be cut with square ends and reamed to prevent burrs, out-of-round or improperly sized ends.

2. After cutting, all surfaces to be soldered shall be thoroughly cleaned to a metal-bright finish, free from dirt, grease or other material before fluxing and soldering. This cleaning shall be performed by using emery cloth, sandpaper or steel wool. Clean the outside end of the tubing for a length of 1/2-in greater than the depth of the fitting. The inside of the fittings shall be cleaned in a similar manner. Apply flux and assemble the joint.
3. The surfaces to be joined shall be heated up slowly and uniformly to the melting point of the solder. The surface being soldered shall be maintained above the melting point of the solder for sufficient time to draw the solder completely into the joint. When the solder congeals to a plastic state the excess metal shall be removed with a cloth brush, leaving a fillet around the end of the fitting. Full penetration of the solder uniformly throughout the entire socket is required. The soldered joints shall be allowed to cool in still air until only warm to the hand after which the work may be quenched.
4. Any type of crack, pinhole, area of incomplete penetration, or similar defect shall not be accepted. Peening for closing up defects shall not be permitted.
5. Heating torches of sufficient size shall be used for heating of large fittings prior to soldering. Multiple tips or ring burners for use on combination torches may be used.
6. Remove all external and internal loose solder and flux after joint cools.

J. Hangers and Supports

1. Existing hangers and supports shall be re-used for the interior service line piping.
2. Install support systems in accordance with MSS SP69 and MSS SP89. Install pipe anchors where required to withstand expansion thrust loads and to direct and control thermal expansion.
3. Repair mounting surfaces to original condition after attachments are made.

3.4 PIPE PENETRATIONS

A. General

1. Furnish all labor, materials, equipment and incidentals required and install pipe penetration assemblies at all floor and wall penetrations. Generally, penetration details are called out and referenced on the detail sheets. Where penetrations are required the most conservative

penetration detail shown on the detail sheets shall be utilized as appropriate for the piping type, the wall or floor construction and the rating of the wall or floor penetrated.

2. Where existing tile, brick, wood or other floor or wall material must be cut through, existing materials should be preserved as much as possible and set aside for the Property Owner to re-install.

B. Preparation of Surface

1. The Contractor shall prepare all surfaces that will be in contact with seal shall be free of dirt, loose rust, oil, wax, grease, curing compounds, laitance, loose concrete or other deleterious and all other preparations in accordance with manufacturer's recommendations.

C. Procedures

1. Seal product shall be placed in such a manner, for the consistency necessary for each application, to assure that the space to be sealed is completely filled.

D. SLEEVE INSTALLATION

1. Install sleeved for piping passing through penetrations in walls.
2. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch (25-mm) annular clear space between piping and concrete slabs and walls.
 - a. Sleeves are only required for penetrations of the type shown on the Drawings.
 - b. Cut sleeves to length for mounting flush with interior and exterior surfaces.
 - c. Use grout and silicone sealant to seal the space outside of the sleeve.
3. Select sleeve to allow for manufacturer required clear space between the piping and the sleeve for installing the sleeve-seal system.

E. Curing

1. Seals shall be cured per manufacturer's recommendations.

3.5 CUTTING, CORING AND PATCHING

A. General

1. Holes and opening may be made in existing construction, or in parts of new construction. Procedures for cutting and patching will be the same for either condition.
2. All cutting, coring, and rough patching shall be performed by the Contractor. Finish patching shall be the responsibility of the Contractor.
3. Provide all cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:
 - a. Make its several parts fit together properly.
 - b. Uncover portions of the work to provide for installation of ill-timed or improperly scheduled work.
 - c. Remove and replace defective work.
 - d. Remove and replace work not conforming to requirements of Contract Documents.
 - e. Provide penetrations of structural surfaces and materials for installation of piping.
 - f. Provide penetrations of non-structural surfaces for installation of piping. The determination of what is a nonstructural surface or material shall be made by the Commissioner.
 - g. Remove, install, or relocate materials.

B. Inspection

1. Inspect existing conditions, including elements subject to damage or to movement during cutting and patching.
2. After uncovering work, inspect conditions affecting installation of products, or performance of work.
3. Report unsatisfactory or questionable conditions to the Commissioner; do not proceed with work until the Commissioner has provided further instructions.

C. Preparation

1. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of work.

2. Protect surrounding materials and equipment prior to starting work.
3. Contain and control cooling liquids and slurry produced by the cutting and coring operations.
4. When the cutting or coring will result in the structure or equipment being exposed to provide adequate weather protection.
5. Provide dewatering for excavation work in accordance with Section 31 23 19.

D. Performance

1. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation.
2. Execute excavating and backfilling by methods which will prevent settlement or damage to other work. When excavating in close proximity to piping or other items subject to damage, use hand excavation.
3. All equipment and workplace safety shall conform to OSHA standards and specifications pertaining to plugs, noise and fume pollution, wiring and maintenance.
4. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
5. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
6. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
7. Remove rubble and excess patching materials from the premises.

E. Coring

1. All coring shall be performed in such a manner as to limit the extent of patching. Locate the rebar before coring to minimize cut throughs.
2. Coring shall be performed with an approved non-impact rotary tool with diamond core drills producing a circular hole.

3. Size of holes shall be suitable for pipe, packing, patching, waterproofing or mechanical seals to be installed.
4. All holes cut through concrete, masonry and rock walls, slabs or arches shall be core drilled unless otherwise approved. All work shall be performed by personal skilled in this type of work.
5. If holes are cored through floor slabs they shall be drilled from below where possible. If holes are drilled from above, provide protection and containment below the area being drilled to catch the plug and contain liquid and slurry.

F. Cutting

1. All cutting shall be performed in such a manner as to limit the extent of patching.
2. Cutting shall be performed with a concrete saw and diamond saw blades of proper size.
3. Provide for control of slurry generated by sawing operation on both sides of wall and from below if cutting a floor.
4. When cutting a reinforced concrete wall or floor, the cutting shall be done so as not to damage the bond between the concrete and reinforcing steel left in structure. Cut shall be made so that steel neither protrudes nor is recessed from face of the cut.
5. Adequate bracing of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for partial cracking and provide additional bracing as required to prevent a partial release of cut area during sawing operations.
6. Provide equipment of adequate size to remove cut panel.
7. Saw cut concrete and masonry prior to breaking out sections.
8. Install work at such time as to require the minimum amount of cutting and patching.

G. Protection

1. Provide devices and methods to protect other portions of project from damage.
2. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work.

3. Maintain excavations free from water.

H. Patching

1. Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown.
2. Finish patching shall match existing surfaces as approved.
3. Patching shall be of the same kind and quality of material as was removed.
4. The completed patching work shall restore the surface to its original appearance or better.
5. Patching of waterproofed surfaces shall render the area of the patching completely waterproofed to include the joint between the existing material and the patch.
6. Slurry or tailings resulting from coring or cutting operations shall be contained and vacuumed or otherwise removed from the area following drilling or cut.
7. Equipment shall be protected against mechanical and water damage during cutting and patching. Provide protective covers or use other means to protect equipment that is at risk of damage from the cutting and patching
8. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.

3.6 WATER MAIN TAPPING

- A. All installations shall require a new water main tap regardless of the condition of the existing tap.
- B. The water Main shall be tapped by the Commissioner's crew.
- C. The Contractor shall inform the Commissioner seven (7) days before the water service is scheduled for final connection to the water main.
- D. The water meter shall be installed per Section 33 12 14 before the Commissioner taps the water main. The Commissioner will refuse to tap the water main if the water meter has not yet been installed.
- E. The Contractor is responsible for performing the excavation for the water main tap as directed by the Commissioner and back-filling the excavation after the tap.

3.7 LEAK TESTING AND FLUSHING WATER SERVICE PIPING

- A. Test all pipelines for water tightness as specified herein. Furnish all labor, testing plugs or caps, pipe connections, gauges and all other equipment required.
- B. Testing shall be performed after the line has been constructed in the presence of the Commissioner's representative, and no backfilling of the access pits or trenches will be permitted until the leakage testing is satisfactorily completed.
- C. When the service line has been installed prior to backfilling of the access pits or trenches and connecting the customer service, the ball valve shall be closed, and the corporation and curb stop opened. After all the air is expelled, a visual leakage test will be conducted on all exposed unions and connections. The customer service shall remain disconnected and a 10-minute full velocity flush performed or in accordance with the latest recommendation in AWWA C810, with Contractor disposing of all flush water to the sanitary sewer. When the flush is complete, the final connection shall be made to the water meter and final visual leakage test under "system pressure" will commence for 10 minutes and be observed by Commissioner. Repair faulty joints or remove defective pipe and fittings and replace as approved by the Commissioner. Retest until water service line passes.
- D. If for any reason a part of a lead or, galvanized iron/steel service line cannot be replaced but has been disturbed in any manner a thirty (30) minute flush of the service line shall be performed. The Contractor shall inform the Commissioner immediately if such a situation arises.
 - 1. Flushing shall be performed by installing a jumper before the water meter or other methods approved by Commissioner.
- E. Test Reports
 - 1. Two copies of all field test reports, signed and dated by Contractor and Commissioner
- F. Customer flushing instruction shall be left with Customer and initialed for verification on the form provided in Section 01 11 00.

END OF SECTION 33 12 13

SECTION 33 12 14

WATER METER INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. All new water service line installations shall receive a new meter regardless of if the home is currently metered. If an existing meter is removed, it shall be salvaged and delivered to the location specified by the Commissioner.
- B. The scope of work for this Section includes: 1) the installation of 5/8 inch and 1 inch water meters and meter interface units (MIUs) for automated meter reading on accounts that are presently unmetered and; 2) the installation of 5/8 inch, 1 inch, 1 1/2 inch and 2 inch meters and meter interface units (MIUs) for automated meter reading on accounts that are presently metered in order to replace the existing metering equipment. All work will be at various locations throughout Chicago. The placement and installation of meters at each individual site must be performed as indicated in the specifications and must comply and conform to all applicable federal, state, municipal laws and regulations.
- C. Water meters, meter interface units (MIUs), encoder screw bits, and meter seals will be supplied by the Commissioner of Water Management. All other materials (including but not limited to plumbing hardware required for meter installations, and meter pit enclosures and covers) must be provided by the Contractor.
- D. The Contractor must furnish all supplies, materials, tools and equipment necessary for the successful and timely completion of all meter and MIU installations under this Contract as specified herein, except for the following items: water meters, meter interface units, seals and seal crimping tools, which will be furnished by the Commissioner.
- E. All plumbing demolition and installation work shall be performed by a Chicago Licensed Plumber.

1.2 REFERENCES

- A. City of Chicago Plumbing Code, latest edition.
- B. ASTM International (ASTM)
 - 1. ASTM B30 - Standard Specification for Copper-Based Alloys in Ingot Form.

- 2. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
- 3. ASTM G8 - Standard Test Methods for Cathodic Disbonding of Pipeline Coatings.
- C. America Society of Mechanical Engineers
 - 1. ASME B2.1 - Specifications, Dimensions, Gauging for Taper and Straight Pipe Threads (except dry seals).
- D. American National Standards Institute (ANSI)
- E. American Water Works Association (AWWA)
 - 1. AWWA C800 - Underground Service Line Valves and Fittings.
 - 2. AWWA C810-17 – Replacement and Flushing of Lead Service Lines
- F. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS):
 - 1. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture.
 - 2. MSS SP-69 - Pipe Hangers and Supports - Selection and Application

1.3 WORK SPECIFIED ELSEWHERE

- A. Section 03 12 13 – Small Water Services.
- B. Section 01 32 33 - Construction Videography and Photography
- C. Section 31 23 10 - Excavation Trench Backfill
- D. Section 32 90 00 - Landscape Restoration

1.4 QUALITY ASSURANCE

- A. Each installation will be accepted by the Commissioner conditioned upon (1) electronic submission of a list of completed installations containing for that installation the premise identification number, address, meter serial number, meter reading, MIU serial number, location of meter and MIU, installer's name, Contractor's inspector's name, and all other information relevant to the installation; (2) at its option, satisfactory inspection by the Commissioner; (3) contractor will verify the reading.

- B. All products and materials provided for potable water service application shall be certified “lead-free”, by an ANSI certified, independent third-party organization. The term “lead-free” shall refer to the wetted surface of the pipe, fittings, and fixtures in potable water systems that have a weighted average lead content less than or equal to 0.25 percent per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 and other equivalent state regulations.
- C. The Commissioner will inspect the materials furnished and work done under this Section. The Commissioner will reject all work and materials, and the method of application or any part of it that does not comply with the requirements of this Contract and the Commissioner's Rules and Regulations. The inspection, approval, or acceptance, of any part of the work or materials, shall not preclude the rejection of said materials, or work at any time thereafter during the existence of this Contract, should said work or materials be found defective, or inconsistent with the requirements of this contract. All meter installations must conform to these specifications. There will be no exceptions without written permission of the Commissioner. Any meters set improperly by the Contractor must be reset correctly at the expense of the Contractor in accordance with this specification. Any damage to couplings, unions, or meter threads, due to the use of improper tools or by cross-threading, must be corrected at the expense of the Contractor.
- D. Contractor must train all employees in the subject areas required by the Commissioner, including technical aspects of meter, MIU, and meter pit installations; record-keeping related to the field work; and customer service. The Commissioner will provide training materials in these areas, which the Contractor must copy as needed. The Commissioner will provide training one time to key Contractor employees, who must train the balance of the Contractor’s staff. The Contractor must also provide all other training needed to ensure that all field staff performing meter installation work are trained in these technical specifications, manufacturers’ procedures, OSHA regulations and any other technical tasks required to perform the work. Meters must be installed by qualified personnel who have met minimum certification requirements. The content and scheduling of such training and certification program must be subject to the prior approval of the Commissioner’s Project Manager. During this program the field staff must be trained in the technical and procedural aspects of the work for a minimum of eight (8) hours. In addition to this, the field and office staff must be instructed for a minimum of four (4) hours on the professional and courteous manner in which they must conduct themselves when dealing with the Commissioner customers and basic facts concerning the metering program and the customer service, notification, and record-keeping requirements of this Contract. The training program must be in the Contractor's shop or training facility, not in customers' homes. Upon satisfactory completion of the certification

program, field staff must complete five days of work under direct supervision of qualified supervisors. After an employee completes 100 installation projects, the Contractor must evaluate the employee's ability and forward the results to the Commissioner's Project Manager. The training program must include written and practical tests. The Commissioner's Project Manager, or his designee, may attend any training class for the purpose of program evaluation

1.5 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. Each individual unit must be pressure tested and guaranteed for service at pressures minimally equal to pressure ratings specified for design purposes in AWWA C800. Additionally, all materials must comply with NSF 61. The Contractor must provide an affidavit that materials furnished comply with the above standards.
- C. The Contractor must use a digital camera to record site conditions both before and after the meter installation. The photos must show all of the work performed including the complete meter installation, valves, piping or other work needed to complete the installation. With each pay application, the Contractor must submit a cumulative electronic collection of all photo files created for the Contract to date. The photos must be electronically submitted in EAM. Digital photos must be a minimum of three (3) megapixels and must be "stamped" with the date and time. The photos must be indexed by address, meter number, premise number, date taken and photographer name

1.6 WARRANTIES

- A. The Contractor is responsible for ensuring meters operate properly before leaving the work site. All Work done under this Section will have a maintenance and guarantee period of one year from the date of Project Completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Water meters, meter interface units (MIUs), encoder screw bits, and meter seals will be supplied by the Commissioner of Water Management.
- B. All other pipe materials shall be as specified in Section 03 12 13 Small Water Services.

- C. Detailed description of the approved materials for outdoor meter enclosures in Exhibit A at the end of this Section.

PART 3 - EXECUTION

3.1 GENERAL

- A. Before any installation work begins, the Contractor must discuss with the property owner where the meter will be installed, any hole that will need to be cut into walls, whether doors will be installed, where the wire will be installed, and where the MIU will be installed. If an access door is required, explain whether the door will be installed at the same time as the meter installation, or whether a second visit will be required. Show the Customer a meter and an MIU. If a pit is required, (and that decision has been approved by the Commissioner) the Contractor will discuss the pit location with the property owner.
- B. The the Contractor shall go to 1424 W Pershing, Chicago, IL, or as directed by the Commissioner, to pick up supplies provided by the Department of Water Management (Water meters, meter interface units (MIUs), encoder screw bits, and meter seals will be supplied by the Commissioner of Water Management).

3.2 CONTRACTOR INSPECTION AND EVALUATION OF INSTALLATION SITE

- A. Prior to beginning work at a location, the Contractor must inspect and photograph the existing conditions and determine which type of meter installation and technology is appropriate -- indoor versus outdoor and meter type.
- B. The Contractor must perform the following outdoor inspection items as required for the type of meter installation work to be performed:
 - 1. Determine if there is an existing meter pit, and whether it contains a standard meter setting. Determine whether the piping and pit are in good repair, suitable for installing a meter. If the pit or pipes need repairs, Commissioner supervisors may elect to have the repair work completed by the Contractor, or assign the job to a Commissioner crew (and have the meter installed at the time of the pit repair). If the pit and pipes are in good condition, complete the property inspections, have discussions with Property Owner and install the meter in the pit.
 - 2. Examine probable sites for the MIU, on the front of the building or on the sides near the front. Determine which sites are less likely to be subject to damage or blocking (garbage can storage, cars parked, traffic). Notice the basement windows and the level of the

ground relative to the windows to help determine the location of the exit hole for the wire.

- C. While performing inspection inside of the building, the property owner or his representative must accompany the Contractor. The Contractor must perform the following inspection items as required for the type of meter installation work to be performed:
1. The Contractor must complete the Service Order Inspection Form with site specific meter and service information, as applicable, for each meter installation. The information provided in the paragraphs that follow are intended to provide general guidance to the Contractor with respect to completing the form:
 - a. Size of Service Pipe: The inside diameter of the pipe entering the building. The meter size is determined by the size of the service pipe entering the building, not the size of pipe installed within the building. Service pipe with an inside diameter up to and including 1 inch will be metered with a 5/8 inch meter. Service pipe over 1 inch and up to 1 1/2 will be metered with a 1 inch meter.
 - b. Service Pipe Material: Lead, copper, or iron.
 - c. Condition of Control Valve: Working, partially working, not working.
 - d. Size of Indoor Pipe: This is the inside diameter of the pipe on which the meter is installed.
 - e. Indoor Pipe Material: Lead, copper, or iron.
 - f. Condition of Indoor Pipe: (at and near the proposed meter installation) Good (safe enough to work on), or Bad (not safe to work on).
 - g. Electrical Ground Connections
 - (1) Case 1: “Ground repairs needed, meter installation possible”: If the home’s grounding wire is missing or in poor condition (loose, arcing, frayed), leave a notice (See Exhibit 8 for sample) with the owner notifying them of the problem. Make no repairs to the electrical system. Return a copy of the notice to the Commissioner. The meter installation is still possible.

(2) Case 2: “Ground repairs needed, meter installation not possible.”: The grounding wire connection interferes with the proposed meter installation and must be moved. Do not move the connection. Leave a notice with the owner notifying them of the problem. Return a copy of the notice to the Commissioner. The meter installation is not possible and must be rescheduled after the electrical repair.

(3) Case 3: “Ground appears OK.”: No defect is noticed in the ground connection and it does not interfere with the meter installation.

- h. Meter Installation Couplings: Are there existing couplings or a meter spread which can be replaced with a meter and its fittings? (See Exhibit 3 for examples of appropriate coupling configurations.)
- i. Existing Meter Size and Make: If the service is presently metered, record the size, make and reading of the existing meter.
- j. Floor Drains: Ask the owner if they work or test with bucket of water to ensure the floor drains are operable.

D. Based on the information gathered above, the Contractor must determine the best method for installing a water meter, selecting from the approved methods listed in this Section.

3.3 SELECTING AN OUTDOOR INSTALLATION

A. Outdoor installations of meter pits are not allowed simply because a customer prefers to not have the construction, the meter, or the wire to the MIU in his home. The Contractor must provide digital photos to the Commissioner that document why any outdoor pit is required and show the possible location(s) for the pit. No meter pit may be installed without pre-approval from the Commissioner and may require Commissioner inspection of the location before proceeding with the work. The Commissioner will also coordinate any required B-box repairs or replacement with the pit installation. The meter may be set outdoors in the following circumstances:

1. If an outdoor meter pit exists and the pit and the piping in the pit are in good condition, it must be used for the meter installation.
2. If the service entering the building has wiped joints below the basement floor to divide it into branches before it comes up

through the floor in two or more places, the water for the building cannot be metered by a single meter unless it is installed outdoors in a pit. If the service first comes up at one point and has a valve, adequate room and/or fittings for a meter before it goes back underground to be split, a meter must be installed indoors. Test to make sure that turning off the valve at that point turns off the water throughout the building before attempting an installation.

3. If there is no basement or accessible crawl space and the water service enters directly into living space (i.e., not a utility room) and the space behind the wall is too small to contain a meter installation, the meter must be installed outdoors in a pit.
4. If the meter installation is more than fifty feet (50') from the property line at the point where the water service enters the property, a pit is required.

3.4 INSTRUCTION COMMON TO ALL METER INSTALLATIONS

A. Workmanship

1. Installation of water meters and appurtenances must be performed by workers thoroughly experienced in such work. Piping and cable work must be properly aligned and permanently supported and must present a neat and workman-like appearance. Piping and cable must be run in straight lines parallel to building walls and floors. Where offsets are required, 45 degree fittings must be used to minimize friction losses. All plumbing work must be performed by plumbers licensed in the State of Illinois or City of Chicago and comply with the City of Chicago Plumbing Code.

B. Furnishing and Installing Valves

1. The Contractor must install a new meter outlet control valve for all meter installations where space permits the proper installation of this valve. The excessive use of elbows or bends to install either inlet or outlet control valves will not be allowed. The Commissioner will reject such installations and the Contractor will not be reimbursed for the work.
2. Full port ball valves must be used for all 5/8 inch, 3/4 inch, 1 inch, 1 1/2 inch and 2 inch domestic service lines.

C. Incidental Plumbing

1. The Contractor must be responsible for any and all piping modifications and fittings necessary to install meters in accordance with these specifications, at no additional cost to the City. All pipe

work required upstream or downstream of the meter setting may be replaced in kind or with other materials approved by the Commissioner.

D. Incidental Appurtenances.

1. All required appurtenances necessary to perform the installation are incidental to this installation. Such appurtenances include, but are not limited to, piping, bends, setters, meter fittings, tees, check valves, test-tee assemblies, flanges, hangers, reducers, access doors and framing, expendable items, and items further described in the following sections.

E. Strainers

1. If any existing water meter to be replaced is found to have an external strainer before the meter, then the strainer must be removed and replaced with the necessary pipe and fittings to complete the installation as part of the Work included in the unit prices.

F. Electrical Grounding During Installation

1. The Contractor must take all reasonable care to ensure the safety of installers, residents, and homes with respect to grounding of electrical facilities to the water service line. No condition will be created that causes a hazard to any person or property during the installation or afterward. An electrical bypass (e.g., automobile jumper cables) will be in place, electrically connecting the pipe before and after installation site, while work is in progress.

G. Electrical Grounding After Installation

1. The Contractor must ensure that electrical continuity is provided with or without the meter in place, by means of a bonding jumper or other approved method for all completed installations. Such a jumper will connect the piping before and after the meter couplings.

H. Installation Supports

1. All completed installations must be properly supported and secured to ensure adjacent pipe is not stressed or damaged. Permanent supports embedded in the wall, floor or ceiling may be used. Wall-mounted brackets, toggle bolts inserted into the wall or ceiling-mounted hangers or plumbing strapping are all acceptable. The use of concrete or wooden blocks or boxes as meter set or piping supports is prohibited. Any piping supports or clamps must be

compatible with the type of piping supported and not cause any galvanic corrosion. Supports must comply with the additional pipe support details in Section 03 12 13.

I. Quality Assurance

1. Check that the installation is watertight and that all service or distribution piping and household fixtures are operating as found before the meter installation.

J. Uniform Piping

1. The piping used throughout the installed meter set must be of uniform size.

K. Sealing Meters

1. Wire and seal the meter, register head terminal cover, and couplings upon completion of testing. The seal number must be recorded on the installation report. Wire and seal must be installed in a fashion that will allow the Commissioner to determine if tampering has occurred with the meter, register, or connections.

L. Restoration of Service and Customer Notification

1. When restoring service, Contractor must turn water on slowly and observe the meter to detect if water is moving through the system. If, after reasonable time is allowed to flush, charge and leak check the system, and no leaks are detected the Contractor must notify the water customer that the meter installation work has been successfully completed. If a leak or problem is detected with the Work, the Contractor must slowly shut down the system and notify the customer of the condition. The condition must be repaired by the Contractor and the water system and meter set functioning properly before the Contractor leaves the site. All service or distribution piping and household fixtures must be operating as they were before the meter installation was performed. This procedure does not relieve the Contractor of its obligations of emergency repair work or of any other warranties in these specifications.

M. Checking and Reporting Customer Leaks

1. With the building's fixtures not in use or shut off, the Contractor must observe the water meter for any movement of the register dial. Movement will indicate a leak in the building plumbing or fixtures that the Homeowner will need to repair. The Contractor must:

- a. Notify the Customer verbally that a leak exists that needs repair
- b. Provide the Customer with a Commissioner brochure on how to locate and repair common plumbing leaks.
- c. Note the leak on the Service Order Inspection form

N. Testing of the Completed Installation

1. All meters must be checked to confirm that flow is in the proper direction. Make sure the meter IS NOT SET BACKWARDS. The operation of the meter register and MIU must be checked for the reading and identification number. Check for a good reading from across the street. Minimum acceptable reading level is 500 RSSI. Defective installations must be corrected immediately and defective equipment must be replaced. The Contractor must have a device capable of reading the meter through the MIU and capable of testing the register head/MIU assembly
- O. Provide digital photographs of the completed meter installation as part of the Completed Work Order submittal.
- P. If the service is presently unmetered, the Contractor must collect and provide to the Commissioner all of the information required for control of the meter. (See Exhibit 6). The meter control information form must be completed and uploaded to EAM in a real-time manner when the work is completed.
- Q. Upon completion of all work and testing, the Contractor must thoroughly clean the work site so that it is at least as clean as it was when the Contractor arrived. All debris and garbage must be removed from the site and properly disposed by the Contractor offsite. Unfinished basements with dirt floors must be swept with debris being collected and removed. Concrete or other solid floors must be swept and vacuumed. Painted concrete floors or finished floors must also be mopped and scrubbed clean.

3.5 INDOOR INSTALLATIONS

A. Indoor Installation (Service is presently unmetered)

1. After inspecting the site, determine the type of meter installation to be performed (See Exhibit 3):
 - a. Vertical pipe using a meter setter
 - (1) Clean pipe at cut location using steel wool or medium emery cloth.

- (2) Properly support existing piping to prevent damage and cut proper length of pipe to be removed (cuts will be square). Use a portable band saw or a 4-wheel pipe cutter. Remove burrs and ream ends if necessary.
 - (3) Install new meter inlet and outlet control valves as required by these specifications Attach inlet and outlet ball valves to meter setter body and insert assembly into space between pipes.
 - (4) Follow manufacturers' instructions for connecting approved fittings, ensuring a stable and electrically conductive connection.
 - (5) Properly support meter assembly.
 - (6) Flush out pipes to wash out pipe scale and chips.
 - (7) Insert meter in setter and tighten nuts.
- b. Horizontal pipe, no existing meter fittings, not using a meter setter
- (1) Clean pipe at cut location using steel wool or medium emery cloth.
 - (2) Properly support existing piping to prevent damage and cut proper length of pipe to be removed (cuts will be square). Use a portable band saw or a 4-wheel pipe cutter. Remove burrs and ream ends if necessary.
 - (3) Install new meter inlet and outlet control valves as required by these specifications Attach inlet and outlet ball valves to meter setter body and insert assembly into space between pipes.
 - (4) Follow manufacturers' instructions for connecting approved fittings, ensuring a stable and electrically conductive connection.
 - (5) Properly support meter assembly.
 - (6) Flush out pipes to wash out pipe scale and chips.
 - (7) Insert meter in setter and tighten nuts.

c. Horizontal pipe, existing meter fittings, not using a meter setter

- (1) Remove the existing fittings and replace with meter couplings, nipples and other pipe fittings as required to install the meter. If the opening can accommodate it, install an outlet control valve.

B. Indoor Installation (Service is Presently Metered)

1. Confirm that this is the correct location and meter prior to commencing installation. Check the serial number of the existing meter and record the present meter reading.
2. Control the flow of water.
3. Expose the connection to the service line and any piping between the service line connection and the meter to ensure that they are in a condition that won't be damaged by changing the meter.
4. Replace the meter using new gaskets or washers.
5. Install the MIU at a location acceptable to the Commissioner and in accordance with the requirements set forth in this document and in the manufacturer's installation and operations manuals. To the extent possible, install the MIU to maximize the transmission range. Free hanging wires must be avoided as much as feasible.
6. Place plastic caps on the inlet and outlet of the old meter and handle meter with care in the event of post-removal testing is necessary.
7. Furnish all meter adapters, bushings, incidental piping or other hardware necessary to install the new water meter in the existing meter setup. Install Commissioner-approved standard connections (meter couplings) for all meters if none exist presently.
8. Install the Meter Interface Unit (MIU) per the manufacturer's instructions and in a manner approved by the Commissioner.

C. Access through Walls and Ceiling

1. If a wall or ceiling must be cut, the Contractor must obtain written permission from the Homeowner. The following outline must be followed when such permission has been obtained from the Homeowner.

2. Access holes must be cut and repaired only by workers approved by the Commissioner who are properly trained. All work must to be completed in a professional manner.
3. When cutting the wall, the Contractor must take all reasonable steps to avoid damage to communication, electrical, gas, sewer, and water systems.
4. Finished openings must be cut no larger than necessary to facilitate the installation and maintenance of the water meter and control valve. All reasonable efforts must be made to keep the opening to less than twenty-four inches wide and twenty inches in height.
5. Homeowners may cut their own opening in a wall to provide access for the meter installation and, after installation, provide and install their own access panel or door.
6. After installation of the meter, the wall must be repaired with an approved cabinet-quality access door. Doors must be surface mounted and have a handle and spring-loaded hinges or other suitable mechanism that must keep the door in a closed but unlocked position. The access door must be of a size that must allow repairs or replacement of the meter without any disturbance to the finished wall, and preferably no greater than twenty-four inches wide and twenty inches in height.
7. The Contractor must make every reasonable effort to ensure that all water meter accessories, including the access door are installed at the time of the meter installation. If the door is not installed, the Contractor must leave the owner with a form notice concerning the installation of an access door. (See Exhibit 5).
8. If the meter is not located behind a wall but protrudes from a wall penetration, no door need be installed, and the Contractor must frame the opening created to access the service piping and install the meter, except that sufficient opening must remain to permit access to any shutoff valve inside the wall.

D. Soldering, Brazing or Welding

1. If soldering, brazing or welding is to be conducted indoors the Contractor must have fire extinguishers, aprons and fire block materials present at all work sites. Electrical soldering must be used whenever soldering is to be performed near flammable materials. Open flame soldering is not permitted inside walls or immediately adjacent to flammable materials. All reasonable precautions must be made when using open flame soldering.

E. Meter Interface Unit (MIU) Installation

1. An MIU must be installed for all meters. The Commissioner will provide the MIU. A test of the MIU must be performed, before the Contractor leaves the site, using a Commissioner approved visual display device to ensure it is operating properly. The Contractor must obtain or have the use of a device or devices which can read the MIU. Improper or deficient MIU installations must be corrected before any payment will be made for the meter installation. If payment has been made on an MIU installation subsequently found to be improper or deficient, the amount of the payment will be deducted from compensation due or which may become due the Contractor under this Contract.
2. The location of the MIU is a material part of this contract and any MIU placed in an inappropriate or unreasonable location must be relocated. The guidelines are to be followed unless an individual exception is approved by the Commissioner.
3. If there is any question about the location, the installer must report to his supervisor, who then must consult with the Commissioner for final placement.
4. The installer must select the MIU location while complying with the following constraints. The customer's location preference will be complied with as long as these constraints are not compromised:
 - a. The MIU must be installed on the exterior of the building.
 - b. The MIU must be located on the front of the building if possible, or on the side and near the front.
 - c. The location must ensure that the MIU can be read by a mobile reader on the curb, on the opposite side of the street in front of the building, as well as communicating with the fixed network of data collection units. Minimum acceptable reading level is 500 RSSI.
 - d. The MIU must be located to prevent the need to add additional wire to the permanently pre- installed lengths on the meter register and the MIU.
 - e. The MIU must be placed to minimize the amount of wiring exposed on the outside of the building. Whenever possible, no wiring must be exposed, and the hole for the wire must be contained by the MIU mounting plate.

- f. The bottom of the MIU must be at least 24 inches above grade, and may be as high as 36 inches above grade. Installations higher than 36 inches require approval of a Commissioner supervisor.
 - g. No MIU's are to be attached to window frames or within 12 inches of a window.
 - h. The MIU location must be selected to minimize the hazards of vandalism from pedestrian traffic or accidental damage from other customer activities (such as children playing or materials storage).
 - i. The MIU must be located to minimize radio interference from metal objects, such as parked cars, stored garbage cans, and downspouts and gutters.
 - j. For buildings that have multiple types of facing material, the MIU must be located within only one of those materials.
5. The MIU and all wire must be secured with City-approved fasteners appropriate for the surface to which the MIU and its wiring are attached. Fasteners must be installed securely, but not penetrate the protective wire jacket or crack the MIU mounting devices. Wire must be secured at sufficient intervals to avoid sagging or snagging, generally every 12 inches to 18 inches for inside wire runs. Exterior wire must be secured at least every 12 inches and at or near the location where the wire exits the building, internally and externally and before it goes into the MIU cover. Exterior wire must be secured at the point it exits the building with a small “drip loop” to ensure that water does not run down the wire and into the drilled hole. The drip loop must be securely attached to the building to prevent snagging. Caulk the joint between the MIU and the building. Wire runs must be straight with any turns to be done at 90-degree angles and secured before and after each turn. The amount of wire to be exposed on the exterior of the building must be limited to the smallest amount necessary to place the MIU in a suitable location. All new holes drilled for running wire to the exterior must be drilled at an upward angle from the outside to the inside. The wire exit hole must be caulked if it is not contained within the MIU case.
6. The MIU and meter register are each supplied with potted connections to wire. These lengths of wire are all that is required to complete the installation in most cases. The pre-installed wires must not be cut. Excess wire must be treated as follow:

- a. For inside meters approximately 1 foot of wire must be stored in a coil as slack within the MIU case. The balance of excess wire must be stored at the meter. Sufficient wire must be left at the meter location to allow for the meter or meter register to be removed from the setting and placed flat on the floor below the meter setting, and the balance must be coiled in a small, neat loop. The loop of extra wire must be secured with a plastic wire tie. The loop of tie-wrapped wire must be attached to the inlet side of the pipe before the meter coupling nut. The loop of extra wire must not touch the ground or floor.
 - b. For vault meters sufficient wire must be left at the meter location to allow for the meter lid/MIU to be lifted from the meter (approximately 3 feet) or allow for the meter or meter register to be removed from the setting and placed flat on the ground, outside of the meter pit or vault. Same instructions for the making and attaching the loop of extra wire as above.
 - c. Should there not be sufficient wire remaining in the installation to allow for both a loop of wire at the meter and the exit to the structure, construct the wire loop at the exit first and use any remaining wire to construct the wire loop at the meter.
7. Wires must be connected together with gel-filled connectors provided by the MIU manufacturer or other Commissioner-approved device. The wire must be secured on each side of the splice
 8. Should there be insufficient wire provided to place the MIU in the preferred location, add wire. Cut the wire connected to the meter register to five feet (5') in length so that the splice will be near the meter, and then add wire as needed to form all required slack loops.

3.6 OUTDOOR METER PIT INSTALLATION

- A. No meter pit may be installed without pre-approval from the Commissioner and may require Commissioner inspection of the location before proceeding with the work. The Contractor must provide digital photos to the Commissioner that document why any outdoor pit is required and show the possible location(s) for the pit.
- B. Location of Meter Pits (Service is presently unmetered).

1. Meter pits must be located immediately adjacent to, and on the house side of the b-box and curb stop (roundway) valve. They must generally be located in the area from the curb to the sidewalk in the public right-of-way. They must not be placed outside of the general location or in the private property without site-specific approval from the Commissioner. The Contractor must discuss the pit location with the Customer, explaining any limitations (location of service line, tree roots, other utilities, the need for access by Commissioner), and the City's responsibility to restore the installation site on public property to the original condition established by the City (as opposed to any improvements or alterations made by the property owner). The Contractor must provide the Customer with a form describing the location of the pit and obtain the Customer's signature and printed name on the form. The form will be two-part with one part left with the Customer, one copy for the Contractor and a scanned image uploaded to EAM and sent to the Commissioner. (See Exhibit 5).
- C. All pit liners, collars, lids, and meter setters used in enclosures for 5/8 inch and 1-inch meters must be from the approved equipment list maintained by the Commissioner. (See Exhibit 3).
- D. The Contractor must use the b-box valve to shut off the water supply. No work will be performed until the b-box and curb stop (roundway) valve are in operating condition.
- E. Excavation for Pit (Service is presently unmetered).
 1. The Contractor will notify DIGGER to request other underground utilities to mark the location of their facilities adjacent to the work site in order to avoid possible damage to same. It is the Contractor's responsibility to protect those existing utilities that are to remain in operation during and after completion of the work. The Contractor will be held fully responsible for any damage resulting from the performance of the work. All work in the public right-of-way must comply with Chicago Commissioner of Transportation (CDOT) regulations.
 2. The Contractor must use the best pipe location technology commonly in use by utilities and water service contractors, as approved by the Commissioner.
 3. Hand excavate, as required.
 4. Ensure that no other utility lines or services pass through the water meter enclosure. Upon Commissioner site-specific approval, the pit for 5/8 inch or 1-inch meters may be offset from the water

service line up to 4 feet if, and only if, an offset is required to avoid interference with other utilities lines, tree roots or boulders. An offset is not permitted to avoid removal of an additional sidewalk flag.

5. Materials of any nature must not be stockpiled under the drip line of trees and shrubs in order to eliminate surface and subsurface root damage and soil compaction.
6. The Contractor must ensure that all existing landscape features on private property including trees, shrubs, perennials, lawns, paving, walls, stairs, fences, etc., are protected prior to the start of and during the work
7. Commissioner has determined whether the Commissioner of Forestry needs to be consulted, and until the Commissioner gives approval as part of its initial inspection, scheduling and DIGGER notification process.
8. After drawing straight marker lines, the Contractor must use a saw (using water to control dust) to cut sidewalks and pavements, etc. The breaking of pavement and sidewalks by impact, such as with the use of a ball, is not permitted. Only full flags of sidewalk will be removed.
9. All excavations must comply with OSHA excavation regulations including the use of OSHA- compliant trenching supports when required.

F. Meter Installation in Pit (Service is presently unmetered).

1. Meters installed in pits must be installed with Commissioner-approved pre-manufactured meter setters.
2. Determine if the pipe is accessible and is in acceptable condition. If the pipe is not accessible or is in poor condition, call for support from the Commissioner to determine whether an installation can be performed.
3. Stop the flow of water sufficiently to do the installation. Use the b-box valve.
4. Clean pipe at cut location using steel wool or medium emery cloth and cut out the proper length of pipe. (Cuts will be square.) Remove burrs and ream ends if necessary. Cover house side of pipe so debris does not enter.

5. Use approved fittings to install copper tubing risers of sufficient length to place the center line of the inlet and outlet ports of the meter 16 3/4 inches from the pit lid.
6. The copper tubing risers running from the meter setter to the service line must be bent smoothly using a bending tool or machine, not by hand. Elbows must not be used.
7. All enclosures must be set upon a bed of approved backfill material to prevent sinking and prevent damage to the water service line.
8. For locations with a grade of greater than five percent (5%) the Contractor must use a graded pit cover collar, aligned to leave the pit lid flush with the surrounding surface.
9. Install the Meter Interface Unit in the meter enclosure as per the MIU manufacturer's instructions and in a manner approved by the Commissioner.
10. Install the meter enclosure cover and lid.
11. Install an approved insulating "poncho" to protect the meter and pipes from freezing.

G. Meter Installation in Pit (Service is presently metered).

1. If the meter being installed in the pit is replacing an existing meter, then the Contractor must complete the work items below:
2. Confirm that this is the correct location and meter prior to commencing installation. Check the serial number of the existing meter and record the present meter reading.
3. Turn off the water to the building using the B-box.
4. If the meter pit is flooded such that the meter is fully or partially submerged, pump out the vault before changing the meter. Dispose of the pumped out water in a safe and proper manner so as to not cause harm to the surrounding property or others.
5. Ensure that the water service is not in any way contaminated, even intermittently, by standing water in the meter pit.
6. Remove and properly dispose of any dirt needed to access the meter in the pit. Dirt must be removed such that there is a minimum of 2" clearance below the meter.

7. Expose the connection to the service line and any piping between the service line connection and the meter to ensure that they are in a condition that won't be damaged by changing the meter.
8. Replace the meter using new gaskets or washers.
9. Install the MIU at a location acceptable to the Commissioner and in accordance with the requirements set forth in this document and in the manufacturer's installation and operations manuals. To the extent possible, install the MIU to maximize the transmission range. Free hanging wires must be avoided as much as feasible.
10. Place plastic caps on the inlet and outlet of the old meter and handle meter with care in the event of post-removal testing is necessary.
11. Furnish all meter adapters, bushings, incidental piping or other hardware necessary to install the new water meter in the existing meter setup. Install Commissioner-approved standard connections (meter couplings) for all meters if none exist presently.
12. Install the Meter Interface Unit (MIU) per the manufacturer's instructions and in a manner approved by the Commissioner.
13. If the existing meter pit tile or enclosure is found to be deteriorated, the Contractor shall replace the deteriorated section with a new approved enclosure.
14. Replace any existing round 12 inch or 15 inch metal frame and lid with approved frame and lid rated for automated meter reading. All new lids must be of a locking design.
15. All other lids of various sizes and shapes are owned by and the responsibility of the property owner. These lids must be drilled by the Contractor to accept the MIU. The Contractor must secure written permission of the property owner before drilling, modifying or replacing.
16. Under no circumstance will a meter pit be left uncovered and unsupervised.
17. Install an approved insulating "poncho" to protect the meter and pipes from freezing.
18. Properly dispose of all waste from cleaning the meter pit, including the ring and lid if replaced.
19. Repair any grass or shrubbery damaged by the installation process.

20. Installation conditions that will be included in the standard installation include, but are not limited to: flooded pits, buried meters, insects, syringes, difficult to locate pits and bad data from the City.

H. Meter Interface Unit (MIU) Installation in Pit

1. An MIU must be installed for all meters in pits. The Commissioner will provide the MIU. A test of the MIU must be performed, before the Contractor leaves the site, using a Commissioner approved visual display device to ensure it is operating properly. The Contractor must obtain or have the use of a device or devices which can read the MIU. Improper or deficient MIU installations must be corrected before any payment will be made for the meter installation. If payment has been made on an MIU installation subsequently found to be improper or deficient, the amount of the payment will be deducted from compensation due or which may become due the Contractor under this Contract.
2. The location of the MIU is a material part of this contract and any MIU placed in an inappropriate or unreasonable location must be relocated. The guidelines are to be followed unless an individual exception is approved by the Commissioner. The MIU shall be located in accordance with the manufacturer's specific instructions and the Commissioner guidelines below.
 - a. In a plastic meter lid:
 - (1) Attach the MIU by screwing the MIU into the threaded connection underneath the lid.
 - (2) Collect excess wire and leave on top of the meter. Do not tie the wire down. The excess wire is needed when opening the meter pit so the MIU device does not become disconnected when lifting off the lid.
 - (3) After the meter installation place plastic lid back over the meter pit and tighten bolt to lock in place.
 - b. In an existing square or rectangular metal lid:
 - (1) Drill a 1-7/8" hole in lid.
 - (2) Install the mounting cap included in the installation kit through the hole in lid.

- (3) Install the MIU device into the mounting cap and lock into place using the locking nut included in the installation kit.
- (4) Collect excess wire and leave on top of the meter. Do not tie the wire down. The excess wire is needed when opening the meter pit so the MIU device does not become disconnected when lifting off the lid.
- (5) After the meter installation place metal lid back over the meter pit.

3. Disputes.

- a. If there is any question about the location, the installer must report to his supervisor, who then must consult with the Commissioner for final placement.

I. Restoration and Landscaping

1. Backfilling the meter vault shall be per Section 31 23 10.
2. Landscaping shall be per Section 32 90 00.
3. Interior restoration shall be per Section 01 11 00.

END OF SECTION 33 12 14

SECTION 33 39 13

SEWER MANHOLES, CATCH BASINS, INLETS AND SPECIAL STRUCTURES

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes the requirements for constructing and/or adjusting of sewer manholes, catch basins, inlets, junction chambers, tumbling basins, and other structures constructed of cast-in-place or precast concrete, or masonry structures shown on the drawings and specified here.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 31 23 10 – Excavation, Trenching and Backfilling.
- B. Section 31 23 19 – Dewatering Excavations.
- C. Section 03 30 00 – Cast-In-Place Concrete.
- D. Section 33 05 22 – Repair and Adjustment of Sewer Mains and Structures.
- E. Section 33 31 13 – Sewer Main Pipe and Fittings.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM), latest edition:
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings.
 - 2. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete Reinforcement.
 - 3. ASTM A197 - Standard Specification for Cupola Malleable Iron.
 - 4. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 5. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 6. ASTM C32 - Standard Specification for Sewer and Manhole Brick.
 - 7. ASTM C55 - Standard Specification for Concrete Building Brick.

8. ASTM C139 - Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 9. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets.
 10. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
 11. ASTM C857 – Standard Practice for Minimum Structural Design Loading for Underground Pre-cast Concrete Utility Structures.
 12. ASTM C858 – Standard Specifications for Underground Precast Concrete Utility Structures.
 13. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants.
- B. IDOT Standard Specification for Road and Bridge Construction (SSRBC), latest edition.
- C. American Association of State Highway Transportation Officials, Standard Specifications for Highway (AASHTO), latest edition.

1.4 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. Shop Drawings: When not indicated on the Contract Drawings in sufficient detail or definition, Contractor must submit detailed drawings of cast-in-place and precast concrete utility structures and related metal work.
- C. Product Data: Contractor must submit manufacturers' product data for standard manufactured precast concrete sections and structures, for metal gratings and covers, and for other, related miscellaneous metal items.
- D. Certification: Contractor must submit certification or other acceptable evidence that covers and grates to be provided for roadways and parking areas meet proof-testing requirements for AASHTO H-20 traffic loading.

PART 2 – PRODUCTS AND MATERIALS

2.1 PRECAST CONCRETE STRUCTURES

- A. Contractor must precast concrete base and riser sections furnished for manholes, valve basins, catch basins and other structures must conform to ASTM C478.
- B. Riser sections must be furnished in various heights, including an offset tapered section, as detailed on the Drawings, or as directed by the Commissioner.
- C. Contractor shall precast reinforced concrete flat slab tops for manholes must conform to ASTM C857, and be designed to accommodate a minimum AASHTO loading of H-20, unless directed otherwise by the Commissioner.

2.2 JOINT SEALANTS

- A. Rubber gaskets must conform to ASTM C443.
- B. Preformed butyl rubber flexible rope type gaskets must conform to ASTM C990.

2.3 ADJUSTING RINGS

- A. Adjusting rings are to be precast concrete with sufficient steel reinforcing to prevent cracking in normal handling and use.
- B. Mating Faces: Must be smooth, parallel, and free from cracks, chips, spalls or casting irregularities which interfere with creating a watertight mating surface between the adjusting ring and top of the utility structure.
 - 1. Contractor must provide grooves in faces to contain extrudable preformed gasket material when applicable.

2.4 CASTINGS

- A. Iron castings are to be ductile iron castings conforming to ASTM A536, Grade 60-40-18, or gray iron conforming to ASTM A48, free from blowholes, shrinkage, cracks and other defects.
- B. Allowance for shrinkage must be made in the patterns to meet the specified thickness. Frames and lids are to seat at all points.
- C. Malleable castings are to conform to ASTM A197.
- D. All castings are to be made accurately to dimensions shown on the plans, and planed, filed, or ground where otherwise necessary to secure flat and true surfaces.

2.5 STEPS

- A. Aluminum alloy WP 6061 or WP 6063 conforming to ASTM B361. The portion of aluminum step embedded in concrete and the portion extending two (2) Inches beyond embedment must be coated with bituminous paint.

2.6 CAST-IN-PLACE CONCRETE

- A. Concrete in accordance with Section 03 30 00 – Cast-In-Place Concrete.

2.7 CONCRETE AND MASONRY BLOCKS AND BRICKS

- A. Precast concrete brick must conform to ASTM C55 quality designated Grade N-1.
- B. Sewer brick must conform to the qualifications for “brick for sewers or drainage structures”, Grades SS or SM, as established in Table I of the current ASTM C32, except where modified here.
 - 1. Brick must be uniform, sound, hard burned, of compact texture, free from lime and cracks with a clear ringing sound when struck, whole and with edges full and square, and of standard dimensions.
 - 2. Brick, when thoroughly dried and immersed in water for twenty-four (24) hours, must not absorb more than 15% by weight of water.
 - 3. If in any load of brick more than 10% are inferior, the whole load is rejected.
 - 4. If in any load of brick less than 10% are inferior, the brick is accepted provided the Contractor pulls out all inferior bricks, and immediately removes them from the Site of the Work.

2.8 MORTAR

- A. Mortar for brickwork is to be composed of one (1) part Portland cement and two (2) parts screened sand.
 - 1. Portland cement must conform to the requirements of Section 1001 of the SSRBC.
 - 2. Sand must be Class A quality and Gradation FA-9 as specified in Article 1003.02 of the SSRBC.
- B. The cement and sand must be proportioned by volume and thoroughly mixed in a tight box.

- C. After the initial mixing, water is to be added gradually and the ingredients mixed until the mortar is of proper consistency. The amount of water must be no more than necessary to produce a workable, plastic mortar.
- D. Only a sufficient amount of mortar for immediate use shall be prepared, and any mortar that has begun to set must not be retempered or used in any way in the Work.

2.9 REINFORCING STEEL

- A. Reinforcing steel is to meet the requirements of ASTM A615, Grade 60 and A185 for wire fabric.

PART 3 - EXECUTION

3.1 GENERAL

- A. Contractor must excavate, backfill and compact in accordance with Section 31 23 10 -Excavation, Trenching and Backfilling.
- B. All brick must be thoroughly wetted immediately before being laid.
- C. Old brickwork must be thoroughly cleaned and wetted before new work is jointed thereto.
- D. No masonry work is to be done when the temperature is below 33° F unless otherwise approved, and then only under conditions for protecting it from frost.

3.2 PRE-CAST STRUCTURE INSTALLATION

- A. Contractor must carefully place precast sections for all structures on prepared bedding so as to fully and uniformly support the structure and allow pipes to be laid to proper grade.
- B. All lift holes on precast sections must be completely filled with mortar, smoothed on both inside and outside surfaces.
- C. Joints between riser sections must be sealed with approved sealant such as ConSeal or Trelleborg products, or as directed by the Commissioner.
- D. Contractor must place one adjusting ring (only) on manhole top. Thickness of adjusting ring must be selected to bring completed structure to required elevation.
- E. Joints between adjusting rings and frames must be sealed with approved mastic sealant before backfilling structures.
- F. Contractor must install manhole frame and cover.

3.3 MASONRY STRUCTURE INSTALLATION

- A. Contractor must install precast concrete or cast in place base as shown on the Drawings.
- B. Contractor must thoroughly wet all brick immediately before laying.
- C. Brick courses must be laid to the line, straight and parallel, breaking joints with those in adjacent courses.
- D. Brick must be laid radially as headers in a full bed of mortar with joints not exceeding 3/8-Inch in thickness.
- E. Contractor must fill joints with mortar. Interior joints must be trowel-struck.
- F. Fresh masonry must be plastered inside and outside and must be protected from damage of all kinds.
- G. New work, unless immediately covered with earth or brick backing, or an approved form of curing compound, must be kept moist until the mortar has hardened.
- H. Contractor must install manhole frame and cover.

3.4 CAST-IN-PLACE CONCRETE STRUCTURES

- A. Construct Cast-In-Place Concrete Structures in accordance with Section 03 30 00 – Cast-In-Place Concrete.

3.5 CATCH BASIN FLOW RESTRICTORS

- A. The Contractor must install flow restrictors in all existing/proposed catch basins within the project limits (area of pavement resurfacing). Three inch (3”) diameter plastic vortex type restrictors must be installed in the residential streets, whereas the same without swirl chamber must be installed in the arterial streets. The Department of Water Management, Sewer Section will supply the restrictors, which can be obtained at the Department of Water Management’s Central District, located at 3901 S. Ashland Avenue.

3.6 FINAL ADJUSTMENT OF STRUCTURES

- A. To prevent debris from entering the sewers, 22 gauge galvanized steel plates must be placed beneath perforated lids of all structures prior to the placing of any type of surfacing. Plates must be maintained in place until the completion of all surface restoration.

- B. After the base course and binder course have been placed, and prior to placing the surface course, the structures must be adjusted to match the final pavement elevation.
- C. Contractor shall remove the binder and base course adjacent to and for a distance not exceeding 12-Inches outside the base of the castings.
- D. The castings must be adjusted to final pavement elevation with adjusting rings set in mortar.
- E. Contractor must fill the space around the casting with Class SI concrete to the elevation of the surface of the binder course.

END OF SECTION 33 39 13