

# **STANDARD PROCEDURES**

**FOR**

**PADUCAH WATER**



**PADUCAH WATER  
1800 NORTH 8<sup>TH</sup> STREET  
PADUCAH, KENTUCKY 42001**

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## 1.0 GENERAL

### 1. PURPOSE

The purpose of this document is to provide guidance to Developers, Engineers, Owners and Contractors regarding the construction of water infrastructure that will connect to and become a part of the municipal water system owned and operated by Paducah Water (PW).

### 2. AUTHORITY

#### 1. Commonwealth of Kentucky

Paducah Water owns and operates a public water system (PWSID No. 0730533) as defined in 401 KAR 8:010 and is therefore required to uphold the requirements thereof under regulatory authority of the Kentucky Energy and Environment Cabinet, Division of Water, including Water Main Project Review Agreed Order No. DOW-34382.

#### 2. City of Paducah

Paducah Water (Commissioners of Waterworks d/b/a Paducah Water) was formed by the City of Paducah under enabling statute KRS 96.320 by City Ordinance 114-291 in 1930.

### 3. ADHERENCE TO PW POLICY

The information contained herein shall, in all respects, be consistent with PW's approved policies. In the event of a conflict, PW Policy shall govern.

### 4. DEFINITIONS

#### 1. Developer

An individual, partnership, corporation, or other legal entity or agent thereof, which undertakes the activities of constructing improvements to one or more parcels of land and includes construction of water main and desired connection to Paducah Water's municipal infrastructure or modification thereto. The term "Developer" includes subdivider, Owner and/or builder.

#### 2. Engineer

A Professional Engineer currently registered in the Commonwealth of Kentucky in accordance with KRS 322.040-45.

#### 3. Paducah Water (PW)

Commissioners of Waterworks d/b/a Paducah Water having ownership maintenance and operational responsibility for the municipal water system.

#### 4. Contractor

A person, business or entity responsible for performing the installation of a water mains and appurtenances.

#### 5. Construction Permit

Written approval issued by either Paducah Water or the Kentucky Division of Water that indicates the design and permitting process is complete and approves the initiation of construction of a water main project.

6. Distribution System

The portion of the public water system in which water is conveyed from the water treatment plant to each consumer. The distribution system and appurtenances are owned, operated and maintained by PW.

7. Fire Main

A water main that extends from PW's distribution system to a structure for the dedicated purpose of fire suppression.

8. Qualifying Project

A project that meets the requirements outlined in the Agreed Order between the Kentucky Division of Water and Paducah Water that gives Paducah Water the authority to review and issue a construction permit.

9. Engineering Technician

A representative of PW who is onsite during the construction with sufficient frequency as to attest that a new water project has been constructed in accordance with the approved Construction Permit and PW's Standard Specifications. The Engineering Technician, or his/her designee, is PW's field representative through whom construction-related activities are coordinated.

10. PW's Standard Specifications and Procedures Manual (a.k.a Standard Specifications)

The combined set of documents pertaining to PW's required processes, procedures, materials, etc. which include the following:

- Material Specifications
- Procedures
- Detail Drawings

5. REFERENCED STANDARDS & GUIDANCE DOCUMENTS

All references to documents associated with the following entities/agencies shall be the latest edition.

- American Water Works Association (AWWA)
- American Society for Testing and Materials (ASTM)
- American National Standards Institute (ANSI)
- American Association of State Highway and Transportation Officials (AASHTO)
- Manual on Uniform Traffic Control Devices (MUTCD)
- Underwriters Laboratories (UL)
- Factory Mutual (FM)
- Kentucky Transportation Cabinet's Standard Specifications for Road and Bridge Construction (KYTC Standards)
- Recommended Standards for Water Works, 2012 Edition, A Report of the Water Supply Committee of the Great Lakes-Upper Mississippi River Board of State Public Health and Environmental Managers, 2012, current edition (a.k.a. 10-States' Standards)
- Ductile Iron Pipe Research Association (DIPRA)
- Uni-Bell PVC Pipe Association (Uni-Bell)
- Plastics Pipe Institute (PPI)

## 2.0 PERMIT REVIEW BY PW PER AGREED ORDER

### 1. SCOPE

1. PW has entered into an Agreed Order with the Kentucky Department for Environmental Protection, Energy and Environment Cabinet - Division of Water (KDOW) to provide in-house review and approval for qualifying projects.
2. "In-house review" refers to the process of PW staff reviewing a project and issuing a construction permit under the provisions of the Agreed Order without requiring a submittal to be made to KDOW.

### 2. GOVERNING DOCUMENTS

1. The information contained herein shall, in all respects, be consistent with the terms and conditions of the Agreed Order. In the event of a conflict, the terms of the Agreed Order shall govern.

### 3. QUALIFYING PROJECTS

1. For projects that qualify for in-house review, PW has the authority to review and issue project approval directly to the Engineer without requiring subsequent submittal and review by the KDOW. However, PW is under no obligation to perform in-house review.
2. The Engineering Manager will review each project and make the determination if a project qualifies for in-house permit review, and if PW will perform such review.
3. An abbreviated list of the primary qualifying projects include the following (*refer to the Agreed Order for the complete list*):
  - Overall length less than ten thousand (10,000) contiguous feet
  - New projects with water main sizes up to and including twelve inches ( $\leq 12''$ )
  - Relocation and/or rehabilitation water main projects larger than twelve inches ( $> 12''$ )
  - Projects that do not include treatment, chemicals, storage or pumps

### 4. NON-QUALIFYING PROJECTS

1. For projects in which PW will not perform an in-house review, PW will review and issue a letter of approval along with any pertinent comments. It is then the responsibility of the Engineer to make a permit submittal to the KDOW Drinking Water Branch ([click for link to Permit Form](#)) in order to obtain a construction permit. This process may take up to 30 days.

## 3.0 PROCEDURES FOR EXTENDING A NEW WATER MAIN

### 1. PURPOSE

1. The purpose of this section is to provide Engineers, Developers and Contractors with a step-by-step guide for completing a water main construction project. This section outlines the salient tasks that will be required for each phase of the process.

### 2. PROJECT PLANNING

1. The first step in a water main project involves a planning-level discussion with PW's Engineering Department. This meeting can be coordinated through email, or in-office consultation. The intent of this meeting is to be informal and share information at the earliest

stage in a new or potential project. At this stage, either the Developer or Engineer may perform a planning-level review with PW.

2. All projects involving the construction of a water main that will become a part of PW's distribution system must be designed by an Engineer.
3. The Developer or Engineer should provide a planning-level drawing that conveys the overall site location, proposed use, proximity to existing water mains, roads, etc. With this initial meeting, PW staff will discuss basic information that can be used for project planning such as anticipated connections with existing mains, main sizing, materials, etc.
4. This phase of coordination should be considered very preliminary and the design will be further refined by PW and the Engineer throughout the design and permitting process.
5. An electronic version of PW's distribution system can be viewed by accessing the Map-GIS portal located here: <https://map-gis.org/maps/>.

### 3. PRELIMINARY DESIGN

1. Once the project progresses and the Developer has retained the services of a professional Engineer, the Engineer will initiate the design process.
2. The information gained in the planning phase is to be utilized by the Engineer, along with a field survey, to prepare a preliminary design drawing of the proposed water main extension portion of the project.
3. At approximately a 60% level of completion, the Engineer should submit the preliminary design drawing(s) to PW either via email or hard-copy paper. Information to be depicted on the drawings includes the proposed water main and appurtenances along with basic information related to the project such as easements, property, roads/streets, right-of-way, storm sewer, other utilities, etc.
4. PW will review this submittal and provide comments typically within 5 business days.

### 4. FINAL DESIGN

1. The Engineer shall incorporate PW's comments from the preliminary design submittal into the final design drawings. Information to be conveyed in the final design drawings is provided in Section 4 of this document.

### 5. PERMIT REVIEW

1. The Engineer shall submit the final design package to PW for the purpose of obtaining a construction permit. A complete submittal package consists of the following items. A link to each document is provided below as applicable.
  - [Application for Water Main Extension](#)
  - Hydraulic Analysis
  - Location Map (if not included on the drawings)
  - Stamped Drawings (2 sets, paper)
  - Project Specifications (1 set, paper)
  - Permit Review Fee (\$150)
2. PW will review the permit submittal for conformance with applicable technical standards and will issue a letter and one copy of drawings indicating approval and/or any noted deficiencies



or comments. This information will be sent directly to the entity that made the permit submittal. *Please note that if the submittal is made by the Engineer, it is the responsibility of the Engineer to communicate with the Developer.*

3. PW will strive to review and respond to each permit submittal as soon as possible, typically within 5 business days.
4. For qualifying projects, PW may review and issue a construction permit.
5. For non-qualifying projects, PW will review and issue an approval letter. It is then the responsibility of the Engineer to make a permit submittal directly to the Kentucky Division of Water in order to obtain a construction permit.
6. The construction permit shall expire after 2 years if construction has not begun. If a construction permit expires, a complete resubmittal of the permit application package is required.

#### 6. AGREEMENT AND DEPOSIT

1. Once a construction permit has been issued, PW will prepare an Agreement and Waiver document and forward to the Developer to be executed.
2. The purpose of the Agreement and Waiver is to establish the mutually agreeable terms under which the project will be constructed, connected to PW's existing infrastructure and ownership transferred from the Developer to PW. The Agreement and Waiver template document can be found here: [PW Agreement and Waiver](#).
3. Before construction may begin, the Developer must return the executed Agreement and Waiver document to PW along with a deposit in the form of either cash, cashier's check or evergreen irrevocable letter of credit as is outlined in the Agreement and Waiver document.
4. The required deposit is calculated based on \$5 per linear foot of proposed water main to be installed by the Developer with a minimum deposit of \$5,000, whichever is greater.
5. PW will retain the deposit throughout the duration of the project and the warranty period.
6. PW will release the deposit after all stipulations outlined in the Agreement and Waiver have been met and all obligations of the Developer have been fulfilled. Refer to each Agreement and Waiver Form for additional information.
7. Deposits in the form of cash or cashier's check will accrue interest at a rate that is calculated as the average of the 6 month CD interest rate from 3 local banks. PW will calculate the accrued interest and return the deposit amount along with accrued interest in the form of a check issued to the Developer.

#### 7. ENCROACHMENT PERMITS

1. An encroachment permit is required for any project that will encroach on public right-of-way.
2. It is the responsibility of the Developer/Engineer/Contractor to coordinate with the respective agency having jurisdiction and ensure that all permits and sureties are obtained prior to initiation of construction.
3. For projects that impact City of Paducah right-of-way, contact the City Engineer at 270-444-8511. Obtain the permits and provide sureties as required.

4. For projects that impact McCracken County right-of-way, contact the County Engineer at 270-442-9163. Obtain the permits and provide sureties as required.
5. For projects that impact Kentucky Transportation Cabinet (KYTC) right-of-way, prepare [Form TC 99-1A](#) and submit the completed form along with one copy of the approved PW Drawings in electronic PDF format to the KYTC District 1 Permit Section for review and approval. Obtain the permits and provide sureties as required.

#### 8. PRECONSTRUCTION REVIEW

1. The Developer typically hires a Contractor to construct the water main project. The terms and conditions of this business arrangement are solely between the Developer and Contractor.
2. Prior to initiating construction, PW's Engineering Technician must receive and/or otherwise confirm the following:
  - 2 sets of final construction drawings (paper 24" x 36")
  - Approved material submittals
  - All easements and/or subdivision plats that establish easements (as applicable)
  - Contractor contact information
  - Layout/staking information (for use by the Contractor)
  - CAD DXF file containing the proposed water main (for use by PW)
  - Encroachment permits (as applicable)
  - Construction Permit (PW and/or KYDOW)
3. PW may request an onsite meeting to review the project.

#### 9. CONSTRUCTION PHASE

1. It is the responsibility of the Contractor to install the water main project in accordance with PW's Standard Specifications and the Construction Permit.
2. Unless otherwise noted in this document, all materials necessary for successful completion of the project shall be provided by the Contractor.
3. PW's Engineering Technician will provide construction inspection for the benefit of PW at no cost to the Developer. This service will include obtaining as-built documentation, observation of installation, coordination of testing, disinfection, etc.
4. When deemed necessary, PW's Engineering Technician will coordinate with the Contractor, Engineer and/or Developer to resolve construction-related issues as may arise.

#### 10. FINAL INSPECTION

1. Upon completion of the project, PW's Engineering Technician will perform a walking site inspection with the Contractor.
2. This inspection will identify items that are either outstanding or otherwise require additional work in order for PW to consider the project to be complete. The resulting "Punch List" will be provided to the Contractor, Engineer and Developer in letter form by PW.
3. It is the responsibility of the Developer to ensure that the Contractor performs the outstanding work in a timely manner at no cost to PW.
4. PW will not release the deposit for the project until the work outlined in the Punch List has been completed to the satisfaction of PW.

11. ESTIMATES OF CONSTRUCTION COST

1. Upon completion of construction, the Engineer shall provide an estimate of the construction cost of the water main project to PW's Engineering Technician.
2. This information will be utilized by PW as the basis for entering the water main into PW's capital asset inventory once the warranty period has expired.
3. The requested information should be reported as a single dollar amount for the entire project in letter format on paper or via email.

12. AS-BUILT DRAWINGS

1. PW's Engineering Technician will obtain field measurements, depths, GPS coordinates, etc. of the installed water main throughout construction. Upon completion of construction, this information will be provided to the Engineer. The Engineer shall incorporate this information into the approved drawings with the addition of dimensioning, notes and details to the satisfaction of PW.
2. The Engineer shall submit 1 full-size paper copy and 1 electronic copy in PDF format to PW's Engineering Technician. These drawings shall be clearly labelled "Record Drawings" with corresponding date of submittal.

13. ENGINEER'S CERTIFICATION

1. Upon completion of construction and all required submittals, PW's Engineering Manager will certify, in letter form, that the project has been installed, tested, disinfected, flushed and placed into service in accordance with the construction permit and PW's Standard Specifications.
2. This certification shall be signed and shall bear the seal of a licensed professional Engineer.
3. A copy of the certification will be provided to the Engineer.

14. WARRANTY PERIOD

1. A one-year warranty period will begin on the date that the water main is placed into service.
2. During this warranty period, the Developer is responsible for any and all leaks, defects or other work required to maintain this water main and appurtenances associated with the project.
3. PW reserves the right to extend the warranty period if, in the opinion of the Engineering Manager, there may be inherent defects with the installed water main or other problems that may negatively affect the performance of the water main.
4. If PW is notified of a potential leak or other problem associated with a water main on the Developer's project within the warranty period, PW will perform a field review to determine the likely cause or source of the problem. If it appears that work by the Developer will be required, PW will notify the Developer accordingly. If the Developer does not respond within an appropriate timeframe (as determined by PW based on the nature of the problem), PW reserves the right to repair the leak and seek compensation from the Developer for actual costs incurred by PW.
5. Once the warranty period is complete and there are no outstanding reimbursement costs or other obligations by the Developer, PW will accept the water main and appurtenances into

PW's distribution system and assume responsibility of future maintenance, operation and repairs of said improvements, subject to the terms of the Agreement and Waiver.

6. Refer to the Agreement and Waiver for additional information regarding transfer of ownership.

## 4.0 DESIGN REQUIREMENTS

### 1. DESIGN GUIDANCE

1. Design water extensions and appurtenances in accordance with the requirements of 10-States Standards, current edition, and PW's Standard Specifications.

### 2. MATERIALS

1. All materials shall conform with PW's current [Material Specifications](#).

### 3. HYDRAULICS

#### 1. Demand

The Engineer is responsible for properly sizing the water mains to meet the required demands of the development for the peak domestic and fire flow demands.

#### 2. Hydraulic Analysis

Perform a hydraulic analysis that demonstrates the following:

- The proposed water main(s) can be flushed at a minimum of 2.5 feet per second while maintaining system pressure above 20 psi within the pressure zone of the proposed project.
- The proposed water main project can maintain 30 psi under peak demand.
- The proposed water main project does not drop ground level pressure in any part of the pressure zone below 20 psi under all flow conditions.
- Pressure greater than or equal to 30 psi shall be available at the customer-side of all water meters.

### 4. WATER MAIN SIZE

1. The minimum water main size is 6 inches.
2. Ensure the size of a new water main is sufficient to satisfy the normal daily demand as well as anticipated fire flow demands based on the proposed nature of the development and long-term interests of PW.

### 5. WATER MAIN MATERIAL

1. PW's Engineering Manager will determine the material (e.g. PVC, DIP, etc.) for new water main construction based on a number of factors that include the nature of the development, location of the water main relative to the development, utility congestion, zoning, etc.
2. PW may require the use of multiple materials (e.g. PVC, HDPE) on a single project based on specific applications and materials benefits. One example would be the use of butt-fused HDPE when crossing a creek.

## 6. DRAWINGS

1. Drawings shall be prepared by an Engineer based on a 24 inch by 36 inch plan sheet at a scale not to exceed 1 inch = 30 feet (horizontal) and 1 inch = 5 feet (vertical) unless otherwise approved on a case-by-case basis.
2. Drawings shall contain complete information regarding existing topography (e.g. utilities, roads, sidewalk, buildings, etc.), proposed features of the project (e.g. size and location of utilities, roads, easements, buildings, etc.), as well as standard construction detail drawings sufficient to layout and construct the project to the necessary lines and grades.
3. Depict horizontal alignment of the proposed water main on the drawings using true-to-scale standard mechanical fittings angles (e.g. 90°, 45°, 22.5°) and combinations thereof.
4. Drawings shall include the following unless otherwise approved by PW:
  - Cover
  - Legend
  - Plan/Profile
  - Construction Details (refer to [PW's Detail Drawings](#))
5. The front cover of the drawings shall include the following information:
  - Project Name
  - Name of the Owner (Paducah Water)
  - Location Map
  - Name of Engineering Firm that Prepared the Drawings
  - PE stamp of Design Engineer
6. Unless otherwise approved, drawings shall contain a vertical profile that depicts:
  - Existing and proposed ground lines
  - Existing and proposed utility locations and depth
  - Proposed water main(s) and appurtenances
  - Areas of select backfill and bores
  - Vertical fittings

## 7. COORDINATE SYSTEM AND DATUM

1. Reference the project horizontal coordinate system to Kentucky State Plane Coordinate System, South Zone (1602), NAD 83 in US survey feet, or latest revision.
2. Reference the project vertical control to USGS Datum (NAVD 88).
3. When a project involving PW is part of a larger project (e.g. water main relocation required by the Kentucky Transportation Cabinet), the drawings may utilize the coordinate system and datum of the larger project.
4. Clearly denote the referenced project horizontal and vertical control on the drawings.

## 8. BURY DEPTH

1. The standard depth of cover for water mains is 42 inches.
2. When changes to existing grade are planned or may be reasonably anticipated, maintain a depth of cover of 42 inches below *finished* grade.

3. Maintain a minimum depth of cover of 30 inches in all circumstances throughout construction.

9. THRUST RESTRAINT AND BLOCKING

1. All mechanical joint connections shall have thrust restraints.
2. Restrain pipe joints adjacent to vertical fittings and/or provide steel all-thread to lock fittings together when deemed necessary by PW.
3. Install fittings with sufficient concrete thrustblocking to prevent movement.
4. Restrain pipe that abuts HDPE water main to prevent joint separation.

10. CREEK CROSSINGS

1. The minimum cover for water mains crossing small creeks and ditches is 30 inches. PW may increase this depth of cover based on the size and nature of the creek. Refer to PW Detail Drawings for more information.
2. PW will determine the material and method of joint restraint to be used at each crossing based on the size and nature of the creek. In each case, the ease/difficulty of installation as well as the long-term implication for maintenance and operation will be considered.
3. For creek crossings having a bottom width greater than 15 feet:
  - Provide either fused HDPE or restrained-joint water main pipe as determined by PW.
  - Provide valves at both ends of the crossing so that the section can be isolated for testing or repair. The valves should be easily accessible and not subject to flooding.
  - A means for testing for a leak and obtaining samples should be provided on each side of the valve closest to the supply.
4. When an open-cut creek crossing is required, perform the work in accordance with the following (current edition):
  - USACE Nationwide Permit 12 – Utility Line Activities
  - Kentucky Division of Water General Conditions for Water Quality Certification and General Certification of Nationwide Permit 12 – Utility Line Backfill and Bedding

11. SEWER CROSSINGS AND SEPARATION

1. Locate water mains a distance of 10 feet or greater horizontally from any existing or proposed gravity or pressurized sanitary sewer (non-storm) pipe. Measure the horizontal distance from the outside of the water main to the outside of the sewer pipe.
2. In cases where PW determines that it is not practical to maintain the 10-foot separation, water mains may be installed closer provided that the water main is laid in a separate trench or on an undisturbed shelf located on one side of the sewer, such that the bottom of the water main is at least 18 inches above the top of the gravity sewer. For each case, PW will document this variance, the reasons for the variance and maintain records with the project file.
3. There shall be no deviations from the minimum 10 foot separation requirement for pressure sanitary force mains.

4. No water main shall pass through or come in contact with any part of a non-storm sewer manhole.
5. When water mains and sewers cross:
  - Provide a vertical distance of 18 inches between the water main and sewer as measured from the outside of the water main to the outside of the sewer pipe.
  - Provide one full length of water main centered on the sewer pipe so that both joints of the water pipe are as far from the sewer as practical.
  - Where necessary, provide special structural support for the water and/or sewer pipes.

## 12. PROXIMITY TO UNDERGROUND CONTAMINATION

1. Where water mains are installed or replaced in areas of organic contamination or in areas within 200 feet of underground petroleum storage tanks, all pipe, service lines and joint materials shall be made of materials that resist permeation by organic compounds.

## 13. FIRE HYDRANTS

1. Fire hydrants shall only be installed on mains 6 inches in diameter or larger.
2. Equip each fire hydrant with an auxiliary valve that allows the isolation of the hydrant for routine maintenance and/or repair without affecting the supply water main.
3. Hydrant drains shall not be connected to any sanitary sewer, combined sewer, septic tank or subsoil treatment system.
4. Locate hydrants at high points along a water main to allow for the removal of air that may accumulate within the water main.
5. Locate hydrants at roadway intersections and/or property lines when practical, and consider the potential for damage to property during initial and routine flushing.
6. Protect hydrants located within commercial parking lots or other high-traffic areas by a raised concrete curb and/or pipe bollards.
7. Adjust hydrants to finished grade.
8. Hydrant spacing will be determined by PW on a case-by-case basis, and should not exceed the guidelines below:
  - In urban commercial areas, not more than one block
  - In urban residential areas, not more than 800 feet
  - In rural areas, not more than one mile

## 14. VALVES

1. Unless otherwise approved by PW, provide inline valves on each side of a fire hydrant to allow directional flushing from either side of the hydrant.
2. Unless otherwise approved by PW, provide inline valves on each side of a tee to allow directional flushing from either side each direction along the water main.
3. All buried valves shall be resilient seat gate valves. Butterfly valves are not allowed for direct-bury applications.

15. STREET/ROAD CROSSINGS

1. Conform with the requirements of the agency/entity having jurisdiction over the right-of-way for water mains crossing streets and roads.
2. When a new water main crosses a proposed (future) street/roadway, backfill the water main trench using select backfill in accordance with PW's Detail Drawings.
3. When a new water main crosses a rural KYTC roadway, install the main using a trenchless method and within steel encasement.
4. When a new water main crosses an urban KYTC roadway or a City/County roadway, install the main by open-cut or trenchless method as determined by PW and the agency/entity having jurisdiction over the right-of-way on a case-by-case basis.

16. AUTOMATIC AIR RELEASE VALVES

1. Automatic air release valves are not allowed without prior approval by PW.
2. Utilize fire hydrants and other means to manually release accumulated air at high points.

17. DEAD-END MAINS

1. Dead-end mains shall be minimized.
2. Provide a suitable means of flushing at the end of each dead end water main.
3. PW may require that a dead-end water main is connected to an existing water main. In making this determination, PW will consider the following conditions:
  - Distance from the proposed dead end and the existing water main
  - Physical features/limitations between the proposed dead end and the existing water main
  - Project phasing
  - Other conditions as deemed appropriate by PW
4. When PW requires a continuation of a dead-end water main associated with a development beyond the limit of the Developer's property, PW will provide materials, engineering and easement costs associated with the extension in accordance with PW's policy entitled "Extension to Unserved Property".

18. CROSS CONNECTIONS

1. Cross connections are prohibited in accordance with 40 KAR 8:020.
2. Installation, maintenance and testing of backflow assembly devices installed on or within a customer's premises, as required by Kentucky State Plumbing Code (815 KAR Chapter 20) as well as the inspection thereof, are the responsibility of the customer.
3. PW maintains an archive of testing/inspection logs for each customer facility upon request. Contact PW's Materials Manager at 270-444-5563 for more information.

19. VARIANCE REQUEST

1. The Engineer may submit, in writing, a variance request to PW's Engineering Manager for deviation from one or requirements of PW's Standard Specifications.



2. The written variance request shall include the basis for deviation, and clearly explain the rationale for the request in a clear and concise manner.
3. PW's Engineering Manager will review the variance request and issue approval or denial as part of the permit review process.

## 5.0 EASEMENTS

### 1. PURPOSE

Easement preparation, acquisition and recording requires close coordination between Developer, Engineer, Surveyor, PW and PW's Counsel. The purpose of this section is to provide guidance for a Developer to obtain and/or provide easements on behalf of PW for a water main extension project. This section is applicable for easements that are obtained from a private property owner and not established by plat of subdivision.

### 2. SCOPE

1. All new water mains and appurtenances that will be owned and maintained by PW shall be located within a dedicated easement or public right-of-way.
2. All field surveying and preparation of legal descriptions shall be performed under the direction of a professional surveyor licensed in Kentucky in accordance with applicable regulations. However, it is typical for the Engineer to serve as the primary contact and Project Manager. As such, references to Engineer herein may also include Surveyor.

### 3. EASEMENT DATA SUBMITTAL

Once the proposed extension has been designed and construction permit has been approved by PW, the Engineer should submit the following information to PW's Engineering Manager in electronic format:

1. Ownership data for each affected parcel (MS Excel spreadsheet format):
  - First and last name(s) as on the deed
  - Deed book/page #
  - Address (city, state, zip)
  - Marital status
2. Exhibit A – Location Map for each parcel in PDF format:
  - 8.5" x 11" letter size
  - The map must clearly depict the property and right-of-way lines, property ownership, water main and easements when printed and reproduced in black and white.
3. Legal Description
  - Include a suitable description of the proposed permanent and temporary easements for each parcel in MS Word format.
  - Each description shall be a separate MS Word file named appropriately by parcel or owner name.
  - Examples of preferred descriptions for typical easements are:

*“A strip of land 15 feet in width parallel and adjacent to the Grantor’s south property line, said line being coincident with the north right-of-way line of US Highway 60. The permanent easement shall extend along the entire frontage of Grantor’s property and shall abut both the Grantor’s east and west property lines.”*

or

*“A strip of land 15 feet in width centered on the installed waterline with said waterline being located generally within the southernmost 30 feet of the Grantor’s property. The permanent easement shall extend along the entire frontage of Grantor’s property and shall abut both the Grantor’s east and west property lines.”*

4. The standard easement dimensions for permanent and temporary easements are as follows. PW may modify these on a case-by-case basis depending on the requirements of each project.
  - Permanent Easement 15 feet wide
  - Temporary Easement 10 feet wide along each side of permanent
  - Temporary Easement (bore) 40 feet wide, 50 feet long
5. In all cases, the temporary easement(s) shall be sufficient to construct the water main and shall account for ingress/egress, material laydown and spoil management.

#### 4. EASEMENT PREPARATION

1. PW’s Engineering Manager will review the submitted information and provide comments/revisions as deemed necessary. Once all information is suitable, the Engineering Manager will forward this information to PW’s Counsel for preparation of easement documents.
2. PW’s Counsel will verify ownership information provided and populate the information in PW’s easement template document accordingly.
3. The standard easement template for PW is maintained by PW’s Counsel. Revisions to the language, terms or requirements of this template are made by either the Engineering Manager or General Manager.
4. PW’s Counsel will direct any questions to the Engineer and/or Engineering Manager as deemed appropriate. There shall be no substantive changes to the terms of the easement document without approval of the Engineering Manager. However, minor revisions such as marital status, addresses, etc. may be coordinated directly between Counsel and Engineer.
5. Easement documents will be returned electronically to PW’s Engineering Manager for review upon completion.
6. PW’s Engineering Manager will review and forward the completed easement documents to the Engineer in native electronic format.

#### 5. EASEMENT ACQUISITION

1. The Engineer (and/or Developer) is responsible for contacting the affected property owners and obtaining the necessary signatures as required by the easement document.
2. The Engineer is not permitted to negotiate the terms of the easement nor compensation on behalf of PW beyond that which appears on the document.

3. Should modifications, restrictions or special conditions (e.g. sod, easement width, construction restrictions, etc.) be requested/required by the affected property owner, the Engineer shall obtain approval from the Engineering Manager prior to accepting the requested change.
  4. It is the sole responsibility of the Developer to provide compensation, goods or services to a property owner as may be required in order to obtain an easement. All such obligations shall remain solely between the Developer and property owner. PW will not provide compensation to a third party as part of easement negotiation initiated by a Developer.
  5. All signed easements shall be notarized.
6. RECORDING ACQUIRED EASEMENTS
1. Once all easements have been obtained, the Engineer shall deliver the original, fully-executed documents to the Engineering Manager.
  2. The Engineering Manager will review the documents and deliver them to PW's Counsel.
  3. PW's Counsel will review and forward the documents to the McCracken County Clerk's office for recording. The cost for recording will be borne by PW.
  4. After recording, PW's Counsel will deliver the documents to PW's Engineering Manager to be archived in PW's project files.
  5. Construction shall not be initiated until all necessary easements have been obtained.

## **6.0 CONSTRUCTION REQUIREMENTS – GENERAL**

1. RESPONSIBILITY OF THE CONTRACTOR
  1. It is the Contractor's responsibility to perform all work in accordance with the requirements of PW's Standard Specifications, as well as all applicable city, state and federal regulations.
2. COMMUNICATION
  1. PW and the Contractor may communicate verbally throughout the project for routine instructions, questions, comments, etc. as part of the execution of the work. Either party, at any time, may request that communication is committed to writing.
3. CALL BEFORE YOU DIG LAW
  1. The Contractor shall comply with the requirements of the Underground Facility Damage Prevention Act of 1994 (a.k.a. Kentucky 811) in accordance with KRS 367.49.
4. HEALTH AND SAFETY
  1. Conduct all work in accordance with OSHA 29 CFR Part 1926, as is applicable to the project. It is the Contractor's sole responsibility to maintain compliance with all local, state and federal health and safety regulations.
5. PUBLIC SAFETY AND CONVENIENCE
  1. Conduct work to ensure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work, and to ensure the protection of persons and property in a manner satisfactory to PW and governmental authority (as applicable).

6. PERMITS AND LICENCES

1. It is the Contractor's responsibility to ensure that all necessary permits, business licenses, fees, etc. have been obtained prior to construction.

7. TEMPORARY FACILITIES

1. The Contractor is responsible for providing, installing and maintaining adequate temporary sanitation facilities at the Site.
2. Upon completion of the work, remove all temporary Contractor equipment and structures from the site.

8. TRAFFIC CONTROL

1. When working within or adjacent to public roadway right-of-way, the Contractor shall provide adequate signs, barricades, caution lights and flagmen and take all necessary precautions for the protection of the work and the safety of the public, including signing for any specific detours.
2. Provide and implement traffic control in accordance with the Manual on Uniform Traffic Control Devices for Highway Construction and Maintenance, (MUTCD).

9. ADEQUATE SUPERVISION, STAFFING AND EQUIPMENT

1. Maintain adequate numbers of suitably trained and experienced workers at all times.
2. The Contractor is solely responsible for the means, methods, techniques, sequencing and procedures of construction.
3. Use equipment that is adequate in size, capacity and numbers to accomplish the work safely in a timely manner.

10. EROSION CONTROL AND POLLUTION PREVENTION

1. Conduct construction activities in accordance with the applicable requirements of [Best Management Practices \(BMPs\) for Controlling Erosion, Sediment and Pollutant Runoff from Construction Sites](#), latest edition.

11. COMPLIANCE WITH ALL LAWS

1. Comply with all Federal, State, County and City laws, by-laws, ordinances, and regulations, which control the work, actions and operations of those engaged or employed in the work or which affect materials used.

## 7.0 CONSTRUCTION REQUIREMENTS - EXECUTION

1. MATERIAL SUBMITTALS

1. Prior to ordering materials, the Contractor (via material supplier) shall submit 1 complete set of manufacturer's shop drawing submittals for each item to be provided by the Contractor.
2. Submittals should be sent via email directly to PW's Engineering Manager in PDF format, with information such as manufacturer, size, type, pertinent industry standard, origin of manufacture etc. clearly noted for all component parts.

3. PW's Engineering Manager will review each material submittal for conformance to PW's Material Specifications and will indicate one of three possible conditions:
    - Approved
    - Approved as noted (notes shall become a condition of approval)
    - Not Approved (revise and resubmit)
  4. One electronic copy of the reviewed submittals will be returned to the Contractor via email in PDF format.
  5. In the event that the material submittal is incomplete, the Engineering Manager will indicate items that must be included prior to approval.
  6. Material that is ordered prior to obtaining approval by the Engineering Manager is subject to rejection and replacement at the Contractor's expense.
  7. PW's Engineering Technician will review the materials once delivered to the project site. Any items that are not in conformance with the approved submittals shall be removed and replaced at the Contractor's expense.
2. MATERIALS PROVIDED BY PW
    1. If materials are provided by PW, the Contractor is responsible for loading and transporting all materials from PW's materials yard to the project site.
    2. The Contractor may use PW's fork lift if it is available at the time of pickup (coordinate with PW's Material Manager). If the forklift is unavailable and/or inadequate, the Contractor is responsible for providing alternate equipment.
    3. Prior to leaving PW property, the Contractor shall provide PW's Materials Manager with an itemized list of the description and quantity of each item to be transported to the project site.
    4. The Contractor accepts all responsibility for the care and storage once material leaves PW property.
3. OBSTRUCTIONS
    1. The Contractor shall make every effort to locate all underground pipelines including utility service lines, conduits, and other structures by contacting owners of underground utilities, prospecting, or otherwise, in advance of all earthwork operations.
    2. All incidental damage to existing utilities shall be repaired by the owning utility or the Contractor as directed.
4. CONSTRUCTION DRAWINGS
    1. The Contractor shall have the most recent set of approved drawings on site at all times while water main construction is underway.
    2. If the most recent set of approved drawings is not present on site while construction is underway, PW's Engineering Technician may stop work until the Contractor provides a set of approved drawings to the project site.

5. LAYOUT OF WORK

1. Provide competent, qualified personnel to survey and layout water main, bores and appurtenances, easements, right-of-way as necessary to construct the project to the design lines and grades.
2. Locate and protect survey control points and stakes and take such action as necessary to prevent their destruction.
3. PW's Engineering Technician may stop the Contractor's work if it is determined that there are inadequate field references for installation of the water main to approved line and grade.

6. WORKING HOURS

1. PW's standard working hours are Monday through Friday, 7:00 am to 3:30 pm.
2. Contractors must request and obtain prior approval from PW for work beyond standard working business hours, when such work requires PW participation (e.g. testing/sampling, critical-phase tie-in, etc.).
3. Coordinate work to be performed by PW crews (e.g. taps) so that it can be performed during standard working hours.
4. Work on federal holidays is prohibited without prior approval from PW.

7. PRODUCT HANDLING AND INSTALLATION

1. Handle, transport and install all materials in accordance with manufacturer's recommendations and industry guidelines.
2. In the event that material is damaged by the Contractor during transport, unloading or installation, the damaged item shall be replaced by the Contractor.

8. INSTALLATION OF WATER MAIN AND APPURTENANCES

1. Begin and end water main installation approximately 10 feet from the points of connection to PW's active distribution system by constructing a blow-off assembly. Beginning a new water main installation by laying out of a tapping valve is prohibited unless specifically approved otherwise by PW. Refer to PW's Detail Drawings for additional information regarding the blow-off assembly.
2. Unless noted otherwise in this document, install water main in accordance with standard industry practice for the respective pipe material incorporated herein by reference and manufacturer's recommendations. Click on each guide for a hyperlink to each document.
  - [Installation Guide for Gasketed-Joint PVC Pressure Pipe](#), PVC Pipe Assoc.
  - [Installation Guide for Ductile Iron Pipe](#), DIPRA
  - [The Performance Pipe Field Handbook](#), Performance Pipe Institute
3. Install all water main with tracer wire.
4. Provide polyethylene encasement for all ductile iron pipe (including distribution mains and fire mains) and fittings.
5. Cleanly cut roots larger than 2 inch diameter at the trench wall.
6. Over-belling pipe is prohibited.

7. Install a temporary plug at the open end of pipe at the end of each day. The nature of the plug shall be sufficient to prevent intrusion of silt and debris.
  8. Supporting pipe on blocks or piers is prohibited.
  9. Limit joint deflection to 50% of the maximum deflection recommended by the manufacturer and/or the installation guidance manual.
  10. Longitudinal field bending of PVC pipe is prohibited.
9. POLYETHYLENE ENCASEMENT
1. Install polyethylene tube encasement for ductile iron pipe in accordance with AWWA C105 Method A or B.
  2. Utilize AWWA C105 Method C – wrapped encasement using polyethylene sheet material - for rodded fittings or other unique circumstances where tube encasement is not feasible.
  3. Refer to DIPRA’s Installation Guide for Ductile Iron Pipe Section 2.15 for more information.
10. VALVE, HYDRANT AND FITTING INSTALLATION
1. Install valves, hydrants and fittings in accordance with AWWA C600 Section 4.3.6 and PW Detail Drawings.
  2. Connections for valves, fittings and hydrants shall be mechanical joint (MJ) ductile iron with thrust restraints. Standard MJ glands are not allowed.
  3. Provide concrete thrustblocking between the fitting and undisturbed earth in a quantity and dimension sufficient to prevent movement over the entire range of testing and working pressures of the water main.
  4. Install concrete thrustblocking in a manner that maintains the ability to remove and replace bolts and nuts associated with each appurtenance.
  5. Utilize a block-jack when directed by PW’s Engineering Technician to supplement concrete blocking until the concrete can develop suitable compressive strength. Refer to PW’s Detail Drawings for additional information.
  6. Before installation, field check all bolts/nuts on valves and hydrants that are not self-adjusting for proper tightness.
  7. Install each valve with a cast iron valve box that is adjusted to finished grade.
  8. Valves located in un-paved areas shall be installed with a concrete valve box pad with a ground rod and adjusted flush with finished/existing grade.
  9. Valve box pads for a valve cluster shall be formed and poured to encompass all valves in a single monolithic concrete pad unless otherwise approved by PW.
  10. Install valve boxes so that no shock or loading is transmitted to the valve body.
  11. Utilize bolt-through restraints (e.g. Foster Adaptors®) between MJ fittings and gate valves to minimize the make-up distance for valve clusters.
  12. Install hydrants associated with new construction on anchoring (a.k.a. swivel) tees.
  13. Rotate the pumper nozzle on hydrants as necessary to face the adjacent roadway unless otherwise required by PW.

14. Restrain vertical fittings as necessary to prevent movement and separation of the adjacent pipe joints. Such restraint may include one or more methods including restrained-joint pipe, rodding between fittings and/or concrete dead-man anchors.
15. Field gauge ductile iron pipe larger than 12 inches in accordance with AWWA C600 Section 4.3.4.5.4 prior to cutting. However, contrary to Section 4.3.4.5.4, a mechanical-joint gland or other physical go/no-go template should be utilized. *It is important to note that factory gauging relates to measured outside diameter of the pipe and does not relate to ovality.*

#### 11. TRENCH BEDDING AND BACKFILL

1. Install trench bedding and backfill in accordance with PW's Detail Drawings and the requirements of this document.
2. Water main in unimproved (e.g. grass, field etc.) areas may be installed directly on an earth trench bottom and backfilled with native material. Remove debris, rocks larger than 6 inches and roots from the excavated soil prior to backfilling.
3. Install water main in improved (e.g. gravel, concrete, asphalt, etc.) areas and all anticipated future improved areas with granular bedding and either select backfill or 80 psi flowable fill as required.
4. Extend select/flowable backfill not less than 2 feet from each edge of the improved surface or back of curb.
5. Install backfill within the limits of public right-of-way in accordance with the requirements of the agency having jurisdiction.
6. When the bottom of the trench is excavated beyond the desired grade, backfill with a material that will minimize settlement of the installed waterline as directed by PW.
7. All backfill material shall be compacted. The method and degree of compaction shall be as follows:
  - Compact soil backfill material in unimproved areas to a level of compaction that approximates the native surrounding soil.
  - Provide vibration to granular bedding in improved areas prior to installing select/flowable backfill to consolidate the bedding material around the pipe haunches and seat the bedding into the trench bottom and sidewalls.
  - Compact select backfill in lifts as necessary to achieve 95% of maximum standard proctor density (ASTM D698f).
8. PW reserves the right to request field nuclear density testing to confirm and/or verify the adequacy of the Contractor's means/methods of compaction of trench backfill. In the event that PW requires such testing, the resulting costs shall be the responsibility of the Contractor.
9. Do not backfill trenches until authorized to do so by PW's Engineering Technician. Trench backfill that has been installed without PW's prior to authorization may be subject to removal and replacement at the Contractor's expense.

#### 12. TRENCH SETTLEMENT

1. The Contractor is responsible for addressing trench settlement to the satisfaction of PW and/or the owning agency (state, city, county) that occurs during construction and throughout the warranty period.



2. The Contractor shall repair trench settlement at the direction of PW and/or the owning agency.

13. MAIN INSTALLATION BY HORIZONTAL DIRECTIONAL DRILL (HDD)

1. PW must approve the HDD Contractor, and may request proof of adequate experience with similar bores and sufficient capabilities prior to initiation of construction.
2. Provide either restrained-joint (R/J) PVC or butt-fused HDPE in accordance with PW’s Material Specifications and as directed by PW. No other material/products may be utilized for HDD water main installation without prior approval by PW. As a guidance:
  - When it is likely that the water main may be tapped for either main or service lines, PW will likely require R/J PVC. Restrained-joint PVC water main is typically utilized for shallow bores with a flat bore path.
  - When it is unlikely that the water main will be tapped or will be excessively deep for repair, PW will typically require HDPE.
3. When HDPE pipe is utilized, increase the diameter of the pipe by one nominal pipe size larger than the water main to offset the reduction in internal diameter. For example, 8 inch HDPE is utilized for a 6 inch PVC water main project.
4. Transition from HDPE to PVC or DIP water main utilizing a mechanical joint adaptor kit and DIP mechanical reducer. Flange adaptor transitions are prohibited. Refer to PW Detail Drawings for additional information regarding this transition.
5. Utilize a horizontal directional drill of sufficient size and capacity to perform the reaming and pull-back without assistance.
6. Join pipe in accordance with the pipe manufacturer’s guidelines and recommendations.
7. Perform the HDD in a manner consistent with [Guidelines for Use of a Mini-Horizontal Directional Drilling for Placement of High Density Polyethylene Pipe \(TR-46\)](#) by the Plastic Pipe Institute. *Note that this guidance document was developed for use with HDPE pipe, and all references to pipe material properties shall be considered unique to HDPE. However, the basic planning and execution of the HDD itself is applicable to both HDPE and PVC.*
8. When planning and executing the HDD bore path, do not at any time exceed the parameters provided in the table below:

Diameter (in)	HDPE Pipe (DIPS DR11)		R/J PVC Pipe (DR14)	
	Max Pull Force (lbs) <sup>1</sup>	Min. Bending Radius (ft) <sup>2</sup>	Max Pull Force (lbs) <sup>3</sup>	Min. Bending Radius (ft) <sup>4</sup>
6	14,200	28	18,900	288
8	24,400	37	24,300	376
10	36,700	46	48,700	464
12	52,000	55	53,800	550
16	90,300	72	72,000	726

<sup>1</sup> Handbook of PE Pipe, Plastic Pipe Institute® Chapter 12, Table 6 for PE4710

<sup>2</sup>Technical Note PP 819-TN, Performance Pipe for bore path (use 50% for open trench).

<sup>3</sup>Certa-Lok® Technical Bulletin

<sup>4</sup>Certa-Lok® Technical Bulletin with safety factor of 2 applied by PW

9. Expose utilities crossing the bore path utilizing vacuum excavation or other non-destructive means of positive identification.
  10. Provide vacuum-excavated holes at both sides of improved drives/roadways and above sanitary sewer laterals along the bore path as necessary to minimize fluid pressures and the potential for damage due to soil expansion during back-reaming.
  11. Pull tracer wire for trenchless applications per PW's Material Specifications along with the water main pipe and leave adequate length at each end for connection. PW may require additional tracer wire and/or require larger gauge (higher tensile strength) wire on a case-by-case basis.
  12. Manage drilling fluids proactively to prevent migration into ditches, storm inlets and other undisturbed areas. In the event of a drilling fluid release (i.e. frac out) promptly initiate work to contain the drilling fluid and prevent its migration.
  13. Record horizontal position and depth to the nearest 0.5 foot at not more than 25 foot intervals along the bore path.
  14. Utilize caution to avoid damaging surface improvements and rigid (concrete and vitrified clay) storm and sanitary pipes during shallow drilling backreaming and pull-back.
  15. If an HDD bore becomes locked or otherwise immobilized during a pull back and cannot be recovered, a new bore path may be required. The Contractor shall under no circumstances exceed the tensile limits of the pipe material provided in Section 7.13.8 in an attempt to recover the locked bore.
  16. If a bore becomes locked under a public right of way or other permit-required crossing, obtain approval from the owning agency prior to initiating excavation to recover the drilling head/reamer.
  17. Restrain water main adjacent to each end of HDPE as appropriate to resist axial forces following installation and prior to testing.
14. UNENCASED BORES
1. Unencased or "slick" bore is a trenchless water main installation method that avoids damage to surface improvements by boring a horizontal hole below the surface improvement (e.g. drives, trees, landscaping, etc.) utilizing a horizontal directional drill, auger boring machine or pneumatic hammer. A short section of water main is then pushed or pulled into place through the bored hole without encasement.
  2. Install pipe by either pushing or pulling into place with both ends temporarily plugged/capped. When pushing pipe, utilize a substantial wooden block between the end of the pipe and excavator bucket.
  3. Utilize bell and spigot pipe with a maximum of 2 pipe lengths (40 feet). Utilize pipe designed for HDD installation for unencased bores longer than 40 feet in length.
  4. Pipe should advance with very little effort. If pipe encounters resistance, remove the pipe and ream the bore as necessary to remove obstruction prior to resuming installation.
  5. Limit the diameter of the bore hole to 1.5 times the outside diameter of the water main pipe.
  6. Install tracer wire (for trench installation) along with the water main pipe and leave sufficient length at each end for connection to adjacent tracer wire.

7. When a bore is performed in advance of trench installation, temporarily plug each end of the water main pipe and mark its location and depth with a stake or other functional equivalent.

#### 15. STEEL ENCASED BORES

1. Install water mains crossing KYTC roadways and railroad right-of-way within steel encasement unless otherwise approved by PW and the respective owning agency.
2. Install steel encasement in accordance with the requirements of the owning agency having jurisdiction and PW Standard Specifications.
3. Prior to initiation of construction, provide field staking as necessary to clearly delineate the ends of the encasement and elevation to the bottom of the encasement at each end.
4. Install steel encasement to a tolerance of 1.5% of the length of the bore for both horizontal and vertical accuracy. (For example, a 100 foot long bore with target elevation of 350 would have an acceptable elevation of  $350 \pm 1.5'$ .) However, nothing in this tolerance range shall relieve the Contractor from maintaining minimum cover or otherwise remaining within permissible horizontal alignment (i.e. easement).
5. PW will verify the installed encasement using survey-grade GPS equipment to determine conformance with the tolerances noted above. PW reserves the right to reject the bore if the installed tolerances exceed those stated above. In the event a bore is rejected, the Contractor will be required to either remove or re-bore the encasement. If PW accepts a bore that exceeds the tolerances above, the Contractor will be required to adjust for the bore (e.g. fittings, backfill, restraint glands, thrustblocking) and return the water main to design line/grade.
6. In the event that a previously unknown obstruction is observed in the field that requires the elevation of the bore to be modified from the approved design drawings, the Engineer, Contractor and PW Engineering Technician must approve the modification and elevation prior to initiating construction.
7. Install polyethylene-wrapped ductile iron water main with joint restraint gaskets within steel encasement and not less than 10 feet beyond each end.
8. Restrain fittings within 20 feet of the end of steel encasement to the encasement using two,  $\frac{3}{4}$  inch diameter all-thread rods and lugs welded to the encasement.
9. The number of casing spacers shall be in accordance with the manufacturer's recommendations and spacing shall not exceed 8 feet.
10. Butt-weld steel encasement 360° around the circumference with a full-penetration weld without voids.
11. Install #67 stone bedding to the springline (3 to 9 clock position) of the water main as directed by PW's Engineering Technician from each end of the steel encasement to the point at which the water main rests uniformly on the trench bottom.

#### 16. PRESSURE TESTING

1. Initiate pressure testing after the water main has been installed and backfilled, but before performing disinfection, flushing and connection to PW's active system.
2. Test installed water mains to 150 psi in accordance with AWWA C600 with exceptions noted herein.

3. Contrary to AWWA C600 Section 5.2, a testing allowance for leakage with make-up water is prohibited. Newly installed water main shall exhibit zero leakage for not less than 2 consecutive hours at the test pressure before the test is accepted by PW.
  4. Test hydrants in the closed position, with hydrant valves in the open position.
  5. Conduct testing on a water main that is completely filled with water. Pressure testing with air is prohibited.
  6. Utilize either multiple or new-in-box pressure gauges.
  7. The Contractor is responsible for providing all labor, materials, and equipment necessary for pressurizing the water main.
  8. PW's Engineering Technician shall witness the pressure test.
  9. Coordinate all pressure testing with PW's Engineering Technician not less than 24 hours in advance.
  10. Do not utilize hydrants for pressure testing unless approved by PW.
  11. Conducting a pressure test against a closed line valve is discouraged, and is subject to prior approval by PW.
  12. If a water main fails a pressure test, the Contractor is responsible for investigating the source of the failure, remedying the source of leakage as applicable and repeating the test until a successful test has been performed.
  13. Note that HDPE pipe will relax when subjected to internal stress which may resemble the presence of trapped air or a leak during a pressure test. As a result, HDPE will pressure test differently than PVC or DIP. It is recommended that Contractors conduct pressure testing of HDPE water main over a longer period time with smaller, incremental pressure/sequences until the test pressure is achieved.
  14. Do not initiate a pressure test after 1:30 pm without prior authorization by PW's Engineering Technician.
17. DISINFECTION, FLUSHING AND SAMPLING
1. Initiate disinfection after the water main has passed a pressure test.
  2. Perform sampling and flushing as directed by PW's Engineering Technician.
  3. Disinfect the new water main in accordance with AWWA C651 except that liquid chlorine (gas) and calcium hypochlorite tablets are prohibited.
  4. Provide a temporary hose to connect the new water main to PW's distribution system utilizing the blow-off assembly, adequate lengths of hose and backflow assembly and hydrant meter. The minimum hose size should be 1.5" in order to adequately fill and flush from this connection. Coordinate with PW's Engineering Technician for a source of water if a hydrant is not in the vicinity of the project.
  5. Flush the new water main to remove foreign objects and other deleterious materials.
  6. Open hydrant valves so all new hydrants and valves are disinfected along with the new water main.

7. Chlorinate as necessary to obtain an initial free chlorine concentration of between 50 ppm and 100 ppm. After 24 hours, the residual must remain at 25 ppm or greater. If, after 24 hours the residual is less than 25 ppm, reintroduce chlorine and repeat the process until a residual greater than 25 ppm is obtained after 24 hours.
8. Once a residual of 25 ppm has been obtained, flush the new water main to reduce the chlorine concentration to 2 ppm or less. PW will then collect bacteriological samples and forward to PW's in-house laboratory for analysis. After 24-hours, PW's Engineering Technician will obtain the test results and communicate such to the Contractor. A bacteriological test has passed if the results are 0 coliform present after 24 hours. The presence of coliform will require the Contractor to repeat the process of flushing, chlorination and bacteriological sampling until a 0 coliform test has been achieved and approved by PW's Engineering Technician.
9. Samples will be analyzed in PW's laboratory during normal working hours at no cost to the Contractor.
10. Collect samples at connection points to existing mains, at not more than 1 mile intervals, at dead ends and from each branch of the new water main.
11. Once all bacteriological samples have passed, the new water main may be tied into PW's distribution system.
12. Immediately following connection to PW's distribution system, PW's Engineering Technician will flush the new water main to achieve a minimum scour velocity of 5 feet per second. Flushing of multiple hydrants simultaneously may be required to achieve this velocity. Refer to the table below for approximate velocities necessary for scouring flushing before and after tie-in:

Diameter (in)	Approx. Flow Required to Produce 5 ft/sec (gpm)
6	500
8	900
10	1380
12	1950
16	3400

13. The Contractor is responsible for the dechlorination and disposal of highly chlorinated water in a manner that does not violate 401 KAR 10:030.
14. Bacteriological samples will be taken Monday through Thursday from 7:00 am to 2:30 pm.
18. **INSPECTION AND ACCEPTANCE**
  1. PW's Engineering Technician will perform part time observation of construction and obtain field measurements to be utilized in the creation of record drawings. This onsite representation by PW is for the benefit of PW and does not relieve the Developer, Engineer and Contractor from the responsibility of ensuring that the project is constructed in accordance with the construction permit and PW's Standard Specifications.
  2. Unless otherwise authorized, PW's Engineering Technician must be provided the opportunity to visually inspect all pipe, fittings, valves, hydrants and connections prior to installing backfill.

3. PW may require the Contractor to excavate any or all of buried water main and appurtenances that were backfilled without providing PW’s Engineering Technician an opportunity for a visual inspection.
4. PW may stop construction if deemed appropriate based on a number of factors which include, but are not limited to: Contractor’s continued poor performance, lack of responsiveness, disregard for instruction, lack of proper management or equipment, and untrustworthiness.

19. CLEANUP AND RESTORATION

1. Maintain a neat and orderly jobsite by picking up trash and debris at the end of each work day.
2. Following initial trench backfill, perform rough grading that leaves the work area approximately at finish grade.
3. At the completion of the project, clean up the site and remove rocks, concrete, debris, roots, and other deleterious material from the site and restore the disturbed areas to final grade.
4. Install seed, straw mulch and erosion control best management practices as necessary to stabilize the site in a manner that is consistent with the development plan for the project.
5. Seed all disturbed areas as follows unless otherwise specified by the Developer/Engineer:

Location	Seed Mix	Rate (lbs/1000 sf)
Open Field (non-pasture)/Woods	Contractor Mix (75% Kentucky 31 and 25% Perennial Rye)	8
Non-Irrigated Lawn	Kentucky 31 Fescue	10
Irrigated Lawn (Fescue)	Turf Fescue Blend or Fescue Sod	20
Irrigated Lawn (Other)	Match Existing Sod	n/a

20. TAPPING EXISTING WATER MAINS

1. Unless otherwise approved by PW, connect new water mains to PW’s distribution system “hot” without the need to interrupt service of the distribution water main.
2. Taps up to and including 12 inch diameter shall be performed by PW personnel. The Contractor is responsible for paying the one-time tap fee and providing project and contact information for the requested tap. Note that the tap fee is based on the size of the tap for the new main being installed. A schedule of main tapping fees is located here: [Main Tapping Fees](#).
3. The process for requesting a main tap is coordinated through the Customer Service Department via telephone (270-442-2746) or in person at PW’s business office.
4. The Contractor is responsible for determining the desired location of the tap, preparing a safe excavation, cleaning the main, connecting the tapping valve to the new water main, backfilling, installing the valve box and restoration.
5. PW will provide and install the tapping sleeve and valve, perform the tap and provide a valve box for installation by the Contractor. All other work is the responsibility of the Contractor.

6. Taps larger than 12 inches may be performed by a Contractor that is suitably trained. The material, method and experience of the personnel that will perform the work must be approved by PW prior to construction. The Contractor is responsible for paying all costs relating to the labor, material and equipment required for taps larger than 12 inch diameter.
7. Coordinate and schedule tap with PW one week in advance of the desired date.

21. TEMPORARY WATER SERVICE

1. When a project requires a temporary water source, the Contractor is responsible for obtaining a temporary water meter from PW.
2. Available sizes for temporary meters that are installed on existing fire hydrants and approximately flowrates and connection sizes are provided below:

Nominal Meter Size	Max Flow	Outlet Connection
5/8"	15 gpm	¾" garden hose
2"	±500 gpm	2.5" NST

3. To obtain a temporary hydrant meter, the Contractor must visit PW’s business office and meet with a Customer Service Representative, fill out an [application](#) and pay a deposit and connection fee that is based on meter size.
4. Refer to [PW’s Temporary Water User’s Guide](#) for additional information regarding monthly billing, connections fees, deposit refund, etc.
5. Once the application has been completed and deposit has been paid, PW will install the hydrant meter at a location that is mutually agreeable between PW and Contractor.
6. It is the Contractor’s responsibility to ensure that the meter, hydrant and associated hoses are not damaged by cold weather.
7. The Contractor is responsible for providing all hoses and adaptors as required to connect to the water meter. *Note that silver colored hydrants have a nozzle thread that requires a unique adaptor to connect to national standard thread (NST).*
8. PW provides bulk water for sale at the water treatment plant (1800 North 8<sup>th</sup> Street) for transportation by the Contractor. Contact PW’s Customer Service Representatives for additional information. A post hydrant is available with 2.5 inch NST connection, and the Contractor must provide the hose and an appropriate method of backflow prevention.

**8.0 CUSTOMER SERVICE CONNECTIONS**

1. REQUESTING NEW SERVICE

1. Meters for new customer services will be installed by PW only after a newly constructed water main has been pressure tested, disinfected, connected, flushed and placed into service.
2. The process for requesting a new meter service is coordinated through PW’s business office or online at [www.pwwky.com](http://www.pwwky.com). The following items must be completed and provided by the new customer or Contractor:
  - Application for new service (residential or commercial)

- One-time [meter setting fee](#)
  - Plumbing Permit (coordinate through a licensed plumber or Health Department)
  - JSA Sewer permit (if service is available)
3. An irrigation system must be connected to a separate meter, not the main meter servicing the structure.
2. **METER SIZE**
    1. It is the responsibility of the new customer or the Contractor/plumber to determine the appropriate size of each new water meter. Contact PW's Engineering Manager (270-444-5560) with any questions or for additional information related to sizing water meters and recommendations regarding service line sizing.
    2. The standard meter size for most residential applications is 5/8 inch x 3/4 inch.
    3. The minimum size for a meter utilized for irrigation is 1 inch unless otherwise approved by the Engineering Manager.
  3. **METER INSTALLATION**
    1. Once the above items have been received, PW will generate a work order, spot the proposed location of the meter in the field and submit a utility locate request in accordance with the requirements of Kentucky's Call Before You Dig Law.
    2. PW will install meters on a first-come-first-served basis that is dependent upon work load, weather and other operational considerations. Typically, new meters will be set within 7 to 10 business days from the date of creation of a work order.
    3. For customers that are on the same side of the road as the water main, PW will typically install the new meter directly above the existing water main. For properties that are on the opposite side of the roadway from the water main, PW will install the new meter on the customer side of the roadway near the roadway right-of-way line.
    4. Once the new meter has been installed, PW will leave a short ( $\pm 5$  foot) section of copper tube size (CTS) service line temporarily capped above ground on the customer's side of the meter. It is the customer's responsibility to connect to this short section of service line and continue the service line to its desired point of termination in accordance with the requirements of KY Plumbing Code.
    5. Typically, the service line size from the meter to the water main (PW-owned portion) is the same nominal size as the meter.

## **9.0 FIRE MAINS**

1. **GENERAL**
  1. Water used for fire protection of a structure shall be supplied by a dedicated fire main unless otherwise approved by PW.
  2. PW does not require a permit application and construction permit for fire mains. However, PW advises that the Owner/Engineer coordinate with PW's Engineering Manager during the design process.
  3. Tapping fire mains for domestic or irrigation meters is prohibited.



4. Water consumed for fire protection is non-metered.

## 2. FLOW TESTS

1. PW performs fire flow tests at no cost.
2. Anyone requesting a fire flow test should contact PW's Engineering Manager at 270-444-5560 and provide the address and general purpose of the test.
3. If PW has flow test data on file in the vicinity, PW will provide that data via email generally within 1 to 2 business days,
4. If PW does not have a recent test in the vicinity, PW will perform the test and provide results via email generally within 3 to 5 business days, weather permitting.

## 3. MATERIALS

1. Pipe shall be ductile iron installed with tracer wire and polyethylene encasement.
2. Plastic pipe is not approved for use as a fire main.

## 4. CONSTRUCTION AND TESTING

1. Install fire mains in the same manner as new distribution water mains unless otherwise noted below.
2. PW's Engineering Technician shall inspect all fire mains prior to connection to PW's system.
3. If a new fire main is installed via tapping PW's distribution system, test the new fire main to 200 psi.
4. If a fire main is installed concurrently with a new distribution water main as part of a larger project, the fire main may be tested with the distribution main at 150 psi as one contiguous system.
5. The fire main subject to installation and testing by PW extends from the distribution main to a blind flange located within the sprinkler/mechanical room of the structure. Refer to PW's Detail Drawings for more information.
6. Facilities served by a fire main that is 10 inches or larger shall install a laminated notice in the sprinkler room that reads: *"NOTICE – Notify Paducah Water at least 24 hours in advance of testing system or fire pumps. Call PW Plant Superintendent at 270-444-5570"*.

### LOG OF REVISIONS

Revision	Date	Section	Description
0	07/2021	all	Update and re-issue in new format.