

# **Elverson Water Company, Inc.**

26 E. Main Street • P.O. Box 20

Elverson, PA 19520

610-286-5115 • fax 610-286-8954

# **STANDARDS & TECHNICAL SPECIFICATIONS**

for the

Design and Construction of  
Water Distribution Systems  
and Appurtenances

September 23, 2015

## STANDARD SPECIFICATIONS

### I. STANDARDS

- A. These standards outline the minimum acceptable standards for construction of water lines and appurtenances for residential or commercial properties to the Elverson Water Company Water Distribution System. Work shall be done in accordance with these Standard Specifications. The Applicant shall review Company Ordinances, Building Codes, and other regulations for his Work's conformance.
- B. The Work shall be executed by qualified, careful, and experienced workmen. Work connected to the Elverson Water Company Distribution System shall be designed and constructed using the materials and products as listed herein or approved equals. The Company shall determine what is an approved equal. The cost of the evaluation of proposed alternate methods or materials shall be paid by the Applicant.
- C. Any connections other than those from residential or commercial properties, or any appurtenances or special structures not covered in these Standards must be submitted separately to the Company for review. These Standards are to be considered the minimum requirements and further requirements may be made upon the Applicant at the Company's direction if it is believed to be in the best interests of the Company.

### II. DEFINITIONS

Whenever the following terms are used in these standards, the intent and meaning shall be interpreted as follows:

Applicant - A person who applies for a water connection or main extension permit to Elverson Water Company. The applicant may be the property owner of the dwelling or commercial establishment or an agent acting on his behalf.

Engineer - The Company Engineer or his authorized representative acting as an Agent of Elverson Water Company.

Inspector - The authorized representative of the Company assigned to make detailed inspection of any or all portions of the Work.

Company - Elverson Water Company, Inc.

Work - The proposed construction activities, materials, schedules and/or procedures of the applicant.

### III. INSPECTION BY Company

- A. The Company will review (observe) the Work for compliance with these Standard Specifications. During construction, the Inspector will make periodic inspections. The primary responsibility for compliance with design drawings and specifications for conformance rests with the Applicant. The cost of the inspections shall be paid for by the Applicant. Inspection fees shall be determined by the Company. Final inspection of the completed connection will also be made by the Inspector.
- B. Inspection will be required for:
  - 1. Open trenches for pipes, valves, hydrants, etc.
  - 2. Pipe bedding before backfill.

3. Air and water tests performed on pipes and fixtures.
  4. Final lateral connection into the main including meter, backflow devices, valving and pressure regulator installation.
  5. Others as deemed necessary by the Company.
- C. No work can be accepted or use made of the Company's Water System without the Company's inspection and approval.

#### IV. QUALITY CONTROL

- A. The Applicant is responsible for maintaining quality control of the work. Specifically, the Applicant shall:
1. Perform Work by persons qualified to produce workmanship of specified quality.
  2. Comply fully with manufacturers' instructions, including each step in sequence.
  3. Request clarification from Company before proceeding if manufacturer's instructions conflict with these Standards.
  4. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- B. Test results must also be submitted by the Applicant to the Company for the following if required for the water connection:
1. Sieve analysis for stone or special fills.
  2. Backfill compaction in any roadway or highway including right-of-ways.
  3. Pressure testing of all mains and laterals (150% of static main pressure for 20 minutes).
- C. If requested by Company, Applicant shall comply with the following provisions regarding testing:
1. Applicant shall employ services of an independent firm to perform testing. Applicant shall pay for services of that firm.
  2. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the Company
  3. Reports shall be submitted by the independent firm to the Company certifying observations and results of tests and indicating compliance or noncompliance with the specifications.
  4. Make arrangements with independent firm and pay for additional samples and tests required for Applicant's use.
  5. Provide for retesting if the Work does not meet the requirements of these Standards.

## V. RECORD DRAWINGS AND INFORMATION

- A. After construction and before final approval or acceptance by the Company, the Applicant shall furnish to the Company one (1) reproducible or three (3) prints of each drawing showing the overall plan and details of the work as actually constructed. The drawings shall indicate actual dimensions by measurements made by the Applicant and shall be used as record drawings by the Company.
- B. In addition, the Applicant shall furnish to the Company, the location of each individual service connection for the water facilities in the form required by the Company.
- C. Whenever a stone or concrete sidewalk or curb exists, service connections shall be indicated by witness signs cut into the sidewalk or curb.
- D. Marks indicating water laterals shall be painted blue.

## VI. LAWS AND EASEMENTS

- A. The Applicant shall at all times observe and comply with all Federal, State and County laws and regulations, and local bylaws, ordinances and regulations in any manner affecting the conduct of the work or applying to employees on the project, as well as all safety precautions, and orders or decrees which have been promulgated or enacted, or which may be promulgated or enacted by any legal bodies or tribunals having authority or jurisdiction over the work, materials, equipment, employees or the contract; such observance and compliance shall be solely and without qualification the responsibility of the Applicant without reliance on superintendence or direction by the Company. The duty of enforcement of all said laws, ordinances, regulations, order or decrees lies with the body or agency promulgating them, not with the Company.
- B. Also, the Applicant must specifically comply with the following:
  - 1. The Elverson Water Company Tariff.
  - 2. All applicable building and plumbing codes of the Company.
  - 3. All applicable Federal, State and County regulations including but not limited to:
    - a. Regulations concerning Wetlands
    - b. Regulations concerning Sedimentation and Erosion Control.
- C. The Applicant shall comply with the requirements of the State of Pennsylvania, Chester County, Local Municipality and Elverson Water Company related to the occupancy of existing roads and highways and shall procure all permits, pay all charges and fees and shall give all notices necessary and incident to the proper and lawful prosecution of work

## VII. SAFETY

- A. The Applicant shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The Applicant's attention is drawn to the regulations of the

Pennsylvania Department of Labor and Industry relating to trenches and excavations, tunnel construction, equipment, materials, labor, safety, sanitation, and other regulations on which the applicant shall be fully informed and with which he shall fully comply.

- B. Attention is also drawn to the U.S. Department of Labor, Occupational Safety and Health Administration, Construction Safety and Health Regulations, Part 1926, with particular emphasis on those sub-parts which apply to the work involved in installing water distribution systems.
- C. Observance of and compliance with the above regulations shall be solely and without qualification, the responsibility of the Applicant, without reliance on superintendence of or direction by the Company, the Inspector, or the Engineer. The duty of enforcing such laws and regulations lie with the said Department, not with the Company.

#### VIII. GENERAL CONSTRUCTION NOTES

- A. The Applicant shall supervise and direct the work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction.
- B. The Applicant shall patch, repair and finish all damaged surfaces caused by the work using materials of the same kinds.
- C. Fabrication and installation of all materials, finishes, etc. shall be in accordance with manufacturer's written instructions.
- D. All construction to be in accordance with local building codes and OSHA.
- E. The Applicant shall field verify location of all utilities prior to construction. Prior to use of any power equipment for excavation, applicant shall call the Pennsylvania One Call System, 1-800-242-1776, in accordance with Pennsylvania Act 172.
- F. Applicant shall field verify existing conditions and dimensions prior to ordering and/or fabrication of any materials

#### IX. STANDARD SPECIFICATIONS, ABBREVIATIONS

- A. All standard specification abbreviations used herein, such as ACI, ASTM, AWWA, etc., shall refer to specifications published by the organizations listed below Standard specifications shall be the latest revision.

ASTM	American Society of Testing Materials
ASCE	American Society of Civil Engineers
AWWA	American Water Works Association
AASHTO	American Association of State Highway and Transportation Officials
ASA	American Standards Association
AISC	American Institute of Steel Construction
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute

## X. LINES AND GRADES

- A. The Applicant shall provide competent personnel and shall be responsible for the layout, lines and grades for all water pipes. Water Mains shall generally be located at the centerlines of streets and roadways when service laterals extends to both sides of a street. All elevations shall be based on U.S. Geologic Survey datum.

## XI. APPLICATION

- A. A properly completed application form and sketch plan of the proposed water line and connection must be submitted to the Company. The Company must approve the application prior to any construction. Any Equivalent Capacity Unit charge applicable to the property served by the application shall be due prior to the issuance of either a main extension agreement or water connection permit.

## XII. PROCEDURE

- A. File an "Application for Water Service" at the Water Company's office at 26 E. Main Street during regular business hours.
- B. Notify the Water Company of the date & time you plan to begin the work by calling 610-286-5115 during regular business hours. The Water Company will need a 24 hour advance notice.
  - 1. A Water Company employee will visit your home or place of business at a mutually convenient date & time,
  - 2. approve a location for the service line and water meter, and
  - 3. review your plans and schedule for the installation.
- C. Notify the Water Company BEFORE backfilling the service line trench.
  - 1. A Water Company employee will visit your location and make a service line inspection. Service lines backfilled before inspection, will require re-trenching at the customer's expense so that inspection can be made.
- D. Visit the Water Company's office at 26 E. Main Street during regular business hours to receive an approved Water Company owned idler/spacer that matches the length of the water meter to be installed.
- E. Within one week of receiving the idler/spacer, notify the Water Company of the date & time you would like final inspection by calling 610-286-5115 during regular business hours. The Water Company will need a 24 hour advance notice.
  - 1. A Water Company employee will visit your location and make the final inspection. If all things are in order, the employee will remove and keep the idler/spacer, and in its place, install the water meter. At that point, water service will be considered activated.

## **TECHNICAL SPECIFICATIONS**

### I. EXCAVATION

#### A. GENERAL

1. Trenches shall be excavated, protected and backfilled as necessary for the completion of the work to be done under these specifications. All excavation shall be in open trenches. Boring and/or tunneling may be allowed under separate application to Company. In general, trenches may be excavated and backfilled either by machinery or by hand provided however, that hand excavation may be required where necessary to protect existing structures, utilities, or private or public properties and provided further that backfilling shall be done by hand to the extent hereinafter specified.
2. The Applicant shall perform all excavation of every description and of whatever substance encountered, to the depths indicated by the Drawings, as specified herein, or as required by the Company. In performing the work as specified in this Section, the Applicant shall conform to the current regulations of the Pennsylvania Department of Labor and Industry of Excavations and Construction and the U.S. Department of Labor OSHA regulations. All excavated materials not required for backfill shall be removed and wasted or otherwise disposed of as required of specified.
3. If excavation is stopped on any trench for any reason and the excavation is left open for an extended length of time in advance of construction, the Applicant shall backfill the trench and not excavate again until work proceeds.

#### B. RESPONSIBILITY FOR CONDITION OF EXCAVATION

1. The Applicant shall solely be responsible for the condition of all excavations made by him. All slides and cave-ins shall be removed by the Applicant at whatever time and under whatever circumstances they may occur.
2. The failure or refusal of the Company to require the use of bracing or sheeting or a better quality, grade, or section, or larger sizes of steel or timber, or to require sheeting, bracing struts, or shoring to be left in place, shall not in anyway or to any extent relieve the Applicant of any responsibility concerning the condition of excavation or any of his obligations nor impose any liability on the Company; nor shall any delay, whether caused by any action or want on the part of the Applicant, or by any act of the Engineer, Company, or their agents, or employees, resulting in the keeping of an excavation open longer than would otherwise have been necessary, relieve the Applicant from the necessity of properly and adequately protecting the excavation from caving or slipping, nor from any of his obligations relating to injury of persons or property.

#### C. ACCOMMODATION OF TRAFFIC

1. Streets shall not be unnecessarily obstructed, and unless the Applicant has been authorized in writing, he shall not completely close the street and shall take such measures as may be necessary to keep the street or road open and safe for traffic.
2. The Applicant shall construct and maintain such adequate and proper bridges over excavations as may be necessary or as required for the safety accommodation of pedestrians or vehicles. The

Applicant shall furnish and erect, without cost to the Company, substantial barricades at crossings of trenches, or along the trench, to protect the traveling public.

3. The Applicant shall not obstruct fire hydrants.
4. The roadway on one side of the line of work shall be kept open at all times.
5. The streets, crosswalks and sidewalks shall be kept clean, clear and free for the passage of vehicles or pedestrians. A straight and continuous passageway of sidewalks and over crosswalks, at least three feet in width, shall be preserved free from all obstruction.
6. In narrow or congested streets or alleys, when so required, the Applicant shall complete his work up to a point designated by the Company before opening the work ahead, in order to give access to garages and other places. The Applicant shall in all cases so arrange his work as to cause the least inconvenience to property owners consistent with the proper prosecution of the work.

#### D. PREPARATION OF THE SITE

1. Prior to any excavation, the Applicant shall properly prepare the right-of way or site of the work.
2. The Applicant shall first provide adequate protection for all lawns, trees, shrubs, landscape work, fences, utilities and sidewalks that are to remain in place, and for such other existing similar growth, structures and facilities. Such protection shall be maintained so long as necessary to prevent damage.
3. All grass and sod shall be carefully removed from all lawns and stored, protected and replaced following backfill and tamping of the excavated area, providing it is in suitable growing condition. If the sod is not satisfactory for replanting, the Applicant shall seed the excavated area. The Applicant shall also remove all plant material, where required, store and replant the material following completion of the work or replace with suitable material. The plant material shall be examined six months after being planted, and all material not growing shall be replaced.
4. The clearing and grubbing operations shall be maintained a sufficient distance ahead of the excavating operation. The site shall be cleared of all dead trees, stumps, brush, roots and other objectionable material.
5. The Applicant shall remove all street and sidewalk pavement, curbing, rip-rap, barriers and such obstacles as required for the proper execution of the work, and shall store and protect all materials that can be used in restoring the site to its original condition.
6. The amount of pavement and road surface to be removed shall depend on the width of the trench and the width and length of the pavement area required for the construction of all structures and appurtenances. The width of the pavement removed along the normal trench for the installation of the pipe shall not exceed the width of the trench by more than 12 inches on each side of the trench. The width and length of the area of pavement removed for the construction of structures shall not exceed the maximum linear dimensions of such structures by more than eighteen inches on each side. The Applicant shall saw cut the pavement along straight lines. The face of the remaining pavement shall be vertical.



## E. REMOVAL AND STORAGE OF MATERIAL

1. In the business districts or in streets that are important thoroughfares, or in narrow streets or at any other locations where the working space is limited, the material excavated from the first 100 feet of any opening, or from such additional length as may be necessary, shall, when required by the Company, be removed from the street as soon as excavated. The material subsequently excavated shall be used to refill the trench. In no case will the Applicant be allowed to cast excavated material beyond the curb or right-of-way lines, or on sidewalks or lawns.
2. In case more material is excavated from any trench than can be backfilled or can be stored on the street or within the limits of the right-of-way, leaving space for the traffic and drainage as herein provided, the excess material shall be removed to some convenient place provided by the Applicant.

## F. WIDTH AND DEPTH OF TRENCHES

1. The trench excavation shall be of sufficient width and depth to provide adequate room for the construction or installation of the work. Walls of trenches shall be kept as nearly vertical as possible, and the trenches shall be twelve (12) inches wider than the outside diameter at the barrel of the pipe to be laid therein. The trenches shall be excavated true to line so there is a clear space of eight (8) inches on each side of the barrel of the pipe to a height not less than the top of the pipe. If sheeting is required at the level of the pipe, the dimensions in the foregoing sentence shall be applicable to the inside faces of the sheeting.
2. Pipe laid in rock trenches will always require a supplementary foundation to provide uniform support for the bearing surface of the pipe. The foundation shall be formed by placement in the bottom of the trench, to a depth of six (6) inches, a layer of AASHTQ #57 crushed stone or with suitable fill from on site as determined by the Company.
3. When the material encountered at subgrade is unstable, it shall be removed from the trench bottom. The excavation below subgrade of such unsuitable material shall be backfilled with suitable fill from the site or with AASHTO #57 crushed stone. In rock excavation, if trenches are shattered by blasting below or beyond the lines of excavation specified herein, the trench shall be refilled to specified lines of excavation with suitable compacted fill. If earth trenches are excavated beyond the specified depths, they shall be backfilled to the proper grade with AASHTO #57 crushed stone. Suitable fill from the site may be used in lieu of such crushed stone as determined by the Company.
4. In all cases for water mains, the bottom of the pipe shall be fully and uniformly supported; the full load of the pipe resting on the barrel of the pipe.
5. No trench shall be excavated more than one hundred and fifty feet in advance of the completed line. Wherever a branch for a proposed extension is built in rock, the required trench shall be excavated a distance of not less than five feet beyond the end of the branch, in the direction of the proposed extension.

## G. SHEETING, BRACING AND SHORING

1. All work performed and materials used for sheeting, bracing and shoring shall be in conformity with the requirements of the State Department of Labor and Industry and other State and Local laws and requirements.

2. Whenever, in the opinion of the Company, the materials being used or the methods being followed are not in conformance with generally accepted practices for that type of work, the Company may stop that phase of the work.
3. All sheeting, sheet piling, braces or shores shall be driven or put in place by men especially skilled in such work, and shall be so arranged that they may be withdrawn as the trenches are backfilled, without injury to the water distribution line and its appurtenances, and without injury to or settlement of adjacent structures and pavements.
4. Where the maximum width of trench may be exceeded under these Specifications and where permitted under the Regulations of the Pennsylvania Department of Labor and Industry, the sides of the trench may be sloped in lieu of providing sheeting and bracing. If the sloping of trench banks is permitted, the slope shall begin at a point 12 inches above the top of the pipe. Sheeting shall be installed as required by the Department of Labor and Industry Regulations to support the vertical part of the excavation.
5. Sheeting, sheet piling, bracing and shores shall be withdrawn and removed as the trenches are being backfilled, except where and to such an extent as the Company shall require in writing, that the same be left in place, or where they shall permit the Applicant to leave the same in place at the Applicant's own request.
6. In withdrawing sheeting and sheet piling, special care shall be taken to insure that all voids or holes left by the planks as they are withdrawn, are filled with satisfactory material and thoroughly rammed with thin rammers provided especially for that purpose.
7. The Applicant shall cut off any sheeting or sheet piling left whenever and at such points as the Company shall require and shall remove from the work the portion cut off.
8. The failure or refusal of the Company to require the use of sheeting or sheet piling or a better quality or larger sizes of timber, or to require sheeting, sheet piling, bracing or shores to be left in place, or the giving or failure to give any orders or directions as to the manner or methods of driving or placing sheeting, sheet piling, bracing or shores shall not in any way or to any extent relieve the Applicant of any or all of his obligations under the contract, nor impose any liability on the Company.

#### H. DEWATERING

1. The Applicant shall remove by pumping bailing or other means, any water which may accumulate or be found in the trenches or other excavations and shall form all dams, flumes, or other works necessary to keep them entirely clear of water while the water lines and other structures are being constructed. The Applicant shall have sufficient pumping machinery available at all times on the site ready for immediate use.
2. The water from the trenches and excavation shall be disposed of in such a manner as will not cause a public health nuisance or injure public or private property, work completed or in progress, surface of the streets, or cause interference with use of the area by the public. Where points of drainage discharge are in question, approval shall be obtained from the Company. In addition, all such work and activities shall be conducted in accordance with the recommendations and regulations of the

Pennsylvania Department of Environmental Resources, Chester County, and Elverson Water Company with respect to soil erosion and sediment control. The most restrictive regulations shall apply.

I. EXPLOSIVES AND BLASTING

1. The use of explosives shall be governed by the "Regulations for the Storage, Handling and Use of Explosives" of the Pennsylvania Department of Labor and Industry.
2. All blasting shall be done under the supervision of a competent blasting expert, and subject to the State including Department of Labor and Industry, County or local regulations for blasting.
3. All blasting will be permitted only after securing written approval from the Company. No blasting shall be done adjacent to existing lines or structures which may be damaged through blasting operations, and under no circumstances shall blasting be done on the site during or for a period of at least forty-eight hours after concrete has been placed.
4. Rock excavation within five feet of sewer, water or gas mains shall be done by hand or with light charges of explosives, and the utmost care shall be exercised to avoid disturbance of the such lines. Any damage to them by blasting shall be promptly repaired by the Applicant at his expense, and in no case shall blasting be done within twenty-five feet of newly laid water line.
5. Prior to blasting, sufficient warning shall be given all persons in the vicinity and traffic shall be stopped at the proper distance from the site and controlled by watchmen.
6. The Applicant shall use the utmost care in the use of explosives necessary for the prosecution of the work not to endanger life or property. All blasting operations shall be conducted by experienced men who have proper certificates or licenses. The handling and use of explosives shall be done strictly in accordance with the Specifications issued by the United States Bureau of Mines and with any Federal or State regulations now in effect or that might become effective in the future; and in compliance with the Local and State Laws. Failure to observe necessary precautions will be sufficient grounds for temporary suspension of the work. All explosives shall be transported and stored in a secure manner and in accordance with the Local and State Laws; all vehicles and such storage placed shall be marked clearly "Dangerous - EXPLOSIVES!", and shall be in care of a competent watchman at all times. In no case shall caps or other detonators be stored or transported with dynamite or other explosives.

J. UTILITIES

1. The Applicant shall carefully support and protect from injury all existing gas pipes, water pipes, steam pipes, electric conduits, sewers, drains, hydrants, valve boxes and other structures which do not have to be changed in their location. In case of injury or temporary removal, these facilities shall be restored to as satisfactory conditions as that in which they were found.

K. BARRICADES. GUARDS AND SAFETY PROVISIONS

1. To protect persons from injury and to avoid property damage, adequate barricades, construction signs, torches, red lanterns and guards, as required, shall be placed and maintained during the progress of the construction work and until it is safe for traffic or pedestrian use. Whenever required, watchman shall be provided to prevent accidents. All rules and regulations of local, state and county authorities regarding safety provisions shall be observed.

## L. DRAINS. CULVERTS SEWERS AND OTHER OBSTRUCTIONS

1. Adequate provision shall be made for the flow of sewers, drains, culverts and watercourses encountered during the construction, and the structures which may have been disturbed shall be satisfactorily restored upon completion of the work.
2. Where concrete gutter drains along State highways or municipal roadways are disturbed, the entire gutter shall be reconstructed unless construction joints permit replacement only of the sections disturbed. All pipes and crushed stone or gravel located under these gutters so removed or disturbed shall be completely replaced. All this work shall be in complete accordance with the requirements of the Pennsylvania Department of Transportation and/or local governing officials.

## M. DRILLING OR JACKING OF CASING

1. Tunneling will not be allowed without the approval of the Company. Specific Drawings and Specifications shall be submitted to the Company for review and approval.
2. The installation of casing by drilling or jacking shall be carried on without disturbance of the embankment. All working operations of the Applicant, subcontractor and/or their agents or employees must be subordinate to the free and unobstructed use of the right-of-way for the passage of traffic without delay or danger to life, equipment or property. The Applicant shall conduct his operations in such a manner that all work will be performed below road level, and standard clearances shall be maintained at all times.
3. The Applicant must be fully equipped and experienced in the installation of pipes by drilling or jacking.
4. The Applicant shall inspect the location that is to be drilled or jacked and familiarize himself with the conditions under which the work will be performed and with all necessary details as to the orderly prosecution of the work.
5. If, in the opinion of the Company, the installation of the pipe is being conducted in an unsafe manner, the Applicant will be required to stop work until suitable agreements are reached between the Applicant and the Company.
6. The casing pipe used for the operation shall be black steel material having a yield strength of 35,000 psi. All joints between sections of casing shall be made by continuous welding and, if deemed necessary by the Company, a welding bank shall be used to eliminate misalignment.
7. The entire annular space between the carrier pipe and the casing shall be grouted with cement grout.

## II. BACKFILL

## A. GENERAL

1. The work shall not be covered until inspected by the Company and approved as satisfactory work. If the work is found unsatisfactory with respect to workmanship and materials, the Applicant shall

immediately remedy, remove and/or replace with new materials and proper construction that part rejected.

2. Backfilling shall include all backfilling, ramming or rolling as required, the regrading of adjacent disturbed areas, the replacing of drains and other surface and subsurface structures, the placing and maintaining of temporary sidewalks and driveways, furnishing of suitable backfill material if necessary, and all appurtenant work incidental thereto.
3. It is the intent of the following requirements for the backfilling of trenches to specify methods which will:
  - a. result in thorough compaction of the backfilled material without displacement of the grade or alignment of the sewer or water main or their appurtenances and,
  - b. minimize settlement of the backfilled materials and
  - c. assure a sound foundation above the pipe. If displacement of the pipeline or settlement of the backfilled material does occur, it will be considered as conclusive evidence of improper workmanship or the inclusion of unsuitable materials or both and it shall be the Contractor's responsibility to remove and recompact the settled material and regard and realign the pipeline.
4. During the course of the backfilling operation, the Company may, at any location or depth of trench, make tests to determine whether the Applicant's compaction operations are adequate, proper and sufficient.
5. The Applicant shall comply fully with the requirements of the Pennsylvania Department of Transportation, and Elverson Water Company relative to backfill for all work along State, County, Municipal or Private Roadways, and meet the requirements if in excess of these specifications.

#### B. BACKFILL MATERIAL

1. Excavated material free of large stones will normally be suitable as backfill for ductile iron water pipe installations. Where excavated material is unsuitable for backfill, it must be removed from the work area and suitable material secured from other sources

#### C. BACKFILL PROCEDURES

1. The procedure for backfilling water laterals shall be as follows: The bottom of the trench shall be free of stones larger than gravel and prepared against settling. After the pipe has been installed, the trench, to a height 6" over the pipe, shall be refilled with stone bedding material in such a manner as not to disturb the pipelines. Suitable backfill from the site shall only be acceptable as approved by the Company.
2. The procedure for backfilling water mains shall be as follows: The bottom of the trench shall be free of large stones and have proper compaction against the barrel of the pipe. After the pipe has been installed, the trench shall be refilled with suitable backfill from the site. In the absence of such suitable backfill, stone bedding material may be secured from other sources as approved by the Company

3. When in or within two (2) feet of paved surfaces, the remainder of the trench shall be backfilled by one of the following methods and using the following suitable materials.
4. When the pipeline is located within a State Highway, County, Municipal or Private road, parking lot or other roadway area, the trench shall be backfilled with PA 2RC stone as shown on the attached detail or to meet PA DOT standards whichever is more restrictive. Alternatives will only be accepted as agreed in writing by the Company.
5. When the water line is located within two feet of a paved shoulder or roadway of an existing Pennsylvania State or County Highway, Municipal or Private street or road, parking lot or other roadway area, the trench shall be backfilled with compacted PA 2RC stone. Alternatives will only be accepted as agreed in writing by the Company.
6. Backfilling material, placed within two (2) feet of manholes, hydrants, or other structures, shall be deposited uniformly around the sides in layers not exceeding eight (8) inches in depth, and solidly tamped in such a manner as to avoid impairing the structures or producing unequal pressures on them.

### III. RESTORATION AND CLEANUP

#### A. RESTORATION OF PAVEMENT. CURBS AND SIDEWALKS

1. All pavements, road surfaces, sidewalks, driveways or curbs which the Applicant is required to replace shall be reconstructed in accordance with roadway specifications, subdivision rules and regulations and other applicable requirements of the Company or the PA DOT.
2. The Company shall make an examination of all surfaces where pipelines have been constructed, and shall note any depressions due to breakage, settlements, washouts or other causes that may be attributed to the construction.
3. Upon written order from the Company, the Applicant shall repair breaks, refill depressions, remove any surplus that has previously been left upon the trenches, or make other repairs or replacements which are necessary to place all the work in first class condition.
4. Materials used in replacing pavements, walks, curbs and gutters shall be at least equal to the same quality as those in the original construction or as called for above.
5. After the trenches have been backfilled and properly compacted to within one (1) inch of the original existing grade, Applicant shall provide over all areas where existing paving has been removed, a temporary paving consisting of bituminous material applied to the base course described above at the rate of 1.5 gallons per square yard, using a mechanical spreader. The bituminous material shall conform to classification C-I or NC-I. Pennsylvania Department of Highways Specification for Bituminous Materials - Bulletin 25. No. 1-B Type B crushed stone shall then be applied at a rate of twenty five pounds per square yard and rolled with a ten ton trench roller until tight. The completed surface of this based course shall meet the surface of the adjacent pavement. Any sinking or settlement of the trench areas shall be brought to proper grade by loosening the surface and removing or adding material as may be required, after which the entire area, including the surrounding surface, shall be rolled until it is compacted satisfactorily.

6. The Applicant shall maintain the temporary surfacing for a period of six (6) months or until such time as he may be required to install permanent repaving. In the event the six (6) month period ends during a time of adverse weather conditions, the Applicant shall continue to maintain the temporary surfacing until it becomes permissible to construct the permanent repaving.
7. After the temporary surfacing has remained in place for the appropriate length of time it shall be constructed as shown on the typical Trench Detail.
8. A heated bitumastic sealer or BMI asphalt cement, meeting the Pennsylvania Department of Transportation specifications shall be applied along the trench edge making a watertight bond between the original and new paving. This material shall be evenly spread, covering an area six (6) inches wide.
9. As soon as the trench has been backfilled and properly tamped, the shoulder areas shall be restored in the manner described herein and backfilled using the methods described herein to an elevation of six (6) inches below the finished shoulder grade. The remainder of the trench shall be backfilled using PA 2RC stone, placed and rolled to the true line and grade of the shoulder area. Where a trench is contained within the shoulder area and parallel to the roadway, it shall be mandatory to effect final compaction of the selected material utilizing a roller weighing 10 tons.
10. After the shoulder area has been backfilled and compacted to the satisfaction of the Company, a bituminous penetration material, RT-2C or TR-2W, shall be applied at the rate of 0.30 gallons per square yard to provide a permanent traffic surface.
11. Any depressions in the trench area shall be brought to grade by repeating the above operation.

## B. RESTORATION OF LANDSCAPING

### 1. General

- a. The Applicant shall, in the preparation of the site, provide adequate protection for all lawns, trees, shrubs, and landscape work that are to remain in place or shall remove and preserve all topsoil within areas in which the lawns cannot be protected. Such protection or preservation shall be maintained so long as necessary to prevent damage or deterioration due to the operations of the Applicant.
- b. All landscape work and topsoil that must be removed shall be stored and protected and replanted or relayed following backfill and tamping of the excavated areas, providing it is suitable for reuse. If such material is not suitable, it must be replaced.
- c. All areas other than traveled roads and landscaped areas that are disturbed shall be graded and a ground cover of rye grass planted so that erosion of said areas is kept to a minimum until natural vegetation flourishes and predominates.

### 2. Lawns

- a. All lawns which are damaged due to the execution of this work shall be replaced in accordance with these instructions.

- b. The sowing of seed shall be done only within the seasons extending from September 1st to October 15th and from April 15th to June 1st, except at such times therein as the Engineer may deem inadvisable because of weather or other conditions, and except as otherwise specified. In the event that seasonal and other conditions permit, and upon approval of the Company, seeding may start earlier and/or be continued later than the specified date. The sowing of seed shall be started on all areas during the first planting season after the areas have been released to the Applicant for lawn operations.

### 3. Sodding

- a. When directed by the Company, Contractor shall restore disturbed areas with sod instead of seeding.
- b. Contractor may use sod as a substitute for seeding if preferred.
- c. Surface to be sodded shall be prepared and fertilized as for seeding. Prepared surface shall be moistened to a depth of  $\frac{1}{2}$  inch immediately prior to sodding. Lay sod smoothly with no visible open joints. Joints shall be staggered. Water sodded areas immediately after installation to saturate sod and soil to a depth of four inches. Water frequently to prevent grass and soil from drying out. Maintain until sod is well established. Replace sod in areas which show deterioration or bare spots.

### 4. Clean-up of Undisturbed Areas

- a. All areas adjacent to the disturbed areas of work shall be cleaned of all rubbish, debris and other materials, following the completion of the lawn and planting work.

## C. CLEANUP

1. The Contractor shall clean up the site of the work and the work itself, thoroughly flushing all sewers and drains in a satisfactory manner.
2. All surplus pipeline materials, blocking and banding, excavated materials, cut trees and brush, broken pieces of pavement and concrete, rubbish and dirt shall be removed from the site and disposed of by the Applicant. All temporary structures and the project sign shall be removed by the Applicant and the areas around the temporary buildings, the sign and any access roads or paths to these areas shall be regraded as necessary and restored to their condition prior to construction.
3. All cleanup work shall be completed to the satisfaction of the Company.

## IV. DISTRIBUTION SYSTEM MATERIALS AND PRODUCTS

### A. PIPE AND FITTINGS

1. Pipe
  - a. All water mains shall be Ductile Cast Iron Pipe or Plastic PVC Pipe. Pipe shall be joined with gasketed push-on type joints manufactured in accordance with standards specified.



- b. All service line connections (laterals) shall be either copper or Plastic PVC. Alternative service line pipe shall only be used upon approval by the Company. Piping shall be joined with materials meeting the standards specified in this section. Standards not listed shall be determined at the discretion of the Company.
- c. All Mains shall be subject to a pressure test at 150% of the projected static water pressure in the Water Main. Such pressure shall hold for 20 minutes.

<u>Standard Designation</u>	<u>Subject</u>
ANSI/AWWA C-150/A 21.50	Thickness Design of Ductile Iron Pipe
ANST/AWWA C-151/A 21.51	Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or other Liquids, Class 2
ANSI/AWWA C-104/A 21.4	Cement-Mortar Lining for Gray Iron and Ductile Iron Pressure Pipe and Fittings
ASTM D 3034	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings SDR 35 (4" to 15")
ASTM F 679	Standard Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Sewer Pipe and Fittings, Wall Thickness T-1 (18" to 27")
ASTM F 477	Rubber-Gasket Joints for Poly (Vinyl Chloride) (PVC) Gravity Sewer Pipe (4" to 27")
ASTM D 3213	Standard Specification for Pipe Joints using Elastomeric Seals

## 2. Fittings

- a. Fittings for ductile cast iron pipe shall be gasketed push-on or mechanical joints. All fittings shall be manufactured in accordance with ANSI/AWWA C-110/A 21.10 Ductile Iron Fittings 2" through 48".
- b. Fittings for polyvinyl chloride pipe shall be constructed of polyvinyl chloride having a cell classification of 12454-13 or 12454-C or 13343-C as defined in ASTM D-1784.

## 3. Steel Casing

- a. Minimum 18" diameter, .250" steel casing pipe shall be used for protection of water pipe in tunnels and borings.

B. MANHOLES

1. Concrete

- a. Cast-in-place manhole bases and pipe cradles shall be 5000 psi concrete as shown in the standard details.

2. Precast Sections

- a. All precast reinforced concrete manholes shall meet the requirements of ASTM Designation C478. Riser sections shall have tongue and groove ends and minimum wall thickness as shown in the standard details. Eccentric cones shall have the same minimum wall thickness and area of circumferential steel reinforcement as the round riser section. Top sections shall have a top width of such design and dimensions as to properly support the required manhole frame and cover and the lower joint shall be of tongue and groove design.

3. Water Connections

- a. Laterals shall be connected as shown in Section VI. of this Specifications.

C. CONCRETE WORK

1. Cement

- a. Cement shall conform to the requirements of ASTM Designation C150, Type I for Portland Cement. Where air-entrainment, moderate or high resistance to sulphates, high-early strength or low heat of hydration types are required, they shall conform to the following requirements:

Air-entraining Portland Cement	ASTM C 175, Type IIA
--------------------------------	----------------------

Vinyl resin additive to entrain air between 3 and 6 percent by volume	ASTM C 226
---	------------

High early strength Portland Cement	ASTM C 150, Type III
-------------------------------------	----------------------

2. Concrete Aggregates

- a. All concrete mixtures shall use fine and coarse aggregate to conform to the requirements of ASTM Designation C33.

3. Water for Concrete

- a. Water containing sewage, clay, oil or filth must not be used for concrete. The water for use with cement concrete mixtures shall be clean and free from injurious amount of vegetable matter, oil, acid and alkali. The tensile strength of a mortar molded in a standard briquette mold, composed of one part of cement and three parts of standard Ottawa sand, proportioned by volume, using

the water sample under test, shall be at least equal to that developed with distilled water when mixed in the same proportion with the same cement and sand.

#### 4. Concrete

- a. Three classes of concrete will normally be used for all types of construction. 3000 PSI concrete shall be used for all structural members. It shall have a compressive strength at 28 days of 3000 psi. 2500 PSI concrete to be used for buttresses, backfill etc. and shall have a minimum compressive strength at 28 days of 2500 psi.
- b. Concrete for manhole inverts shall be 4000 psi rated after 28 days.
- c. Ready-mixed concrete may be used providing it conforms to the requirements of ASTM C94 or ASTM C685-73T.
- d. Retarding densifiers, such as Plastiment (Sika Chemical Corp.); Sanotard (L. Sonneborn & Sons); Possolith (MasterBuilders); or Retardwell (Johns-Manville) or equals may be added in accordance with manufacturer's recommendations depending on the particular application.
- e. Initial curing shall immediately follow the concrete finishing. Concrete shall be kept continuously moist at least overnight. Curing compounds conforming to "Specifications for Liquid Membrane-Forming Compounds for Curing Concrete" (ASTM C309) may be used when applied according to the manufacturer's recommendations. Other acceptable methods of curing are by ponding, continuous sprinkling or using an absorptive mat or fabric kept continuously wet.
- f. Curing shall continue until the cumulative number of days or fractions of days (not necessarily consecutive) during which the temperature of air in contact with the concrete is above 500F has totaled seven days. When high early strength concrete is used, curing shall continue for a total of three days. During the curing period, the concrete shall be protected from mechanical injury, sun and running water.
- g. Grout shall be composed of one part Portland Cement to two parts Type A sand as approved for concrete work.
- h. Where "non-shrink" grout is called for by the Drawings or specified herein, it shall be Five Star, Non-Metallic, Non-Shrink Grout as manufactured by U.S. Grout Corp., Old Greenwich, Conn. 06879 or approved equal.

#### 5. Reinforcement

- a. Material for reinforcing bars shall conform to ASTM Designation A615 with deformations conforming to ASTM A305 Intermediate Grade. Bars shall be of new stock, free from scale, rust, oil, paint or coatings of any kind.
- b. Steel wire fabric shall consist of steel wire conforming to the requirements of the ASTM Designation A82, rigidly welded at all joints and points of intersection to form a fabric reinforcement

## 6. Structural and Miscellaneous Steel

- a. All plain and fabricated structural and miscellaneous steel shall conform to ASTM Designation A 36, Specification for Structural Steel.
- b. High strength bolts shall conform to "Specification for High Strength Carbon Steel Bolts for Structural Joints, Including Suitable Nuts and Plain Hardened Washers", ASTM A325. When high tension bolts are used in erection of steel for making permanent field connections, the connection shall be in accordance with "Specifications for Assembly of Structural Joints Using High Strength Bolts" issued by the Research Council on Riveted and Bolted Joints of the Engineering Foundation.
- c. All welding shall comply with the requirements of the Specifications of the American Institute of Steel Construction and of the American Welding Society for the type of steel to be welded. Welding electrodes shall be suitable for the type of steel to be welded.
- d. All structural steel to be furnished shall be cleaned of rust or mill scale in accordance with the Steel Structures Painting Council Surface Cleaning Specifications SSPC-SP 2-63 "Hand Cleaning" and/or AAPC-SP 3-63 "Power Tool Cleaning" as required.
- e. Paint shall be applied after field welding and on steel surfaces which will be in contact with concrete.
- f. All structural steel to be furnished shall receive one shop coat of paint which shall conform to the Steel Structures Painting Council's Paint Specifications SSPC-PA 1-64 "Shop, Field and Maintenance Painting."

## V. PIPE HANDLING AND INSTALLATION

- A. Following the trench preparation, pipe laying shall proceed with the bells upgrade. Each length of pipe shall be carefully handled and accurately laid by skilled workmen to line and grade in dry trenches without the use of any form of blocking. Each length shall be cleaned, the joint prepared in accordance with the manufacturer's recommendations and be shoved home against the previously installed downgrade length.
- B. Suitable tools and equipment shall be used for proper handling, storing and placing of the pipe and fittings in the trench. In order to avoid damage to the interior of the pipe, lifting hooks or bars shall not be inserted therein. All pipe and fittings shall be checked for defects and injuries as laying proceeds. Imperfect pipe materials shall be rejected and removed from the work.
- C. If pipe must be cut to fit as closing pieces, such cuts shall be evenly and squarely made in a workmanlike manner according to manufacturers requirements with approved equipment. Injury to lining or coatings shall be satisfactorily repaired.

## VI. SERVICE CONNECTIONS

### A. General Requirements

1. The customer shall be responsible for the installation of all plumbing beyond the Water Company's curb stop, including the service line, fixtures and related accessories.

2. The installation must be performed by a licensed registered plumber or by the individual customer.
3. All work must be completed in accordance with these specifications and the attached "Service Line Diagram".
4. The Water Company must approve the location of the service line and water meter before work begins.
5. The Water Company shall make two inspections. One prior to backfilling the trench, and the other prior to activating the service.
6. All Service Connections shall be subject to a pressure test at 150% of the static water pressure in the Water Main. Such pressure shall hold for 20 minutes.

B. Service Lines

1. The service line shall be installed at least 36" below the ground surface.
2. Piping shall be type 'K' copper with a minimum diameter of 3/4" for residential uses. A larger diameter and alternative material of piping may be required for commercial, industrial and institutional uses.
3. The service line shall run continuously wherever possible.
4. Joints, if required, shall be flared couplings. No solder joints shall be permitted underground.
5. Backfill material shall be smooth and without rocks. If soil is rocky, a sand screening shall be required to protect the line.
6. The service line must run directly from the Water Company's curb stop to the premises. Connection to any other line is not permitted.
7. The service line shall not be installed in the same trench with other utility lines.

C. Fixtures

1. The water meter shall be supplied by the Water Company. The use of idlers or bypasses prior to meter installation or at any time is prohibited.

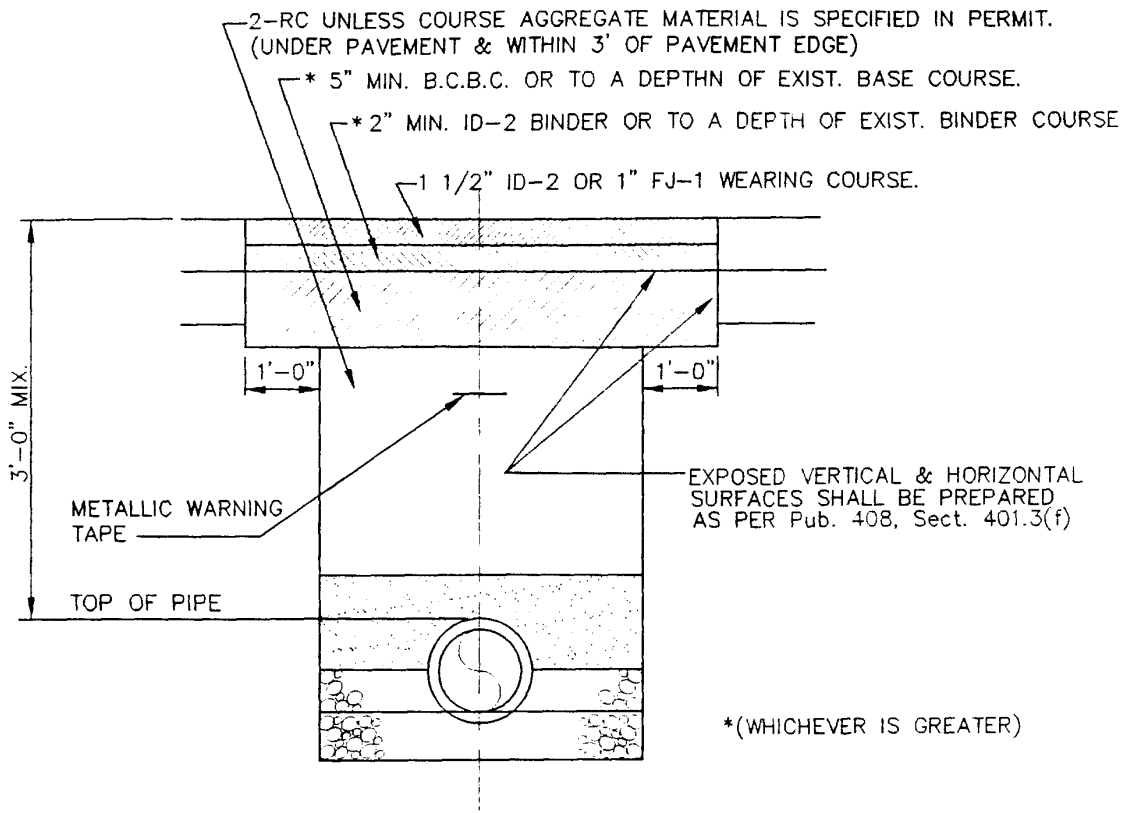
2. The hand valve, check valve or backflow preventer, pressure regulator and stop & waste valve shall be provided by the customer in accordance with the following chart:

Fixture	Specification
Hand value	Watts gate, globe or ball valve or equal
Check value (residential)  Backflow preventer (commercial, industrial, institutional or sprinkler use)	Watts dual check valve or equal  Zurn/Wilkins RPZ backflow preventer or equal
Pressure regulator	Watts 300 psi pressure regulator or equal
Stop & waste valve	Watts SWS valve or equal

3. All work and fixtures shall comply with BOCA Code and local ordinances.
4. The water meter must be installed horizontally.
5. No stored material or other obstructions shall be placed in the path of access to the meter and other fixtures. The Water Company must have enough room to easily read and maintenance the water meter.

VII. DRAWINGS OF STANDARD INSTALLATION DETAILS

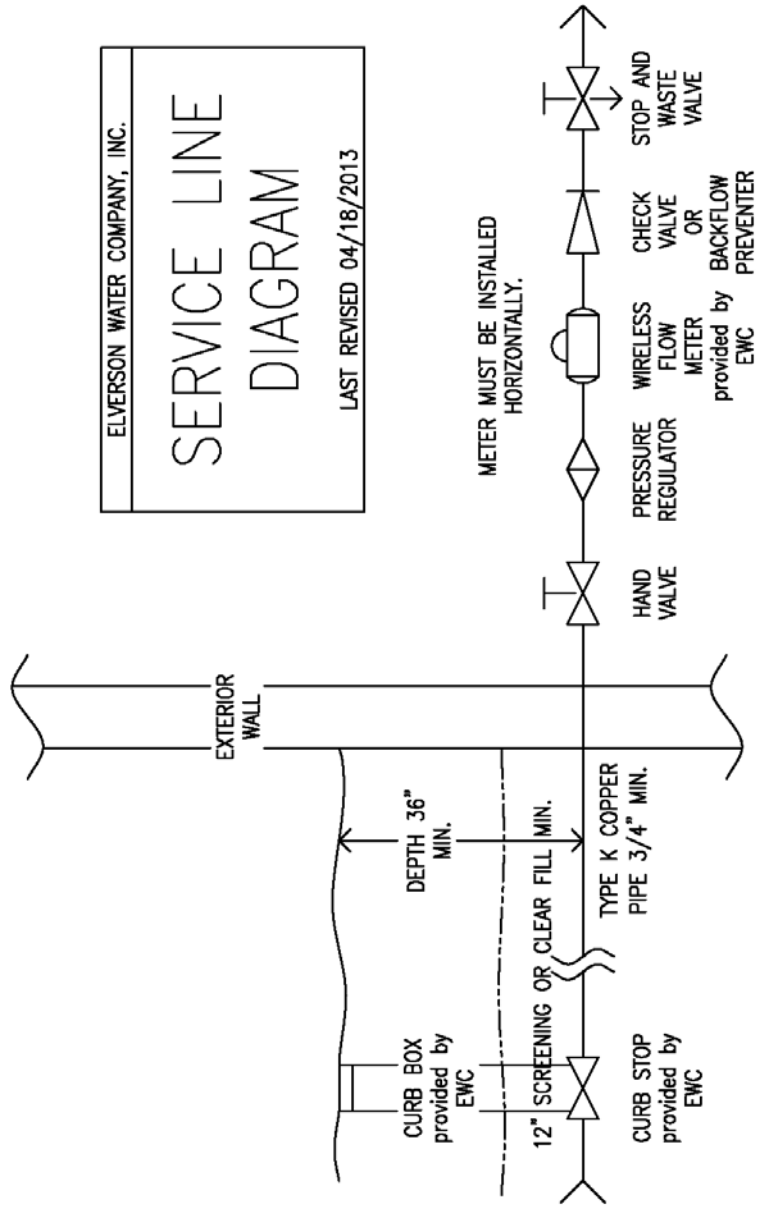
A. Typical Trench Detail



**TYP. PAVEMENT RESTORATION DETAIL**  
NO SCALE

**WITHIN PENNSYLVANIA DEPARTMENT OF TRANSPORTATION  
& TOWNSHIP RIGHT OF WAYS PAVED AREAS**

B. Service Line Diagram



ELVERSON WATER COMPANY, INC.
<b>SERVICE LINE DIAGRAM</b>
LAST REVISED 04/18/2013