

## INTRODUCTION

### 1. PURPOSE OF THE STANDARDS MANUAL

These Standards are guidelines for Developers, their Engineers and Contractors for the planning, design and construction of water distribution systems and associated appurtenances within the City of Lebanon, Tennessee, Public Services Department, hereinafter identified as the “City of Lebanon”, service areas.

These Standards shall govern the construction materials and installation of water distribution systems that are, or will become, the responsibility of the City of Lebanon to operate and maintain as part of their system.

These standards are intended to meet or exceed the requirements of the State of Tennessee’s Department of Environment and Conservation (TDEC) and to aid the Engineer in his design of water distribution systems. This design should incorporate the highest level of standards of practice and specify materials of highest quality identified in the technical specifications.

The Standards identify a single set of standards, criteria, submittal requirements and approval procedures to be used in the planning, design, and construction of projects within the City of Lebanon service area.

These Standards are not intended to serve as a step-by-step design and construction method, nor can this manual address every situation that may arise. The application of sound engineering/surveying principles combined with the information contained herein is necessary to complete the planning, design, and construction for water distribution projects.

# GENERAL INFORMATION

## SECTION 1

## SECTION 1 - GENERAL

### 1. DEFINITIONS

Public Services – City of Lebanon, Tennessee; Department of Public Services

City – City of Lebanon, Wilson County, Tennessee

City Engineer – Engineer for the City of Lebanon, Tennessee

City Engineering Department – City of Lebanon Engineering Department

Planning Commission – City of Lebanon Planning Commission

Developer – Owner of a proposed development in which waterlines are to be located.

Contractor – Contractor who is installing water lines in a proposed development.

Engineer – One who has prepared the construction plans and specifications for the installation of water lines in a proposed development. As provided by the laws of Tennessee, he must be a registered professional engineer and plans and specifications must bear his official seal.

State Regulatory Authority – Tennessee Department of Environment and Conservation; Division of Water Supply.

Plans – Drawings, details, specification, survey, plats and any other documents used to communicate design information to a Contractor or regulator necessary to construct improvements, extensions or modifications to the City of Lebanon water system.

### 2. SCOPE OF REGULATIONS

These regulations should apply to any person, developer, firm, business or entity interested in and desiring to construct additional water lines or to extend water lines within the city limits of Lebanon, or to construct additional water lines or extend water lines in a way that affects the water service provided by the City.

### 3. PLAN REVIEW PROCEDURE

Before any connection is made to a waterline of the City of Lebanon, Department of Public Services, the Developer or other party through his Engineer shall submit and receive approval of his proposed plan. Plans will not be deemed approved until the City of Lebanon Engineering Department's stamp of approval has been affixed to the cover sheet of the drawings and specifications.

The approval of the Engineering Department must be obtained before submittal of the plans and specifications to the State Regulatory Authority, and both approvals must be obtained before construction is started. Evidence of State Regulatory Authority approval must be furnished to the Engineering Department before beginning construction. A copy of the City and State approved plans must be present at the project site during construction.

Approval of plans for proposed water line construction for new subdivisions and other developments must be obtained from the Engineering Department before final approval for such developments will be granted. Approval of plans shall be valid for one (1) year from the date of approval.

Plan submittal procedure shall be as follows:

- A. All plans and other required documents shall be submitted to the City of Lebanon Engineering Department through the City's electronic plan review portal – IDT Plans. Submissions shall include, as a minimum:
  - Transmittal letter
  - Plans including vicinity map.
  - Preliminary plat showing the plan development if applicable.
  - Engineering reports including design criteria used in sizing mains and/or pumping stations, as required.
  - A \$300 plan review fee is required for all water mains. This will need to be submitted before the plan review process is started in IDT.
- B. The City Engineering Department will review the plans and specifications. Should the proposed water line plan need corrections, a comment list will be generated and sent through the IDT Portal to the Design Engineer for applicable changes.
- C. Once the proposed water line plan meets the City of Lebanon's current specifications, it will be stamped approved through the IDT Portal and sent to the Design Engineer electronically. The Design Engineer is responsible for providing one (1) City approved hard copy of the water line plan to the City of Lebanon Engineering Department as well as submitting to the Tennessee State Regulatory Authority for their approval.

#### 4. PLAN SHEET REQUIREMENTS

- A. All plans shall be stamped by a Tennessee Licensed Professional Engineer.
- B. Plans shall be drawn on a standard 24" x 36" sheet.
- C. A cover sheet shall be made a part of all plans and shall incorporate a location map on an approximate scale not less than 1" = 1000', the name of the project, and the names, address, telephone numbers, and fax numbers of the Developer and the Engineer.
- D. The plan scale will be: Plan 1" = 50' or 1" = 100', profile where applicable 1" = 5' or 1" = 10' vertical. Show profiles of all water lines 16" and larger. Profiles should be included on the same sheet as the corresponding plan view.
- E. The direction of North should be clearly shown on all sheets.

- F. Show all existing and proposed utilities, including septic drain fields, wastewater, gas, electric, telephone, cable TV, and storm sewers on the plans with measurements and/or details of proposed clearances of same.
- G. Show all topographic features such as driveways, pavements, rights-of-ways, property lines, storm drainage, structures, etc., especially those which may conflict with the proposed water main.
- H. Submitted plans shall include the water main plan as well as plans showing the finished grades for the roadways, curbs, gutters, sidewalks and ground as well as the location, size and invert elevation of other utilities and drainage structures.
- I. Provide detailed drawings for unusual conditions such as stream crossing, railroad crossings, highway crossings, etc.
- J. Hydraulic calculations and data shall be submitted for the proposed system including estimated flow demands, both domestic and fire flows, based on State design criteria and recommendations of the National Board of Fire Underwriters.
- K. Show the limits of all existing and proposed easements.
- L. The plans shall also include the latest revision date if applicable.
- M. The City of Lebanon may, at its option, require additions to be made in the plans where circumstances warrant.
- N. The City of Lebanon reserves the right to relocate water lines on the construction plans to facilitate maintenance and to provide service for adjacent properties.
- O. All final construction plans shall be based on field run survey information and shall include the name and stamp of the registered surveyor.

## 5. DESIGN FEATURES

Water system design features shall generally conform to good municipal practice with adequate line sizes and valving. Each plan will be reviewed for conformity to Department of Public Services practices and general plans. The following is provided for general information.

- A. Line size shall be adequate for the intended water service with no line smaller than 6" in diameter. Any line serving a fire hydrant shall be at least 6" in diameter, and where required, 8" lines shall be used to insure adequate fire flows at proper pressures.
- B. Water systems shall be designed in a matter to minimize dead end lines.
- C. Fire hydrant spacing and locations shall be confirmed by the City of Lebanon Fire Department before final placement during construction. In general, for residential area one fire hydrant will be placed near each street intersection with intermediate hydrant set so that hydrants are not over 500 feet apart.

- D. For commercial districts or commercial subdivisions, intermediate hydrants shall be set so that hydrants are not over 300 feet apart.
- E. Fire hydrants shall have a cut-off valve in the lead line from the main to the hydrant.
- F. A fire hydrant shall be installed at the end of 6” and larger dead end water mains.
- G. Private fire protection systems shall have a detector/double check valve Watt’s 709 DDC or equal installed in the system and the installation shall be approved by the Department. The DDC must be located adjacent to the tap on the main and inside an above ground hot box.
- H. Water pressure shall be sufficient to provide proper service to all levels of a building requiring water service. In certain areas, high level systems exist to provide pressures for satisfactory operation. In general, any building in these areas will have to be served by a high level system. Storage facilities will generally be required on high level systems serving more than 50 customers and may be required on smaller systems.
- I. Reduced pressure backflow preventers (RPBP) shall be installed where required by the City of Lebanon. In general, all commercial and industrial water service lines shall have an approved RPBP. Details of this installation shall be approved prior to installation. The RPBP shall be installed such that it is protected from freezing and in a manner to allow for proper drainage and testing. It must be located adjacent to the tap and meter in an above ground hot box.
- J. Generally, the following locations should be utilized for location of new water lines unless field conditions such as other utilities, etc. make it impractical to do so:
  - 1. New Subdivisions – New water mains shall be in the right-of-way in the required green area to be located between the back of the curb and front of the sidewalk, unless otherwise approved by the Engineering Department and shall not be located under sidewalks. Dual feeds shall be required unless otherwise approved by the City of Lebanon.
  - 2. Along older roads in existing subdivisions that have open ditches, the water mains shall be located in easements unless otherwise approved by the Engineering Department.
  - 3. Service lines shall be generally located in the center of the building lot and/or out of the way of driveways, landscaping, headwalls, etc.
  - 4. Where underground electrical service exists or is proposed, the water line must be located on the opposite side of the road.
  - 5. Where gas lines exist or are proposed, there must be at least 10’ horizontal separation between the water line and gas line and a minimum 18” vertical separation between the lines.
  - 6. Separation of Water Mains and Sewers shall be maintained in accordance with the following guidelines:

- a. Where sewer lines exist or are proposed, line separation is to be at least 10 feet edge to edge. If this cannot be obtained, the bottom of the water line shall be at least 18 inches above the top of the sewer. If this condition is also unobtainable, the sewer line is to be constructed of materials and have a joint design equivalent to water main standards as approved by the Department of Public Services and shall be pressure tested to 50 psi to assure watertightness. In the event the sewer line is to be located above the water line, the sewer line must be sleeved for a distance of 10' on each side of the water line.
  - b. Such sewer lines shall be pressure tested to 50 psi to assure watertightness. Water mains passing under sewers shall be protected (in addition to the above sewer line construction) by providing: at least 18 inches between the bottom of the sewer and the top of the water line; adequate structural support of the sewer to prevent excessive joint deflection or damage to the water line; centering of the water line section to result in the water line joints being removed from the sewer line to the maximum possible extent.
  - c. No water line shall pass through or come into contact with any part of a sewer or sewer manhole.
- K. Water valves should generally be spaced a maximum of 1,000' along a water main and on all lines at each intersection, and should be located on the right-of-way line extended.
- L. In proposed transmission mains, air release valves at high points must be provided.
- M. Water taps will be made by the developer during construction. Developer is responsible for furnishing and setting the meter box.
- N. Provide detailed drawings for unusual conditions such as stream crossings, railroad crossings, highway crossings, etc.
- O. The City of Lebanon operates an AMI (advanced meter infrastructure) system to collect meter readings. New developments requiring City water service are required to contribute to improvements of the system based on the size of the development and the system's signal strength at the development site.

## 6. EASEMENTS

- A. A minimum of 20 feet (10 feet on center) must be dedicated for an easement for a water main constructed outside a public right-of-way.
- B. Easements for water line extensions may be provided in either of two ways:
  - 1. Easement Document on forms provided by the Department, which must include legal description of the easement(s), exhibit map, legal Owners name, map and parcel, and must be signed by the Owner; and then notarized and recorded.
  - 2. Record with Subdivision Plat.

- C. All easements for work on property not owned by the Developer must be obtained and recorded before final plans approval.
- D. Special permits such Aquatic Resource alteration, Railroad crossings, T.V.A. crossings and State Highway crossings must be prepared by the Developer's Engineer and in hand prior to final plans approval by the City of Lebanon. Any costs associated with these permits will be paid for by the Developer.

7. PERMITS

Before beginning any construction the Contractor shall obtain all necessary permits as required by law. Such permits include, but are not limited to, those from State and County Highway Departments and the City.

8. PRECONSTRUCTION CONFERENCE

Before beginning any construction, and after the plan approval process is complete, the Developer or his Engineer shall schedule a Pre-Construction Conference to be held between the Contractor, Developer, Developer's Engineer, and the City of Lebanon personnel. At this meeting, the contractor will be informed of the City's policies and any special requirements. Listed below is a Checklist of items relating to the pre-construction conference:

- A. Developer, or his Engineer, is to schedule and coordinate the conference at least 3 days prior to the requested conference date.
- B. Developer, or his Engineer, is to have project plans approved by all agencies prior to the conference.
- C. Contractor is to have shop drawings approved by the Department prior to the pre-construction conference.
- D. When submitting plans and shop drawings to the Department, the Department will retain three (3) copies. Shop drawings, including but not limited to, pipe, fire hydrants, valves, service pipe and other major appurtenances, will not be reviewed unless they have been checked by the Contractor and stamped by him to indicate that they meet the specifications.
- E. Shop drawings for pipe, valves, hydrants, etc. shall be submitted to the Department a minimum of seven (7) calendar days prior to the pre-construction conference for review and approval after being thoroughly checked by the Contractor and dated and stamped with his approval.
- F. Upon request by the Department, laboratory test reports shall be provided on all pipe to assure that it meets the requirements of these specifications.
- G. The Developer must have plans and specifications that have been approved by the Department and the Tennessee Department of Environment and Conservation (TDEC), the State's approval letter, a copy of the Construction Start Notification form and its return receipt showing it has been delivered to TDEC. These must all be



submitted to the City Engineering Department prior to scheduling the preconstruction meeting.

- H. All outstanding fees (plan review, inspection, etc.) must be paid prior to scheduling the preconstruction meeting.

## 9. ABILITY TO PERFORM

The Developer may be asked to establish, to the satisfaction of the Department, that the Contractor proposed to be used on any project, is to be approved by the Department as one who has the ability to perform the Contract and meets at least the minimum standards set forth below. Such factors as judgment, skill, and integrity will play an important part in the overall determination. Although additional criteria may be used, a responsible Contractor must at least:

- A. Have adequate financial resources or the ability to secure such resources to successfully perform the proposed Contract safely, with minimum impact on the general public in a reasonable time frame;
- B. Have the necessary experience, organization, and technical qualifications and have or show proof that he can acquire the necessary equipment to perform the proposed Contract;
- C. Be able to comply with all required performance schedules or completion dates, taking into account Contractor's existing commitments;
- D. Have a satisfactory record of performance, integrity, judgment, and skills;
- E. Be otherwise qualified and eligible to receive an award under applicable laws and regulations;
- F. Maintain a permanent place of business.

The Developer may be required to furnish the Department information sufficient to show that the proposed Contractor and its subcontractors and supplies currently meet these minimum standards.

## 10. INSPECTION

All projects shall be subject to inspection during construction, and upon completion of construction, by an authorized representative of the Water Department. Inspection may consist of full-time resident inspection at the sole discretion of the City Water Department. Presence or absence of the inspector during construction does not relieve the Developer and/or Contractor from adherence to approved plans and specifications.

The work shall, at all times, be subject to the inspection of authorized representatives of the City Water Department. Materials and/or workmanship found not meeting requirements of approved plans and specifications shall be immediately brought into conformity with said plans and specifications.

Contractor must coordinate with the City of Lebanon GIS Department to collect the following data points. A 30 min to 1 hour notice is required. Contact information is as follows:

- GIS Office Number: 615-444-3647 ext. 2312 or 2313
- Jared: 615-354-4654
- Patrick: 615-796-4191

The following GPS requirements apply to both public and private water lines:

1. Every valve, hydrant, and meter box needs to be collected.
2. Every fitting (tee, cross, wye, 90, 45, 22.5, 11.25), cap, plug, reducer, or saddle (tap) needs to be collected. Every bell/joint needs to be exposed.
3. Features need to be collected while the ditch is open, so the elevation and a picture if needed can be documented. This is the most important aspect for aligning the water lines on the City's maps and keeping up with what each valve controls.
4. On water mains, every bell/joint must be exposed for collection/documentation.
5. On service laterals, the entire service line needs to be exposed from saddle (tap) to meter. If the service runs through a casing pipe, then each end of the casing needs to be exposed from saddle (tap) to meter.
6. Casing pipes need to be collected at both ends if straight. If not straight, use the same recommendations as water mains.
7. For any water main that runs underneath any structure (gas, sewer, stormwater, etc.), the main needs to be exposed underneath the structure for location and picture documentation.

**IMPORTANT: If any feature that requires GPS documentation is covered, you will be required to uncover the feature for said documentation.**

An authorized representative of the City Water Department shall make a final inspection of the project after completion to determine acceptability of the work. Before this final inspection can be made, the Engineer responsible for the Project shall notify the City Water Department in writing that the work has been completed in accordance with the approved plans and specifications.

The Developer must pay the cost of the inspection provided by the City Water Department. Inspection costs for the final inspection shall be \$1.50 per foot of water line actually installed. Footage shall include main lines only with service lines not included in the computation. Before construction begins, the Developer shall make a deposit on the final inspection fee equal to an amount calculated by multiplying the water inspection fee, \$1.50 per foot, times the linear feet of water lines as scaled or otherwise taken from the plans. The total amount of the deposit shall be made to the City Engineering Department before construction begins. Upon completion of the project, the City Engineering Department shall refigure the inspection fee on the basis of water lines actually constructed and shall make whatever adjustment is necessary to correct the amount of the original deposit.

A minimum inspection fee of \$500.00 shall be charged for each project.

Final acceptance of the work shall be accomplished as described in section 1.14.

## 11. WORKMANSHIP

- A. The work shall at all times be subject to the inspection by authorized representatives of the City Water Department. Materials and/or workmanship found not meeting requirements of approved plans and specifications shall be immediately brought into conformity with said plans and specifications.
- B. All water system construction shall be in accordance with the latest specifications of the City of Lebanon Public Services Department.
- C. Contractor shall provide competent, suitably qualified personnel to survey, layout and construct the work. Contractor shall at all times maintain good discipline and order at the site. Except as otherwise required for the safety or protection of persons, the work or property at the site or adjacent thereto, shall be performed during regular working hours. Regular working hours shall be considered to be 7:00 a.m. to 4:00 p.m., Monday through Friday. Contractor will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday without the Department's approval. A request to work outside regular working hours must be made two (2) working days prior to the time they proposed to do the work.
- D. The Contractor shall be responsible for locating and verifying the elevations of existing utilities prior to construction.
- E. All grading work shall be completed and all roads constructed to sub grade and lot corners marked prior to the installation of water lines.
- F. The Developer and his contractors shall protect all utilities whether existing or new from damage by other utility installers. The Developers shall replace any water service/wastewater service in its entirety, (for water lines from the main to the meter and for wastewater lines, from the main to the easement line/right-of-way) should it be damaged.

## 12. FINAL INSPECTION

An authorized representative of the Department shall make a final inspection of the project after completion to determine acceptability of the work.

Before a final inspection is scheduled, the following must take place:

- A. When the Developer completes the construction of lines, a semi-final inspection will be held by the Department and the Contractor. Upon completion of the "punch list" by the Contractor from this semi-final inspection, a final inspection with the Developer or his representative, the Contractor, and the Department will be held.
- B. Binder pavement must be in place in road sections where water and/or wastewater lines are installed. All valves in roadway must be operated and valve boxes checked for proper clearance.
- C. When the list of deficiencies, if any, is corrected, the Contractor will arrange for a final inspection.

- D. The City at its discretion may require additional surveys by a licensed surveyor or engineer to verify placement of lines or other facilities within the easement.

### 13. RECORD DRAWINGS

#### 13.1 GENERAL REQUIREMENTS

- A. A record of all deviations from the construction plans shall be recorded in the field by the projects superintendent, and submitted to the Design Engineer who shall, upon completion of the project, generate Final Record Drawings (As-Builts). As-Builts are generated by revising the original design information and adding the corrected data. Therefore, the Final As-Builts will depict the constructed information.
- B. The Design Engineer shall provide a complete set of As-Builts (including private developments), 2 sets of prints and in digital format compatible with the City's geographic information system software, upon completion of construction. As-Builts shall include actual field angles between lines, all actual service lines and meter locations. These As-Builts must be completed and submitted prior to acceptance of any facilities into the public system and any connections being made thereto.
- C. The completed As-Builts shall be submitted to and reviewed by the Department for verification of information. The plans will be either accepted as As-Builts or rejected and the above process is repeated.

#### 13.2 DRAWING INFORMATION

The drawings shall depict the Design Engineer's verification of the pipe sizes, location of fittings, valves, and hydrants tied to a minimum of 3 topographic features, as well as the horizontal and vertical locations of the water lines. Each drawing shall have the following shown on each sheet:

- A. The Engineer and Surveyor shall stamp and sign **ALL SHEETS** of the As-Builts.
- B. The Engineer shall affix a note on each sheet identifying the Drawings as As-Builts.
- C. A statement affixed on the lower right-hand corner stating: "In accordance with the information provided by the field survey conducted by (surveyor) on (date), information provided to (certifying engineer) by (contractor) on (date), and based on separate field reviews, I hereby certify that these construction drawings represent a true and accurate depiction of the as-built conditions to the best of my knowledge."
- D. Stamp and signature of certifying engineer
- E.
- F. Any unverified data shall show +/-, thereby indicating that information has not been verified. This shall only apply to information that could not be field verified by reasonable methods as approved by the Field Representative.

### 14. FINAL ACCEPTANCE

When facilities qualify as public facilities, the Department of Public Services will accept ownership of the completed facilities when the work has passed the final inspection and when final drawings are submitted to the Engineering Department reflecting actual "As Built" conditions. The City Engineering Department will review the prints and, if acceptable, will begin the one (1) year warranty period.

Final acceptance by the Department of Public Services will be made in writing, by the City Engineer's office, upon satisfactory completion of the project including final inspection, submittal of "As Built" drawings and payment of all fees due. The Developer shall guarantee the work for a period of one year from the date of final acceptance by posting an applicable Letter of Credit and shall immediately correct any deficiencies in the work due to materials and/or workmanship, which occur during the guarantee period. The Letter of Credit amount will be determined by the Engineering Department and will be an amount equal to 10% of the total estimated project cost.

### **PROCESS**

- STEP 1: The Developer shall obtain final approval from the Planning Commission for any proposed extensions to be located within a new subdivision, development, etc.
- STEP 2: The Developer will contract with an Engineer to design the proposed water line extension.
- STEP 3: Developer and Engineer prepare construction drawings.
- STEP 4: Initial plan submittal of construction drawings to City of Lebanon for review. Initial submittal should include all necessary permits and easements needed from any agency and/or person having jurisdiction in the project area.
- STEP 5: City of Lebanon Engineering Department reviews the plan and returns any comments for corrections to be made to the Design Engineer.
- STEP 6: The Developer returns the plans and specifications for City of Lebanon approval.
- STEP 7: The Developer's Engineer submits approved copies of the plans and specs to TDEC for approval.
- STEP 8: The Developer's Engineer submits two (2) hard copies of the approved plans to the City of Lebanon Engineering Department.
- STEP 9: Developer and/or his contractor set up a PRECONSTRUCTION CONFERENCE with City representatives and pay all fees.
- STEP 10: BEGIN CONSTRUCTION: Provide minimum 48-hour notification.
- STEP 11: Developer and Contractor set up final inspection.

STEP 12: Developer's Engineer submits "As-Builts".

STEP 13: Developer posts one-year maintenance Letter of Credit.

STEP 14: City of Lebanon accepts project, issues letter of acceptance.

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