MANUAL FOR

WATER LINE CONSTRUCTION

SHIPPENSBURG BOROUGH AUTHORITY

SHIPPENSBURG, PENNSYLVANIA

ORGINAL JULY 1998

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Manual incomplete without Material Specifications

PROJECT MANUAL

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WATER LINE DETAILS

DOCUMENT 00700

GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS

Wherever used in these General Conditions or in the Manual for Water Line Extension Construction the following terms have the meaning indicated which are applicable to both the singular and plural thereof:

AGREEMENT – The written agreement between the OWNER and DEVELOPER covering the Work to be performed.

DETAIL DRAWINGS – The detailed construction drawings in the Manual for Water Line Extension Construction.

DEVELOPER – The person, firm, or corporation ultimately responsible for construction of the water line, with which OWNER has entered into the Agreement, as well as agents acting on behalf of the DEVELOPER, including the DEVELOPER'S CONTRACTOR.

DEVELOPER'S CONTRACTOR – The person, firm, or corporation constructing the water line on behalf of DEVELOPER, if other than DEVELOPER.

DEVELOPER Drawings – The drawings which show the character and scope of the Work to be performed and which have been prepared by DEVELOPER and approved by ENGINEER and are referred to in the Water Line Extension Agreement.

ENGINEER – CET Engineering Services, the independent consulting engineer with whom the Borough of Shippensburg has contracted to review and inspect the DEVELOPER'S design, installation and completion of any water line.

General Requirements – Sections of Division 1 of the MANUAL.

Laws and Regulations: Laws and Regulations – Laws, rules, regulations, ordinances, codes and/or orders of the Borough of Shippensburg, Cumberland and Franklin Counties, Commonwealth of Pennsylvania, and United States of America.

MANUAL (of Manual) – The Manual for Water Line Extension Construction.

OWNER – The Borough of Shippensburg, also referred to as the Borough.

PROJECT – The total construction of the water line extension.

PROJECT INSPECTOR – The authorized representative of the OWNER or ENGINEER assigned to the site or any part thereof for inspection of construction.

SHOP DRAWINGS – All drawings, diagrams, illustrations, scheduled and other data which are specifically prepared by or for DEVELOPER to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by DEVELOPER to illustrate material or equipment for some portion of the Work.

SPECIFICATION – Those portions of the Manual consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

SUBSTANTIAL COMPLETION – The Work (or a specified part thereof) has progressed to the point where, in the opinion of the ENGINEER as evidenced by ENGINEER'S definitive letter of Substantial Completion, it is sufficiently complete, in accordance with the Manual so that the Work (of specific part) can be utilized for the purpose for which it is intended.

SUPPLIER – A manufacture, fabricator, supplier, distributor, materialman or vendor.

UNDERGROUND FACILITIES – All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any or the following services or materials: electricity, gases, steam, liquid petroleum products, telephone, or other communications, cable television, sewage, and drainage removal, traffic or other control systems or water.

WORK – The entire complete construction of the water line or the various separately identifiable parts thereto required to be furnished under the Manual. Work id the result of performing services, furnishing labor and furnishing and incorporating material and equipment into the construction, all as required by the Manual.

ARTICLE 2 – PRELIMINARY MATTERS

Before starting construction:

2.1 The DEVELOPER must provide 10 days prior notification before undertaking the project.

Preconstruction Conference:

2.2 At least 10 days prior to construction but before the DEVELOPER'S CONTRACTOR starts the WORK at the site, a conference attended by the DEVELOPER'S CONTRACTOR, OWNER, ENGINEER and others as appropriate will be held to discuss procedures for handling Shop Drawings and other submittals, and to establish a working understanding among the parties as to the Work.

ARTICLE 3 – DEVELOPER'S RESPONSIBILITIES

Supervision and Superintendence:

3.1 DEVELOPER shall supervise and direct at Work and completely and efficiently, devoting such attention thereto and applying such skills and expertise as may be solely responsible for the means, methods, techniques, sequences and procedures of construction. DEVLOPER shall be responsible to see that the finished Work complies accurately with this Manual.

3.2 DEVELOPER shall keep on the Work site at all times during its progress a competent resident superintendent. The superintendent will be the DEVELOPER'S representative at the site and shall have authority to act on behalf of DEVELOPER. All communications given to the superintendent shall be as binding as if given to the DEVLOPER.

Labor, Materials, and Equipment

3.3 DEVELOPER shall provide competent, suitably qualified personnel to survey and layout the Work and perform construction as required by the Manual. DEVELOPER shall at all times maintain good discipline and order at the site. Except in connection with safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Manual, all Work at the site shall be performed during regular working hours, and DEVELOPER will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER'S written consent given after prior written notice.

3.4 All materials and equipment shall be of good quality and new, except as otherwise provided in the Manual. If required by the AUTHORITY and/or ENGINEER, DEVELOPER shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable SUPPLIER except as otherwise provided in the Manual; but no provision of any such instructions will be effective to assign to the AUTHORITY and/or ENGINEER, or any of ENGINEER'S consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 5.7.

3.5 The DEVELOPER shall be responsible to oversee safety on the project site at all times. The DEVLOPER must comply with all OSHA, Labor & Industry and other regulatory agencies.

Substitutes or “Or-Equal” Items:

3.6.1 Whenever materials or equipment are specified or described in the Manual by using the name of the proprietary item or the name of a particular SUPPLIER the naming of the item is intended to establish the type, function, and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other SUPPLIERS may be accepted by the AUTHORITY and/or ENGINEER if sufficient information is submitted by the DEVELOPER to allow the AUTHORITY and/or ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named. Requests for review of substitute items of material and equipment will not be accepted by the AUTHORITY and/or ENGINEER form anyone other than the DEVELOPER. If DEVELOPER wishes to furnish or use a substitute item of material and equipment DEVELOPER shall make written application to AUTHORITY and/or ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified.

3.6.2 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Manual, DEVELOPER may furnish or utilize a substitute means, method, sequence, technique, or procedure if construction acceptable to the AUTHORITY and/or ENGINEER, if DEVELOPER submits sufficient information to allow the AHUTORITY and/or ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by the AUTHORITY and/or ENGINEER will be similar to that provided in paragraph 3.6.1. as applied by the AUTHORITY and/or ENGINEER.

3.6.3 The AUTHORITY and/or ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute, and no substitute will be ordered, installed or utilized without the AUTHORITY and/or ENGINEER’S prior written acceptance which will be evidenced by an approved Shop Drawing. OWNER may require DEVELOPER to furnish at DEVELOPER’S expense a special performance guarantee or other surety with respect to any substitute. The AUTHORITY and/or ENGINEER will record time required by the AUTHORITY and/or ENGINEER and ENGINEER’S consultants in evaluating substitutes proposed by DEVELOPER and in making changes in the Manual occasioned thereby. Whether or not the AUTHORITY and/or ENGINEER accepts a proposed substitute, DEVELOPER shall reimburse OWNER for the charges of the AUTHORITY and/or ENGINEER and ENGINEER’S consultants for evaluating each proposed substitute.

Record Documents:

3.7 DEVELOPER shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders, and written interpretations and clarifications (issued pursuant to paragraph 5.4) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for Reference. Upon completion of the Work, these record documents, samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Shop Drawings and Samples:

3.8 After checking and verifying all field measurements ad after complying with applicable procedures specified in the General Requirements, DEVELOPER shall submit to ENGINEER for review and approval, five (5) copies (unless otherwise specified in the General Requirements) of all Shop Drawings, which will bear a stamp of specific written indication that DEVELOPER has satisfied DEVELOPER'S responsibilities under the Manual with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to enable ENGINEER to review the information as required.

3.9 ENGINEER will review and approve with reasonable promptness Shop Drawings and samples, but ENGINEER'S review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Manual and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Manual) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. DEVELOPER shall make corrections required by ENGINEER, and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. DEVELOPER shall direct specific attention in writing to revisions other than the corrections called for by the ENGINEER or previous submittals.

3.10 ENGINEER'S review and approval of Shop Drawings or samples shall not relieve the DEVELOPER from responsibility for any variation from the requirements of the Manual unless DEVELOPER has in writing called ENGINEER'S attention to each such variation at the time of submission as required by paragraph 3.8 and ENGINEER has given written approval of each such variation by a specific written notation thereon incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve DEVELOPER form responsibility for errors or omissions in

the Shop Drawings or from responsibility fir having complied with the provisions of paragraph 3.8.

3.11 Where a Shop Drawing or sample is required by the Manual, any related Work performed prior to ENGINEER'S reviewing and approval of the pertinent submission will be the sole responsibility of DEVELOPER and may be subject to rejection.

ARTICLE 4 – OWNER'S RESPONSIBILITY

4.1 The AUTHORITY'S responsibility in respect of certain inspections, tests and approvals is set forth in Paragraph 7.4

ARTICLE 5 – OWNER'S/ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

5.1 The ENGINEER will be the OWNER'S representative during the construction period, but does not have the power to bind the OWNER to any financial or other legal obligations whatsoever.

Visits to Site

5.2 As may be directed by OWNER, ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work, and to determine, in general, if the Work is proceeding in accordance with the Manual. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity or Work. ENGINEER'S efforts will be directed towards providing for OWNER a greater degree of confidence that the completed Work will conform to the Manual. On that basis of such visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

Project Inspector:

5.3 OWNER will either appoint a PROJECT INSPECTOR or request that ENGINEER provide a PROJECT INSPECTOR to observe the performance of the Work. Inspection shall be provided solely for the purpose and to the extent necessary to insure conformance with the Manual construction requirements.

Authorized Variations in Work:

5.4 ENGINEER may authorize minor variations in the Work form the requirements of the Manual only in accordance with the procedures described in Section 01153 of the Project Manual.

Rejecting Defective Work:

5.5 Inspector or ENGINEER will have authority to disapprove or reject Work which INSPECTOR or ENGINEER believes to be defective, and will also have authority to require special inspection of testing of the Work as provided in paragraph 7.9 whether or not the Work is fabricated, installed or completed.

Shop Drawings:

5.6 In connection with ENGINEER'S responsibility for Shop Drawings and samples, see paragraphs 3.8 through 3.11 inclusive.

5.7 ENGINEER will not be responsible for DEVELOPER'S means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, and ENGIEER will not be responsible for DEVELOPER'S failure to perform or furnish the Work in accordance with the Manual.

5.8 ENGINEER will not be responsible for the acts or omissions of the DEVELOPER or of DEVELOPER'S CONTRACTOR, any Supplier, or of any other person or organization or forming or furnishing any of the work.

ARTICLE 6 – CHANGES IN THE WORK

6.1 All changes in project shall be in accordance with Section 01153 of General Requirements.

ARTICLE 7 - WARRANTY AND GUARANTEE; TESTS AND INSPECTION; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

7.1 DEVELOPER warrants and guarantees to OWNER and ENGINEER that all work will be in accordance with the Manual and will not be defective. Prompt notice of all defects shall be given to DEVELOPER. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this article.

Access to Work

7.2 ENGINEER and INSPECTOR, and other representatives of OWNER, testing agencies and governmental agencies with jurisdictional interest will have access

to Work at reasonable times for their observation, inspecting and testing. DEVELOPER shall provide proper and safe conditions for such access.

Tests and Inspections

7.3 DEVELOPER shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests, and approvals.

7.4 If Laws and Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested, or approved, DEVELOPER shall assume full responsibility therefore, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. DEVELOPER shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER'S or ENGINEER'S acceptance of the SUPPLIER of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to DEVELOPER'S purchase thereof for incorporation in the Work.

7.5 All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to OWNER and DEVELOPER (or by ENGINEER if so specified).

7.6 If any Work (including the work of others) that is to be inspected, tested, or approved is covered without concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering shall be at DEVELOPER'S expense unless DEVELOPER has given ENGINEER timely notice of DEVELOPER'S intension to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

7.7 Neither observations by ENGINEER or INSPECTOR nor inspection, tests, or approvals by others shall relieve DEVELOPER from DEVELOPER'S obligation to perform the Work in accordance with the Manual.

Uncovering Work;

7.8 If any Work is covered contrary to the request of the INSPECTOR or ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER'S observation and replaced at DEVELOPER'S expense.

7.9 If INSPECTOR or ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, DEVELOPER, at ENGINEER'S request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, DEVELOPER shall bear all

direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals).

Correction or Removal of Defective Work;

7.10 If required by INSPECTOR or ENGINEER, DEVELOPER shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with nondefective Work. DEVELOPER shall bear all direct, indirect and consequential costs of such correction or removal (including but nor limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Title of Work

B. Work Sequence

1.02 RELATED REQUIREMENTS

A. General Conditions

B. Section 01040 – Project Coordination

1.03 WORK COVERED BY MANUAL FOR WATER LINE CONSTRUCTION

A. Manual covers OWNER'S requirements for construction of waterlines by DEVELOPERS for ultimate dedication to the OWNER.

1.04 CONTRACT METHOD

A. Construct the Work in accordance with the plans approved by the OWNER.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01040

PROJECT COORDINATION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Coordination of Work of Contract

1.02 RELATED REQUIREMENTS

A. Section 01010 – Summary of Work

B. Section 01701 – Project Closeout Procedures: Closeout Submittals

C. Section 01060 – Field Access in Rights-of-Way.

1.03 DESCRIPTION

A. Coordination scheduling, submittals, and work of various sections of Specifications to assure efficient and orderly sequence of installation of construction elements.

1.04 MEETINGS

A. Hold coordination and meetings and pre-construction conferences with OWNER, ENGINEER, PROJECT INSPECTOR, and personnel to assure coordination of Work.

1.05 COORDINATION OF SUBMITTALS

A. Schedule and coordinate submittals specified in Section 01340.

B. Coordinate work of various sections having interdependent responsibilities for installing connection to, and placing in service, such material.

1.06 COORDINATION WITH OWNER AND ENGINEER

A. Notify OWNER 10 days in advance of beginning work in a work area.

B. Cooperate with OWNER to keep existing facilities in service during construction.

1.07 COORDINATION OF CONTRACT CLOSEOUT

A. Assemble and coordinate closeout submittals specified in Section 01701.

1.08 COORDINATION OF UTILIES AND OTHER OWNERS

A. Prior to beginning construction, inform all public service companies, individuals, and others owning or controlling any facilities or structures within the project, which may be affected by the Work, that it will commence on a certain date.

B. Where the proposed facilities cross telephone, telegraph or electric cables, gas, oil or water lines, sewer, or other facilities and structures on, under or over the proposed facilities, it shall be the responsibility of the DEVELOPER to give the owner of the facility due notice of the proposed crossing to permit the owner of the affected facility time to send a field representative to the site to mark, guard, or protect the facility if the owner of the affected facility so desires. DEVELOPER shall cooperate with facility owners by arranging and performing work in and around such facilities; to facilitate their relocation, preservation or reconstruction, as may be required. In addition, the DEVELOPER shall obtain names of persons to contact if damage should occur during construction operations.

C. DEVELOPER'S attention is directed to the provisions of Pennsylvania General Assembly Underground Utility Line Protection Act and all other related local, state, and federal statutes, rules, ordinances and regulations as they may apply to the work under this project. DEVELOPER shall have complete responsibility for compliance with the Pennsylvania General Assembly Underground Utility Line Protection Act and all other related local, state, and federal statutes, rules, ordinances and regulations.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. DEVELOPER is responsible to provide and pay for al field engineering services required for project.

1. Survey work required in execution of Project

2. Civil, structural or other professional engineering services specified, or required to execute DEVELOPER'S construction methods.

1.02 RELATER REQUIREMENTS

A. Conditions of Contract

B. Section 01010 – Summary of Work.

C. Section 01720 – Project Record Documents.

1.03 QUALIFICATONS OF SURVEYOR OR ENGINEER

A. Qualified engineer or registered land surveyor, acceptable to DEVELOPER and OWNER.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01060

FIELD ACCESS IN RIGHTS-OF-WAY

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. DEVELOPER shall be responsible for obtaining access to existing water line located in rights-of-way.

1.02 RELATED REQUIRMENTS

A. Section 01720 – Project Record Documents

B. Section 01040 – Project Coordination

1.03 WATER LINE LOCATIONS

A. Existing water line locations are as designed on Drawings by DEVELOPER.

B. Locate and identify all rights-of-way access roads prior to starting work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Applicability of Reference Standards.

B. Provision of Reference Standard at Site.

C. Acronyms used in Manual for Reference Standards. Source of Reference Standards.

1.02 RELATED REQUIREMENTS

A. General Conditions of the Contract: Reference Standards.

1.03 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. The date of the standard is that in effect as of the Agreement date.

C. When required by individual Specification section, obtain copy of standard. Maintain copy at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.

1.04 SCHEDULE OF REFERENCES

AA	Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006
AASHTO	American Association of State Highway And Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20006
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219

AISC	American Institute of Steel Construction 1221 Avenue of the Americas New York, NY 10020
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, DC 20036
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing Materials 1916 Race Street Philadelphia, PA 19103
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
AWS	American Welding Society 2501 NW 7th Street Miami, FL 33125
CRSI	Concrete Reinforcing Steel Institute 180 North LaSalle Street Suite 2110 Chicago, IL 60601
EJMA	Expansion Joint Manufactures Association 708 Westchester Avenue White Plains, NY 10604
FM	Factory Mutual System 1151 Boston-Providence Turnpike Norwood, MA 02062

FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navel Yard, Bld 197 Washington, DC 20407
IEEE	Institute of Electrical and Electronics Engineers 345 East 47th Street New York, NY 10017
IMIAC	International Masonry Industry All-Weather Cou International Masonry Institute 823 15th Street, N.W. Washington, DC 20005
MIL	Military Specification Navel Publications and Form Center 5801 Tabor Street Philadelphia, PA 19120
NEMA	National Electrical Manufactures' Association 2101 L Street, N.W. Washington, DC 20037
NFPA	National Fire Protection Association Battery March Park Quincy, MA 02269
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 20076
PCI	Prestressed Concrete Institute 20 North Wacker Drive Chicago, IL 60606
PennDot	Pennsylvania Department of Transportation Harrisburg, PA 17120
PS	Product Standard U.S. Department of Commerce Washington, DC 20203

SDI	Steel Door Institute 712 Lakewood Center North Cleveland, OH 44107
SSPC	Steel Structures Painting Council 4400 Fifth Avenue Pittsburgh, PA 15213
UL	Underwriters Laboratories, INC. 333 Pfingson Road Northbrook, IL 60062

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01153

PROCEDURES FOR PROJECT CHANGES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Promptly implement procedures for project changes.

1. Provide full written data required to evaluate changes.

2. Provide full documentation to ENGINEER on request.

B. Designate in writing the member of DEVELOPER'S organization

1. Who is authorized to accept changes in the Work.

2. Who is responsible for informing others in DEVELOPER'S employ of the authorization of changes in the Work.

1.02 PROCEDURES

A. OWNER or ENGINEER may require changes by timely submitting a letter of project change to the DEVELOPER. Under no circumstances shall the OWNER or ENGINEER be financially or otherwise liable for any increase costs by virtue of such changes to meet OWNER'S requirements, unless mutually agreed upon.

1. Description of the change, products, and location of the change in the Project.

2. Supplementary or revised Drawings and/or Specifications.

B. DEVELOPER may initiate changes by submitting a written notice to ENGINEER, containing:

1. Description of the proposed changes.

2. Statement of the reason for making the change.

3. Statement of compliance with Project Manual requirements.

4. Documentation supporting need for change.

5. No changes from the approved design shall be made without written authorization from the ENGINEER.

1.03 CONSTRUCTION CHANGE AUTHORIZATION

A. In lieu of letter of project change, ENGINEER may issue a field Construction Change Authorization for CONTRACTOR to proceed with a change for subsequent inclusion in letter for project change.

B. Authorization will describe changes in the Work, including both additions and deletions.

C. ENGINEER will sign and date the Construction Change Authorization in the field as authorization for the DEVELOPER to proceed with the changes.

D. CONTRACTOR may sign and date the Construction Change Authorization to indicate agreement.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 10201

PRECONSTRUCTION CONFERENCES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. DEVELOPER participation in preconstruction conferences.

1.02 RELATED REQUIREMENTS

A. Section 01010 – Summary of Work.

1.03 PRECONSTRUCTION CONFERENCE

A. ENGINEER will schedule conference at least 10 days prior to construction.

1. If construction does not commence within 20 days after Preconstruction conference a new Preconstruction conference will be held and all costs of that meeting shall be the responsibility of the DEVELOPER to pay.

B. Attendance: OWNER, ENGINEER, DEVELOPER, and CONTRACTOR.

C. Agenda:

1. Distribution of Manual

2. Submittal of list of subcontractors, list of products, list of materials, and progress schedule

3. Designation of responsible personnel

4. Procedures and processing of field decisions, submittals, substitutions, changes, and project closeout procedures.

5. Scheduling

6. OWNER’S requirements.

7. Survey and layout.

8. Procedures for testing and acceptance of facilities to be put into service.

9. Procedures for maintaining record documents.

10. DEVELOPER'S responsibility for safety.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Procedures for submittals

1.02 RELATED REQUIREMENTS

A. Section 01040 – Project Coordination: Coordination of submittals

B. Section 01405 – Project Quality Control

C. Section 01720 – Project Record Documents.

1.03 SHOP DRAWINGS

A. Present in a clear and thorough manner. Title each drawing with Project name and number.

B. Identify field dimensions; show relation to adjacent or critical features of Work or products.

C. Minimum Sheet Size: 8 ½ x 11 inches

1.04 PRODUCT DATA

A. Submit only pages, which are pertinent; mark each copy of standard printed data to identify pertinent products.

B. Modify manufacture's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.

C. Provide manufacture's preparation, assembly, and installation as specified in Section 01405.

1.05 CONTRACTOR REVIEW

A. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacture's catalog numbers, and conformance of submittal with requirements of the Manual.

B. Coordinate submittals with requirements of Work and Manual.

C. Sign or initial each sheet of shop drawings and product data, and each sample label to certify compliance with requirements of Manual. Notify ENGINEER in writing at time of submittal, of any deviations from requirements of Manual.

D. DO not fabricate products or begin work, which requires submittals until return of submittals with ENGINEER'S acceptance.

1.06 SUBMITTAL REQUIREMENTS

A. Transmit submittals in accordance with approved procedures.

B. Apply DEVELOPER'S CONTRACTOR stamp, signed or initialed, certifying to review, verification of products, field dimensions and field construction criteria, and coordination of information with requirements of Work.

C. Coordinate submittals into logical groupings to facilitate interrelation for several items.

D. Submit number of opaque reproductions of shop drawings CONTRACTOR requires, plus three, which will be retained by ENGINEER. Maximum number of copies not to exceed seven.

E. Submit number of copies of product data DEVELOPER'S CONTRACTOR requires, plus three copies, which will be retained by ENGINEER. Maximum number of copies submitted not to exceed six.

F. Submit number of samples required by individual Specifications sections.

G. Submit under transmittal letter. Identify Project by title and number, identify Contract by number. Identify Work and product by Specifications section and Article number.

1.07 RESUBMITTALS

A. Make resubmittals under procedures specified for initial submittals; identify changes made since previous submittal.

1.08 ENGINEER REVIEW

A. ENGINEER will review and return submittals within 15 days.

1.09 DISTRIBUTION

A. Distribute reproductions of shop drawings, copies of product data, and samples, which bear ENGINEER stamp of approval, to job site file, Record Documents file, subcontractors, suppliers, and other entities requiring information.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OFSECTION

SECTION 01405

PROJECT QUALTITY CONTROL

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Quality control of product and workmanship.

B. Manufacture's instructions.

1.02 RELATED REQUIREMENTS

A. Section 01090 – Reference Standards

B. Section 01340 – Shop Drawings, Product Data, and Samples; Field Samples

1.03 DESCRIPTION

A. Maintain quality control over supervision, subcontractors, suppliers, manufactures, products, services, workmanship, and site conditions, to produce Work in accordance with Manual.

1.04 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. Provide suitable qualified personnel to produce Work of specified quality.

1.05 MANUFACTURE'S INSTRUCTIONS

A. When required in individual Specification sections, submit manufacture's printed instruction in the quantity required for product data, for delivery, handling, storage, assembly, installation, startup, balancing, and finishing, as appropriate.

B. Require compliance with instructions in full detail, including each step in sequence.

C. Should instruction conflict with Manual, request clarification from ENGINEER before proceeding.

1.06 MANUFACTURE'S CERTIFICATES

A. When required in Manual, submit manufacture's certificate, in duplicate, certifying that products meet or exceed specified requirements, executed by responsible officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 GENERAL

1.01 REQUIRED INCLUDED

A. Provide and maintain methods, equipment, and temporary construction, as necessary to provide control over environmental conditions at the construction site and related areas under DEVLOPER'S control. Remove controls and temporary facilities at the completion of work.

1.02 RELATED REQUIREMENTS

A. Section 01040 - Project Coordination.

1.03 DUST CONTROL

A. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent air-borne dust from dispersing into the atmosphere

1.04 DIVERSION AND CARE OF WATER DURING STREAM CROSSINGS

A. Where required, OWNER will obtain the necessary permits for wetland and stream crossing from Pennsylvania Department of Environmental Resources and the Pennsylvania Fish Commission. DEVELOPER shall not perform and work in a stream channel, unless he has been notified that the required permit has been issued, and whether or not the permit is subject to stipulations or special conditions. DEVELOPER shall take sufficient precautions to prevent pollution of wetlands or streams with fuels, oils, bitumens, or other harmful materials. He shall conduct his operations is such a way that will minimize damage to the stream channel and stream banks, prevent erosion of stream banks and deposits of excess sediment in streams, or otherwise harm streams or the properties along streams.

B. Diversion and care of water during wet land or stream crossing and canal embankment excavation work shall consist of diverting and maintaining the flow during construction period, and dewatering work areas. All permanent construction work shall be performed in areas free from water unless otherwise specifically authorized by ENGINEER. The finished structures and portions thereof shall be protected form damage by flowing water until completion of work.

C. The Contractor shall lay the pipe in the dry by diverting streams and/or dewatering the wetlands. In diverting streams, extreme care must be used to prevent property damage.

D. The pipe shall be installed on concrete blocks in order to maintain the proper grade. The pipe shall be encased in concrete in accordance with the dimensions shown on the Drawings. If the material wet areas or streams bottoms is soft, forms shall be used to construct the concrete encasements. Unsuitable material shall be removed to a depth at which stable, undisturbed earth or rock is encountered, not to exceed a depth below pipe invert of three (3) feet, or to the limits designated by the ENGINEER. Trench subbedding shall be backfilled with No. 3 crushed stone. If wet areas or streams bottom is rock, forms shall not be used and, instead, the concrete shall be placed on firm rock below the pipe, and against form rock on both sides of the pipe.

E. After the concrete is placed, the balance of the trench under the streams and their banks shall be backfilled with PA Select Granular Material. The trench over the encasement in wet areas shall also be backfilled with PA Select Granular Material in accordance with Section 02221 and the Detail Drawings, or as directed by the ENGINEER.

F. Removal of Temporary Work: Unless otherwise authorized, all temporary protective structures and other works shall be removed upon completion of work. All banking and filing which is not part of the permanent work shall be removed to the original ground surfaces existing prior to beginning of work and all diversion channels, ditches, and other cavities shall be backfilled with embankment material, placed and compacted in accordance with Section 02221. Materials used in temporary construction shall be disposed of to the satisfaction of the ENGINEER. Whenever the ENGINEER determines that the removal of sheeting and bracing will endanger completed work, he will direct that it be cut off not less than 2 feet below the ground surface, left in place, and backfilled. All temporary protective works shall be removed from the site after having served their purpose.

1.05 WATER CONTROL

A. Provide methods to control surface water to prevent damage to the Project, the site, or adjoining properties.

1. Control fill, grading and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas, and to direct drainage to proper runoff.

B. Maintain excavations and trenches free of water, provide and operate pumping equipment of a capacity to control water flow.

C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas; comply with applicable codes and regulations, and Article 1.07.

1.06 DEBRIS CINTROL

A. Maintain all areas under DEVELOPER'S control free of extraneous debris.

B. Initiate and maintain a specific program to prevent accumulation of debris.

1. Provide containers for deposit of debris.

2. Prohibit overloading of trucks to prevent spillages.

a. Provide periodic inspection to enforce requirements.

D. Schedule periodic collection and disposal of debris.

1. Provide additional collections and disposal of debris whenever the periodic schedule is inadequate.

1.07 SOIL EROSION AND SEDIMENTAION CONTROLS

A. Plan and execute construction to control surface drainage to prevent erosion and sedimentation.

B Comply with PA DER'S Erosion and Sedimentation Pollution Control program Manual and in accordance with DEVELOPER'S approved plan.

1.08 TRAFFIC CONTROL

A. All traffic control shall comply with the PA Vehicle Code, Title 67 and any additional requirements of the Borough Police Department.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01610

TRANSPORTATION AND HANDLING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide for expedition transportation and delivery of products o Project site undamaged, on a schedule to avoid delay of the Work, or work of other contractors.

B. Provide equipment and personnel at the site, unload and handle products in a manner to avoid damage to products.

1.02 RELATED REQUIREMENTS

A. Section 01340 – Shop Drawings, Product Data, and Samples.

B. Section 01620 – Storage and Protection.

1.03 DELIVERY

A. Arrange deliveries of products in ample time to facilitate inspection prior to installation.

B. Coordinate deliveries to avoid conflict with Work and conditions at site.

1. Limitations of storage space

2. Availability of equipment and personnel for handling products.

C. Immediately on delivery, inspect shipment to assure:

1. Product complies with requirements of Manual and reviewed submittals.

2. Containers and package are intact, labels are legible.

3. Products are properly protected and undamaged.

1.04 PRODUCT HANDLING

A. Provide equipment and personnel necessary to handle products, by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring, or otherwise damaging products or surrounding surfaces.

C. Handle products by methods to prevent bending or overstressing.

D. Lift heavy components only at designated lifting points.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01620

STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMNETS INCLUDED

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

1.02 RELATED REQUIREMENTS

A. Section 01610 – Transportation and Handling.

B. Individual Specifications Sections: Special requirements for specific products.

1.03 STORAGE

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

1. Store and maintain products in accordance with manufacture's instructions.

2. Label products stored with project number, title, and date and other specific or pertinent information.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END FO SECTION

SECTION 01710

CONTRACT CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Administrative provisions for Substantial Completion and for final acceptance.

1.02 RELATED REQUIREMENTS

A. Document 00700 – General Conditions.

B. Section 01010 – Summary of Work: Owner Occupancy.

C. Section 01720 – Project Record Documents.

1.03 SUBSTANTIAL COMPLETION

A. When DELOPER considers Work of designated portion of Work is substantially complete, submit written notice with list of items to be completed deficiencies.

B. Should ENGINEER or PROJECT INSPECTOR find Work is not substantially complete, he will promptly notify DEVELOPER in writing, listing observed deficiencies.

C. DEVELOPER shall remedy deficiencies and provide a second notice of substantial completion.

D. When ENGINEER finds Work is substantially complete he will prepare a Certificate of Substantial completion.

1.04 FINAL COMPLETION

A. When DEVELOPER considers Work is complete, submit written certification:

1. Manual has been reviewed

2. Work has been inspected for compliance with Manual

3. Work has been completed in accordance with Manual, and deficiencies listed with letter of substantial completion have been corrected.

4. Work is complete and ready for final inspection, and dedication.

B. Should DEVELOPER or PROJECT INSPECTOR find Work is incomplete, he will promptly notify DEVELOPER in writing listing observed deficiencies.

C. DEVELOPER shall remedy deficiencies and send a second certification of final completion.

D. When ENGINEER or INSPECTOR finds work is complete, OWNER will request closeout deeds of dedication submittals.

1.05 DEED OF DEDICATION SUBMITTALS

A. Evidence of Compliance with Requirements of Governing Authorities.

B. Project Record Drawings: In accordance with Section 01720.

C. Maintenance Bond in accordance with the Agreement.

D. Deed of Dedication.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01720

PROJECT RECORD DRAWINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Maintenance and submittal of Record Documents and samples.

1.02 RELATED REQUIREMENTS

A. Section 01340 – Shop Drawings, Product Data, and Samples

B. Section 01710 – Project Closeout Procedures.

C. Individual Specification Section: Manufacture's certificates and certificates of inspection.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. In addition to requirements in General Conditions, maintain for OWNER one record copy of:

1. Project Drawings

2. Changes and other modifications to the Project

3. Review shop drawings, product data, and samples

4. Manufacture's certificates

5. Daily work sheets.

B. Maintain Record Documents in clean, dry and legible conditions, Do not use Record Documents for construction purposes.

C. Keep Record Documents and Samples available for inspection by INSPECTOR or ENGINEER.

1.04 RECORDING

A. Record construction information on a set of black line or blue line opaque drawings, in a copy of the Project Manual, or daily work sheets.

B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

C. Project Drawings:

1. Measure horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Field changes of dimension and detail

3. Changes made by modifications.

4. Details not on original Project Drawings

5. References to related shop drawings and modifications.

6. Other Documents: Maintain manufacture's certifications, inspections certifications, field test records, and other documents required by individual Specifications sections.

D. Daily work sheets: Maintain a daily record of work completed and materials used.

1.05 SUBMITTALS

A. Project closeout, deliver Record Drawings,

1. Drawings indicating as-built conditions, labeled "RECORD DRAWING".

2. A copy of the "RECORD DRAWING" shall be in an electronic format compatible with Borough computer system. Currently, AutoCAD 2000 I; Borough to advise at time of submittal.

3. Show location of all fittings, valves, fire hydrants, and service connections

4. Provide copies in accordance with Agreement.

PART 2 PRDOUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 02221

TRENCHING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Excavated trenches for utilities and utility structures as shown on Drawings.

B. Compacted bed and compacted fill over utilities to subgrade elevations.

1.02 RELATED WORK

A. Section 01560 – Temporary Controls: Control of Water, Traffic Control.

1.03 REFERENCES

A. Pennsylvania Department of Transportation Publication 408.

1.04 PRTOTECTION

A. Notify all utilities prior to work so that they may locate all affected facilities.

B. Protect excavation by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in of loose soil from failing into excavation

C. Underpin adjacent structures, which may be damaged by excavation work, including service utilities and pipe chases.

D. Notify ENGINEER of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.

E. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

F. Use rubber-tired of tracked equipment on pavements unless otherwise authorized in writing by the agency having jurisdiction.

G. Grade excavation top perimeter to prevent surface run-off into excavation.

1.05 WORK IN PRIVATE RIGHT-OF-WAY

A. Right-of-way, if required, to be secured by DEVELOPER. Protect from injury all property including land, ornamental shrubs and trees, fences, and other improvements thereto that may exist; and replace in kind all those damaged.

B. Pay all claims for property damage, trespass occupation for drainage outside the right-of-way.

C. It shall be the DEVELOPER'S responsibility to obtain all right-of-way for access to the Construction site, Written authorization from all affected property owners shall be provided to ENGINEER before beginning work in the affected areas.

PART 2 PRODUCTS

2.01 SELECT MATERIALS

A. Course Aggregate AASHTO No. 8

B. Course Aggregate AASHO No 57.

C. Course Aggregate PA No.2A.

2.02 COMMON FILL MATERIAL

A. Subsoil: Reused of imported: graded free of stones and rock greater than 2" clay lumps, brush roots, weeds, or suitable material.

PART 3EXECUTION

3.01 INSPECTION

A. Verify stockpiled fill to be reused is approved.

B. Verify areas to be backfilled are free of debris, snow, ice, or water; and sub-surfaces are not frozen.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum

B. When necessary, compact subgrade surfaces to density requirements for backfill.

3.03 EXCAVATION

A. Excavate subsoil required for utilities as shown on the Detail Drawings.

B. Cut trenches to the width shown on the Detail Drawings.

1. In unpaved roads, streets, or highway shoulders, or residential driveways, residential lawns, sides of excavation are to be kept as nearly vertical as possible. Provide shoring or sheeting as required by all applicable laws, codes, and regulations.

2. Undeveloped areas and open country excavation my be sloped back form 12-inches above the top of pipe. Keep excavation within right-of-way. Slope shall be as required to maintain excavation stability; and as required by applicable laws, codes, and regulations.

C. In paved areas comply with all requirements of the owner on the paved area.

D. Hand trim excavations and leave free of loose matter. Hand trim for bell and spigot pipe under section 02221.

E. Remove lumped subsoil, boulders, and rocks up to 1/3 cu. yd. Remove larger material under section 02221.

F. Excavation shall not interfere with normal 45 degree bearing splay of existing foundations.

G. Correct unauthorized excavations.

H. Fill over-excavated areas under pipe bearing surfaces in accordance with direction by INSPECTOR or ENGINEER.

I. Excavate trenches at least 30 feet in advance of pipe laying except in muck or quicksand where pipe laying must follow as closely as the best interests of the work will require.

3.04 BACKFILLLING

A. Support pipe during placement and compaction of bedding fill. Prior to pipe placement the bedding shall be graded by hand to provide a uniform and continuous bearing support for its entire length – bell holes shall be provided at ends of pipe length, but size of holes shall be kept to a minimum. The bell holes shall be backfilled with bedding material, which shall be compacted and brought up to the height of the adjacent material.

After pipe is placed, bedding material shall be placed and carefully compacted to the dimension shown in the Detail Drawings.

B. Backfill trenches to contours and elevations. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous wet, or spongy subgrade surfaces.

C. Compact all backfill material as shown on Detail Drawings, or as directed by ENGINEER.

D. Maintain optimum moisture content of backfill materials to attain required compaction density.

E. Remove surplus backfill material form site.

F. Backfill in accordance with the details shown on the Detail Drawings.

G. Materials shall be placed to 95% of the dry maximum density as determined by ASTM D698 or as directed by the INSPECTOR or ENGINEER.

3.05 UNSUITABLE MATERIAL

A. Remove and dispose of unsuitable material encountered during trench excavation work. Replace with R-3 Coarse Aggregate material as specified herein or class A concrete bedding if directed by ENGINEER.

3.06 TRENCHING IN FILL AREAS

A. Place and compact all fill prior to trenching for water line construction.

1. Provide at least three, compaction test per lift and/or three tests for each change in soil material in accordance with ASTM D2922. Material shall be compacted to 95% of optimum moisture as determined in accordance with ASTM D1557.

2. Provide testing results to INSPECTO or ENGINEER.

END OF SECTION

SECTION 02500

PAVING AND SURFACING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Bituminous paving

B. Bituminous paving replacement.

C. Concrete paving

D. Curbs.

1.02 RELATER REQUIREMENTS

A. Section 02221; Trenching

1.03 REFERENCES

A. Pennsylvania Department of Transportation Publication 408

B. Pennsylvania Department of Transportation Bulletin 25

C. Pennsylvanian Department of Transportation Bulletin 27

1.04 PROTECTION

A. Protect street and access road paving

B. Protect lawns, sidewalks and curbs

C. Repair damage

PART 2 PRODUCTS

2.01 MATERIALS

A. Base Course: Bituminous concrete base course Penn DOT Publication 408 Section 305

B. Surface Course: Bituminous surface course Penn DOT Publication 408 Section 420, ID-2 Wearing Course.

C. Bituminous Tack Coat: Bituminous tack coat Penn DOT Publication 408 section 460

D. Concrete Paving: Concrete paving in accordance with Penn DOT Publication 408 Section 500

E. Temporary paving shall be bituminous concrete base course in accordance with Penn DOT Publication 408 Section.305

PART 3 EXECUTION

3.01 INSPECTION

A. Verify subgrade has been inspected

B. Verify trench backfill has been inspected

3.02 PREPARATION

A. Identify areas to be paved, required lines, and datum coordinates with section 01050

3.03 PAVEMENT RREPLACEMENT

A. Neatly remove existing paving, base and surface course for the width of the trench plus one foot on each side where shown on the Drawings.

B. Neatly remove existing paving required for installation of piping connections or manholes 1 foot beyond the pit dimensions.

C. Install base course in accordance with Penn DOT Publication 408 section 305.

D. Where paving joins existing paving, point existing paving with an application of bituminous material.

E. When paving is complete, seal joints with an application of AC-20 bituminous material.

F. Seal joints between curbs, buildings, manholes gratings with an application of AC-20 bituminous material.

G. Install pavement replacement in accordance with details shown in the Drawings

3.04 TEMPORARY PAVING

A. Install compacted stone of 2 inches below adjoining paving.

B. Install 2 inches of bituminous concrete base course Penn DOT Publication 408 Section 305 as temporary material. This material shall be removed prior to the installation of the permanent pavement.

3.05 SCHEDULES

A. Permanent Pavement shall not be install between October 15th and April 1st

B. Install permanent pavement replacement at the conclusion of all heavy construction on the site or as directed by ENGINEER.

END OF SECTION

SECTION 02710

WATER LINE INSTALLATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Installation of piping, valves, air release chambers, pressure reducing valves and chambers, specials, etc

1.02 QUALITY ASSURANCE

A. Materials

1. All materials shall be handled in accordance with manufactures approved handling methods.

2. Any material that is dropped or damaged in any way shall be marked and will be removed from the job location by the end of that workday.

B. Pressure Tests for ductile iron pipe

1. All completed ductile iron pipe shall be tested for leakage between valves or bulkheads. Tests shall be conducted as directed by the OWNER or INSPECTOR and as noted below.

2. Test piping over 4 inches in diameter after installation at 20 psi above maximum anticipated system operating pressure or 200 psi which ever is greater. The pressure shall be measured at the highest point in the section of pipeline being tested. The piping shall hold the test pressure for 2 hours without pumping. Repair of all visible leaks is required in accordance with the OWNER or INSPECTOR'S instructions.

C. Pressure tests on copper tubing

1. Test piping 1 inch and less in diameter after installation at 150 psi. The piping shall hold the test pressure for 2 hours without pumping. Repair of all visible leaks is required in accordance with the OWNER or INSPECTOR'S instructions.

2. Test piping 1 ¼ - 2 inches in diameter after installation at 150 psi. The piping shall hold the test pressure for 2 hours without pumping. . Repair of all visible leaks is required in accordance with the OWNER or INSPECTOR'S instructions.

D. Water quality analysis

1. In taking water samples for chemical analysis the contractor shall have the sample placed in their name and the name of the project also on the label. The sample shall be taken to a laboratory that is approved by DEP for the performance of that analysis.

2. The Contractor/Developer shall supply the OWNER and the INSPECTOR with a copy of the results as soon as they are available.

E. Compaction test

1. Compaction test as required shall be done as directed by the OWNER or INSPECTOR by a company certified to complete and certify the test.

2. The Contractor or Developer shall provide a copy of the test results to the OWNER/INSPECTOR.

3. Compaction shall be 95% in the Cartway and 90% in other areas unless specified by the Owner.

F. Piping, valves, specials, etc., specified herein shall be essentially the standard product of the manufactures, who have been regularly engaged in the successful production of that product consisting of high quality for a period of five (5) years.

1.03 SUBMITTALS

A. Furnish Manufacture's affidavit for the following:

1. Ductile iron pipe and fittings

2. Copper tubing

3. Gate valves, check valves, air release valves, pressure reducing valves, etc.

4. Corporation and curb stops.

5. Valve boxes.

6. Tapping sleeves and valves

7. Fire hydrants and blow-offs

8. Detection tape.

9. Concrete chambers, hatches, frames and covers, etc.

10. Submersible pumps and controls.

11. And any other material as deemed necessary by the OWNER/ENGINEER/INSPECTOR

B. Manufacture's affidavit shall state that al materials furnished comply with all applicable provisions of the referenced standards and specifications thereto described herein.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery, storage, and handling of the piping, valves, and appurtenances shall be in accordance with the manufacture's recommendations, and as supplemented herein.

B. Pipe and related materials shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such material be dropped or skidded against piping already on the ground. Any material dropped or damaged shall be marked and removed from the job site by the end of the workday.

C. Pipe and related materials shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. All pipe, valves and appurtenances shall be carefully lowered or raised into place, with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall pipe or accessories be dropped or dumped. Any material dropped or dumped shall be marked and removed from the job site by the end of the workday.

D. Pipe, pipe lining, fittings, valves, and all related materials shall be thoroughly inspected for defects prior to their being installed. Any defective, damaged, or unsound material, as determined by the OWNER, shall be repaired or replaced as directed at no additional cost to the OWNER. Once defective material has been identified it shall be marked and removed from the job site by the end of the workday.

E. All lumps, blisters and excess coating shall be removed from the end of each pipe or fitting. The joints shall be wire brushed and wiped clean, and kept dry and free from oil and grease before the pipe is installed.

1.05 PIPE INSTALLATION

A. Installation of all ductile iron pipes shall be accomplished in accordance with the manufacture's recommendations, common safe construction practices, and as supplemented in this section. The water line shall have a minimum of 4' of cover.

B. Water line shall be bedded in a minimum of 6" of fine material and not more then 8" to provide a rock free (larger than 2" diameter) environment under the pipe. There shall be 6" of the same material placed above the pipe. The bedding material shall be PA NO. 8 or approved equal. The bedding shall be installed as shown on the standard detail in these specifications.

C. Installation of copper service lines that have been open cut, or areas of a service line that has been open cut, shall be bedded in sand of the same grade as used in children's sand boxes. The bedding shall be 4 to 6 inches below the pipeline and 6 inches above.

1.06 FITTING INSTALLATION

A. Installation of all ductile iron fittings shall be accomplished in accordance with the manufacture's recommendations, common safe construction practices, and as supplemented in this section.

B. Fittings shall be restrained by either the use of poured concrete thrust blocking, and or an approved mechanical restraint system, or both as directed by the OWNER or INSPECTOR. Concrete use shall have a 2000-psi load bearing strength.

1.07 VALVE INSTALLATION

A. Installation of control valve shall be a fitting, and shall be restrained to the fitting. The approved restraint assemblies shall be Mega-Lug or approved similar device, <u>in no case shall rods and duck lugs be used</u>.

1.08 FIRE HYDRANT INSTALLATION

A. Fire hydrant installation shall be in accordance with the spacing requirements in these specifications. Fire hydrants shall be installed by the use of a hydrant "TEE", and the gate valve shall be restrained to the "TEE". The hydrant shall be restrained to the lateral water line by the use of Mega-Lug of other approved restraining assembly. <u>In no case shall the use of rods and duck lugs be used of allowed.</u>

B. All fire hydrants shall have a poured in place concrete thrust and support blocking, or as approved by the Owner. There shall also be a concrete support pad at ground level that is 18” minimum from the outside edge of the barrel of the fire hydrant. This pad shall be a minimum of 6” thick. There shall be a minimum of 2” and a maximum of 4” clearance for the bottom of the hydrant flange bolts and the top of the pad. If the pad should include the control valve the pad shall be extended so that there is at least 6” of concrete from the outside edge of the valve box.

C. All fire hydrants installed in the Shippensburg Borough Authority system shall be painted chrome yellow in color.

1.09 VALVE BOX INSTALLATION

A. Valve boxes shall be installed on every valve and shall be level with the ground surface. These boxes shall be securely supported at the base and shall be centered on the operating nut of the valve.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ductile Iron Pipe

1. Ductile iron pipe shall be centrifugally cast, annealed ductile iron manufactured in accordance with ANSI A21.51, and conform to AWWA Standard C151

2. Joints on ductile iron pipe shall be push-on of mechanical joint and shall conform to ANSI A21.11 and AWWA Standard C111. All joints shall be furnished with the appropriate accessories.

3. All ductile iron-pipe shall be class 52 unless otherwise specified, and shall conform to AWWA Standards C150.

4. All ductile iron pipe shall have a concrete mortar lining in accordance with ANSI A21.4 and AWWA Standard C104

5. Paint seal coating on all ductile iron pipe shall conform to ANSI 21.4

6. Pressure rating shall be 250 psi of greater as specified

B. COPPER PIPE

1. Copper pipe shall be of ASTM B88 type “K” annealed.

2. Copper pipe shall be supplied in 100’ roll lengths.

C. FITTINGS

1. Ductile iron fittings shall be compact unless otherwise specified and conform to AWWA Standard C-153. Fittings shall also meet ANSI 21.10, 250 psi rating.

2. Joints on fittings shall be mechanical joint type in accordance with ANSI 21.11 and AWWA Standard C111.

3. Furnish the fittings with the required accessories as specified.

D. SERVICE LINE FITTINGS

1. Corporation Stop

a. The corporation stop shall be of a square design to allow maximum grip of flat wrenches on the center part of the corporation stop. Corporation stop shall be the conventional plug type design. Thread shall be AWWA taper thread (CC) on inlet side and *Grip Joint or Quick Joint on the outlet depending on size.*

b. Manufacture shall be Ford Meter Corp. model *FB1000-3G for ¾”, FB1000-4G for 1”, FB1000-6Q for 1-1/2”, FB1000-7Q for 2”* and there are **no substitutes allowed.**

2. Curb Stops

a. The curb stop shall be of a full flow ball valve design. They shall have the standard tee head design and the body permits only a 90-degree turn on and off. All curb stops shall meet or exceed the AWWA Standard C800. The end design shall be of the grip joint type by using a grip joint nut to compress a Buna-N beveled gasket to make a watertight seal around the pipe. A bronze split ring is drawn down when the nut is tightened providing the mechanical seal and lock on the pipe.

b. Manufacture shall be Ford Meter Corp. model *B44-xxx-Q* and there are **no substitutes allowed.**

3. Swivel Eight Bend Coupling

a. All *Swivel Joint Couplings* shall meet or exceed the AWWA Standard C800. They shall have a *female copper thread swivel nut inlet and a quick joint nut on outlet*.

b. Manufacture shall be Ford Meter Corp. model *LA04-xxSI-Q* and there are **no substitutes allowed**.

c. *All Swivel Joint Couplings shall have Ford Meter Corp. Ring Adapters model RA42-xx used between the corporation stop and the swivel bend coupling* ***no substitutes allowed.***

4. Coppersetters

a. All coppersetters shall be made using lead free solder. They will have a dual angle check valve on the outlet side. The check valve shall be spring loaded, of brass, plastic and stainless steel construction and have a removable cap for in-line servicing. The connection to the meter shall be with saddle nut ends. The inlet valve shall be an angle ball valve and have pad lock wings. The water line connections shall be of the grip joint type. The setter shall be for a 5/8”x3/4” meter and be 24” in height.

b. Manufacture shall be Ford Meter Corp model *VBHC72-24-44-33Q* only **no substitutes allowed**.

5. Water Meter Boxes

a. The meter box shall be a molded one piece plastic, with the middle of the wall formulated to provide excellent insulating properties, as well as high rigidity and strength. The typical wall thickness exceeds ½” and freestanding vertical loads of 20,000 lbs. The interior surface shall be bright white to provide easy reading. There shall be an anti-settling flange on the bottom of the box. The material shall be modified polyethylene with a UV degradation protectant. The exterior shall be black with 100% color retention. The box shall exceed ASTM D-746 brittleness standards. The wall textures shall be smooth. There shall be a 4” horseshoe opening in the bottom of the box to allow the waterline to pass through.

b. Manufacture of the meter box is Mid-States 18” x 36” with notches on bottom for waterline.

c. *Meter Box Covers*

Water Meter Box cover shall be manufactured by Ford Meter Corp. model A32-T, and shall meet ASTM A48-92, Class 25 along with a E-coating finish.

6. Curb Boxes

a. All curb stop boxes shall be 3-piece, gray-cast iron and conform to AWWA Standard C110, ANSI A21.10-82, ASTM A438-62 and ASTM A48-76. They shall be adjustable and have integrally cast male threads. The top of the box shall be marked WATER.

b. The base of the curb box shall have a inside diameter of 2 ¼" and accommodate a curb stop up to 1 ¼". The wall thickness shall be ¼". The height shall be adjustable and specified by job instructions, however it is incumbent on the contractor to provide the correct height. The bottom shall have feet to allow support with an opening that is 2 ¾" x 3 11/16" horseshoe type. The lid shall have a pentagonal bolt that has sides of ½" with an overall dimension of 13/16".

c. Manufacture shall be Tyler Pipe, Model 93D with the following part numbers 144946, 145028, and 145325, substitutions allowed but not without prior approval of the OWNER

E. VALVES 3" AND ABOVE

1. Gate valves 3" and larger shall be resilient seated and meet or exceed AWWA C509. The gate valve shall be made of ductile iron as to conform to ASTM A536 with a minimum tensile strength of 65,000 pounds, and have a working pressure rating of 250 PSI. Gate valve shall have zero leakage at rated working pressure. The valve shall have a clear and unobstructed waterway with no pockets. The shell shall be tested and certified to 500 PSI. Valves shall be listed by Underwritters Laboratories, INC, and shall conform to UL262. Factory Mutual Research (FM), Approval Class Numbers 1120 and 1130, shall approve the valve. All internal and external ferrous surfaces of the valve shall have a fusion bonded epoxy coating, complying with ANSI and AWWA C550, applied electrostatically prior to assembly. The exterior of the valve wedge shall be fully encapsulated with nitrile rubber. The wedge shall be symmetrical and seat equally well with flow in either direction. The thickness of the nitrile rubber shall be at least ¼". The stem shall be bronze in full compliance with Section 4.7 of AWWA C509, and be removable without removing the bonnet. The wedge shall engage the stem by use of a stem nut independent

of the wedge. The stem shall be sealed with three o-rings. The top two o-rings shall be replaceable with the valve fully open and while subject to rated pressure. All exterior bolting shall be made of 316 stainless steel. The valve shall have thrust washers located above and below the thrush collar for easy operation. The valve shall be suitable for buried applications.

1. Valve shall open when turned to the left.

2. The valve shall have a 2’ square operating nut.

3. The flanges on the valve shall be mechanical joint unless otherwise specified.

4. Manufactures American Darling series 2500, or approved equal. All approved equal must be submitted at least 7 days prior to the opening of any bids for review.

5. Valves 16” and larger shall have a bypass valve attached.

2. Tapping valve shall meet all of the above standards with the exception that they will have flanged inlets and mechanical joint outlet. They shall conform to AWWA Standard C500 applicable section.

F. Tapping Sleeves

1. The Contractor shall verify the type and size of the existing waterline before ordering any tapping sleeve. He shall measure and provide to the Owner/Inspector or designated representative the outside diameter. The sleeve shall conform to the applicable section of AWWA Standard C500.

2. The tapping sleeve shall be manufactured from gray cast iron meeting or exceeding ASTM A126 Grade B. The sleeve shall be lightweight compact type with the seal to be effected by a single rectangular gasket used inside the sleeve. The sleeve shall be made in two halves, which can be bolted around the main. Gaskets shall extend the entire length of the sleeve to form a watertight joint when the sideblots are properly tightened.

3. Coating of the tapping sleeve shall be inside with asphaltic varnish per federal specification TT-V-51, Military specification MIL C-450, or

equal. The coating on the outside of the tapping sleeve shall be of two (2) coats of bituminous coating in accordance with AWWA specifications.

4. The Contractor shall furnish manufacture's certified shop drawings, in accordance with Section 01340 of these specifications. In addition, the manufacture shall furnish an affidavit that the tapping sleeve conforms with the applicable provisions of AWWA Standard C500.

5. Manufacture (no substitutes allowed)

A. American Darling
B. Mueller

G. Submersible Pumps

1. Construction: Cast Iron shell with cooling fins, Class F insulation, permanently lubricated double seal ball bearings, cast iron impeller keyed to stainless steel shaft, cast iron pedestal and mechanical seal moisture sensor.

2. Controls: Differential type mercury float switch with "pump off", "high water mark".

3. Control Panel: NEMA-1 enclosure with circuit breakers, contractors, control transformer and fuse, test-off-auto selector switch, and pilot lights.

4. Type: Simplex

5. Manufactures: Weil Pump Co. Model 1400 or equal.

H. Air Release Valves

1. The air release valve shall close drip tight, incorporating an adjustable Buna-N orifice button. All internal parts shall be of stainless steel. The float shall be of stainless steel and be capable of withstanding a test pressure of 1,000 PSIG. The linkage/lever mechanism shall be able to be removed from the valve without disassembly of the mechanism, and shall be designed to prevent jamming.

2. The body and cover shall be cast iron conforming to ASTM A126, Class B and shall be designed to withstand a test pressure of 450 PSIG.

3. The air release valve shall be manufactured by G.A. Industries, INC., Mars, Pa (no substitutes).

I. Blow Off Hydrant

1. Blow-off hydrant shall a 3-inch DIP barrel, 2 ½ inch NST nozzle with cap and chain, inlet shall be 2-inch and have a cast iron box with locking device.

2. Manufacture: The Kupferle Foundry Company, St. Louis, Mo. Or approved equal.

J. Detection Tape

1. Detection tape shall be a metal detectable reinforced underground utility marking tape with a 50 gauge (0.0005”) solid aluminum core with permanent printing under mylar.

2. The detection tape shall consist of a aluminum 9.0 mill (0.0009”) overall thickness, coated and colored cross-woven polyethylene, with no less than 2,500 lbs of tensile strength per 12” width and color coded suitable for direct burial.

3. Detection tape shall be 2-inch width minimum.

K. Miscellaneous Valves and Specials

1. Lever operated ball valves shall be bronze suitable for 225 pounds services. Valves shall be one piece body design, blowout proof stem, reinforced Teflon seats and seals, threaded ends and lever operated. Valve shall be manufactured by Stockham, NIBCO, or Crane.

2. Pressure Gauges shall be 4” inch dial size, with range suitable for line pressure, glycerin filled, gauges shall be furnished with shut-off valve and diaphragm seals to protect gauges form surges and solids. Gauges shall be as manufactured by, Ashcroft, H.O. Trice, and Pollard.

L. Mechanical Joint Couplings

1. Ductile Iron mechanical couplings of the gasketed, sleeve type shall be furnished and installed as required. The coupling shall be of the proper diameter to make a tight joint. The coupling shall have no stops. All couplings shall be for a minimum of 150 psi working pressure.

2. Each coupling shall conform to AWWA C153 specification and shall have a middle ring of appropriate length suitable for the application. There shall be tow (2) follower glands and two (2) rubber compound wedge section gaskets and sufficient trackhead bolts to properly compress the gaskets.

3. Couplings to be buried shall be coated inside and outside with two coats of asphaltic varnish in accordance with federal specification TT-V-51c.

4. Manufacturers:

   A. Dresser Manufacturing Division

   B. Rockwell

   C. Griffin Pipe

   D. Approved Equal

PART 3 EXECUTION

3.01 LAYING PIPE

A. General

1. Following trench excavation, pipe lying shall proceed upgrade with pipe laid carefully, hubs upgrade, spigot ends fully centered into adjacent hubs, and true lines and grades given.

2. Each section of pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and joints. Each pipe shall be firmly held into position so that the invert forms a continuous grade with the invert of the pipe previously placed.

3. Under no conditions shall pipe be laid in water, on sub-grade containing frost, and/or when trench conditions are suitable for such work. In all cases, water shall be kept out of the trench until concrete cradles, supports, encasement, or saddles, where used, and materials in the joints have hardened.

4. Any pipe that has its grade or joint disturbed after laying shall be taken up and relied. Any section of pipe already laid and found to be defective shall be taken up and replaced with new pipe without expense to the owner.

5. Walking or working on top of the completed pipeline, except as may be necessary in backfilling or tamping, shall not be permitted until the trench has been backfilled to a height of at least 2 feet over the top of the pipeline.

6. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by watertight plug.

B. Ductile Iron Pipe

1. Push-on Type Joints

1. The inside of the bell and the outside of the spigot end shall be thoroughly cleaned to remove oil, grit, excess coating and other foreign matter. These parts shall be kept clean throughout assembly at the joint.

2. The circular rubber gasket shall be flexed inward and inserted in the gasket recess of the bell socket. Care shall be taken to insure that the gasket is properly seated.

3. A minimum amount of lubricant shall be evenly applied to the spigot end with a brush. Gasket lubricant shall be as supplied by the manufacturer.

4. The spigot end shall be properly centered and force applied, using a ratchet jack-type tool or a roller chain-type jack, until the white stripe at the spigot end is just visible at the face of the bell. Any required deflection shall be made only after the joint assembly has been made.

5. Proper positioning of the gasket shall be checked with a “feeler” gauge after each joint is made.

6. The edges of “ field cut” pipe shall be touched up with a file or grinder so as to remove rough edges and facilitate assembly.

2. Mechanical Joints

a. Thoroughly clean the bell and the spigot end of the pipe of all foreign mater and wash them with soapy water.

b. Slip the gland and gasket over the plain end and seat the spigot end in the bell (the small end of the gasket and the lip on the gland shall face the bell).

c. Push gasket into position with fingers, making sure it is evenly seated.

d. Move gland into position for bolting, insert bolts and make all nuts finger-tight, keeping the spigot centrally located within the bell.

e. Tighten bolts in accordance with the manufacture's written instructions.

f. If effective sealing is not obtained at the maximum torque indicated above, the joint must be disassembled and reassembled after thorough cleaning. Under no circumstances are bolts to be over stressed.

3. Mechanically Coupled Joints.

a. Mechanical couplings shall be installed in strict compliance with the manufacture's instructions, and in a manner to insure permanently thigh joints under all reasonable conditions of expansion, contraction, shifting, and settlement. The required torque ranges for the joint harness shall be as specified by the manufacture.

3.02 SETTING VALVES AND VALVE BOXES

A. All valves shall be provided with a valve box or precast concrete valve manhole as detailed on the Drawings.

B. Unless otherwise directed by the Owner all valves shall be set with their stems truly vertical.

C. The tops of the valve box shall be set neatly to the grades of the surface of the existing ground, unless directed otherwise by the Owner.

D. The valve box shall not transfer shock or stress to the valve and shall be centered and plumb over the operating nut of the valve.

E. Valve boxes shall be free of all debris.

F. When raising the valve box to final paving grade the valve box risers shall be set at least than ¼" below grade and not more than ½" below grade.

3.03 REACTION BACKING

A. Concrete reaction backing and/or restrained joints shall be provided for all tees and bends, both horizontal and vertical, at the location indicated on the Drawings. Concrete shall be class A in

3.04 CONNECTIONS TO EXISTING WATERLINES

A. Connections shall be made to existing water mains at various points in the project. These connections shall be made in strict accordance with the requirement set forth by the AUTHORITY and/or ENGINEER, and as specified hereinafter.

B. General

1. The CONTRACTOR shall take special precautions so as not to disturb in any way the functional operation of the existing water main, except on a preplanned schedule basis, the time and date of which will be in established in advance with the Authority. The Authority shall be given at least three (3) days advance notice of this schedule and may approve or deny based on system conditions.

2. The CONTRACTOR shall at no time operate water valves in the existing water system without the presence of a duly qualified representative of the OWNER present.

3. The CONTRACTOR shall be responsible for working in coordination with the OWNER to ensure that all customers that may be affected by the interruption if service are given adequate notice of the pending interruption of service. If the number of customers and the length on the interruption are such , in the opinion of the OWNER, to justify the need, the CONTRACTOR shall place advertisement in the local newspaper at a minimum of three (3) times, prior to the scheduled interruption of service. The cost of such advertising shall be included in the price bid for the various connections.

C. Schedule of Work: The CONTRACTOR shall follow the installation schedule as outlined below:

1. In location where new water mains are to be connected to existing water mains the CONTRACTOR will not be permitted to proceed with the construction of the connection until he has dug test pits, and determined the exact location, elevation, and type of the existing water

2. If the conditions and geometry of the connection warrant, as determined by data obtained from the excavation of the test pits, the CONTRACTOR shall order any necessary additional materials.

3. The CONTRACTOR shall notify the OWNER at least 5 days in advance of the time he proposes to install the connection, and shall establish with the OWNER the procedures to be followed in installing the connection, including the day and time of the proposed shutdown, and establish a new date and time for the shutdown, based on the OWNER'S knowledge of system conditions. The CONTRACTOR is hereby warned that the OWNER reserves the right to require that any particular connection be made at night or on Sunday.

4. Before the starting of the installation of a connection, the CONTRACTOR shall do as much work in advance as practicable prior to actually shutting down the main, and shall have all necessary tools, equipment, materials, and labor on hand at the start of the work.

5. Once the existing main is cut, work shall be continuous until water service is restored.

6. Retainer glands or other types of restraint joints, and tie rods and clamps shall be used to the maximum extent possible, in lieu of concrete thrust blocks when installing connections, unless shown otherwise on the Drawings. If it is necessary to use concrete thrust blocks, the high early strength cement-concrete shall be used. If high early is used the concrete thrust blocks shall be enlarged and have Engineer's seal attached on the drawing showing that the size calculations have been checked.

3.05 DISINFECTION

A. Disinfect all potable water piping in accordance with Section 02730.

END OF SECTION

SECTION 02730

DISINFECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Disinfection of potable water mains.

1.02 DISINFECTION

A. Preliminary Flushing: Prior to disinfection, the section of pipeline being disinfected shall be flushed as thoroughly as possible with the waster pressure and outlets available. Flushing shall be done after the pressure and leakage tests have been completed. If necessary, the line shall be opened up to flush as in a case where no fire hydrants are available.

B. Chlorination

1. General. Before being placed in service, all potable water piping installed under this Contract shall be disinfected by chlorination

2. From of Chlorine for Disinfection. Either of the following methods may be followed upon approval of the ENGINEER.

a. Liquid Chlorine. A chlorine gas-water mixture shall be applied by means of a solution feed chlorinating device in combination with a booster pump for injecting the chlorine gas-water mixture into the main to be disinfected. This method shall be used only if the CONTRACTOR can demonstrate to the ENGINEER that the person supervising the operation is thoroughly familiar with and experienced in the handling of chlorine gas, and that the equipment to be used is suitable, and that proper safety equipment is available.

b. Calcium Hypochlorite Solution. A chlorine-water solution of 1 percent available chlorine shall be prepared, using granular calcium Hypochlorite, and this solution

shall then be injected or pumped into the pipeline. A chlorine-water solution of 1 percent available chlorine may be prepared by mixing approximately 1 pound of calcium Hypochlorite with 8.5 gallons of water.

3. Application of Chlorine. The Hypochlorite solution shall be applied to the water main with a gas or electrically powered chemical feed pump, designed for feeding chlorine solutions. For smaller applications, the solution may be prepared in a barrel, and then pumped into the main with a hand pump, such as a hydraulic pump. The dosage rate shall be such that the chlorine concentration in the water in the pipe is a minimum of 50p.p.m. Available chlorine. The following table gives the amount of calcium hypochlorite and the quantity of 1 percent hypochlorite solution required to produce 50 p.p.m. Chlorine concentration in 100 feet of Pipe:

Calcium Hypochlorite and Chlorine Solution required
To produce 50 p.p.m. Concentration in 100 feet of pipe

Pipe size	Contents in a 100-FT. Section			Amount of Calcium Hypochlorite		Chlorine Solution
Inches	Cu. Ft.	LBS.	Gals.	Ounces	LBS.	Gallons
6	19.60	1,225	147	1-1/2	0.091	0.73
8	34.90	2,180	261	2-1/2	0.159	1.30
10	54.55	3,405	408	4	0.252	2.06
12	78.55	4,905	588	5-5/8	0.350	2.88
16	139.60	8,725	1,044	10	0.621	5.22

4. Point of Application. The point of application of the chlorinating agent shall be at the high end of the pipeline section, and through a corporation stop inserted in the top of the new pipe. If the water for the preparation of the chlorine solution is supplied form a tap on the existing pipeline, there shall be a physical break between the injector supply and the injector or pump. If a physical break is not possible then an approved backflow prevention assembly shall be installed after the tap and before any pump or chemical injection point. This backflow assembly must be tested and certified functional by an approved tester on the day prior to the chlorination. A certificate of test will be required to be in possession of the worker using the equipment and on file with the ENGINEER/OWNER.

5. Rate of Application. The chlorine solution shall be pumped slowly into the new pipeline. Chlorine application shall not cease until the

entire main is filled with the chlorine solution. If required by the ENGINEER, the chlorine residual shall be measured at several points along the section of main being tested to insure that the proper dosage and distribution of the chlorine solution is obtained.

6. Prevention of Reverse Flow. Great care shall be exercised in manipulating valves, so that the strong chlorine solution in the line being treated will not flow back into the adjoining water distribution system.

7. Retention Period and Chlorine Concentration. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants in the section treated shall be operated, in order to disinfect the appurtenances. At the end of this 24-hour period, the treated water shall contain no less than 25 p.p.m. chlorine throughout the length of the main. Should the initial procedure fail to result in such results in the condition specified, the chlorination procedure shall be repeated until such results are obtained, at the CONTRACTOR'S expense.

8. Point of Discharge. The CONTRACTOR shall discharge the disinfecting solution from the mains through available outlets, or through taps in the main. The CONTRACTOR shall exercise all due precautions in discharging the chlorine bearing water since it is extremely toxic and, if allowed to flow into streams, can readily destroy aquatic life. If any damage to property or fish life occurs due to disposal of the disinfecting solution, the cost of the damage shall be paid by the CONTRACTOR. If the possibility of damage to aquatic life is such, in the opinion of the ENGINEER, that special precautions are required, the CONTRACTOR shall dechlorinate the disinfecting solution before it goes to waste. The chlorine solution may be neutralized by applying sodium thiosulfate in the ration of 2 parts thiosulfate to 1 part chlorine at the point of discharge.

9. Final Flushing. Following chlorination, the heavily chlorinated water shall be thoroughly flushed form the line at its extremities until the replacement water throughout its length, upon test, be proved comparable to the quality of water in the existing distribution system.

10. Flushing Water. Water for flushing will be provided by the OWNER, but at no time shall valves on the water distribution system be operated without the presence of a duly qualified representative of the OWNER.

11. Water for Testing. The OWNER will furnish water for one hydrostatic test and disinfection procedure. If pipelines must be retested and disinfected, the cost for additional water will be borne by the CONTRACTOR at the cost rate determined by the OWNER. Generally the rate used will be the current rate for bulk customers as established by the AUTHORITY.

1.03 DISINFECTION OF WATER MAIN CONNECTIONS

A. Since it may not be possible to disinfect the pipes, valves, and fittings installed at certain connections in the manner specified above, the CONTRACTOR shall proceed as follows:

1. Installation of Connection. Every precaution shall be observed during the installation of the connection to prevent foreign material and trench water from entering the pipe, fittings, and valves during their installation.

2. Disinfection: The interior of all pipe, fittings, and valves shall be swabbed with a 5 percent hypochlorite solution. A 5 percent hypochlorite solution can be obtained by mixing approximately 3 pounds of granular calcium hypochlorite in 5 gallons of water.

3. Flushing: After the pipe, fittings, and valves have been swabbed, they shall be thoroughly flushed with water.

1.04 DISPOSAL OF WATER

A. Again, the CONTRACTOR is reminded that the chlorinated water must be disposed of in a manner such that no damage occurs to fish life or vegetation. If the Department of Environmental Resources has regulations for waste water disposal, it shall be the CONTRACTOR'S responsibility to follow the regulations to their end.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 03420

PRECAST CONCRETE STRUCTURES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes precast concrete structures, plant cast, including the following:

1. Wall pipe and sleeves

2. Hatches

3. Ladders and ladder safety equipment

4. Manhole steps

B. Related Section:

1. Section 02221 – Trenching

2. Section 02710 – Water line Installation

1.02 PERFORMANCE REQUIREMENTS

A. Engineering Responsibility: Engage a fabricator who assumes undivided responsibility for engineering structural precast concrete units by employing a qualified professional engineer to prepare design calculations, fire-resistance calculations, shop drawings, and other structural data.

1.03 SUBMITTALS

A. Product data and instructions for manufactured materials and products.

B. Shop drawings prepared by or under the supervision of a qualifies professional engineer detailing fabrication and installation of precast concrete units. Indicate member dimensions and cross-section; location, sizes, and types of reinforcement, including special reinforcement; and lifting devices necessary for handling and erection.

C. Design mixes for each concrete mix. Submit revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustment.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed structural precast concrete work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Fabricator Qualification; Firm shall have two (2) years successful experience in producing structural precast concrete units similar to those indicated for this Project and with a record of successful in-service performance as well as sufficient production capacity to produce required units without delaying the Work

1. Fabricator must participate in the Precast/Prestressed Concrete Institute's (PCI) Plant Certification Program and be designated a PCI Certified Plant for the following product group and category.

2. Product Group and Category: Group C, Category C1

C. Professional Engineer Qualifications: A professional engineer legally authorized to practice in the jurisdiction where Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation and successful in-service performance of precast concrete units similar to this Project in material, design, and extent.

D. PCI Design Standard: Comply with recommendations of PCI MNL-120 " Design Handbook – Precast and Prestressed Concrete" applicable to types of structural precast concrete units indicated.

E. PCI Quality-Control Standard: Comply with recommendations of PCI MNL-116 " Manual for Quality Control for Plants and Production of precast and Prestressed Concrete Products," including manufacturing and testing procedures, quality-control recommendations, and chamber and dimensional tolerances for types of units required.

F. ACI Publication: Comply with the following ACI publications applicable to types of structural precast concrete units indicated:

1. ACI 301 " Specifications for Structural Concrete for Buildings."
2. ACI 318 (ACI318M) " Building Code Requirements for Reinforced Concrete."
3. ACI 350R-89 " Environmental Concrete Structures."

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver precast concrete units to Project site in such quantities and at such times to ensure continuity of installation. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and so that markings are visible.

B. Lift and support units only at designated lifting or support points as shown on final shop drawings.

C. Deliver anchorage items that are to be embedded in other construction before starting such work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 PRODUCTS

2.01 FORMWORK

A. Forms: Provide forms and, where required, form facing materials of metal, plastic, wood, or another acceptable material that is nonreactive with concrete and will produce required finish surfaces.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60 (ASTM A 615M, Grade 400), deformed.

B. Steel-Welded Wire Fabric: ASTM A 185, plain, cold drawn.

C. Supports for Reinforcing: Provide supports for reinforcement, including bolsters, chains, spacers and other devices for spacing, supporting, and fastening reinforcing, complying with CRSI recommendations.

1. For exposed-to-view concrete surfaces, where legs of support are in contact with forms, provide supports with legs that are protected with plastic (CRSI, Class 1) or stainless steel (CSRI, Class 2).

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I, or III

1. Use only one brand and type of cement throughout Project, unless otherwise acceptable to ENGINEER.

B. Fly Ash: Not permitted

C. Silica Flume: Not permitted

D. Normal-Weight Aggregates: ASTM C 33. Provide aggregates form single source.

E. Water: Potable

F. Admixtures, General: Provide admixtures for concrete that contain not more than 0.06 percent chloride ions by mass of Portland cement or cementations material.

G. Air-Entraining Admixture: ASTM C 260, certified by manufacture to be compatible with other required admixtures.

H. Water-Reducing Admixture: ASTM C 494, Type A

I. High-Range, Water Reducing Admixture: ASTM C 494, Type F

J. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E

K. Water-Reducing and Retarding Admixture: ASTM C 494, Type D

2.04 GROUT MATERIALS

A. Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2 ½ parts sand, by volume, with minimum water required for placement and hydration.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and a 30-minute working time.

C. Epoxy Grout: ASTM C 881, 2-component epoxy resin, of type, grade, and class to suit requirements.

2.05 CONCRETE MIXES

A. Prepare design mixes for each type of concrete required

B. Design mixes may be prepared by qualified independent testing agency or by qualified precast manufacturing plant personnel at precast fabricator’s option.

C. Normal-Weight Concrete: Proportion mixes by either laboratory trail batch or field test data methods according to ACI 211.1 and ACI 301, using materials to be used on the Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28-Day): 5000 psi (34.5 Mpa)

2. Maximum Water-Cement Ration at Point of Placement: 040

D. Add air-entraining admixture at manufacture's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows, with a tolerance of plus or minus 1 ½ percent:

1. Air Content: 6 percent for 1 inch maximum aggregate

2. Air Content: 6 percent for ¾ inch maximum aggregate

3. Air Content: 7 percent for ½ inch maximum aggregate

E. Other Admixtures: Use water-reducing, high-range water-reducing, water-reducing and accelerating, or water-reducing and retarding admixtures according to manufacture's direction.

F. Concrete-Mix Adjustments: Concrete-mix adjustments may be proposed when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.

2.06 FABRICATION

A. Formwork: Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete placing operations, temperature changes, and for pretensioning and detensioning operations. Maintain formwork to provide complete precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified in PCI MNL-116.

1. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial-formula, form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces requiring bond adhesion. Apply in compliance with manufacture's instructions.

B. Built-In Assemblies: Accurately position built-in assemblies and secure to formwork

C. Cast-in opening larger than 10 inches in diameter or 10 inches square according to final shop drawings.

D. Reinforcement: Comply with the recommendations of CRSI'S "Manual of Standards Practice" for fabricating, lacing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.

2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations.

3. Place reinforcement to obtain at least the minimum coverage's for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed in to concrete, not towards exposed concrete surfaces.

4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Concrete Mixing: Comply with requirements and ASTM C 94. Following concrete batching, no additional water may be added.

F. Concrete Placement: Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast units. Comply with requirements of ACI 304R for measuring, mixing, transporting, and placing concrete.

1. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with ACI 309R.

2. Comply with ACI 306R procedures for cold-weather concrete placement.

3. Comply with ACI 305R procedures for hot-weather concrete placement.

G. Identify pickup points of precast concrete units and orientation in structure with permanent marking, complying with marking indicated on final shop

H. Cure concrete according to the requirements of PCI MNL-116 b y moisture retention without heat or by accelerated heat curing, using low-pressure live steam or radiant heat moisture.

I. Delay detensioning prestressed concrete units until concrete has attained at least 70 percent of its compressive strength as established by test cylinders cured under the same conditions as the concrete.

1. If concrete has been heat cured, de-tension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.

2. Detention pretensioned tendons, using a sequence either by gradually releasing tensioning jacks or by heat-cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.

J. Finish formed surfaces of precast concrete as indicated for each type of unit, and as follows:

1. Standard Finish: Normal plant-run finish produced in forms that impart a smooth finish concrete. Small surface holes caused by air bubbles, normal color variations, and form joint marks, and minor chips and spalls will be tolerated. Major or unsightly imperfections, honeycombs, or structural defect are not permitted.

K. Finish unformed surfaces by trowel, unless otherwise indicated. Consolidate concrete; bring to proper level with straightedge, float, and trowel to a smooth uniform finish.

2.07 WALL PIPES AND WALL SLEEVES

A. Wall pipes shall be ductile iron, or steel flange, flange and flange, or flange, flange and mechanical joint. Wall pipes shall be tapped for studs as required.

B. Wall sleeves shall be ductile iron or steel plain end flange and plain end. Annular space shall be sealed watertight using modular seals.

2.08 HATCHES

A. General: Provide manufactured hatches cast into chamber slabs. Hatch dimensions shall be as indicated on the Standard Detail Drawings.

B. Materials

1. Door Leaf: ¼ inch, aluminum diamond plate equipped with slam lock and removable handle, compression spring operators and hold-open arm. Hatch shall be capable to withstanding an HS-20 wheel load.

2. Hinges: Forged brass with stainless steel pins.

3. Hardware: Zinc plated and chromate sealed.

4. Watertight Frame: ¼ inch aluminum channel with perimeter anchors flanged and 1 ½ inch drainage coupling.

5. Finishes: Mill finish with bituminous coating to exterior of frame by manufacture.

6. Warranty: Manufacture supplied guarantee against defects in material or workmanship for a period five years.

C. Manufactures:

1. The Bilco Company

2. Halliday Products

3. Approved equal

2.09 ALUMINUM LADDER SAFETY EXTENSION

A. General – Provide post with telescoping tubular section that has been manufactured explicitly for ladder use.

B. Post shall be fastened to ladder rungs and lock automatically when fully extended.

C. Post shall be aluminum, 6061-T alloy, with mill finish.

D. All hardware shall be stainless steel.

2.10 MANHOLE STEPS

A. Aluminum Steps: Aluminum alloy 6061-T6, tensile 38,000 psi, yield 35,000 psi. Manhole steps shall be installed in the reinforced concrete

walls of base, riser and eccentric top sections. Coat the portion of aluminum step embedded in concrete with bituminous paint.

B. Reinforce Plastic Steps: Composed of a 3/8 inch grade 60 ASTM A615 deformed steel reinforcing bar completely encapsulated in Grade 49108, ASTM D4104 polypropylene copolymer compound Type II.

1. Manufactures:

a. MA Industries, Inc. Type PS4

b.

c. Approved equal

2.11 JOINT SEALING METHODS (MANHOLES AND CHAMBERS)

A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL-116 requirements.

B. Strength of precast concrete units will be considered potentially deficient when precast concrete units fail to comply with requirements, including the following:

1. Fail to meet compressive strength test requirements.

2. Concrete curing and protection of precast units against extremes in temperature fail to meet requirements.

3. Precast units are damaged during handling and erecting.

C. Testing: When there is evidence that the strength of precast concrete units may be deficient or may not meet requirements, the OWNER will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTMC 42.

1. A minimum of 3 representative cores will be taken from precast concrete units of suspect strength, form locations directed by ENGINEER.

2. Cores will be tested, following immersion in water, in a wet condition per ACI 301 when precast concrete units will be wet under service conditions.

3. Cores will be tested in an air-dry condition per ACI 301 when precast concrete units will be dry under service conditions.

4. Strength of concrete for each series or 3 cores will be considered satisfactory if the average compressive strength and no core compressive strength is less than 75 percent of the 28-day design compressive strength.

5. Test results will be made in writing on the same day that the tests are made, with copies to ENGINEER, CONTRACTOR, and precast fabricator. Test reports will include the Project identification name and number, date, name of precast concrete fabricator, name of concrete testing agency; identification letter, name, and type of precast concrete unit or units represented by core tests, design compressive strength, compressive strength at break and type of break, corrected for length-diameter ratio, and direction of applied load to core with respect to horizontal plane of concrete as placed.

D. Patching: Where core test results are satisfactory and precast concrete units meet requirements, solidly fill core holes with patching mortar and finish to match adjacent concrete surfaces.

E. Dimensional Tolerances: Units having dimensions smaller or greater than required and not meeting tolerances limits may be subject to additional testing.

1. Precast units having dimensions greater than required will be rejected if the appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction. Repair or remove and replace rejected units, as required, to meet construction conditions.

F. Defective Work: Precast concrete units that do not conform to requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that meet requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions for compliance with requirements, including installation tolerances, true and level bearing surfaces, and other conditions affecting performance of precast concrete units. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, Prestressed units, unless otherwise acceptable to ENGINEER.

B. Erection Tolerances: Install precast units level, plumb, square, and true, without exceeding the recommended erection tolerances of PCI MNL-127 “Recommended Practice for Erection of Precast Concrete”.

C. Shore and brace precast concrete units to maintain location, stability, and alignment until permanent connections are installed.

D. Grouting Connections and Joints: After precast concrete units have been placed and secured, grout open spaces and keyways, connections, and joints as follows:

1. Grout Type: Nonmetallic nonshrinking grout.

2. Provide forms or other acceptable method to retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, plumb, and level with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it hardens.

3.03 CLEANING

A. Clean exposed surfaces of precast concrete units after erection to remove weld marks, other markings, dirt, and stains.

1. Wash and rinse according to precast concrete fabricator’s recommendations. Protect other work from staining or damage due to cleaning operations.

2. Do not use cleaning materials or processes that could change the appearance of exposed finishes.

END OF SECTION