



WATER and SEWER
UTILITY STANDARDS MANUAL

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Chapter 1: Prince William County Service Authority's Role

1.1 Mission, Vision, and Values

The Prince William County Service Authority's (Service Authority) mission, vision, and values were established by the Service Authority's Board of Directors (BOD) and are deployed to every member of the workforce. Our mission, vision and values are:

Mission: The Service Authority is dedicated to excellence in providing clean, reliable water service to our customers and returning clean water to the environment.

Vision: To be a nationally acclaimed leader in providing clean water and excellent customer service through sustainable, innovative business practices, community partnerships and environmental stewardship.

Values: Our core competency is a High Performing Culture of Excellence, which is reflected in the following strengths:

- Customer-First Focus (exceeding customer expectations)
- Integrity (every transaction, every time)
- Respect (treat others the way we want to be treated)
- Quality (go the extra mile, provide first-class service)
- Accountability (to each other)

It is our expectation that everyone we engage in business with, follow these same values (behaviors) to ensure we have a common approach that is successful.

1.2 Introduction

A. Basis and Intent

By action dated March 9, 2017, the Service Authority's Board of Directors (BOD) has adopted this edition of the *Utility Standards Manual* (USM or Manual), which provides standards for the design and construction of water and sanitary sewer infrastructure within the utility's Service Areas (*see Chapter 1, Section 1.3*). This Manual is amended and updated from time to time, subject to the approval of the Service Authority's General Manager (GM), without formal action of the BOD. The Service Authority reserves the right to amend or modify this publication without notice, and to interpret the meaning and requirements of all statements made herein.

This Manual documents the accepted practices, policies, standards, and procedures required to design and construct extensions to water mains, sanitary sewers, and minor sewage pumping stations (up to one (1) Million Gallons per Day (MGD), Average Daily Flow (ADF)) to be owned and operated by the Service Authority for projects serving the following stakeholders:

1. Applicants applying for service shall use the USM for guidance to prepare Project Plans and specifications and for information to work through the administrative

procedures that support their projects.

2. Service Authority staff shall use the USM for reviewing Project Plans and inspecting water and sanitary sewer installations.
3. Service Authority staff shall use the USM for the design and construction of Service Authority Capital Improvements Projects as applicable.

Chapters and Appendices in the Manual are read and interpreted together with the Development Review Process and System Improvement Policy to produce optimum designs. For example, *Chapter 4: Water Distribution* and *Chapter 5: Sanitary Sewer Collection*, the Applicant shall use these chapters for all designs and the descriptions of installations and assemblies depicted in *Appendix A: List of Water Distribution System Details*, *Appendix B: List of Sewer Collection System Details*, *Appendix D: Approved Equipment Manufacturers*, and *Appendix C: USM Approved Products List*.

B. Limitations/Waivers

1. All designs must comply with the requirements of all applicable regulatory agencies including, but not limited to:
 - Virginia Department of Health (VDH)
 - Virginia Department of Environmental Quality (VADEQ)
 - Virginia Department of Transportation (VDOT)
 - Prince William County Design and Construction Standards Manual (DCSM)

Where conflicts exist, the more stringent requirement shall apply. Nothing herein is deemed to waive or modify other requirements of existing regulations and law. Applicants are encouraged to bring conflicts to the attention of the Director of Engineering and Planning (Director).

2. Where the Prince William County Service Authority (PWCSA) or the Applicant believes that project-specific conditions warrant a waiver to or from the provisions of this Manual, the Applicant shall submit a completed USM Waiver Form (refer to *Appendix F*) with applicable exhibits electronically to the Service Authority Engineer who is reviewing the plans. USM Waivers are not for policies or standards of a general nature but are for a non-recurring and exceptional nature. A proposed USM Waiver shall incorporate approved engineering design practices before being considered reasonable by the Director or designee. Approval of a USM Waiver is not guaranteed. The Director or designee shall consider the USM Waiver request through the Project Plan review process. The Director or designee shall render a decision, in most cases, within 30 days of receipt of the USM Waiver request. In general, USM Waiver requests are not considered if they result in a negative impact to the Service Authority, such as accepting substandard infrastructure or design. Financial hardship and inconvenience are not acceptable justifications for a USM Waiver.
3. Due to the wide variety of situations that arise, it is impossible to address all scenarios. Exceptional measures required to address project-specific conditions are addressed on a case by case basis. Many criteria listed are minimums. The Service Authority reserves the right to exercise engineering judgment and will make the final determination as to the acceptability of each design and may require additional studies, reports, design justification, etc.

4. Where a conflict occurs between this Manual and Service Authority project-specific contract documents (specifications and drawings) on Service Authority Capital Improvements Project, the Service Authority project-specific contract documents shall govern. Where the contract for the work has been issued by a Developer, the provisions of this Manual shall govern.
5. The policies, procedures, standards, and regulations that are identified and included in this Manual as an Appendix, or incorporated by reference, are the latest version in effect at the time of publication.
6. The Development Department will provide a written approval letter for all Project Plan approvals.

C. Legal Authority

The Service Authority was created by a resolution of the Prince William Board of County Supervisors (BOCS) on January 11, 1983. The Service Authority is chartered by the State Corporation Commission and is an independent public body responsible for providing a comprehensive county-wide water and sanitary sewer system within the unincorporated areas of Prince William County (*see Chapter 1, Section 1.3*), excluding Dale City. The Service Authority's BOD has eight (8) members appointed by the BOCS. The management of the Service Authority is vested in the BOD by the BOCS. The Service Authority's BOD appoints the General Manager (GM), who is responsible for the daily management of the Service Authority.

D. Statement of Policy

The GM is responsible for the authority and administration of the USM and other related policies, procedures, standards, and regulations. The GM may delegate the administration of these documents to the Director. Designs of service connections and local mains must conform to principles established in this Manual or as directed. These include, but are not limited to, the following companion documents:

- Service Authority Customer Handbook
- Service Connection Policy
- Development Review Process and System Improvement Policy
- Low Pressure Force Main and Grinder Pump Policy
- Community Notification and Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities Policy

Other related policies, procedures, standards and regulations are used by Applicants to plan for and connect to the Service Authority System, establish the terms of receiving service from the Service Authority, establish all fees and charges for such service, and establish all fees pertaining to the application, permitting, and construction processes discussed in this Manual.

E. Rates, Rules, and Regulations

Applicants are subject to all Rates, Fees, Rules, and Regulations based on the types of services that are certified by the Service Authority. How services are configured and how many Equivalent Residential Units (ERU) are purchased determine how an account is eventually billed, so the Applicant will take careful consideration in designing such

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services. Decisions such as Water-Only accounts versus sub-metered services or ensuring accurate usage estimates are financial considerations that the Applicant will evaluate (refer to *Appendix H: Service Authority Customer Handbook and Rates and Fees for New Connections (Developer Fees)* associated with ERU calculations).

It is the responsibility of the Applicant to make all service connections and system extensions/upgrades, both on-site and off-site, to the water and sanitary sewer systems necessary to develop a property in accordance with Service Authority policies (refer to *Appendix R: Development Review Process and System Improvement Policy* and *Appendix I: Service Connection Policy*). The Service Authority has final approval for layout, alignment and connection points.

F. Terms and Abbreviations

Table 1-1: Terms and Abbreviations	
AASHTO	American Association of State Highway and Transportation Officials
Acceptance	Service Authority completion of a review of a plan or study. Acceptance does not constitute approval of the study or the proposed development project nor does it guarantee water and sewer capacity or availability
ACI	American Concrete Institute
ADF	Average Daily Flow
AISC	American Institute for Steel Construction
ANSI	American National Standards Institute
Applicant	Applicant shall mean that person or persons (property owner, developer, designated agent, Engineer, etc.) applying for water and/or sanitary sewer service
ASCE	American Society of Civil Engineers
ASSETS	Service Authority owned property (real property, buildings, all associated water and sanitary sewer facilities, etc.)
ASTM	ASTM International (formerly the American Society for Testing and Materials)
AWWA	American Water Works Association
BOD	Service Authority Board of Directors
BOCS	Prince William Board of County Supervisors
Bypass Pumping	Bypass pumping shall consist of pumping arrangements used to bypass the gravity sanitary sewer flow in order to perform work on the gravity sanitary sewer system

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By-Right Development Project	A development project in which a property is developed in accordance with its current zoning designation within Prince William County or a Town
CAD	Computer-Aided Design
CD	Compact disc
Certification	A written authorization to establish service and physically connect a new location to the Service Authority's System
Conditional By-Right Development Project	A development project in which a property is developed in accordance with a change in its zoning designation within Prince William County or a Town
CCTV	Closed-circuit Television
Construction Improvements	The entire construction or the various separately identifiable parts thereof required to be provided by the Applicant to complete the requirement of the approved Project Plans
CIP	Capital Improvement Projects
CTC	Certificate to Construct
CTO	Certificate to Operate
DCSM	Prince William County <i>Design and Construction Standards Manual</i>
DIPRA	Ductile Iron Pipe Research Association
Development Manager	Manager of the Development Department for the Service Authority
DIP	Ductile iron pipe
Director	Director of Engineering and Planning for the Service Authority
Easements	Requisite Property Access Rights
EPA	United States Environmental Protection Agency
Engineer	The Virginia-licensed Professional Engineer or Surveyor responsible for the Project Plans and specifications
ERU	Equivalent Residential Units
Facility	Infrastructure (buildings, water and sanitary sewer assets, etc.) owned and operated by the Service Authority
Fire Marshal	Prince William County Fire Marshal's Office
Field Inspector	Inspector assigned by the Service Authority Inspections Manager to inspect and approve construction activities for compliance with the approved Project Plans and <i>Utility Standards Manual</i>

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Field Services	Field Services Department of the Service Authority
fps	Feet per second
ft	Foot, feet
GIS	Geographic Information Systems
GPIN	Grid Parcel Identification Number
General Manager (GM)	General Manager of the Service Authority
gpd	Gallons per day
gpm	Gallons per minute
GPM	Gallons per Month
Hg	Inches of mercury
hp	Horsepower
HVAC	Heating, ventilation, and air conditioning
IBC	International Building Code
in.	Inch
Inspections Manager	Manager of the Inspections Section for the Service Authority
Land Use Entitlement	Requests submitted to Prince William County's Planning and Zoning Office or the appropriate Town agency by Applicants to change, modify or amend current zoning designations or development requirements for parcel(s) of land for the specific purpose of developing those parcels
LED	Light-emitting diode
LFC	Local Facilities Charge
Low Pressure Force Main (LPFM)	A pressurized sanitary sewer line serving multiple grinder pump connections that does not double as a discharge force main from a centralized sewage pumping station
LUP	Land Use Permit
mADC	Milliamperes direct current
Manual (USM)	Service Authority's Utility Standards Manual
MGD	Million gallons per day
mg/L	Milligrams per liter
MPUA	Master Plan Utility Adjustment
NACE	National Association of Corrosion Engineers
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
No.	Number

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OSHA	Occupational Safety and Health Administration
PDF	Portable document format
Performance Standards	The Service Authority's System Performance Standards criteria include water quality (0.5 mg/l minimum chlorine residual, looping, and minimizing dead-ends), water pressure (30 psi or greater at the main), water quantity (maximum day demand and fire flow), while maximizing system effectiveness, efficiency, maintainability, operational costs and customer satisfaction
PEX	Cross-linked Polyethylene
Planning Manager	Manager of the Planning Department for the Service Authority
PLC	Programmable logic controller
Polywrap	High-density, cross-laminated polyethylene tube wrap
ppm	Part per million
Products Committee	Committee composed of Service Authority Engineering & Planning and Operations & Maintenance staff members that reviews and approves materials and products to be used in water and sanitary sewer applications.
Project Engineer	Project Engineer for the Development Department of the Service Authority
Project Manager	Project Manager for the Capital Improvement Department of the Service Authority
Project Plans	Project Plans shall mean a set of plans used for site development containing the necessary information to extend utilities and provide water and/or sanitary sewer service sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia.
psi	Pounds per square inch
PVC	Polyvinyl chloride
PWC	Prince William County
SCADA	Supervisory control and data acquisition
SCADA Manager	Senior SCADA Program Manager for the Service Authority
SCAT	Sewage Collection and Treatment Regulations per Virginia Administrative

Chapter 1: Prince William County Service Authority's Role

	Code, Title 9, Agency 25, Chapter 790 (9VAC25-790).
Service Authority	Prince William County Service Authority (PWCSA)
Service Authority System	The Service Authority utility system includes water and sanitary sewer facilities, water transmission mains, sewer interceptors, collection and distribution lines, storage tanks, and pumping stations
Sub-Meter	A permanently installed meter that may be used for the purpose of eliminating sanitary sewer charges on water consumption that does not enter the sanitary sewer system
System Improvements	Service connection improvements determined by the Service Authority in addition to minimum Performance Standards required for Project Plans in order to increase the hydraulic characteristics of the water or sewer system to serve future anticipated customers, strengthen the utility system, improve reliability and redundancy, and provide better overall customer service. These improvements include but are not limited to: pipeline oversizing, loop closures, multiple feeds, pumping stations, easement dedications for future tanks, control vaults, and pipeline extensions. Improvement projects have generally been previously identified in the County's Comprehensive Plan, Town Comprehensive Plan, the Service Authority's Capital Improvement Program, Preliminary Engineering Reports or Studies, or operational observations and recommendations.
SPS	Sewage Pumping Station
TDH	Total Dynamic Head
THHN	Thermoplastic high-heat-resistant nylon-coated
VADEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
VFDs	Variable Frequency Drives
VDOT	Virginia Department of Transportation
WWF Manager	Water and Wastewater Facilities Manager for the Service Authority

1.3 Service Areas

A. Current Areas Served by the Service Authority

The Service Authority owns and operates drinking water (potable) and sanitary sewer systems within the unincorporated areas of Prince William County (PWC), excluding Dale City. The Service Authority is not the only water and sewer service provider within PWC, and only requests for service within the Service Authority's Service Area, as shown in Figure 1-1, are reviewed. The Service Authority's Service Area is divided into two (2) sub-areas:

1. East-end Service Area

The East-end Service Area is identified as areas south of the intersection of Lake Jackson and Prince William Parkway.

The East-end Service Area includes the Town of Dumfries and Town of Occoquan.

2. West-end Service Area

The West-end Service Area is identified as areas north of the intersection of Lake Jackson and Prince William Parkway and includes Bull Run Mountain Estates and Evergreen Country Club.

The West-end Service Area includes the Town of Haymarket and water-only service for Bull Run Mountain Estates and Evergreen Country Club, and sewer-only service for the Town of Nokesville.

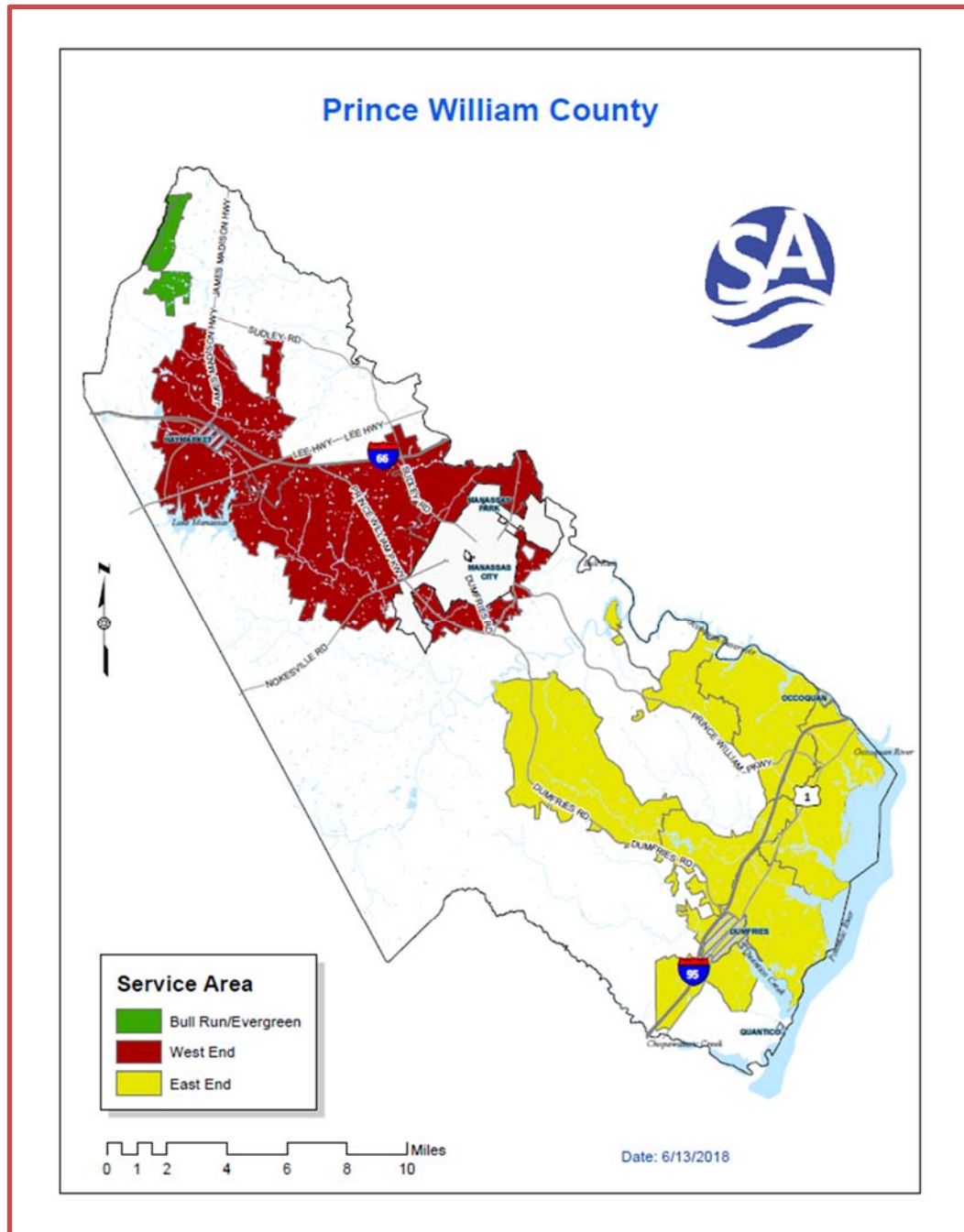
Where Service Authority facilities are not available to a particular location within the service area, as shown in Figure 1-1, and an Applicant is able to obtain service through another service provider, the Service Authority may agree to allow the Applicant to connect to the other service provider's water and/or sewer system. A separate agreement concerning this connection is required between the Service Authority, the Applicant, and the service provider.

B. Areas Not Served by the Service Authority

The Service Authority does not provide service to the following areas: City of Manassas, City of Manassas Park, Dale City or the Town of Quantico.

Properties connected to privately owned wells and sanitary sewer disposal systems are not subject to the standards of this Manual; however, they are subject to the requirements of the PWC Department of Health, which is responsible for permitting individual privately owned wells and sanitary sewer disposal systems.

Figure 1-1: Current Service Area Map



1.4 The Engineering & Planning Division

The Service Authority's Engineering & Planning Division provides comprehensive oversight for the design and construction of all publically owned water and sanitary sewer facilities within the Service Authority's Service Area (*see Chapter 1, Section 1.3*); including developing and updating the water and sanitary sewer master plans, managing the design and construction of capital facilities, and reviewing land development applications to ensure compliance with the Service Authority's policies, procedures, standards, and regulations. The Engineering and Planning Division is comprised of the following Departments:

A. Planning Department

Guides future system development and expansion, ensures adequacy of planned facilities with regard to sizing and location, enhancing reliability and readiness for emergency situations, reviews Land Use Entitlement Applications and water and sanitary sewer studies submitted by the Applicant.

B. Development Department

Reviews Project Plans and responds to public inquiries to coordinate the installation of water and sanitary sewer projects initiated by an Applicant. Provides permitting, certification, inspection services for construction of all facilities contributed to the Service Authority, and inspection services for Service Authority capital projects.

C. Capital Projects Department

Prepares Project Plans, specifications, and administers construction contracts for the Service Authority Capital Improvements Program.

1.5 Public Inquiries

The public is encouraged to visit <http://www.pwcsa.org> where this Manual and other important information and services are available.

During normal business hours, a Development Department staff member is available to answer development related questions for projects not assigned to a Service Authority Project Engineer. Responses to public inquiries are limited to available information.

1.6 Request to Initiate a New Water and/or Sanitary Sewer Connection

Prospective Applicants desiring to initiate a new water and/or sanitary sewer connection will consult the Development Department to determine whether the property in question is eligible for service. The Applicant shall follow the Service Authority's policies, procedures, standards and regulations and will be subject to all applicable rates and fees for new connections (Developer Fees). The Applicant shall certify an account with the Service Authority prior to the commencement of water and/or sanitary sewer service.

In all situations involving the initiation of new service within the Service Authority's Service Area (*see Chapter 1, Section 1.3*), or the modification of an existing service, the Applicant is responsible for acquiring the necessary permits from the Service Authority prior to beginning

work. Utility Permitting is discussed in *Chapter 1, Section 1.8*.

1.7 Plan Review

Applicants seeking water and/or sanitary sewer service for a location in which no prior service has been established and for which new construction is planned shall submit a development or public improvement plan to PWC, which is routed to the Service Authority for review and approval. Lot grading plans and all development plans for properties located in the Town of Haymarket, Town of Occoquan and Town of Dumfries are submitted directly to the Service Authority.

The Applicant's Engineer shall determine the improvements required, subject to Service Authority approval, to provide domestic water, fire protection, and sanitary sewer service that are in accordance with all applicable local, state, and federal policies, procedures, standards and regulations. The Applicant is responsible for submitting the required subdivision and/or site plan and supporting information to the appropriate regulatory agencies.

1.8 Utility Permit

The Applicant may request a Utility Permit from the Service Authority once the Project Plan has been approved by Prince William County or applicable jurisdiction. The Applicant shall acquire a Utility Permit and then hold a pre-construction meeting with the assigned PWCSA Field Inspector prior to commencing utility construction. The Utility Permit authorizes ground work for utility installation. The Utility Permit includes a letter from the Service Authority to the Virginia Department of Transportation (VDOT) which states that the Service Authority will operate and maintain Service Authority approved infrastructure in that portion of the VDOT right of way identified in the Project Plans. The Applicant shall pay all Plan Review and Utility Permit Fees prior to the issuance of a Utility Permit (refer to *Appendix H: Service Authority Customer Handbook and Rates and Fees for New Connections (Developer Fees)*).

A. Utility Permit Fees and Requirements

The following requirements and fees apply for acquiring a Utility Permit and are paid prior to issuance:

1. Payment of Utility Permit Fees

The Utility Permit Fee is comprised of four (4) components: Plan Review Fees, Inspection Fees, Closed-circuit Television (CCTV) Inspection Fees, and As-Built Fees:

a. Plan Review Fees

Plan Review Fees cover all submittals necessary to address review comments and are due prior to the issuance of a Utility Permit. There is a base fee and per linear foot charge based upon the amount of water and sanitary sewer main submitted.

b. Inspection Fees

Inspection Fees are charged per linear foot and cover the cost of the water and sanitary sewer main inspections from the start of construction through Beneficial Use and bond release. There is a minimum charge of 100-linear feet for water and 100-linear feet for sanitary sewer. The Applicant may submit a bond release request to the Development Department once final pavement is installed. The

Service Authority will not recommend final bond release of a project until all fees have been paid.

c. CCTV Inspection Fees

CCTV Inspection Fees cover the cost to inspect the sanitary sewer main by CCTV camera. This fee includes one CCTV inspection. Additional CCTV inspections are subject to re-inspection and/or return trip fees.

d. As-Built Fees

As-Built Fees cover the cost of preparing as-built drawings for the Service Authority's records after the utility installation is complete. The As-Built Fee is calculated based on the linear footage of water and/or sanitary sewer main installed. There is a minimum charge per project.

2. Address Listing

Address listings for new subdivisions are submitted to the Utility Services by the PWC GIS Office upon their approval of the listing. The customer submits their address listing to the PWC GIS Office who checks the listing for accuracy. Upon approval, the list is forwarded to the Utility Services Section.

3. Payment of a Local Facilities Charges (LFC), where applicable; see *Chapter 1, Section 1.13.B*.

4. Capital Recovery Charge (reserved for future use)

1.9 Certification

Certification is the written authorization executed by the Development Department's Utility Services Section to establish service and physically connect a new location to the Service Authority's water and/or sanitary sewer system. A separate water and sanitary sewer service connection is required for each property. The Applicant shall pay all Plan Review and Utility Permit Fees prior to applying for Certification. Certification Fees are paid in full and in accordance with the fee schedule in effect at the time of payment. No connection to the Service Authority's System is made without proof of Certification. Certification is required prior to the issuance of a water meter.

A. Requesting a new Water and/or Sanitary Sewer Service Connection

Water and sanitary sewer capacity is allocated on a first-come, first-serve basis provided that capacity is available and such requests are in accordance with the PWC Comprehensive Plan (SEW-POLICY 1 and WA-POLICY 1). A property is eligible if it is zoned and planned by PWC with a land use designation that permits public water and sanitary sewer, or has been authorized by PWC to connect

The Service Authority requires payment of all appropriate Availability Fees prior to the issuance of a Certification of Water and/or Sanitary Sewer Capacity (Certification) for each property where no prior service has been established. Once a Certification is issued, an account for the property is established. Billing will not occur until the construction meter is installed.

B. New Connection to the Service Authority's System by New Development

Applicants requesting service to a premises not already having direct access to an existing public water main or sanitary sewer main shall, upon plan approval, submit an address listing at the time of Utility Permit Fee payment. The Applicant shall complete a Request for Payment of Water and/or Sewer Certification and submit to the Development Department to verify and pay, in full, the appropriate Water and/or Sanitary Sewer Availability Fees. The Service Authority will issue a Certification after payment of the appropriate Availability Fees. The Applicant may schedule a meter set upon issuance of the Certification.

C. New Connection to the Service Authority's System by Existing Development

Applicants of a single lot or parcel seeking water and/or sanitary sewer service for a location with an existing service and/or an existing building or home shall work with the Development Department staff to sketch the desired service. When an existing water service or sanitary sewer lateral is reused as part of a new development, the Service Authority shall inspect the existing water service line or sanitary sewer lateral to ensure that it is serviceable and meets current Service Authority material specifications. The Applicant shall repair or replace any defected or out-of-date materials, at the Applicant's expense, to the satisfaction of the Service Authority before the existing water service or sanitary sewer lateral is placed back into service.

1.10 Meter and Lateral Scheduling/Inspection

A. Scheduling Meter Installations and Inspections

Water meter installation and inspection requests are made online at www.pwcsa.org, by fax to (703) 335-8933 or by phone to the Water Meter Service Line at (703) 335-8980. This is a 24-hour voicemail line. The Applicant shall provide the name, company, and phone number, as well as the subdivision, phase, section, and lot number of the property where the inspection and meter are requested. The Service Authority conducts a limited number of installations and inspections each day. Requests are honored on a first come, first serve basis.

The Service Authority will install all water meters, provided the Applicant's meter assembly meets Service Authority requirements and is in accordance with the current USM. If the meter assembly is unacceptable, the Service Authority will not install the meter and a Return Trip/Re-Inspection Fee is assessed. The Applicant shall pay the Return Trip/Re-Inspection Fee and correct any deficiencies with the meter assembly prior to requesting another meter installation. Re-inspections are scheduled no earlier than two (2) business days following the date of rejection.

The Service Authority will make every effort to perform all installations and inspections within three (3) working days of the initial request. To the extent possible, requests received prior to 2:00 p.m. are scheduled for the next business day. Calls received after 2:00 p.m. are scheduled for two (2) business days after receipt of call. The Service Authority will make every effort to perform the installations and inspections as scheduled; however, extenuating circumstances, such as inclement weather, scheduled holidays, emergencies, or unusually heavy workloads may cause delays. The Service Authority strongly recommends planning ahead to avoid delays.

B. Final Inspection for Occupancy

It is the responsibility of the Applicant to schedule a final inspection with the Service Authority. Prior to the issuance of an occupancy permit by PWC or other applicable jurisdiction, the Service Authority must perform a Final Inspection of the water meter assembly and sanitary sewer lateral to ensure that materials and installation are in accordance with this Manual. The Applicant may submit a Stabilization Waiver for final stabilization (see Section 1.13 G). If the water meter assembly or sanitary sewer lateral is unacceptable, the Service Authority will leave an orange sticker on site listing the deficiencies. The Applicant shall correct all deficiencies before scheduling a re-inspection. Inspection Fees cover one trip. Re-inspection/Return Trip Fees are assessed on re-inspections, as determined by the Service Authority. The Applicant shall provide access to the water meter at all times. Construction Meter Account

All public water users within the Service Authority's Service Area (see Chapter 1, Section 1.3) are metered and charged according to the adopted rate schedule regardless of the nature of the business. The Service Authority will provide and install all water meters, at the currently applicable Meter and Meter Installation Fee. "Jumpers" (unmetered temporary connections) are not permitted and, if found, the Applicant will be subject to additional fees associated with Unauthorized Use of or Unauthorized Access to Service Authority facilities or assets (see Chapter 2, Section 2.7).

The Applicant shall initiate a temporary construction meter account by contacting the Development Department's Utility Services Section at (703) 335-7930 to schedule a construction meter installation. The Applicant is responsible for the payment of water and sanitary sewer bills associated with a temporary construction account. Monthly billing for actual consumption and service charges will begin upon the installation of the water meter. The Applicant shall be responsible for any costs associated with damaged, lost, or stolen meters.

Once initiated, temporary construction water service must continue until the property passes the Service Authority's final inspection for occupancy, at which time it is considered a permanent meter installation/service.

1.11 Construction Meter Installation

The Applicant shall schedule a meter installation with the Development Department's Utility Services Section at (703) 335-7930.

The Service Authority will install all water meters, provided the meter assembly is acceptable. The meter assembly must meet the current USM standards. If the meter assembly is unacceptable, the Service Authority will not install the water meter and a Return Trip/Re-Inspection Fee is assessed. The Applicant shall pay the Return Trip/Re-Inspection Fee and correct any deficiencies with the meter assembly prior to requesting another meter installation.

1.12 Summary of Fees**A. Certification Fees**

Certification includes the following fees (refer to *Appendix H: Service Authority Customer Handbook and Rates and Fees for New Connections (Developer Fees)*):

1. Application Fees

All new accounts are charged an Application Fee at the time the account is opened. The Application Fee covers the administrative costs associated with establishing a new account.

2. Availability Fees

Water and Sanitary Sewer Availability Fees are charged when applying for Certification to cover the cost of the customer's pro-rata share of water and/or sanitary sewer treatment capacity as well as water transmission mains, sanitary sewer interceptors, storage tanks, reservoirs, pumping stations, infiltration and inflow and Engineering Administration. Availability Fees are not used to pay for operations, maintenance, repairs or capital improvements to benefit existing customers. Availability Fees do not include Service Connections and System Extensions/Upgrades.

Availability Fees are sold in Equivalent Residential Units (ERU) at the time of certification. ERUs are determined for each customer class as follows:

a. Residential

One ERU is assigned to each single family home or townhouse, based on meter size in accordance with BOD approved rates and fees.

b. Multi-family Residential

ERUs for apartments, condominiums, or like use, are based on 80 percent (%) of one ERU, per dwelling unit.

c. Student Housing

ERUs are based on the specific estimated peak monthly usage.

d. Commercial

ERUs for meter sizes $\frac{3}{4}$ -inch through 1-1/2-inches are based on a fixed schedule as indicated in the Service Authority's adopted schedule of Rates and Fees. Commercial ERUs for meter sizes 2-inches and greater are calculated on an individual basis based on the specific customer's peak monthly usage.

Connection to the Service Authority's System requires payment of an Availability Fee. The Service Authority shall not waive Availability Fees in accordance with adopted BOD policy. Availability Fees are non-refundable and non-transferable. Certifications are fixed to the property certified and are not transferable to other properties. Should that capacity cease to be needed at the connection initially served, the capacity can be applied in support of any other connection that is located on the same parcel of land. Where a parcel of land with an assigned capacity is subdivided, or its boundaries adjusted, capacity may be applied to support service on the resultant property or properties.

The payment of an Availability Fee allocates an amount of capacity in the Service Authority's System. One ERU of water is allocated as 10,000-gallons maximum usage per month.

The required meter size is approved, by the Director or designee, during the Plan Review process and is based on the customer's maximum instantaneous flow rate

as supported by the customer's submitted plans. Should actual consumption exceed the meter's rated capacity, the Applicant is required to upgrade the meter to the appropriate meter type and size and pay any associated meter charges and Supplemental Availability Fees. The Service Authority shall review a customer's estimated instantaneous flow based upon fixture unit computations to verify the rated capacity of the requested meter size is adequate.

In certain circumstances, such as establishing the ERU basis for 2-inches and larger commercial meters, the Service Authority may also consider:

- i. Typical consumption for like facilities or customers;
- ii. Comparable consumption data for like facilities or customers;
- iii. Type of use, principal use, or timing of use;
- iv. Other engineering or hydraulic information when instantaneous demands are not predicted by the fixture units, such as water used in processing or manufacturing applications;
- v. Other factors applicable to the specific Applicant when trying to establish appropriate meter size or ERUs. Commercial customers shall pay High Demand Charges for water consumption above their allotted ERUs as defined by the Service Authority's adopted User Rates. The customer may request or the Service Authority may require additional capacity which is reviewed on a case by case basis.

3. Supplemental Availability Fees

The customer may request or the Service Authority may require additional capacity. Supplemental Availability Fees are calculated in ERUs and are based on either the change in meter size or the amount of capacity added (ERUs used during the peak month, less ERUs previously purchased) based on the current rates in effect on the date of the bill. Customers identified as exceeding the applicable usage limits and who consistently place high demands or a capacity burden on the Service Authority's System are required to pay Supplemental Availability Fees. At any time, the Service Authority reserves the right to seek Supplemental Availability Fees when water or sanitary sewer demand exceeds the amount of capacity purchased, regardless of a change in ownership.

B. Local Facilities Charges

In some cases, new service locations are subject to additional fees established by the BOD, termed Local Facilities Charges (LFC). LFCs are designed to recoup the proportionate cost of designated infrastructure projects from new service locations within a specific Service Area that benefits from the project. If a property is subject to an LFC, the Applicant shall pay the fees in accordance with the terms stated in the resolution adopted by the BOD. Financial responsibility is incurred at the time of issuance of a Utility Permit or Certification.

C. Capital Recovery Charge – reserved for future use

D. Meter and Meter Installation Fees

Applicants connecting to the system are subject to the appropriate Meter Fee and Meter Installation Fee based on the size of the meter and associated labor for installation. The required meter size is approved during the Plan Review process. Water meters are procured and installed by the Service Authority. The Service Authority will install the meter in the meter crock or vault that is provided by the customer. The Service Authority may at its own discretion, at any time, remove any meter for routine testing, repairs, or replacement. Water meters are the property of the Service Authority and are right sized at the discretion of the Service Authority to meet the customer's use. Customers are charged the differential cost for a larger meter size and are subject to applicable Supplemental Availability Fees.

E. Sub-Meter Service Fee

The Sub-Meter Service Fee covers the costs necessary for plan review, field service, and customer service administration. This fee is based on the size of the sub-meter required for the project (refer to *Appendix H: Service Authority Customer Handbook and Rates and Fees for New Connections (Developer Fees)*).

F. Final Inspection Fees

A Final Inspection is requested when seeking building occupancy from PWC or other applicable jurisdiction for a specific building or lot. The inspection is conducted when all site construction and landscaping (sod/seed/straw) has been completed as per the approved Project Plans. The meter crock/vault and sanitary sewer lateral are inspected to check that there are no leaks, breaks or foreign material in the crock or lines and that all requirements have been met. If the project passes inspection, the Service Authority will provide a copy of the inspection report, which is used as verification to PWC that the inspection has been completed and is approved. Inspection Fees cover one trip. Re-inspection Fees are assessed on any necessary re-inspections as determined by the Service Authority. In certain situations a voluntary Stabilization Waiver Fee may also apply (*see Chapter 1, Section 1.13.G*).

G. Other Fees**1. Other Review Fees**

Other Review Fees cover the cost of preliminary plan reviews, plat reviews or other miscellaneous reviews.

2. Other Inspection Fees

Other Inspection Fees cover the cost of demolition inspections, replacement inspections or other miscellaneous inspections.

3. Stabilization Waiver Fee

The Applicant may request a Stabilization Waiver if they desire final inspection approval for occupancy prior to final stabilization (sod/seed/straw). The Stabilization Waiver Fee covers the administration of monitoring and performing additional inspections, as necessary, up to the point of final stabilization and/or bond release.

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For more information on Stabilization Waivers please contact the Development Department at (703) 335-7930.

4. Re-Inspection or Return Trip Fees

Re-Inspection or Return Trip Fees are charged when a final inspection or request for meter crock/vault and/or sanitary sewer lateral fails inspection. Re-Inspection Fees are paid in advance of the Field Inspector returning to the site to re-inspect.

-- end of Chapter 1 --

Chapter 2: Project Administration

2.1 Extension of Public Facilities

The Applicant, as referred to in this and the following Chapters, is the Property owner or designated agent, with whom the Service Authority will coordinate with for the design and construction of water and/or sanitary sewer facilities. The term Applicant is also understood to include Developers, Engineers, Employees, Agents, Contractors, Subcontractors, and Vendors providing support. Applicants desiring water and/or sanitary sewer service, within the Service Authority's Service Area, shall submit an Application for Connection to the Service Authority and receive the applicable permit(s) before starting construction of any water and/or sanitary sewer facilities. It is the prime responsibility of the Applicant to make all necessary provisions for the construction of the project per the approved Project Plans and specifications. The Applicant must ensure that all work is conducted in conformance with current guidelines and standards of federal, state, and local governing agencies.

A. Determining Project Scope

Prior to design and engineering, Applicants are encouraged to meet with a representative of the Development Department to discuss the project's scope, specific conditions, application of this Manual, and associated policies, procedures, standards, and regulations.

B. Applicant to Furnish Facilities within the Project Area

The Applicant shall furnish, construct and improve all onsite and offsite water and/or sanitary sewer facilities required to serve the development requirements of the project and to complete the Service Authority's planned systems. The Applicant shall transfer these public water and/or sanitary sewer facilities to the Service Authority, free of debts, liens and/or other legal encumbrances, for ownership, operation, and maintenance. Facilities not complying with the Service Authority's standards are not accepted and are not supplied with water and/or sanitary sewer service until the deficiencies are corrected to the satisfaction of the Service Authority.

Where facilities are to be extended in the future, the Applicant shall extend water and/or sanitary sewer mains and services to the limits of proposed site improvements. Terminations of mains are required to be beyond the limits of proposed pavement, past adjacent buildings, and beyond crossings with storm drains, ducts, or other utilities that could otherwise be undermined during subsequent construction activities. In cases where the future extension will provide a water distribution loop that is necessary to support the Applicant's project, the Applicant shall construct the public main to the site or subdivision boundary.

C. Public Main Required at the Property Served

In situations where the property being developed does not already have direct access and frontage to a suitable public water and/or sanitary sewer main, the Applicant shall extend the public water and/or sanitary sewer main, so as to establish sufficient main to receive a service connection for each property being developed. If the water and/or sanitary sewer main is extended within a public right-of-way, the main is owned,

operated, and maintained by the Service Authority as a public main.

The extension of a privately owned water service and/or sanitary sewer lateral crossing an adjacent property is permissible; however, the appropriate property rights are secured by the Applicant prior to Service Authority approval.

D. Public Gravity Sewer Required

To provide for a sustainable system, the Service Authority has planned an integrated sanitary sewer collection system of gravity mains and sewage pumping stations. Gravity sanitary sewers are utilized for the public collection system, except where low-pressure sanitary sewer facilities currently exist or such facilities are specifically planned or approved by the Service Authority.

E. Easements for Proposed and Future Extensions

The Applicant will dedicate easements and convey ownership to the Service Authority for all water and/or sanitary sewer facilities not located within a public right-of-way. All water and/or sanitary sewer facilities within a public right-of-way are conveyed to the Service Authority prior to street acceptance by PWC. Prior to Beneficial Use, the Applicant will convey to the Service Authority all on-site easements needed to enable the extension, installation, operation, maintenance, repair, and replacement of the proposed public water and/or sanitary sewer facilities, including appropriate access easements in accordance with this Section. Where the Applicant proposes facilities across the lands of others, it is the Applicant's responsibility to acquire and convey the necessary easements to the Service Authority prior to construction.

The Service Authority operates and maintains a fully integrated public utility system (water and sanitary sewer). The extensions by each application are an integral part of the overall public utility system. In support of the fully integrated public utility system, on-site easements are required in areas outside of the proposed improvements for the purpose of extending any of the public systems. The Applicant shall extend such easements to the site or subdivision boundary. The Applicant shall dedicate all easements in accordance with the Service Authority Omnibus Deed of Easement Template (see *Appendix L: Omnibus Deed of Easement Template*). The Applicant may eliminate those portions of the Omnibus Deed of Easement Template that are not applicable to the specific project, however, no language can be added. The Applicant shall incorporate the PWCSA easements into a comprehensive deed and plat.

The easement plat is reviewed as part of the Project Plan review and approval process. Prior to Project Plan approval by PWC, signed deeds and accompanying plats for proposed water and/or sanitary sewer facilities are to be submitted directly to the Development Department for review and signature. Easements are not required for domestic service lines, meters, fire lines, sanitary laterals, or private utilities when they fully reside of the property they serve. The Applicant shall submit proof of recorded easements prior to Beneficial Use. Other easement requirements are described in Service Authority policies and include, but are not limited to, the following: *Appendix I: Service Connection Policy* and *Appendix M: Off-Site Easement Acquisition Policy*.

F. Blanket Utility Easements

Blanket Utility Easements may cover an entire parcel of land, not the specific location of a utility. The purpose of the Blanket Utility Easement is to cross a piece of land without describing a specific location within the parcel giving the utility company flexibility for placement of their utilities. Blanket Utility Easements are granted by the Applicant for water and sanitary sewer utilities provided the Blanket Utility Easement width meets the criteria in *Chapter 4 and Chapter 5*.

A single Blanket Utility Easement provided by the Applicant shall include both water and sanitary sewer mains and appurtenances, if applicable. The Applicant shall provide either a Blanket Utility Easement or discreet water and sanitary sewer easements, but not both.

G. Facility Sizing

The Applicant shall size all water and sanitary sewer facilities, which are located within the area being developed, to support the proposed development in accordance with the Service Authority's Performance Standards, master plans, and Capital Improvements Program plans. When improvements above and beyond those needed to support the proposed development are identified as being required by the Service Authority, the Service Authority and Applicant will enter into an agreement to reimburse the Applicant the incremental cost apportionment for the additional required facilities in accordance with the current Service Authority policies (refer to *Appendix I: Service Connection Policy* and *Appendix R: Development Review Process and System Improvement Policy*).

2.2 Offsite Facilities

Applicants are responsible for the design, construction, and improvements of all onsite and offsite facilities, regardless of size, necessary to serve the project.

Offsite facilities shall include, but are not limited to:

- Supply mains, loop closures, pumping or pressure reducing installations, necessary to extend from existing supply mains to the Project area;
- Collection sewers from the Project area to the existing public sanitary sewer system;
- Sanitary sewer pumping stations;
- All necessary accessories and appurtenances to the water and/or sanitary sewer systems.

2.3 Service to Developed Properties

Developed properties are defined as those properties within the Service Authority's Service Area (see *Chapter 1, Section 1.3*) that are already subdivided, improved, and populated by separate owners and/or renters, including commercial and/or industrial establishments. Developed properties currently not provided with water and/or sanitary sewer services may receive water and/or sanitary sewer service from the Service Authority (refer to *Appendix H: Service Authority Customer Handbook and Rates and Fees for New Connections (Developer Fees)* and *Appendix I: Service Connection Policy*).

2.4 Agreements

A. Bonding

Water and sanitary sewer facilities for projects subject to PWC review and approval will be bonded through PWC. For projects located in the Town of Haymarket, Dumfries or Occoquan, the Applicant shall furnish a Performance Bond for the water and sanitary sewer facilities using the PWC Unit Price sheet as the cost basis, with the Service Authority named as beneficiary. The bond may take the form of a surety or an irrevocable letter of credit in the amount of 100-percent of the estimated cost of the water and/or sanitary sewer improvements per the Prince William County unit price sheet.

B. Reduction for Work Completed

Applicants may request a bond reduction after the installed facilities have passed Service Authority inspection and testing procedures.

1. The Applicant may request a bond reduction by contacting the PWC Bond Administrator. The PWC Bond Administrator will forward a bond reduction worksheet to the Inspections Manager who will complete and return the form to the PWC Bond Administrator. Bonds are not reduced to less than 20 percent (20%) of the original estimated construction cost.
2. For projects bonded through the Service Authority, there are no reductions.

C. Acceptance of Facilities

The Service Authority's bond release inspection is entirely separate from the PWC inspection process. The Applicant shall request a bond release inspection from the Development Manager in order to obtain the release of the performance bond for the project. The Applicant shall pay all applicable Service Authority fees (including Service Authority overtime) and complete all final paving prior to submitting a request for bond release. The Applicant shall submit a request for bond release inspection in writing (an email is preferred) with the County Plan Name (or Service Authority permit number if a Town project) and the Applicant's name and contact information for addressing any deficiencies.

Once the Service Authority has received a valid request for a bond release inspection, the Field Inspector shall perform a bond release inspection of the public water and sanitary sewer facilities within 30 days. If the Field Inspector notes any deficiencies during the inspection, the Field Inspector shall forward a punch list to the Applicant for correction.

It is the Applicant's responsibility to correct all deficiencies, at the Applicant's cost, and schedule a re-inspection with the Field Inspector within six (6) months. A new bond release inspection is required if the six (6) month period has lapsed. Once the Field Inspector signs off on the project, the Development Manager shall provide a letter, to the Applicant, stating that the Service Authority does not object to the release of the performance bond for the project. At this point, the Service Authority assumes ownership and maintenance responsibilities for the public water and/or sanitary sewer facilities.

2.5 Current Project Plans Required

The Applicant shall resubmit construction drawings and specifications that have been approved for five (5) years or more, in advance of construction permitting, with a new review fee, to determine if the design is still current. The Applicant shall address if the conditions on or adjacent to the project are still accurately depicted on the Project Plans. Additionally, the Applicant shall update the Project Plans to meet all current design standards.

2.6 Land Development Process

The Applicant shall follow the Service Authority's Land Development Process when proposing to extend the Service Authority's System. The process includes the following stages:

A. Plan Review

Applicant's plans are submitted to and reviewed by the Service Authority's Project Engineer for compliance with this Manual.

B. Utility Permit

Once the Project Plan is approved, the Service Authority issues a Utility Permit. A Utility Permit is the Service Authority's written authorization for the Applicant to construct water and/or sanitary sewer facilities.

C. Construction Inspections

During construction, water and/or sanitary sewer facilities are inspected and tested for compliance with this Manual, prior to acceptance into the Service Authority's System.

D. Certification

A Certification is the written authorization to establish service and physically connect a new location to the Service Authority's System. Please refer to the *Appendix H: Service Authority Customer Handbook and Rates and Fees for New Connections (Developer Fees)* for rates and fees associated with the Land Development process.

E. Closeout/Bond Release

Water and/or sanitary sewer facilities undergo a final inspection and acceptance process (see *Chapter 2, Sections 2.9 and 2.10*).

2.7 Preconstruction Conference

The Applicant shall request a pre-construction conference by calling the Inspections Manager as directed on the Utility Permit, prior to the commencement of any water and/or sanitary sewer installation. The Applicant shall make the request a minimum of 72-hours prior to any scheduled work.

The Field Inspector will schedule the pre-construction conference with the Applicant. At a minimum, the utility contractor's superintendent and foreman, and the Field Inspector shall attend. As appropriate to the work at hand, other attendees are the Applicant, Applicant's

Engineer, principal subcontractors, suppliers, and the Service Authority's Project Engineer. Participants in the pre-construction conference shall have, on hand, a complete copy of the most recent approved Project Plans for the project, and any supporting permits. Participants will review the scope of work and the installation and inspection procedures to be followed. Project schedules and sequences are reviewed to ensure consensus.

A. Notification

Prior to any work associated with the installation, testing, repair, or replacement of Service Authority facilities, or grading that impacts these facilities, the Applicant or contractor shall contact the designated Field Inspector to request inspection services.

B. Approved Project Plans

The Applicant shall ensure that a copy of the approved Project Plan, revised Project Plan sheets, submittals, and Engineer's cut sheets are available and accessible at all times, on-site, through final acceptance of the work. The Applicant shall provide copies of all water and/or sanitary sewer cut sheets to the Field Inspector prior to installation of any water and/or sanitary sewer facilities. The Applicant shall ensure cut sheets are sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia.

C. Protection of Existing and Proposed Utilities

1. Documentation

When water and/or sanitary sewer construction requires offsite (on property not owned by the Applicant) disturbance within a Service Authority easement, the Applicant shall photograph and/or video record, prior to the start of construction, the work area to document existing conditions such as, but not limited to, existing structures and their condition, existing utilities, and other existing site conditions. The Applicant shall submit a copy of all photographs and/or video recording file(s) to the Field Inspector. The documents shall bare the date and time the photos or video recordings were made.

2. Protection

During construction operations, the Applicant shall properly locate, protect, brace, support, restore and maintain all underground pipes, conduits, drains, and other underground structures uncovered or otherwise affected by the construction work being performed to ensure they are protected from any damage, in accordance with the Virginia State Code 20VAC5-309-140. Applicant shall protect, restore and maintain all pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, and other surface structures (including all sod and shrubs in yards and parks) crossed by or adjacent to the utility under construction.

3. Damage

The Inspections Manager shall observe and document all damage resulting from the Applicant's construction activities.

4. Repair and Replacement

If elements have been removed or damaged, the Applicant is responsible for the cost to replace, repair, or restore any of the elements listed in this Chapter to their existing condition or better with new materials. The Applicant shall, without delay, coordinate with the property owner, agency, or authority having jurisdiction over, the damaged surface or subsurface structure concerning its replacement, repair, restoration, and payment of cost incurred in connection with the damage.

5. Blasting, where required, is done by the Applicant with care and in accordance with all applicable federal, state, and local laws, ordinances, and regulations. The Applicant is responsible for obtaining all required permits prior to blasting. The Applicant shall ensure all permits are onsite and available for review upon request by the Field Inspector.
6. Blasting is not permitted within 25-feet of any Service Authority facility (including, but not limited to: buildings, water storage tanks, buried utilities, or other structures). Approval for blasting closer than 25-feet is granted by the Director or designee, only when the Applicant can certify and demonstrate that the safety and soundness of existing Service Authority facilities will not be impacted by the proposed blasting activities.
 - a. The Applicant shall notify the Inspections Manager or designee at least 24 hours in advance of each detonation series.
 - b. The Applicant shall notify the Inspections Manager or designee within 24 hours of completion of blasting.
7. Unauthorized Use and Access

“Unauthorized Use” means any use or operation of Service Authority facilities or assets not authorized by a Utility Permit. “Unauthorized Access” means any access to Service Authority facilities or assets in a manner that is not authorized by a Utility Permit or other permission granted by the Service Authority (including, but not limited to, any easements, rights of entry, license, or similar privilege).

In the event that an Applicant for or holder/assignee of (“Holder”) a Utility Permit commits an Unauthorized Use of or obtains Unauthorized Access to Service Authority facilities or assets, the Applicant and/or Holder, is liable for all of the following costs and fees:

- All of the Service Authority’s costs in responding to incidents arising from an Unauthorized Use or Unauthorized Access;
- Any fees imposed by any federal, state, or local regulatory agency as a result of Applicant and/or Holder’s Unauthorized Access or Unauthorized Use;
- The costs to Service Authority customers arising from the loss of service caused by an Unauthorized Use or Unauthorized Access.

D. Construction Crossings

Where construction traffic must cross a Service Authority facility, or where substantial grading is to occur, the Service Authority may require plan and profile drawings, cross-sections, loading plane diagrams, and loading calculations, sealed, signed, and dated by a Professional Engineer licensed in the Commonwealth of Virginia. Plan and profile drawing shall demonstrate that the existing facility is protected against damage or adversely impacted by construction traffic or grade changes and that the proposed means and methods for protecting the facility are adequate. The Applicant shall demonstrate that all Service Authority facilities are protected against compromised structural integrity, loss of pipe slope, deformation, and loss of water tightness.

If the placement of additional soil over the facility is used to cushion and bridge a Service Authority facility at a temporary crossing, the Applicant shall remove the added material immediately after construction activities cease, unless otherwise directed by the Service Authority.

E. Safety

The Applicant and all contractors are responsible for the safety and protection of persons and property that are directly or indirectly affected by construction activities. The Applicant shall ensure all activities are performed within current industry standards and guidelines set forth by federal, state, and local governing agencies. Field Inspectors have the authority to stop work and shut down a construction site when safety violations are observed by the Field Inspector.

F. Responsible Supervision

The Applicant and/or utility contractor shall appoint a full-time, competent, and reliable employee or consultant, who will speak, read, and write the English language fluently and be able to communicate effectively with the workers at the site and will be responsible for supervising and maintaining:

1. Quality control per Service Authority's standard and guidelines as specified herein.
2. Health and safety of project workers and the general public.
3. Protection of stored materials and equipment, existing utilities, facilities, and properties per federal, state, and local agencies.
4. Corrective measures as necessary to ensure safety and quality assurance.
5. Discipline or dismissal of any employee from the project who does not demonstrate proper industry safe and healthy work habits.

G. Protection of New Work

The Applicant is fully responsible to protect all work completed or under construction. This includes, but not limited to, materials and equipment from theft and/or damage until the project attains final acceptance by the Service Authority.

H. Operations within VDOT Right of Way or Private Roadways

All development related activities within a VDOT right-of-way or privately maintained roadway are the responsibility of the Applicant. The Applicant is responsible for the implementation, maintenance, and safety procedures as outlined in the approved VDOT Land Use Permit (LUP) and Maintenance of Traffic plan(s) or as required by other policies, procedures, standards and regulations of federal, state, or local agencies having jurisdiction over the roadway.

I. Operations within a Service Authority Facility

All development related activities within the fenced limits of a Service Authority facility or on Service Authority owned property shall require an approved and executed access agreement between the Applicant and the Service Authority (see *Appendix Q: Facilities Access Agreement* for template).

J. Progress Meetings

Formal or informal meetings are conducted regularly, as needed, between the Applicant and the Service Authority Field Inspector as the project progresses, to maintain open communication between participants.

2.8 Field Engineering

Changes or corrections to the approved Project Plans are warranted during construction. The Applicant shall notify the Service Authority's Field Inspector and Project Engineer of any proposed changes or corrections. Minor changes to alignment, certain additions, deletions, substitutions, and minor changes to grading, are approved by the Field Inspector. Where the scope of the change is limited, approval may take the form of a Field Revision; whereby, a markup of the plan is made to reflect the desired change and submitted for approval without a full submission of a revision to the approved Project Plan. Where significant changes to line, grade, or utility size are desired, and where additional easements are required, a formal Project Plan revision is submitted through PWC for comment and approval.

All changes made during construction are recorded and reflected on record drawings prepared by the Service Authority.

2.9 Inspection

The Service Authority is permitted to safely access the project at any time to perform inspections and observe the quality of work and construction safety methods. Work not conforming to the approved Project Plans, Service Authority's standards, or industry standards is subject to rejection. Any work that has been rejected must be replaced or corrected to the satisfaction of the Field Inspector.

A. Beneficial Use

Beneficial Use is placing infrastructure in service prior to the final acceptance by the Service Authority and bond release by PWC. Beneficial Use describes the state of a water or sewer main or pumping facility when it is serving one or more Service Authority customers but has not yet received final acceptance by the Service Authority.

Beneficial Use status does not, in any way, constitute final acceptance of the system; it simply allows the Applicant to place the water main or sanitary sewer main or pumping facility in use while the development is under construction. The Applicant remains responsible for all system maintenance and repair until it has been bond released and turned over to the Service Authority for ownership and operation.

Once Applicant has installed and tested water mains and sanitary sewer mains and their associated appurtenances and the Field Inspector has found them to be in accordance with the approved Project Plan and the requirements of this Manual, the Applicant may request, in writing to the Field Inspector, a Beneficial Use inspection. Base pavement must be in place over all applicable water and sanitary sewer facilities prior to requesting a Beneficial Use Inspection.

If the Field Inspector notes any deficiencies during the inspection, the Field Inspector shall forward a punch list to the Applicant. The Applicant shall notify the Field Inspector when all deficiencies identified on the punch list have been corrected. Upon verification by the Field Inspector that all deficiencies have been corrected, the Director or designee shall issue a Beneficial Use letter placing the project in Beneficial Use status. The Applicant may request construction meters after obtaining Beneficial Use status. The Applicant shall provide to the Development Manager proof of recorded instrument numbers of all required easements and proof that all applicable Service Authority fees (including Service Authority overtime) have been paid prior to submitting a request for Beneficial Use status.

The Applicant's failure to operate and maintain the system while in Beneficial Use status, per the Service Authority's Performance Standards, shall result in a suspension of meter installations and/or final meter inspections until all deficiencies are corrected by the Applicant.

Developers or owners of other properties ("Third Party Connectors") may connect to water and/or sanitary sewer infrastructure in Beneficial Use status with the requisite indemnification and assumption of liability. Prior to permitting such connection, the Service Authority may, in its discretion, require a Third Party Connector to, among other things, post a bond, letter of credit, or other surety in favor of the Service Authority and Applicant and/or obtain a policy of insurance naming the Service Authority and Applicant as additional insureds. Such sureties and insurance policies shall be in amounts satisfactory to the Service Authority.

If a problem occurs during the Beneficial Use status, the Applicant is responsible for making all necessary repairs. If the Applicant fails to initiate corrective action within a timely manner of being notified by the Service Authority Field Inspector, the Service Authority's Operations and Maintenance Division shall repair problems affecting water and/or sanitary sewer services to customers. If this occurs, the Service Authority shall invoice the Applicant for all costs associated with the repairs and shall require payment

prior to proceeding with any additional approvals or meter sets for the Applicant (Refer to *Appendix E: Partial/Full Beneficial Use Developer Request Template*).

B. Partial Beneficial Use

Partial Beneficial Use defines the elective decision by the Applicant where portions of the water and sanitary sewer systems are operational and capable of providing continuous potable water and sanitary sewer service for anticipated occupancy use only to specific portions of a development under construction throughout the build-out of the project. The Service Authority review and approval of Partial Beneficial Use is limited to the water system as a potable water source only. Other reviews and approvals pertaining to fire protection and fire coverage are required from PWC in order to grant occupancy permits.

The Applicant shall provide, to the Development Manager, proof of recorded instrument numbers of all required easements and proof that all applicable Service Authority fees (including Service Authority overtime) have been paid prior to submitting a request for Partial Beneficial Use status.

Once Applicant has installed and tested water mains and sanitary sewer mains and their associated appurtenances and the Field Inspector has found them to be in accordance with the approved Project Plan and the requirements of this Manual, the Applicant may request, in writing to the Field Inspector, a Partial Beneficial Use inspection. Base pavement is in place over all applicable water and sanitary sewer facilities prior to requesting a Partial Beneficial Use inspection.

If the Field Inspector notes any deficiencies during the inspection, the Field Inspector shall forward a punch list to the Applicant. The Applicant shall notify the Field Inspector when all deficiencies identified on the punch list have been corrected. Upon verification by the Field Inspector that all deficiencies have been corrected, the Director or designee shall issue a Partial Beneficial Use letter placing the project in Partial Beneficial Use status. The Applicant may request construction meters after obtaining Partial Beneficial Use status.

The Applicant's Engineer is a Professional Engineer licensed to practice in the Commonwealth of Virginia and shall furnish a written Certification of fire protection/hydrant coverage in accordance with Sec. 300 of the DCSM (Refer to *Appendix E: Partial/Full Beneficial Use Certification Form Template*), which may require hydraulic modeling or on-site fire flow testing of the partially completed infrastructure, at the Applicant's cost. In the event the DCSM requirements are not met, the Professional Engineer must certify the available fire protection/hydrant coverage to the PWC Fire Marshal's Office (Refer to *Appendix E: Partial/Full Beneficial Use Certification Form Template*).

The Applicant's failure to operate and maintain the system while in Partial Beneficial Use status, per the Service Authority's Performance Standards, shall result in a suspension of meter installations and/or final meter inspections until all deficiencies are corrected by the Applicant.

The Service Authority approval letter placing a designated area and partially completed infrastructure in Partial Beneficial Use includes the following language:

Partial Beneficial Use does not constitute certification by the Service Authority that the entire hydraulic system is installed and operational or that service is adequate for fire protection purposes. Available fire flows and hydrants, strategically placed for coverage, may not be available until the entire water system is installed and made operational per the approved development plans and hydraulic model. It is the responsibility of the PWC Fire Marshal's Office to determine if required fire protection is in place for the areas being occupied and that fire protection service will remain available throughout the build-out of the project. The Applicant is required to provide Certification by the Applicant's Engineer that the section being reviewed for Partial Beneficial Use meets hydraulic performance requirements including continuous fire protection to secure occupancy approval. It is the responsibility of the County Building Official to ensure that the PWC Fire Marshal has determined that fire flows are continuously adequate to provide fire protection for the occupied properties subject to Partial Beneficial Use approval throughout the build-out of the project, before approving occupancy of such properties.

C. Final Inspection for Occupancy

Refer to *Chapter 1* for Certification, Stabilization Waiver, and Meter Inspection requirements.

2.10 Project Closeout

A. As-built Survey and Record Drawings

The Service Authority shall contract separately with a consultant to prepare the water and sanitary sewer as-built plans for all projects, using funds collected during the permitting process.

VDOT requires that Service Authority facilities within public rights of way be permitted, using the form known as a Land Use Permit (LUP).

To initiate the preparation of an LUP, the Applicant must obtain and provide the following items.

1. Provide an LUP form with the project and street information completed in hard copy (or preferably in fillable pdf) to the Development Manager.
2. Provide the name, address, and telephone or e-mail address of the Applicant who is responsible for the road acceptance package.

The Development Manager will complete the Service Authority information and return the completed LUP form to the Applicant.

-- end of Chapter 2 --

Chapter 3: Application and Plan Preparation

3.1 Purpose

The Service Authority reviews the Project Plans for all projects that will extend water and/or Sanitary Sewer facilities within the Service Authority's Service Area (*refer to Chapter 1, Section 1.3*). Conformance to the procedures and standards outlined in this Manual will expedite the review process. This application and review process ensures that projects are built to conform to Service Authority standards.

Applicant shall, at a minimum, meet all standards described in this Manual for all facilities that are incorporated into the Service Authority's water and sanitary sewer utility system. These facilities include those constructed within a public right-of-way or on private property where a dedicated easement exists or are provided by the Applicant. Specific variances to these standards are requested by the Applicant and approved in writing by the Director or designee.

3.2 Prince William County Planning and Land Use Applications

Prior to submission of Project Plans to the Service Authority, the corresponding land use application(s), if required, must first be approved by PWC. Such applications include rezoning, special use permits, and comprehensive plan amendments. The Service Authority participates in the County's referral system as an outside agency. Review of the application can result in the following, but not limited to, responses from the Service Authority:

- Comments are provided on the standard design requirements as defined in the Service Authority's USM.
- Comments are provided on the location of existing facilities, general location, and configuration of proposed water and sanitary sewer facilities.
- Identify the need for special studies to determine feasibility of providing service.
- Identifying transmission mains, trunk sewers, and other facilities traversing or needed to serve the proposed development and may include facilities identified in the Service Authority's Capital Improvement Program.
- Identifying areas for easement and/or line extensions necessary to provide access to water and sewer lines to adjacent properties.

3.3 Application Procedures

The Service Authority's review and approval of Project Plans generally occurs concurrent with other agencies (PWC, VDOT, etc.) and does not require a separate plan submittal to be prepared exclusively for Service Authority review; however, the Applicant must incorporate the Service Authority's submittal requirements, as referenced in this Manual. Except as otherwise provided by law and subject to Section 2.5 and Section 3.3.E of this Manual, Project Plans are subject to the requirements of this Manual that are in effect on the date of approval of such Project Plans.

For projects in PWC that are not subject to regulation by a Town, the Applicant shall submit the requisite number of Project Plans for review to the PWC Planning Office, which shall coordinate directly with the Service Authority for concurrent review. The PWC Planning Office is located at 5 County Complex Court, Suite 210, Woodbridge, VA 22192. The Office hours are

8:00 a.m. to 5:00 p.m., Monday through Friday, excluding federal holidays. Refer to <http://www.pwcgov.org/> for more information.

For projects in the Towns of Occoquan, Dumfries, or Haymarket, the Applicant shall submit one copy of the Project Plans directly to the Service Authority at 4 County Complex Court, Woodbridge, VA 22192. The Service Authority's office hours are 8:00 a.m. to 5:00 p.m., Monday through Friday, excluding federal holidays. Refer to <http://www.pwcsa.org/> for more information or call (703) 335-7930 Initial Application.

A. Initial submission must include the following:

1. Project Plans including completed Service Authority Sheet – one full size set (24-inches by 36-inches).
2. Easement plats – one half size set (18-inches by 24-inches).
3. Hydraulic Analysis Report and/or sanitary sewer capacity analysis (if required) – one copy.

B. Subsequent Submissions

After addressing initial comments, subsequent plan submissions include:

1. Response letter, stating how each comment has been addressed and/or reason for action taken.
2. Revised Project Plans including completed Service Authority Sheet – one full size set if processing through PWC Planning Office; or directly submit updated plan sheets electronically as a single Portable Document Format (PDF) to the Service Authority's Project Engineer. After the first review, an Applicant can coordinate directly with the Service Authority's Project Engineer to expedite reviews.
3. Revised plats – one full size set (if applicable). These are submitted electronically, as a single PDF, to the Service Authority's Project Engineer, if the Applicant coordinates directly with the Service Authority's Project Engineer.
4. Revised hydraulic analysis, if applicable.

C. Signature Sets

Once the Project Plan review is completed by the Service Authority, a Computer-Aided Design (CAD) file is submitted to and accepted by the Service Authority. Hard copies of Final PWC Approved plan sets are distributed to the Service Authority by the PWC Planning Office prior to permitting and construction. For Town plans, the Applicant will provide two (2) full size sets of the Town approved Project Plans directly to the Service Authority.

D. Easement Documents

For all easements required with the project, the Applicant shall submit both a plat sealed, signed and dated by a Professional Surveyor licensed in the Commonwealth of Virginia, and owner executed deed (see *Appendix L: Omnibus Deed of Easement Template*),

directly to the Development Department for review and execution once the Service Authority has completed the review of the plans.

E. Revisions to Approved Project Plans

Revisions to approved Project Plans have the same submittal and approval requirements as a new plan submission. Revisions to approved Project Plans may require subsequent submissions, additional fees, revised bonds, and/or revised easements, depending on the nature of the revision. However, plats and/or Hydraulic Analysis Report are not required to be provided to the Service Authority if the water and/or sanitary sewer configuration or the proposed easements are unchanged/unaffected by the revision.

Minor modifications to the water and/or sanitary sewer design during construction that do not require easements are often processed as a Field Revision, which requires a PDF submittal to the Service Authority's Project Engineer of the applicable sheets with the modifications circled.

Once the Applicant has addressed all Service Authority comments, the Applicant shall submit the revised Project Plans to VDH and/or VDEQ (refer to *Chapter 3, Section 3.5*), if needed.

3.4 Calculation of Plan Review Fees

A. Pipeline Projects

Plan Review Fees are calculated from the Base Charge which is dependent upon the submission type (new plan, plan revision, minor site plan, etc.) and the Per Linear Foot fee established by lengths of pipeline reported by the Applicant on the Service Authority Sheet included in the plan submission. The lengths of pipeline reported on the Service Authority Sheet must match the current Project Plans submittal. Plan Review Fees are assessed for each new plan or plan revision, regardless of how many submittals are made to the Service Authority prior to PWC plan approval. Plan Review Fees are invoiced and paid concurrently with the Utility Permit Fee for projects requiring a Utility Permit. For projects that do not require a Utility Permit, Plan Review Fees are invoiced and paid prior to the Service Authority's Project Engineer completing plan review.

For revisions to previously approved Project Plans, the Plan Review Fee is based upon the length of pipe that has been added or subject to redesign since the most recent PWC plan approval. (See Table 3.1)

Table 3.1 – Review Fees

Type of Submission	Basis of Fee
New Plan	Plan Review Fee is based upon the total length of all proposed pipe, with a base fee and a minimum applied to each utility being proposed.
Each Revision to an Approved Plan	Plan Review Fee is based upon length of all pipe that has been added or subject to redesign since most recent approval, with a base charge and minimum applied to each utility being revised.

B. Pumping and Other Non-linear Facilities

Facilities other than pipelines that are to be dedicated to the Service Authority are subject to Plan Review Fees.

3.5 Local Review Authority

The Service Authority reviews plans under Local Review Authority granted by the VDH for water distribution systems and the VADEQ for sanitary sewer collection facilities and small sewage pumping stations. Project Plans do not require a construction permit from VDH for water mains 18-inches or less in diameter, nor from VADEQ for sanitary sewer mains 24-inches or less in diameter, and sewage pumping stations that have a capacity of no more than one (1) million gallons per day (MGD), average daily flow (ADF).

Prior to obtaining a Service Authority Utility Permit, the Applicant shall submit to VDH and/or to VADEQ for review and approval all Project Plans that meet one or more of the following criteria:

- Sewage Pumping stations with a capacity greater than 1 MGD (ADF)
- Water mains with a diameter greater than 18-inches
- Sanitary sewer mains with a diameter greater than 24-inches

A. Water Facilities

The Service Authority has been granted local review authority by the VDH. This applies to public water mains 18-inch or less in diameter. For projects including water mains greater than 18-inches and for all water booster pumping stations, the Applicant shall submit the required documentation directly to VDH after acquiring the Service Authority's written acceptance of the design. Construction of the project may not begin until a Commonwealth's Waterworks Construction Permit has been obtained.

The Applicant shall provide and submit all applications for a Commonwealth's Waterworks Construction Permit with required Project Plans, specifications, hydraulic modeling, summaries and technical memorandums as necessary to meet VDH submission requirements. Materials shall be provide in both paper and digital format as required by VDH with a PDF copy sent to the Service Authority. Plans for submission to VDH shall bear the design Engineer's original signature and seal (wet stamp) on the cover sheet. Seals and signatures must appear on all plan sheets.

B. Sanitary Sewer Facilities

The Service Authority has been granted local review authority by the VADEQ. This applies to public sewers 24-inch or less in diameter and sewage pumping stations up to a capacity of 1 MGD (ADF). For projects including sewers greater than 24-inch and for pumping stations greater than 1 MGD (ADF), the Applicant shall obtain a Certificate to Construct (CTC) from VADEQ. Construction of the project may not begin until the CTC has been obtained. At the completion of these projects, a Certificate to Operate (CTO) is obtained by the Applicant.

C. General Design Requirements

Applicant shall submit Project Plans that have separate plan and profile views of all proposed water and sanitary sewer mains. Plans are sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia. To ensure that utility crossings are accomplished as designed, the Director or designee may require, prior to Project Plan approval, that the Applicant arrange for test holes on all existing utility lines at the Applicant's expense. The resulting test-hole information is shown on plan and profile views.

3.6 Digital Data**A. When Required**

Prior to acquiring a Utility Permit, a digital file in CAD format is submitted to the Service Authority's Project Engineer. This file is used in the Service Authority's Geographic Information System (GIS) to track proposed construction.

B. CAD Files

The Service Authority agrees to protect CAD files as intellectual property and will not distribute the drawings in their CAD form to any third party without the owner's consent. Digitally signed/sealed drawings are not required.

The entire project area is included in the file submitted. The Service Authority (SA) will not accept multiple project files corresponding to the individual plan sheets. Topography is omitted and Applicant shall ensure that the file is geographically referenced.

Horizontal control is based on the Virginia State Plane North Coordinate System, North American Datum of 1983. Linear units are US Survey Feet (not International Feet). Projects that were started prior to September 1, 2008 may use the previous NAD27 datum standard. All new projects started after September 1, 2008 must use the Virginia Coordinate System NAD83 U.S Survey Foot horizontal datum. Plans shall clearly note the horizontal datum used.

Vertical measurements, including elevations, are based on the North American Vertical Datum of 1988 (NAVD 88), with feet as the measurement unit. Projects that were started prior to February 18, 2009 may use the previously required National Geodetic Vertical Datum of 1929 (NGVD 29). Plans shall clearly note the vertical datum used.

1. General Requirements:

- a. The CAD file shall match the approved Project Plans.
- b. The drawing image shall be rotated to show North up.
- c. The CAD file shall be titled with the PWC project name and number.
- d. To the extent possible avoid the use of x-references. If there are X-references are needed, they shall be bind prior to submitting the CAD file and cleared x-clips.

- e. Layers not listed in Chapter 3, Section 6.B.2 shall be purged from the CAD file.
 - f. Bind the CAD file.
2. Provide the following layers when applicable:
- a. Right-of-way
 - b. Lot/parcel boundaries
 - c. Building footprints
 - d. Edge of pavement/curb and gutter
 - e. Project limits
 - f. Water mains and appurtenances
 - Water mains with the size, material and external corrosion protection
 - Domestic service laterals with size, material, and external corrosion protection
 - Valves
 - Fire hydrants
 - Meters`
 - Wells, tanks, water related facility
 - Plugs and blow off assemblies
 - Siamese connections
 - g. Sanitary sewer mains and appurtenances
 - Sewer lines with size, material and external corrosion protection
 - Force mains with size, material and tracing mechanisms
 - Manholes
 - Laterals and cleanouts
 - Valves
 - Plugs
 - Pump stations, grinder pumps, grease traps, or sewer related facility
 - h. Easements
3. The following is a list of acceptable formats/version:
- a. ESRI ArcView Shapefile (preferred)
 - b. ESRI File/File Geodatabase
 - c. AutoCAD 2012-2017
 - d. AutoCAD DXF 2012-2017
 - e. Microstation (versions 7-8)

3.7 Review Process

A. Pre-application Conference

No pre-application conference is required; however, the Applicant's Engineer preparing Project Plans for submission to the Service Authority is encouraged to seek information from the Development Department. Among items that can be provided are record

drawings of existing facilities on adjoining or supporting the subject site; the nature of planned facilities that impact the site; capacity limitations that may exist; and preferences as to layout.

B. Reviews

In response to each plan submission, the Service Authority will provide comments or an acceptance letter. Priority is given to PWC due dates and plan revisions, where construction is already underway. The Service Authority's review of all Applicants' Project Plans is based on evaluating the proposed utility layout to ensure that it fully integrates with the System Performance Standards as defined in this Manual. Service Authority comments and requirements related to development applications and Project Plans shall serve to strengthen and enhance the utility system to maximize system reliability, capacity, resiliency, connectivity and performance.

Applicant shall not rely on the timing of Service Authority Capital Improvement Projects (CIP) as shown in the approved CIP for preparation of hydraulic studies to confirm infrastructure requirements. The approved CIP is a planning document and the timing of projects is subject to change.

The review of an Applicant's Project Plans by the Development Department focuses on the proposed configuration of water and/or sanitary sewer facilities to meet all USM and applicable regulatory requirements. The Applicant is required to fund the design and construction of water and sanitary sewer facilities, regardless of size, both onsite and offsite, necessary to serve the proposed development, including provisions for fire protection.

C. Conferences During Design

Throughout design or redesign, the Applicant's Engineer is encouraged to confer with the Service Authority Engineer, as to the suitability of contemplated layouts or design features. This may take the form of electronic mail and telephone calls, or if needed, meetings.

-- end of Chapter 3 --

Chapter 4: Water Distribution

4.1 Scope

A. Intent

This Chapter describes the planning, layout, design and construction of water systems owned and maintained by the Service Authority.

B. Standards

The Applicant shall apply the information contained in this Chapter in conjunction with the latest edition of the Waterworks Regulations 12 VAC 5-590-10 et seq., published by the Commonwealth of Virginia, Department of Health; standard practices of the American Water Works Association (AWWA); and with other sections of this Manual. The Authority for discretionary provisions for designs lies with the Director or designee.

Connections to the Service Authority's water distribution system are mandated per PWC Municipal Code, Section 32.

C. Definitions

1. "Applicant" shall mean that person or persons applying for a rezoning, submitting plans, analyses, or studies; acquiring permits, constructing utilities, applying for meter certification, requesting inspections, granting easements, requesting bond release, or any activity related to developing land, extending utilities, or establishing water service. All actions performed and the associated expenses are the responsibility of the Applicant.
2. "Furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or other specified location) ready for use or installation and in new, unexpired, usable and operable condition.
3. "Install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
4. "Perform" or "provide," when used in connection with services, materials, or equipment shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
5. "Performance Standards" shall mean system configurations or extensions that maximize reliability, capacity, redundancy, resiliency, connectivity, water quality, operational efficiency, cost-effectiveness of operations, maintainability, customer satisfaction, and a sustainable delivery of water pressure.
6. "Project Plans" shall mean a set of plans used for site development containing the necessary information to extend utilities and provide water and/or sanitary sewer service sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia.

D. Minimum Standards

Applicant shall, at a minimum, meet all standards described in this Chapter for all water facilities that are incorporated into the Service Authority's System regardless if the facility is within public a right-of-way or on private property with dedicated easements.

Many criteria listed are minimums; however, the Applicant shall provide additional separations and clearances as practical to optimize each design and locate utilities so as to facilitate their re-excavation. The Service Authority will consider factors such as depth and magnitude of the facility in determining the adequacy of each design, and may relax or increase dimensional requirements accordingly. Designs shall minimize both maintenance and life cycle costs for the Service Authority.

4.2 Hydraulic Requirements**A. General**

The Applicant shall configure and size all water mains to meet the Performance Standards. The Service Authority's review of all development applications and Project Plans is based on those plans meeting the Performance Standards of the entire water distribution system and not just a local component of it. When submitting Project Plans for review and acceptance, the Applicant shall submit a Hydraulic Analysis Report meeting the specific requirements and format outlined in this Chapter.

The Hydraulic Analysis Report shall state the assumptions made about the existing water distribution system and provide calculations showing available flow rates at the proposed hydrant locations and node pressures throughout the proposed water distribution system.

B. Hydraulic Analysis Report

The Applicant shall prepare and submit a Hydraulic Analysis Report to the Service Authority's Project Engineer for water distribution system extensions. The Applicant shall perform the hydraulic analysis with modeling software demonstrating that the proposed water distribution system extension fully meets the requirements in this Chapter.

1. When a water distribution system extension is proposed within 1,000-feet of a water storage tank, the Applicant shall configure the model using the tank as a fixed grade node and shall assume the tank is half full at the low hydraulic grade line for the given pressure zone.
2. When a water distribution system extension is proposed at a location greater than 1,000-feet from a water storage tank, the Applicant shall configure the model using a simulated reservoir and pump. The simulated pump is created using data from a Service Authority hydrant flow test and the static and residual pressures adjusted to the low hydraulic grade line for the given pressure zone.
 - a. The Applicant shall locate the simulated reservoir and pump in the same location as the static test hydrant identified in the hydrant flow test report.
 - b. The Applicant shall use no more than one simulated pump in the model unless written approval is obtained from the Development Manager or designee.

3. When a large project will develop as multiple sections or phases, the Applicant shall furnish an overall master Hydraulic Analysis Report with consideration to the sequencing of the development. The overall master Hydraulic Analysis Report shall demonstrate that it meets all hydraulic requirements at full build-out; however, the Applicant shall create a separate hydraulic analysis for each Project Plan section/phase demonstrating the design fully meets the requirements independent of a future section or phase.

C. Estimating Water Demand

Applicant shall use the minimum average day demand factors listed in Table 4-1 unless alternate values for comparable facilities, particularly for office, industrial, and commercial facilities are documented by the Applicant and accepted for use by the Development Manager, or designee, and the Planning Manager.

1. The Applicant shall apply average and maximum day demands in the hydraulic analysis as a flow rate in terms of gallons per minute over a maximum 14-hour day unless the Director or designee specifies otherwise.
2. The Applicant shall apply maximum day demands using a factor of 1.6 times the average day demands and shall assume irrigation demands are included, unless irrigation demands are a primary use for a meter, such as golf courses or ball field irrigation.
3. For applications (e.g. bottling, process, cooling, data centers, etc.) having a maximum day demand greater than the factor of 1.6 times the average day, the Applicant shall apply the greater maximum day demand.

Table 4-1: Minimum Average Day Water Demand Factors

Land Use Category	Density (unit/acre)	Unit	Flow/Unit (gpd)
Residential			
Urban (UR)	15–30	Dwelling unit	250
Suburban—High (SRH)	8–15	Dwelling unit	300
Suburban—Moderate (SRM)	4–8	Dwelling unit	350
Suburban—Low (SRL)	1–4	Dwelling unit	350
Semi-rural (SRR)	0.2–1	Dwelling unit	350
Rural (RR)	0.1–0.2	Dwelling unit	390
Agricultural/Estate (AW)	0.1	Dwelling unit	390
Office			
Regional Employment (REC)	—	Acre ^a	2,000
Office/Flex (OF)	—	Acre ^a	2,000
Community (CEC)	—	Acre ^a	2,000
Office (O)	—	Acre ^a	2,000
Industrial			
Heavy (HI)	—	Acre	2,000
Light (LIF)	—	Acre	1,500
Commercial			
Regional (RCC)	—	Acre ^a	2,000
Community (CC, NC)	—	Acre ^a	2,000
“Acre” refers to gross acreage. For specific demand factors not covered in this table, refer to the Virginia Department of Health <i>Waterworks Regulations</i>, 12 VAC 5-590-690, Capacity of Waterworks. ^a If an office, retail or commercial building size is known, use 0.21 gpd per square foot instead of gross acreage factor shown.			

D. Flows and Pressures

For water distribution system extensions of 100-feet or less, the Applicant may provide calculations in the Project Plans demonstrating the available fire flow in the existing water distribution system in place of a formal Hydraulic Analysis Report, with approval by the Development Manager or designee.

The Applicant shall model a water distribution system with extensions greater than 100-feet. Based on the model result, the Applicant shall prepare a design to meet these requirements:

1. Adequate capacity to supply the average (normal) and maximum day demands of all customers while maintaining a pressure of 30 psi or greater at the water main.
 - a. The Applicant shall provide an individual private domestic booster pump, if the minimum delivery pressure, at the building entrance, is less than 40 psi based on the low hydraulic grade line of the pressure zone.
 - b. The Applicant shall provide a private pressure reducing device, if the maximum working pressure within a building is greater than 80 psi based on the high hydraulic grade line of the pressure zone.
2. Adequate capacity to supply the simulated maximum day demands plus fire flow demands, while maintaining a residual pressure of 20 psi or greater throughout the system.
 - a. The Applicant shall apply fire flow demands in the hydraulic analysis as a flow rate in terms of gallons per minute.
 - b. For a project in the County, water distribution systems are designed to meet the fire flow requirements in Section 300 of the DCSM.
 - c. For a project in an incorporated Town, water distribution systems are designed to meet the Town's fire flow requirements.
 - d. If a Hydraulic Analysis Report concludes there is no reasonable way to provide the required flow rates, the Applicant shall acquire a waiver for the available fire flow from PWC Fire Marshal and provide a copy of the waiver to the Development Manager.

E. Main Velocity

The Applicant shall design an extension of the water distribution system to limit velocities in the pipe to no more than 10-fps. The velocity limitation is not applicable to hydrant leads or pipes between a simulated reservoir and pump when modeled as part of a hydraulic analysis. The Director or designee may waive the velocity limit in a modeled fire flow scenario in cases where one or more of the following is true:

1. The high velocity is a trade-off for smaller pipe sizes to improve water quality.
2. An existing field condition cannot be reasonably mitigated.
3. Restrictions in other areas are deemed appropriate to improve water quality.

F. Sizing Water Mains

The Applicant shall size water mains to meet the flow, pressure and velocity requirements in this Chapter and the Performance Standards. Water mains 12-inches or smaller in diameter are considered to be local distribution mains. Water mains 16-inches or larger in diameter are considered to be transmissions mains, unless they are needed to support the proposed development.

1. For single-family detached residential developments, the Applicant shall design the primary supply main with either a minimum 8-inch diameter main (for continuity, hydraulic capacity, and stabilization of the distribution network) or match the diameter of the existing main.
2. For townhomes, multi-family, student housing, mixed-use developments, commercial, and industrial areas, the Applicant shall design the primary supply main with a minimum 12-inch diameter main. The Development Manager may approve, on a case by case basis, smaller diameter mains for a looped water network, as confirmed by the Applicant's hydraulic calculations, or to meet the Performance Standards.
3. Ten (10) inch and 14-inch diameter water mains are not standard and are not used without the written approval of the Development Manager or designee with the possible exception of tying into an existing water distribution system.
4. The Development Manager may approve, on a case by case basis, smaller water mains, 4-inch and 6-inches in diameter, for cul-de-sacs, pipe stems, and dead-ends. A 4-inch diameter water main may serve up to a maximum of five (5) homes.
5. The minimum water main diameter for fire hydrants is six (6) inches. The Applicant shall exclude hydrant leads less than 50-feet in length from the model.
6. Fire lines shall be sized in accordance with the DCSM, but the Applicant shall exclude them from the model.
7. Water service lines to meters shall be sized in accordance with Table 4-2, but the Applicant shall excluded them from the model.

G. Pipe Friction

The Applicant shall calculate head losses using the Hazen-Williams equation with a roughness coefficient (C) of 120 for pipes 12-inches in diameter and larger and a roughness coefficient (C) of 100 for pipes smaller than 12-inches in diameter. Minor losses from valves and other fittings do not need to be separately quantified based on the conservative C value.

H. Hydraulic Analysis Report Content

The Applicant shall prepare and submit to the Development Department a geographically spatially accurate CAD file or GIS feature class of the hydraulic model along with a hard copy or PDF version of the Hydraulic Analysis Report. The Hydraulic Analysis Report shall contain the following information:

1. Title Page
 - a. Title the report with the same plan name and plan number matching the final engineering plans. Include the date the Hydraulic Analysis Report was last updated.
 - b. A Professional Engineer licensed in the Commonwealth of Virginia shall seal, sign, and date the title sheet.

2. Overview

- a. Report the site development location, densities (e.g. number of dwelling units) or metrics (e.g. acres) that will be used to calculate water demands.
- b. Report all pertinent background information for the development.
- c. Report all surrounding and known proposed developments that may impact, or could be impacted by, the proposed project.
- d. Describe the source of water and the existing water system. If modeling from a tank as a fixed grade node, report the tank name and location.
- e. Identify the pressure zone and the associated low hydraulic grade line used for hydraulic adjustments.

3. Basic Data

- a. Report the modeling software and version.
- b. State that the selected modeling software is appropriate for the analysis. If a modeling software other than InfoWater is used, the Applicant shall certify in the Hydraulic Analysis Report that the network hydraulic theory is similar to InfoWater.

4. Design Criteria

- a. Report the roughness coefficient (C) used for the different diameter pipes.
- b. Report the minimum pressure requirements to meet maximum day demands.
- c. Report the minimum pressure requirements for concurrent maximum day plus fire flow demands.
- d. Report the fire flow requirement, per the type of development, and cite the governing standard (e.g. DCSM Section 300).
- e. Report the velocity requirement that must be met.

5. Assumptions

- a. Reference the source for the water demand factors used to determine average day demands (e.g. Table 4-1).
- b. Demonstrate how average day demands are calculated over a 14-hour day and convert to gallons per minute.
- c. Demonstrate how maximum day demands are calculated by applying a factor of 1.6 to average day demands. The Applicant shall present and explain higher maximum day demands in the study, if the expected maximum day demands are greater than 1.6 times the average day demand.
- d. Report the nodes where maximum day demands are applied in the model.

6. Analysis

- a. Report if the model was configured as a tank with a fixed grade node or as a simulated pump and reservoir.
- b. Report how the tank or simulated pump and reservoir were calibrated for the pressure zone's low hydraulic grade line.
- c. Report which model scenarios were run.
- d. Report which design criteria have been met.
- e. Report which design criteria have not been met and the location of the nonconformance.

7. Conclusion

- a. Summarize the maximum and minimum pressures in the proposed water system with maximum day demands.
- b. Report the available fire flow and lowest residual pressure in the modeled water system.
- c. Report the maximum velocity determined by the model.
- d. Reference actions or USM Waivers required to mitigate nonconforming results.

8. Schematic

- a. The Applicant shall provide a schematic on a 24-inch by 36-inch plan sheet.
- b. The schematic shall contain both the onsite and offsite water distribution systems represented in the model. The Applicant shall scale the schematic with pipe lengths matching the Hydraulic Analysis report.
- c. The schematic shall identify all pipe segments matching the pipe report and shall report the pipe size with the pipe identifier.
- d. The schematic shall identify all nodes matching the node report and label in a logical sequence. The Applicant shall report maximum day demands, where applied, with the node in the schematic.
- e. The Applicant shall superimpose the schematic on an overall project site plan showing streets, buildings, retaining walls, natural drainage features and topographical/contour lines with elevation data.

9. Appendixes

- a. Appendix A shall contain the Service Authority-generated hydrant flow test report.
- b. Appendix B shall contain calculations and report tables for the simulated pump and reservoir adjusted to the low hydraulic grade line for the pressure zone. The Applicant shall provide a 3-point pump curve.
- c. Appendix C shall contain pipe and node reports for a maximum day demand model scenario.

- d. Appendix D shall contain pipe and node reports for fire flow model scenarios. The Applicant shall run a separate fire flow model scenario for each hydrant designated to provide fire coverage with maximum day water demands applied.

10. Report Formats

Figure 4-1: Example Report Format

Table of Water Demands							
* Building ID	† No. Units or # of Lots	Demand Factor (GPD / Unit)	Hours per day	‡ Average Day Demand (gpm)	Max Day Factor	Max Day Demand (gpm)	Applied at node
			14		1.6		
* This column is used to identify multi-family or non-residential structures that have a water demand. † This column is used to report the number of single family dwellings, acres, seats, students, or sq. ft. ‡ Average day demand (gpm) = No. Units $\times \frac{\text{gallons}}{\text{day}} (\text{Demand Factor}) \times \frac{1 \text{ day}}{14 \text{ hours}} \times \frac{1 \text{ hour}}{60 \text{ min.}}$							

Reservoir Report Table			
Tank Number or Name	Elevation (ft)	Inflow/Outflow	Hydraulic Grade

Pump Report Table							
Pump Number	Elevation (ft)	Pump Definition (3-Point Curve)	Status (On/Off)	Intake Grade (ft)	Discharge Grade (ft)	Discharge (gpm)	Head (ft)

Pipe Report Table						
Pipe Number	From Node	To Node	Length	Diameter	Pipe Friction (Hazen-Williams) C Factor	Velocity

Node Report Table				
Node Number	Elevation (ft)	Demand (gpm)	Hydraulic Grade	Pressure (psi)

4.3 Design

A. General

The Applicant shall configure and size all water mains to meet the Performance Standards. Hydraulic designs are not limited to providing water service to a local area. The Applicant shall adapt the hydraulic design to function properly with the existing water distribution system and support the logical extension of the water distribution system. Designs shall accommodate system improvements when requested by the Director or designee. Extensions from water mains greater than 30-inches require written authorization from the Director.

Relocation of existing water mains or facilities is the responsibility of the Applicant when proposed site development or site improvements creates a conflict or condition that does not comply with this Manual. The Applicant shall replace in kind water facilities in conformance with this Manual and with new materials.

B. Layout

1. Location of Mains

- a. Where possible, the Applicant shall locate water mains under pavement or in a location that will permit the reasonable re-excavation without impacting other underground or above-ground utilities and/or structures.
- b. The Applicant shall locate water mains to minimize impacts to, but not limited to, above ground or underground structures and utilities and concrete work (e.g. curb, gutters, sidewalk, trails, driveways, etc.).
- c. The Applicant shall, to the extent possible, maintain water line alignment within the shoulder of a road or single lane of traffic to provide the least amount of disruption if re-excavated.
- d. The Applicant shall not place water mains in dam/storm water embankments, slopes greater than or equal to 3:1, under structures, in reinforced soil areas (e.g. geo-grid, tie-backs) for a structure, in areas where re-excavation would undermine the support of a structure and require shoring, or in non-accessible areas. The Director or designee may require structural details, sectional views of the building's loading plane, and engineering certification of the building foundation to confirm there are no impacts to future excavation.
- e. For secure sites requiring indirect routes of travel for Service Authority personnel to access its facilities, the Director or designee may require a site specific access agreement and route map prior to placing the system into Beneficial Use.

2. Reliability

- a. Two (2) sources of supply from the existing water system are desirable to improve reliability, water quality, and operation of the water system. The Director reserves the right to require multiple supply feeds and loop closures.
- b. Virginia Regulation 12VAC5-590-1130, "System Design," requires minimizing dead-end water mains by looping all mains. Where possible, the Applicant shall loop water mains to eliminate dead ends. The maximum length of a permanent dead-end water main is 500 feet.

3. Water Main Stubs

- a. The Applicant shall provide water main stubs in strategic locations, as required by the Development Manager, or designee, to permit access to adjacent properties and for the logical extension of the water distribution system.
- b. The Applicant shall extend water main stubs beyond all site improvements to enable future extensions with minimal disruption.
- c. The Applicant shall utilize existing water main stubs for connection. The Applicant shall extend water mains and close water main loops for all existing water main stubs available for connection. If the Performance Standards can be achieved with an alternate connection, with the approval of the Development Manager, the Applicant shall remove all unused water main stubs and appurtenances as part of the design and cost of the project.

C. Water Quality

Designs shall maximize water quality (0.5 mg/L minimum chlorine residual) by looping, minimizing dead-ends, and proper sizing of water mains while balancing system effectiveness, efficiency, and operational costs. Designs shall not specify water main sizes larger than necessary to meet the Performance Standards.

1. Meter Placement

- a. The Applicant shall design, to the extent possible, the water system layout and building layout to coordinate the placement of the mechanical room in the same vicinity as the terminus of the dead-end water main.
- b. The Applicant shall design, to the extent possible, the location of meters at the end of dead-end water mains.

2. Automatic Flushing Station

- a. Applicant shall provide a dedicated easement area for a future metered automatic flushing station if the design makes maintaining water quality questionable as determined by the Development Manager or designee.
- b. When directed by the Development Manager or designee, the Applicant shall provide a temporary metered Hydro-Guard automatic flushing station, model HG 2 R IN 2 PVC 018 LPLG – TCV, for phased occupancy of residential projects if water quality complaints are registered with the Service Authority. The Applicant shall remove temporary automatic flushing stations prior to bond release.
- c. The Applicant shall provide an easement area and a permanent metered automatic flushing station, prior to bond release, when water quality complaints are not resolved with the full build out of the development.

4.4 Water Main and Appurtenances

A. Ductile Iron Pipe

1. Material

Materials shall comply with the requirements of the Safe Drinking Water Act and other federal requirements. The Applicant shall specify pressure rated ductile iron pipe (DIP) for water main construction by thickness class and in accordance with AWWA C151 (ANSI A21.51).

- a. The Applicant shall specify pipes as double-lined with cement mortar, in accordance with AWWA C104 (ANSI A21.4), and have a protective exterior coating with no defects, gouges or damage.
- b. The Applicant shall specify all pipes as thickness Class 52.

2. Joints

The Applicant shall specify joints for DIP as standard “push-on” or “mechanical” joint and that the joint type is in accordance with AWWA C151 (ANSI A21.51). The Applicant shall specify that joints and gaskets of standard mechanical joint pipe are in accordance with ANSI A21.11. Joint deflection is limited to specifications published by the Ductile Iron Pipe Research Association (DIPRA).

3. Fittings

The Applicant shall specify fittings for DIP are in accordance with AWWA C110 (ANSI A21.10) or AWWA C153 (ANSI A21.53), with a minimum pressure rating of 250 psi.

4. Restraint

The Applicant shall restrain all ductile iron pipe, tees, bends, reducers, plugs, caps, valves, and fire hydrants against movement with mechanical restraining glands (refer to *Appendix C: USM Approved Products List*) in accordance with manufacturer recommendations.

- a. The Applicant may use a proprietary joint restraint system provided by the pipe manufacturer in place of an external restraining gland; however, factory restrained joints, high-strength ductile iron tee-head bolts, hex nuts, ductile iron glands, and rubber gaskets shall remain as the pipe manufacturer has furnished them.
- b. The use of a thrust collar (anchor) is permitted in place of restrained joints provided the Applicant submits, for acceptance by the Service Authority, the necessary calculations and details in the Project Plans.
- c. In addition to mechanical restraining glands, the Applicant shall set all 90 degree bends with a concrete thrust block. The Applicant shall use concrete thrust blocking with permanent plugs and caps. Concrete thrust blocking specified in place of mechanical restraining glands is permitted on a case-by-case basis with the approval of the Development Manager or designee.

- d. The use of gasket restraint devices is only permitted on a case-by-case basis with the approval of the Inspections Manager or designee.
- e. The Applicant shall restrain all valves connected to a cross or tee fitting configured as a water line stub for a future extension with a non-friction type mechanical fastener (e.g. swivel tee or Foster adapter) or non-friction type proprietary joint restraint.

B. Polyvinyl Chloride (C-900) Pipe

1. Materials

Materials shall comply with the requirements of the Safe Drinking Water Act and other federal requirements. Pressure rated C-900 pipe is permitted on case-by-case basis with the approval of the Development Manager or designee. C-900 pipe shall meet AWWA C-900 and ASTM D1784 with a cell classification of 12454.

- a. The Applicant shall specify pipes 12-inches or less in diameter as C-900 with a minimum Dimension Ratio (DR) equivalent to DR-14.
- b. Pipes greater than 12-inches in diameter must be approved for use by the Director.
- c. All C-900 water mains shall have two (2) locatable tracer wires attached, per the detail(s) of this Manual. Test stations for trace wire shall be provided similar to the requirements listed in *Chapter 5, Section 5.8.N*.

2. Joints

All joints for C-900 pipe require a standard “push-on” joint in accordance with AWWA C-900. Joints and gaskets of standard C-900 pipe are required to meet ASTM D-3139 and ASTM F477. No pipe deflection is permitted in the joints or pipe.

3. Fittings

Only one-piece injection molded Polyvinyl Chloride (PVC) fittings meeting ASTM D1784 and AWWA C907 are permitted for C-900 pipe. Fittings shall match the DR rating of the pipe. When PVC fittings are not available, ductile iron fittings are permitted as an alternative.

4. Restraint

Applicant shall restrain all C-900 pipe, tees, bends, reducers, plugs, caps, valves, and fire hydrants against movement with concrete thrust blocking, thrust collars, or a proprietary joint restraint system provided by the pipe manufacturer.

C. Restraint Calculations

Applicant is responsible to calculate, specify, and certify the amount of restraint in the Project Plans for a given design. The Applicant is responsible to determine all system factors and assumptions necessary to support the calculations to include, but not limited to, the following:

1. The Applicant shall classify the soil type used for the calculations.
2. The Applicant shall use a minimum safety factor of 1.5 for the calculations.
3. The Applicant shall use laying condition type 4, in accordance with ANSI/AWWA C150/A21.50, with a minimum pipe bedding of 4-inches of #57 stone for all calculations.
4. The Applicant shall calculate thrust restraints based on a test pressure of 100 psi plus the maximum static pressure, or a minimum test pressure of 200 psi, whichever is greater.
5. The Applicant shall specify in the water line profile of the Project Plans the station where pipe restraint shall begin and the station where pipe restraint shall end.
6. The Applicant shall fully restrain all hydrant leads and ductile iron service lines to meters.
7. The Applicant shall fully restrain all pipe within a casing.
8. The Applicant shall fully restraint all pipe installed between two adjoining residential lots.
9. The Applicant shall fully restrain all pipe installed with slopes set at 15 percent or greater.

D. Corrosion Protection

The Applicant shall encase all ductile iron pipe, fittings, and appurtenances with 4-mil high-density, cross-laminated polyethylene tube wrap (polywrap) in accordance with AWWA C105 (ANSI A21.5). In addition, the Applicant shall completely coat all fasteners and appurtenances with Roskote R28 rubberized mastic.

In areas within 100-feet of gas transmission mains with impressed current systems, rectifiers, or other potential sources of stray current, the Applicant shall provide additional engineering analysis by a NACE-certified Engineer to determine a suitable means to protect the water main from corrosion or use C-900 as permitted in Section 4.4.

E. Soil Corrosivity Analysis

Reserved for future use

F. Separation and Crossings

1. Parallel Installations

- a. Water mains shall not pass through, or come into contact with any part of a sanitary sewer manhole. The Applicant shall provide water mains with at least a 10-foot horizontal separation from a sanitary sewer main or manhole, septic tank, or drain field. The distance is measured edge to edge. The Applicant shall also provide a 10-foot horizontal separation from other utilities and appurtenances (i.e. storm drainage, gas mains, electric, telecommunications, etc.).
- b. In conditions, as determined by the Service Authority, that prevent a horizontal separation of 10-feet between the water main and sanitary sewer main or sanitary sewer manhole, the Applicant may reduce the horizontal separation to 7.5-feet between the water main and the sanitary sewer main or sanitary sewer manhole, provided:
 - i. The bottom of the water main is a minimum of 18-inches above the top of the sanitary sewer main. Where this vertical separation cannot be obtained, the sanitary sewer main must be constructed of AWWA approved water main and pressure tested, in place, without leakage.
 - ii. The sanitary sewer manhole is of watertight construction and tested in place, without leakage.
- c. In conditions, as determined by the Service Authority, that prevent a horizontal separation of 10-feet between the water main and other utilities, the Applicant may reduce the horizontal separation to 7.5-feet from other utility lines.

2. Utility Crossings

- a. Water mains shall cross above sanitary sewer mains with a minimum vertical separation of 18-inches between the bottom of the water main and the top of the sewer main.
- b. In conditions, as determined by the Service Authority, that prevent an 18-inch vertical separation, the Applicant shall use the following construction methods:
 - i. The Applicant shall construct sanitary sewer mains passing over or under water mains with AWWA-approved water main and pressure tested in place without leakage.
 - ii. The Applicant shall protect water mains passing under sanitary sewer mains by constructing structural supports under the sanitary sewer main joints to prevent excessive deflection and settling.
 - iii. When water mains pass under sanitary sewer mains, the Applicant shall provide a vertical separation of at least 18-inches between the bottom of the sanitary sewer main and the top of the water main. The Applicant shall center the water main at the point of the crossing so that water main joints are equidistant and as far as possible from the sanitary sewer main.
- c. The Applicant shall install water mains a minimum of 12-inches above other utility lines with the exception of crossing over a storm sewer pipe, in which case the minimum separation is 6-inches. Whenever possible, water mains should cross over other utility lines. The Applicant may reduce the cover over the water main at a utility crossing to 36-inches to maintain the minimum separation

between the water main and other utility lines. The Applicant shall center the water main at the point of the crossing so that water main joints are equidistant and as far as possible from the storm sewer pipe.

- d. When water mains cross under storm sewer pipes 36-inches or greater in diameter, the Applicant shall protect water mains passing under storm sewer pipes by constructing structural supports under the storm sewer pipe joints to prevent excessive deflection and settling. The Applicant shall center the water main at the point of the crossing so that water main joints are equidistant and as far as possible from the storm sewer pipe.

3. Stream Crossings

- a. The Applicant is responsible for obtaining all required Local, State, and Federal approvals and permits to install a water main designed for a surface water crossing. Above-water (aerial) crossings are not permitted.
- b. All water mains crossing surface water require a minimum of 2-feet clearance under the invert of the creek bed.
- c. All water mains shall have flexible, restrained, watertight joints. Valves shall be set per Section 4.5.F.2.
- d. All water mains shall cross perpendicular to the stream, where possible.
- e. Sampling taps are required at each end of the crossing and at a reasonable distance from each side of the crossing for testing and locating leaks and located outside of and protected against a 100-year storm event.

G. Depth of Cover

1. When possible, the Applicant shall install water mains at a minimum depth of 42-inches, from finished grade to the top of the pipe, without creating intermediate high and low points.
2. The Applicant shall not design or install water mains at depths greater than 8-feet, as measured from finished grade to the top of the pipe.
3. The Applicant shall profile all grade changes over existing water mains, with the exception of 12-inches or less of additional fill. The Applicant shall determine the elevation of an existing water main by test pits to certify an accurate profile. The Applicant shall include the test pit information of the existing water mains in the Project Plans prior to Project Plan acceptance.

H. Casings

1. The Applicant shall install mains that are bored under a right-of-way, roadway, railroad, streams, sensitive environmental area, or installed under an obstruction, in a steel casing, in accordance with the details in this Manual. The Applicant is responsible to adhere to the requirements of the regulatory agency having jurisdiction over the design, installation, and permitting of the casing.
2. The Applicant shall provide design information for the casing pipe installation in the Project Plans, including the material, thickness, diameter, and length in accordance with the details in this Manual. In the case where the size of main proposed is not

listed in the detail, the Applicant shall provide the design calculations for the casing pipe and the means to restrain the main in the casing pipe for Development Manager's approval.

3. The Applicant shall provide welded, one piece, steel casing pipe with a consistent inner and outer diameter.
4. The Applicant shall install the casing pipe on a slope to allow drainage. The casing shall extend as dictated by site conditions to provide easy access for pipe extraction, extension, and maintenance along with the requisite property access rights (easements).
5. The Applicant shall ensure mains are centered and restrained from movement within the casing pipe with prefabricated stainless steel pipe supports with non-conductive skids or other support system as listed on the Approved Products List. Pressure-treated timber skids are NOT permitted.
6. When casings are extended due to road-widening projects, the Development Manager may consider the use of split casings with concrete supports.
7. The Applicant shall mark all casings ends with a fixed metal post and install a 1-inch steel cable welded from each end of the casing to the metal post or as directed by the Field Inspector.

4.5 Valves

The Applicant shall provide valves at all connecting intersections of water mains: four valves are required at crosses and three valves at tees. The Applicant shall provide a valve for each 1,000-foot interval of water main installed, as well as additional valves as directed by the Development Manager. The Applicant shall provide a valve no more than two (2) pipe sections from the end of all dead-end water main segments designed for a future extension, to provide a point to test against and to maintain service to existing customers when the pipe is extended.

A. Gate Valves

1. The Applicant shall provide resilient seated wedge gate valves for water mains 12-inches or smaller in diameter, in accordance with AWWA C509. Reference the Approved Products List for acceptable products.
2. Gate valves shall withstand a working pressure of at least 250 psi, unless otherwise directed by the Development Manager.
3. The Applicant shall provide ductile iron bodied gate valves in accordance with ASTM 536, Grade 65-45 or higher strength, with 304 stainless steel fasteners.
4. The Applicant shall provide gate valves with mechanical joints, in accordance with AWWA C111.
5. The wrench nut shall turn counterclockwise to open the valve.
6. The Applicant shall provide valves with a fusion-bonded, epoxy-coated surface, interior and exterior, in accordance with AWWA C550.

B. Butterfly Valves

1. The Applicant shall provide butterfly valves for water mains greater than 12-inches in diameter, in accordance with AWWA C504. Reference the Approved Products List for acceptable products.
2. The Applicant shall provide Butterfly valves with full-circle, 360 degree rubber-seated, tight-closing valve seat. All butterfly valves shall withstand a working pressure of at least 250 psi, unless directed otherwise by the Development Manager.
3. The Applicant shall provide ductile iron bodied butterfly valves and in accordance with ASTM A536, Grade 65-45 or higher strength with 304 stainless steel fasteners.
4. The Applicant shall provide butterfly valves with mechanical joints, in accordance with AWWA C111.
5. The Applicant shall provide completely enclosed and permanently lubricated actuators for direct bury and frequent submergence in water up to 20 feet of head. The actuator shall open the valve with a counterclockwise rotation and supplied by the same manufacturer as the valve.
6. The Applicant shall provide valves with a fusion-bonded, epoxy-coated surface, interior and exterior, in accordance with AWWA C550.
7. The Development Manager or designee may require a bypass for 24-inch or larger butterfly valves, depending upon the available system configuration, to equalize pressure on each side of the valve.

C. Insert Valves and Line Stops

1. Insert valves and line stops are used at the direction of Development Manager or designee to avoid service outages to customers. Insert valves and line stops are eligible for use with 12-inch or smaller diameter water mains. When insert valves are permitted, the Applicant shall provide resilient seated wedge gate valves made with a ductile iron body, in accordance with AWWA C515, with 304 stainless steel fasteners. Reference the Approved Products List for acceptable products. All insert valves and line stops shall withstand a working pressure of at least 250 psi. The wrench nut shall turn counterclockwise to open the valve.
2. The Applicant shall permanently restrain the valve body to the pipe to maintain pipe integrity via an integral mechanical joint.

D. Fire Line Valves

1. The Applicant shall provide a resilient seated wedge gate valve on all fire lines connected to the public water system. The Service Authority's operation and maintenance responsibility stops at this valve. The Fire Marshal approves the design and conducts inspections of all fire line installations beyond the valve.

E. Tapping Sleeves and Valves

1. The Applicant shall provide mechanical joint type tapping sleeves with a ductile iron body, 304 stainless steel fasteners, and a brass test plug suitable for installation on the existing pipe, in accordance with AWWA C110 (ANSI A21.10). Stainless steel tapping sleeves may be used for a specific field condition as directed by the Field Inspector. Reference the Approved Products List for other acceptable products.
2. The Applicant shall provide mechanical joint type tapping valves with O-ring seals, non-rising stem, in accordance with AWWA C500, with 304 stainless steel fasteners and supplied by the same manufacturer as the tapping sleeve. The inlet end shall have a Class 125 flange for the attending sleeve.

F. Valve Locations

1. The Applicant shall place valves in strategic locations to allow segments of the system to be isolated for repairs and maintenance while leaving the rest of the system in service to minimize the number of customers without service.
2. Place valves on both sides of stream crossings, railroad crossings, limited access right-of-way, and casing pipes. The Applicant shall install isolation valves two (2) full pipe segments outside the limits of jack and bore pits. The Applicant shall restrain pipe upstream and downstream of an isolation valve(s) to allow future pipe removal between the isolation valves.
3. Locate valves within paved areas where possible. The Applicant shall not place valves or valve boxes within the limits of any curb, gutter pan, driveway, sidewalk, trail, parking space, or in areas subject to flooding.
4. When valves are located outside of paved areas, Applicant shall set the valve boxes in accordance with the details in this Manual and paint all valve box lids blue as directed by the Field Inspector

G. Valve Boxes

1. The Applicant shall provide cast iron valve boxes; bases, extensions, and covers. The Applicant shall provide sliding type valve boxes with a 5.25-inch shaft (with a minimum 5-inch inside diameter) and round cover marked "WATER". Valve boxes shall have a minimum range of extension to fit valves ranging from 2 to 12-inches inclusive and installed on mains at depths of 3 to 8-feet of cover in order that the top cover of the valve box is set flush to finished grade. The Applicant shall ensure all valve boxes are installed straight, at a right angle to the water main and centered over the valve wrench nut. Reference the Approved Products List for acceptable products.
2. The Applicant shall provide a single valve stem extension for all valves in which the operating nut is greater than 5-feet below the normal ground or road surface to bring the operating nut to within 5-feet of finished grade. Use of multiple valve stem extensions is prohibited. The valve extension stem shall come with a 2-inch square operating nut on top and a coupling to connect the extension to the operating nut of the valve. The Applicant shall provide a stem guide to keep the valve stem extension concentric within the valve box. The Applicant shall ensure the diameter of the valve stem extension is the same as the valve stem.

3. For valves installed outside of paved areas, the Applicant shall set the valve boxes in a 2-foot-by-2-foot concrete pad with the top of the concrete pad flush to match final grade and the valve box top set flush with the top of the concrete pad, in accordance with the details in this Manual.
4. The Applicant shall adjust valve boxes in the street so that covers are exposed and flush with the final paved surface.
5. During initial installation of the valve boxes, and before the Service Authority accepts them for ownership, valve boxes can be adjusted only by sliding the top casting up or down. Risers are not permitted. Applicant shall paint all valve box lids blue before the Service Authority shall accept them.
6. Once water mains are placed into service through the Beneficial Use or Partial Beneficial Use process, valve boxes must remain accessible at all times. At no time shall a valve box lid be buried, paved over or obstructed by construction equipment, debris, or storage of materials.
7. Once water mains are placed into service through the Beneficial Use process, debris cap and locking device shall be installed in the valve box as close to the top as possible without interfering with installation of the lid on water valves greater than 12-inch. Reference the Approved Products List for acceptable products.

4.6 Blow-offs

The Applicant shall provide a blow-off assembly at the system's lowest points and on all dead-end mains as a means to discard accumulated sediment from the water main. The Applicant shall show the location of all blow-off assemblies on the Project Plans. The Applicant shall design the blow-off assemblies to provide a minimum flow velocity of 3-fps. On water main 6-inches in diameter or larger, fire hydrants are used as a blow-off. If the main is intended to be extended in the future, the Applicant shall utilize a blow-off assembly outside paved areas or as otherwise directed by the Development Manager or designee.

4.7 Air Release

The Applicant shall provide a means to release trapped air at all high points in the water system to accommodate testing of new water mains during construction and for use during normal operation of the water main.

A. Hydrant Air Release

The Applicant shall set hydrants at all high points in the system to function as an air release when they can be located in an area suitable for future operation and maintenance. The Applicant shall use a tangent tee, for water mains 24-inches in diameter and larger, with the branch side orientated at the top of the pipe for the hydrant connection.

B. Automatic Air Release

The Applicant shall use an automatic air release valve, subject to the approval of the Development Manager or designee, when a hydrant cannot be located in an area suitable for future operation and maintenance. The Applicant shall provide a Type AV automatic

air release valve, with an orifice diameter of 0.25-inch, a 2-inch diameter threaded connection, a working pressure from 0 to 150 psi, and a stainless steel float and resilient seat, in accordance with the details in this manual and the Approved Products List.

C. Manual Air Release

Where an automatic air release valve cannot be located on top of the water main and the area is not suited for a hydrant (e.g. a water main in the middle of divided road), the Applicant shall provide a new manual air release when requested by the Development Manager or designee. The manual air release shall consist of a tap made on top of the water main and a $\frac{3}{4}$ -inch service line run installed in a meter box and located as directed by the Development Manager or designee.

4.8 Hydrants

Hydrants are provided for the purposes of fire protection and fire coverage to comply with DCSM Section 300 or Town requirements. Additional hydrants may be required for the operation of the water system as directed by the Development Manager or designee.

A. Design Parameters for Hydrants

1. The Applicant shall connect hydrants to the water main with 6-inch DIP and 6-inch isolation valves located as near the main as practicable. Where a 6-inch main to a hydrant is longer than 50-feet, the Applicant shall provide a second 6-inch gate valve within 6-feet, but no closer than 1-foot, of the hydrant.
2. At stream crossings, railroad crossings, limited access right-of-way, or at locations where a water main is installed in a casing pipe, the Applicant shall provide one (1) hydrant to enable draining, sampling, and flushing of the segmented water main between required isolation valves. Position the hydrant as low as practical and out of the bed and banks of natural water courses.
3. The Applicant shall not install hydrants in areas subject to high groundwater, flooding, contamination, pollutants, or surface water ponding. If there are no alternative locations to avoid these hazards, then the Applicant shall take all steps to protect the water system and hydrant from potential backflow and contaminants, subject to the approval of the Director or designee.
4. The Applicant shall use a hydrant for all permanent terminations of a water main, with the exception of pipe stems and/or 4-inch distribution lines.
5. Water service connections and water main branches are NOT permitted between the hydrant and the hydrant isolation valve.

B. Hydrant Locations

1. Hydrants are located to provide the required fire coverage. Take all distance measurements along the centerline of accessible streets, travel ways, or other unobstructed paths used by the fire department. The Applicant shall show all new and existing hydrants providing fire coverage on the Project Plans.

2. The Applicant shall space all hydrants to maximize the coverage area and to minimize the number of hydrants. Designs should avoid multiple hydrants in the same coverage area.
3. The Applicant shall locate and utilize hydrants at high and low points for fire coverage requirements.
4. The Applicant shall offset hydrants a minimum of 5-feet from non-residential ingress/egress entrances that are subject to large vehicles with limited turning radiuses.
5. The Applicant shall locate hydrants a minimum of 10-feet from an intersection.
6. In areas with curbs and gutters, the Applicant shall locate the center of the hydrant between 18 and 36-inches from the face of the curb. Fire hydrants or their parts shall not conflict with or overhang any sidewalk, trail, or vehicle travel way.
7. The Applicant shall provide bollards where hydrants are located outside of the right-of-way, unprotected by a curb, placed in open spaces subject to vehicular traffic, storage yards, or at the rear of commercial/industrial buildings. The Applicant shall provide bollard protection as directed by the Development Manager or designee.
8. On roads with ditches, locate fire hydrants behind the ditch.
9. The Applicant shall avoid locating hydrants in paved areas and sidewalks when possible.
10. The Applicant shall design and provide a 4-foot radius clear-zone around each hydrant, clear of plantings or other obstructions.

C. Hydrant Color

Hydrants are factory painted with yellow enamel. Reference the Approved Products List for acceptable products. The Applicant shall only use approved products from the Approved Products List or an approved substitute.

D. Hydrant Designations

Hydrants that are in Beneficial Use/Partial Beneficial Use, that are not to be used for fire protection, or that are privately owned and maintained are painted by the Applicant as follows:

1. Hydrants in Beneficial Use/Partial Beneficial Use

The Applicant shall paint the barrel and all caps with reflective yellow paint and the bonnet, dirt shield, and nut silver.

2. Hydrants designated as “Not for Fire Department Use”

The Applicant shall paint the barrel and all caps with reflective yellow paint and the bonnet, dirt shield, and nut black. Hydrants designated as “Not for Fire Department Use” are fitted with a Service Authority furnished sign and installed by the Applicant.

3. Fire hydrants that are privately owned and maintained

The Applicant shall paint the barrel and all caps with reflective yellow paint and the bonnet, dirt shield, and nut red.

4. Fire hydrants designated as “Out of Service”

The Applicant shall bag all installed fire hydrants with an OUT OF SERVICE bag, provided by the Service Authority, until the fire hydrant is placed in Beneficial Use or Partial Beneficial Use. The Applicant shall notify the Field Inspector of the location of any additional new or existing fire hydrant(s) temporarily designated as OUT OF SERVICE and bag the fire hydrant(s) accordingly, refer to *Chapter 4, Section 4.11*.

4.9 Fire Suppression

A. General

The design and adequacy of building fire suppression systems is under the purview of the PWC Fire Marshal. The Service Authority reviews and approves only the connection at the main for independent fire lines or the meter detail for individual residential systems. This process ensures that water infrastructure to be owned and maintained by the Service Authority is in compliance with this Manual.

Service Authority Capital Improvement Projects involving the design and installation of new water mains to replace existing water mains are not subject to meeting current fire protection standards.

B. Sprinkler Systems

The Service Authority has no purview over the design, construction, or adequacy of sprinkler systems or any other onsite plumbing. Sprinkler system design and construction are subject to review and approval of the PWC Fire Marshal. The Service Authority does not guarantee a uniform pressure or an uninterrupted supply of water and cautions the Applicant to provide appropriate devices to satisfy specific pressure and/or flow requirements for private plumbing or fire suppression systems.

C. Independent Fire Line Connections

The Applicant shall show on the Project Plans all water lines serving a fire suppression system in a building and its connection to the public water system. Such connections for non-residential or multi-family sprinklered buildings are non-metered and shall consist of a tee connection at the main and an adjacent resilient, seated wedge, gate valve to isolate the fire line from the main, beyond which the fire line is privately owned and maintained.

Residential Systems for individual homes shall be connected on the house side of the water meter and not as a separate connection to the Service Authority’s water main.

4.10 Water Service Connections and Meters

A. General

Each service location shall have its own separate water service connection to the public water main and water meter. A water service connection shall include the corporation stop or fittings from the water main to meter box or meter vault.

B. Water Service Connection

1. A separate water service and meter is required for each residential property (single family home or townhouse) receiving water service. Multiple properties are NOT permitted to share a water service and/or meter.
2. For multi-family properties (apartments, condominiums, or like use), where buildings reside on a common property, each building shall be served with a single service line and meter.
3. For mixed use properties, where a building contains both residential and non-residential use, separate water service lines and meters are required for each use. Independent plumbing systems are required for residential and non-residential uses.
4. Service connections are NOT permitted on water mains greater than 30-inches.

C. Water Service Lines

1. The Applicant shall provide a 3/4-inch Type K copper or PEX A water service line for all single family homes and townhomes. The maximum length of the service line is limited to 100-feet. Couplings are NOT permitted in the service line. The Applicant shall connect Type K copper and PEX A services lines to the water main with a corporation stop.
2. Multi-family, student housing, and non-residential buildings require a minimum 4-inch ductile iron service line and valve. The Applicant shall fully restrain and polyethylene wrap the ductile iron service line and appurtenances.
3. Water service lines outside of the road right-of-way shall reside on the property they serve. Where a water service line must traverse a property it does not serve, the Applicant shall obtain the required easement(s) for the water service line.
4. Where possible, water service lines shall be offset a minimum of 5 feet from a storm box, structure, or sign.
5. Water service lines shall be offset a minimum of 10 feet from a sanitary sewer manhole.
6. The Applicant shall provide Type K copper or PEX A service lines for 3/4-inch or 1-inch irrigation meters. For irrigation meter sizes greater than 1-inch, the Applicant shall provide 4-inch ductile service line. The Applicant shall fully restrain and polyethylene wrap the ductile iron service line and appurtenances.
7. The Applicant shall provide service line sizing calculations, when requested by the

Development Manager or designee.

D. Meter Locations and Installations

1. The Applicant shall furnish the water meter box and all appurtenances necessary for a meter installation in accordance with the details in this Manual. Service Authority staff shall provide and install all water meters.
2. The Applicant shall install water meter boxes in areas that are accessible to Service Authority staff at all times with adequate room and clearance for operation and maintenance. Where possible, meters are to be shown located in grass areas.
3. The Applicant shall install water meter boxes 2 feet behind the property line, in residential areas, unless approved otherwise by the Development Manager or designee. Where a water meter box resides on a property it does not serve, the Applicant shall obtain the required easement(s) for the water meter box.
4. The Applicant shall install water meter boxes as near to the water main as possible when the water main is located outside of the right-of-way within a commercial property to minimize the amount of service line between the water main and meter.
5. The Applicant shall protect water meter boxes from vehicular traffic (e.g. curb, bollards or other means approved by the Field Inspector). The Applicant shall not locate water meter boxes, for new construction and alterations or modifications of existing facilities, in sidewalks, driveways, travel ways, or parking spaces or any other areas difficult to access or in areas that pose a hazard.
6. The Applicant shall furnish a water meter vault, with an internal bypass in accordance with the details in this Manual, for water meters 3-inches and larger. Prior to ordering, the Applicant shall submit the shop drawing(s) for the meter vault design to the Development Manager or designee. The Development Manager or designee shall review the shop drawing(s) and provide written acceptance. Meters will not be provided or installed in vaults that have not been accepted by the Development Manager or designee.

E. Meter Sizing and Types

1. The Applicant shall use a 5/8 x 3/4-inch water meter for all single family homes and townhomes. An increase to a 1-inch water meter is permitted to accommodate a fire suppression demand.
2. For all other uses, the Applicant shall use water meters sized on the basis of the fixture loading imposed by the building and in accordance with AWWA Manual M22, Sizing Water Service Lines and Meters. The Applicant shall provide the fixture list and meter sizing calculations on the Project Plans.
3. Neptune positive displacement water meters are required for domestic applications. Positive displacement compound water meters are required for water meters sizes 3-inches and larger. The Service Authority may consider other meter types with the approval of the Director or designee.
4. The Applicant shall base the size of the water meter for an irrigation system on the

peak flow rate needed to operate the system. Upon request by the Development Manager or designee, the Applicant shall provide the necessary information to confirm the irrigation demand.

Table 4-2: Water Meter Table

Maximum Flow (gallons/minute)*	Meter Size (inches)	Name	Type	Use	Water Service (inches)	Standard Detail
20	5/8 x 3/4	Neptune	Positive Displacement	Residential (Single family Detached & Townhouse)	3/4"	W-1 REV-2018
				Irrigation	3/4"	
				Multi-Family Use	4"	W-3 REV-2018
				Student Housing	4"	
				Non-Residential Use (e.g. commercial, office, restaurant, etc.)	4"	
50	1	Neptune	Positive Displacement	Residential (Single Family Detached & Townhouse) for Fire Suppression	1"	W-2 REV-2018
				Irrigation	1"	
				Multi-Family Use	4"	W-5 REV-2018
				Student Housing	4"	
				Non-Residential Use (e.g. commercial, office, restaurant, etc.)	4"	
100	1.5	Neptune	Positive Displacement	Irrigation	4"	W-6 REV-2018
				Multi-Family Use	4"	
				Student Housing	4"	
				Non-Residential Use (e.g. commercial, office, restaurant, etc.)	4"	
160	2	Neptune	Positive Displacement	Irrigation	4"	W-7 REV-2018
				Multi-Family Use	4"	
				Student Housing	4"	
				Non-Residential Use (e.g. commercial, office, restaurant, etc.)	4"	
320	3	Neptune	Positive Displacement Compound	Multi-Family Use	4"	W-8 REV-2018
				Student Housing	4"	
				Non-Residential Use (e.g. commercial, office, restaurant, etc.)	4"	

1. The Applicant shall provide backflow prevention devices for buildings and fixtures that comply with Service Authority's cross connection program requirements.
2. The plumbing on all premises served by the Service Authority's System shall include cross connection and backflow prevention conforming to the Virginia Statewide Building Code and other applicable plumbing codes. The Applicant is required to control all cross connections, at all times, in accordance with the requirements of applicable codes and Virginia Waterworks Regulations. Cross connection inspections for commercial buildings are performed by the Service Authority's Environmental Services & Water Reclamation Division's Regulatory Compliance Department.
3. Pipes connected to Service Authority's mains shall not be connected with pipes supplied with water from any other source. Where redundant sources of supply are desired, including fire suppression systems, an approved backflow prevention device must be provided, by the Applicant, to protect the public water system. All backflow prevention devices are subject to review and approval by the PWC Plumbing Inspection Department. Please contact the PWC Plumbing Inspection Department via PWC Building Development Division at (866)-457-5280 or (703)-792-6954 with any inquiries regarding cross connections and backflow prevention devices.
4. The Applicant shall not connect any chambers or pits containing valves, blow offs, meters, or other such appurtenances directly to any storm drain or sanitary sewer facility, nor any flushing devices or air relief valves, as required per 12-VAC5-590-1130C and 12-VAC5-590-1160.

4.11 Water Main Construction

A. Existing Conditions

1. When water and/or sewer construction requires offsite (on property not owned by Applicant) disturbance within a Service Authority easement, the Applicant, prior to the start of construction, shall fully comply with the Service Authority's Community Notification and Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities Policy. The Applicant shall photograph or video record the work area to document the existence and condition of structures or facilities and submit a copy to the Inspections Manager in electronic format by e-mail to inspectionsmanager@pwcsa.org. The Applicant shall date the photo/video record to document conditions.
2. Prior to and during construction operations, Applicant shall properly locate, protect, brace, support, restore and maintain all underground pipes, conduits, drains, and other underground structures uncovered or otherwise affected by the construction work being performed to ensure they are protected from any damage, in accordance with the Virginia State Code 20VAC5-309-140.
 - a. The excavator shall plan the excavation in such a manner to avoid damage to, and minimize interference with, underground utility lines in and near the construction area;
 - b. The excavator shall expose the underground utility line to its extremities by hand digging within the excavation area when excavation is expected to come within 2-feet of the marked location of the underground utility line;

- c. The excavator shall not use mechanized equipment within 2-feet of the extremities of all exposed utility lines;
 - d. The excavator shall maintain a reasonable clearance, to include the width of the utility line, if known, plus 24-inches, between the marked or staked location of an underground utility line and the cutting edge or point of any mechanized equipment, considering the known limit of control of the cutting edge or point to avoid damage to the utility line; and
 - e. The excavator shall provide proper support for underground utility lines during excavation activities. During backfill operations, the excavator shall use the same or similar backfill material that was originally around the utility line, ensure there is proper compaction around the utility line, protect all tracer wires, and protect or replace warning tapes.
3. The Applicant shall protect, restore and maintain all pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, and other surface structures (including all sod and shrubs in yards and parks) crossed by or adjacent to the utility under construction.
 4. The Inspections Manager shall observe and document the extent of damage resulting from the Applicant's construction activities based on photographs or video recording provided the by Applicant or Service Authority Field Inspector. (Refer to *Chapter 2, Section 2.8*)
 5. The Applicant is responsible for the cost to replace, repair, or restore any of the elements listed in *Chapter 2, Section 2.8* to their existing conditions or better with new materials for elements that have been removed or damaged. The Applicant shall, without delay, coordinate with the property owner, agency, or authority having jurisdiction, to replace, repair, or restore all damaged surface or subsurface structures to the satisfaction of the property owner, agency, or authority having jurisdiction.

B. Materials

1. The Applicant shall provide water mains and appurtenances within the Service Authority's Service Area in accordance with the approved Project Plans, specifications, and this Manual's requirements in effect at the time of installation and inspection. All construction improvements are inspected and subject to acceptance by the Field Inspector.
2. The Applicant shall provide new materials, fittings, appurtenances, and equipment, direct from the manufacturer, unused, and free of defects and shall submit proof of purchase to the Field Inspector. The Applicant shall provide a list of all materials and product technical details to be used on the project.
3. The Field Inspector may reject any materials found to be defective, damaged, improperly stored or handled, or determined to not meet the requirements of this Manual or current Service Authority System requirements.

C. Storing and Handling of Materials

1. The Applicant shall follow manufacturer's recommendation for handling and storage

of materials. The Applicant shall protect all materials, including all pipe, fittings, and other appurtenances stored onsite or in a storage yard, from foreign materials, animals, insects, soil, sun, and water at all times.

2. Applicant shall prevent shocking or damaging any materials during handling and shall load and unload pipe, fittings, valves, hydrants, and appurtenances by lifting them with hoists or skidding. The Applicant shall handle pipe so that the coating and lining are not damaged.

D. Line and Grade Stakes

Before an approved water main is constructed by the Applicant, the Applicant's Virginia-licensed Surveyor shall place line and grade stakes identifying dedicated easements, the water main, fittings, valves, hydrants, water meters or other appurtenances to ensure the system is constructed in accordance with the approved Project Plans.

E. Cut Sheets

1. The Applicant shall submit a set of cut sheets in hard copy or electronically, sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia, or Virginia-licensed Surveyor, to the Field Inspector for review and acceptance. The Applicant shall prepare cut sheets at 100-foot station intervals and contain all data pertinent to the construction of the water main, such as the station and length of service connections, and appurtenances; including all fittings, valves, hydrants, tees, and bends.
2. The Professional Engineer or Surveyor who seals and signs the cut sheets shall also provide the following statement on all sets: "The professional seal and signature appearing on this document certifies that information shown conforms to the approved Project Plan and/or actual field conditions."
3. The Applicant shall submit a revision to the approved Project Plans when field conditions require the horizontal location, alignment, or grade of any main, structure, or appurtenance is to be constructed outside of an existing easement, as shown in the approved Project Plans. The Applicant shall provide a sealed, signed and dated, by a Professional Engineer licensed in the Commonwealth of Virginia, revised Project Plan and include the dedication of all additional property rights. The Applicant shall submit the revised Project Plan to the Development Manager or designee for review and acceptance prior to constructing the changes.
4. Field Inspectors may approve field changes that do not change existing easement requirements as a Field Revision.

F. Excavation, Bedding, and Backfill

1. The Applicant shall excavate trenches, provide and install pipe, backfill the excavation, and compact the trench in accordance with the details in this Manual. The Applicant shall provide trenches that are wide enough to accommodate timber supports, sheeting, bracing, and handling of special fittings or appurtenances.
2. The Applicant shall provide bell holes at each joint to ensure the bell and spigot are installed properly.

3. The Applicant shall excavate all trenches to the depth required to provide a uniform and continuous bedding with 4 to 6-inches of #57 stone or crushed aggregate of 1-inch or less on solid and undisturbed ground at every point between bell holes; it is permissible, however, to disturb the finished subgrade surface over a maximum length of 18-inches near the middle of each length of pipe to withdraw pipe slings or other lifting tackle. Under such circumstances, the Applicant shall restore the finished subgrade with #57 stone or crushed aggregate of 1-inch or less.
4. The Applicant shall remove ledge rocks, boulders, and large stones to provide a clearance of at least 6-inches below and on each side of all pipe, valves, and fittings for pipe up to 24-inches in diameter. The Field Inspector may direct a greater clearance for pipes larger than 24-inches in diameter.
5. The Applicant shall not install pipe in standing water or when, in the determination of the Field Inspector, trench conditions are unsuitable. The Applicant shall remove and replace pipe installed in unsuitable trenches when rejected by the Field Inspector once proper trench conditions are established.
6. Backfill within an existing or proposed right-of-way shall conform to all applicable VDOT standards.
7. Backfill in areas subject to vehicular traffic or structural loading shall begin at the top of the granular bedding and be placed in lifts no greater than 8-inches thick. Compact each lift to 95 percent of the maximum dry density as determined by ASTM-D698, American Association of State Highway and Transportation Officials (AASHTO)-T99, or (Virginia Test Method-1) VTM-1. The Applicant shall provide backfill material that is free of organic materials, frozen clods, highly plastic silts or clays, and other unsuitable materials. Backfill shall consist of #57 stone or crushed aggregate of 1-inch or less. The Applicant shall provide bedding that is 4 to 6-inches deep, along the side wall, and a minimum of 24-inches above the crown of the pipe as directed by the Field Inspector.
8. The Applicant shall not use stone or rock larger than 10-inches in any dimension in any backfill.
9. The Applicant shall compact backfill in areas not subject to vehicular traffic to 90 percent of the maximum dry density as determined by ASTM-D698, AASHTO-T99, or VTM-1.
10. The Applicant shall legally dispose of all surplus materials and debris. The disposal of surplus materials or debris on Service Authority easements or property is prohibited.

G. Pipe and Fitting Installations

1. The Applicant shall inspect pipe, fittings, and appurtenances for defects and notify the Field Inspector of any defects prior to installation. The Applicant shall remove lumps, blisters, and excess coal tar coatings from the ends of each pipe, brush the ends of each pipe with a wire brush, and wipe clean the outside of the spigot and the inside of the bell. The Applicant shall ensure spigots are dry and free from oil and grease before pipe is installed.

2. When installing pipe in the trench, the Applicant shall use proper implements, tools, and facilities satisfactory to the Field Inspector and as recommended by the manufacturer for the safe and convenient execution of the work. The Applicant shall carefully lower pipe, valves, fittings, hydrants, and appurtenances into the trench, piece by piece, by means of a derrick, ropes, slings, or other suitable tools or equipment and in such a manner to prevent damage to pipe, valves, fitting, hydrants, and appurtenances, as well as their protective coatings and linings.
3. The Applicant shall take special care to prevent any foreign materials from entering the pipe, which may cause potential contamination problems. The Field Inspector will not accept any pipe with visible debris. At the end of each workday, the Applicant shall cap pipe ends with a push-on joint plug or mechanical joint cap or plug to match pipe joint (ensuring the seal is water tight).
4. The Applicant shall follow manufacturers' instructions for connecting pipe segments. Before inserting gaskets and joining pipe sections, the Applicant shall clean pipe joints and pipe ends thoroughly with potable water. After placing a length of pipe in the trench, the Applicant shall center the spigot end in the open bell of the pipeline and push the pipe to the manufacturer-recommended homing mark. The Applicant shall lay DIP with the bells facing the direction of the laying.
5. The Applicant shall use the proper equipment, per the manufacturer's recommendation, to cut pipe for inserting valves, fittings, or closure pieces; cuts must be made without damaging the pipe's cement lining and must leave a smooth end at a right angle to the axis of the pipe. When machine cutting is not available for cutting pipe 24-inches in diameter or larger, use of an electric-arc to cut the pipe using a carbon steel rod is permitted. Flame cutting using an oxyacetylene torch is not permitted. After the pipe is cut, the Applicant shall bevel the outside cut-end of the pipe to remove any sharp edges or burrs to avoid damage to the gasket.
6. Whenever it is necessary to deflect ductile iron pipe from a straight line, in either the vertical or the horizontal plane, to avoid obstructions, to set valve stems perpendicular to grade, or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required to satisfactory join the pipes, as specified by the manufacturer.
7. The Applicant shall apply restraint and corrosion protection requirements from *Chapter 4, Section 4.4 D* in the field.
8. The Applicant shall remove a minimum of 36 feet of existing water main that is being separated from water service at the connection point for a water main relocation. Pipe shall be removed as necessary to prevent a pipe locating signal migrating to the pipe being separated from water service.
9. The Applicant shall install a plug with buttress on all water main that is abandoned in place and separated from water service.

H. Fire Hydrant Installations

1. The Applicant shall set the finished compacted grade around the fire hydrant within 3-inches of the bury line on the barrel of the hydrant.
2. The Applicant shall install the hydrant so the bottom of the 4.5-inch nozzle is 18-inches above the elevation of the edge of the shoulder on streets without curb and gutter and 18-inches above the elevation of the curb on streets with curb and gutter.
3. The 2.5-inch hose connections shall have a minimum 4-foot clearance on all sides.
4. Restraint and corrosion protection requirements from *Chapter 4, Section 4.4 D*, shall be applied in the field.
5. The Service Authority shall provide bags labeled “OUT OF SERVICE” for fire hydrants placed in an “OUT OF SERVICE” status. The Applicant shall:
 - a. Bag all installed fire hydrants with a Service Authority provided “OUT OF SERVICE” bag until they are placed in Beneficial Use or Partial Beneficial Use.
 - b. Bag all operational fire hydrants with Service Authority provided “OUT OF SERVICE” bag when operational fire hydrants must be placed into a temporary “OUT OF SERVICE” status for any period of time and notify the Field Inspector. The “OUT OF SERVICE” bag will remain in place until the temporary “OUT OF SERVICE” status expires, at which time the bag may be removed after notifying the Field Inspector.
6. The Applicant shall provide a new hydrant when required to relocate an existing hydrant.

4.12 Testing to Place Utilities Into Service

The Applicant shall flush, pressure test, and bacteriologically test each section of completed water main, in accordance with AWWA C600, prior to placing the utility into service. The Applicant shall schedule all pressure testing with the Field Inspector at least 48-hours in advance.

A. Pressure Test

1. Prior to making a wet tap, the Applicant shall pressure test the sleeve and valve assembly at 200 psi for 10 minutes.
2. After backfilling, the Applicant shall test new water mains to a hydrostatic pressure of at least 100 psi above the modeled pressure or Service Authority tested nominal operating pressure at the test site or 200 psi, whichever is greater.
3. Before testing, the Applicant shall vent all high points in the portion of the system under test and expel air from the system before beginning the test. Applicant shall ensure that fittings and hydrants are properly restrained before applying pressure and that concrete thrust blocks, if used, shall have attained their final, 28-day design strength.

4. Once the portion of the system being tested has reached the required test pressure, the Applicant shall maintain the pressure continuously for two (2) hours with no leakage. Should any leakage be detected, the Applicant shall determine the cause of the leak, make the necessary repairs, and the leak test repeated until no leakage is detected.

B. Bacteriological Test

Disinfection process of water main is required in accordance with AWWA C651 including, but not limited to, the following:

1. After pressure testing and before the final inspection of the completed system, Applicant shall flush the system completely at a flow velocity of at least 3.0 feet per second, per the direction of the Field Inspector.
2. A disinfection solution with an initial concentration of 25 ppm shall remain in the main for 24 hours, after which time a minimum chlorine residual, as CL₂, of 10 parts per million throughout the main is required, in accordance with AWWA C651. It is the Applicant's responsibility to have access to AWWA C651, *Disinfecting Water Mains*, at the job site.
3. After chlorination and complete flushing, the Applicant shall fill the pipe with potable water. Before the system can be placed in service, Virginia Waterworks Regulations requires at least two (2) consecutive satisfactory bacteriological samples from the system. Sampling will be conducted at intervals not exceeding every 1,200 feet. The Applicant shall collect bacteriological samples each day over two (2) consecutive days at least 16 hours apart; however, the consecutive days shall not run from Friday to Monday.
4. If the initial disinfection procedure fails to produce satisfactory laboratory results, the Applicant shall repeat flushing, chlorination, and testing procedures until two (2) consecutive satisfactory bacteriological sample results are received.
5. The Applicant shall be responsible for any damage to vegetation, trees, streams, ponds, and lakes caused by the discharge of heavily chlorinated water. The Applicant shall perform the necessary measures to dechlorinate water that has been supplemented with chlorine and used for disinfection purposes prior to discharging water into any storm water system, estuary, or other environmentally sensitive area, in accordance with AWWA C651 and C655.

4.13 Water Main Easements

A. Easement Widths

1. Applicant shall dedicate minimum easement widths of 15-feet for water mains.
2. The Applicant shall dedicate a minimum easement width of 20-feet when a water main runs between structures.
3. The Applicant shall center water mains and hydrants in the easement unless the Development Manager or designee permits the water main to be offset in the easement.

4. The Applicant shall provide a minimum easement of 10-feet by 10-feet, at the request of the Development Manager, to accommodate automatic flushing stations.
5. Increased easement area may be required as deemed necessary by the Director or designee.

B. Easement Exclusions and Offsets

1. The Applicant shall not place trees, fences, monuments, signs, entrance features, sheds, decks, overhanging canopies, light poles, or permanent structures in easements dedicated to the Service Authority without written approval from the Director or designee.
2. The Applicant shall offset utilities and easements to avoid undermining structural foundations and the use of shoring to support structures when utility re-excavation is needed.
3. Project Plans that cannot provide the required easement area shall require a variance and is subject to additional mitigation measures as directed by the Director.

C. Easement Access

1. The Applicant shall provide all necessary easements to the Service Authority to allow adjacent properties access to and extension of the water main(s). Easements shall extend to the property line as directed by the Development Manager or designee.
2. As deemed necessary by the Development Manager or designee, and to ensure routine and emergency maintenance access, the Applicant shall provide permanent access (ingress/egress) easements to utility easements and facilities to be owned, operated, and maintained by the Service Authority.
3. The Applicant is responsible for maintaining all easements serving the development site until final acceptance and bond release by the Service Authority. Maintenance shall include cutting vegetation, removing trees, controlling erosion, maintaining access to all utilities, and grading sufficiently to allow maintenance vehicles to traverse the easement.

D. Overlap with Other Easements

1. Easements of other entities can overlap Service Authority easements, but the physical location of non-Service Authority underground utilities shall remain outside the Service Authority's defined easement; however, crossings are permitted. Applicant shall confirm the location of such underground utilities to ensure that excavations shall pose no danger of undermining the Service Authority's utilities.
2. Although Service Authority easements are non-exclusive, the location and separation requirements of underground utilities shall comply with Virginia State Code 20VAC5-309-140.
3. Buffers, tree-save, conservation, resource protection areas, or other land use-restricting easements shall not overlap Service Authority easements. Applicant shall not restrict the Service Authority's prescribed easement and access rights.

4.14 Water Main Information Required in Project Plans

A Professional Engineer licensed in the Commonwealth of Virginia will prepare, seal, sign and date Project Plans for water main construction. Project plans must be submitted for review to the Development Department. The Applicant shall provide additional information, details, and/or specifications requested by the Development Department Manager or designee to support the review of the Project Plans. The Service Authority shall accept and permit Project Plans prior to the Applicant executing work in the field. At a minimum, Project Plans shall contain the following:

A. Cover Sheet

1. For site plan submission to PWC, the Applicant shall provide a fully completed standard cover sheet. The PWC Cover Sheet can be obtained at:
<http://www.pwcgov.org/government/dept/publicworks/pages/site-development-forms.aspx>
 - a. The Service Authority will assign a plan number after the first review; the Applicant shall add the Service Authority plan number to the title block.
2. The Applicant shall report the following information on the cover sheet for Project Plan submission within an incorporated Town:
 - a. A vicinity map and site location.
 - b. Plans shall have a unique title.
 - c. The Service Authority will assign a plan number after the first review; the Applicant shall add the Service Authority plan number to the title block.
 - d. Identify the Town where the project resides and the contact information for the Town representative managing the plan application.
 - e. Title block with the property address and GPIN, owner information, developer information, and Engineer's information.

B. Plan View

1. The Applicant shall provide plan views at 1:30 scale (1-inch to 30-feet). Other scales are only permitted with written permission from the Development Manager or designee.
2. The Applicant shall provide water main designs in context with site grading, right-of-way limits, structures, buildings, walls, light poles, traffic controls, sidewalks, trails, walkways, concrete pads, and fences.
3. The Applicant shall place water main design information in either the grading and/or utility plan sheets.
4. Show and correctly identify all existing water mains, valves, blow-off assemblies, air releases, meters, and hydrants within 100-feet of the project limits or plan sheet limits, whichever is greater.

5. Show all proposed water mains, valves, reducers, fittings, and hydrants with the designated line type and symbol per Table 4-3.

Table 4-3: Designated Line Type and Symbols

EXISTING WATERLINE W/ TEE	- - - W - - - - T
PROPOSED WATERLINE W/ TEE	- - - W - - - - T
EXISTING FIRE HYDRANT	I • ⊕
PROPOSED FIRE HYDRANT	I • ●
EXISTING WATER VALVE	- - - W ○ - - -
PROPOSED WATER VALVE	- - - ● - - - W
PROPOSED WATER METER	- - - ● - - -
EXISTING REDUCER	- - - W ▸ - - -
PROPOSED REDUCER	- - - ▸ W - - -

6. Show and label proposed water main segments with the pipe size, material, and unique identifier that can be matched to the profile.
7. Place hatch layer, x - x - x - x, over the water mains that are to be removed and hatch layer, // - // - // - //, over the water mains that are to be abandoned in place.
8. Show and label proposed fire lines as private and specify line size and material.
9. Show and label the stationing of proposed water mains in plan view that corresponds with the stationing in the water main profiles.
10. Specify the removal of blow off assemblies or plugs when a water main extension is proposed from an existing blow off assembly or plug.
11. Specify a tee connection to an existing water main as either a wet tap or cut in tee.
12. Show and specify the size and material of water service lines to water meters for multi-family, mixed use, student housing, or non-residential buildings and label ductile iron service lines as fully restrained and polyethylene encased.
13. Specify the meter sizes for multi-family, mixed use, student housing, or non-residential use.
14. Show, label, and specify the size of sub-meters and water-only meters.
15. Show and identify all existing and proposed water main easements, both on and off-site. Provide the recordation number, with the easement identifier, for existing easements.
16. Show and identify all multi-family, mixed use, student housing, or non-residential buildings, including building use, address, square footage, height, and number of dwelling units, if applicable. Provide each building with a unique building identifier to match to the meter schedule in the PWCSA Information Sheet.

C. Profile View

1. The Applicant shall provide profile views at 1:5 vertical scale (1-inch to 5-feet) and 1:50 horizontal scale (1-inch to 50-feet). Other scales are only permitted with written permission from the Development Manager or designee.
2. Profile water mains separately from road, storm, and sanitary sewer profiles.
3. Profile all existing and proposed grades over the center of existing and proposed water mains. Provide and label elevations of the existing water mains per test pit information.
4. Profile interim and ultimate grade elevations over the water main if grading is subject to change with a future Project Plan.
5. Identify and label water main profiles with a unique identifier that can be matched to the plan view. Specify the water main size and material. The specification shall include, “polywrap”, if ductile iron pipe is specified.
6. Identify and label all proposed valves, reducers, bends, tees, crosses, blow-off assemblies, air releases, meters, and hydrants with stationing in profile view to match the plan view.
7. Profile all hydrant leads 50-feet in length or greater.
8. Profiles shall graphically show and specify the amount of proposed or existing water main to be restrained when applicable. The station restraint is to start and the station restraint is to end shall be reported in the profile. General notes or the use of restraint tables are not permitted. Avoid small gaps between restraining zones; do not overlap restraint zones.
9. Show, label, and identify all utility crossings in the profile.
10. Show casing pipes graphically in the profile and label with the following: stationing of casing ends, diameter, material, and length.
11. Show and specify vertical separation from other utilities, which are less than 2-feet, in the profile.
12. Label fire lines as “private” in profile view.
13. Show and label limits of engineered fill graphically and include compaction requirements.

D. PWCSA Information Sheet

1. A completed PWCSA Information Sheet is required for all plan submissions. Reference the PWCSA Information Sheet at <https://www.pwcsa.org/service-authority-standard-plan-sheets>

E. Unit Price Sheet

1. The Applicant shall calculate bond values for all water facilities using the values shown on the current PWC Unit Price Sheet.
2. Water service lines are bonded as part of the Standard Meter Crock & Appurtenances line item and are not bonded separately.
3. Hydrant leads and hydrant isolation valves are bonded as part of the Fire Hydrant Assembly line item and are not bonded separately.
4. The Unit Price Sheet must clearly communicate if the Schedule of Values is being posted as a new bond, changing the quantities of an existing bond, or adding quantities to an existing bond.

-- end of Chapter 4 --

Chapter 5: Sanitary Sewer Collection Systems

5.1 Scope

A. Intent

This Chapter describes the planning, layout, design and construction of sanitary sewer collection system owned and maintained by the Service Authority.

B. Standards

The Applicant shall apply the information contained in this Chapter in conjunction with the latest edition of the Sewage Collection and Treatment (SCAT) Regulations 9 VAC 25-790, as published by the Commonwealth of Virginia, Department of Environmental Quality; and with other sections of this Manual. The authority for discretionary provisions for designs lies with the Director or designee.

C. Definitions

1. “Applicant” shall mean that person or persons applying for a rezoning, submitting plans, analyses, or studies; acquiring permits, constructing utilities, applying for meter certification, requesting inspections, granting easements, requesting bond release, or any activity related to developing land, extending utilities, or establishing water service. All actions to be performed and the associated expenses are the responsibility of the Applicant.
2. “Furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or other specified location) ready for use or installation and in new, unexpired, usable and operable condition.
3. “Grinder Pump” shall mean the grinder pump assembly and all piping, which includes piping on private property from the building to the grinder pump and from the grinder pump to the flush station, all electrical connections, and appurtenances.
4. “Install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
5. “Low Pressure Force Main” (LPFM) shall mean the low pressure force main (in the right of way or easement dedicated to the Service Authority) and the pressure service pipe to the property, up to and including the flush station.
6. “Perform” or “Provide,” when used in connection with services, materials, or equipment shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
7. “Project Plans” shall mean a set of plans used for site development containing the necessary information to extend utilities and provide water and/or sanitary sewer service sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia.

D. Minimum Standards

The Applicant shall, at a minimum, meet all standards described in this Chapter for all sanitary systems that are incorporated into the Service Authority's System regardless of whether the system is within a public right-of-way or on private property with dedicated easements.

Many criteria listed are minimums; however, the Applicant shall provide additional separations and clearances as practical to optimize each design and locate utilities so as to facilitate their re-excavation. The Service Authority will consider factors such as depth and magnitude of the facility in determining the adequacy of each design, and may relax or increase dimensional requirements accordingly. Designs shall minimize both maintenance and life cycle costs for the Service Authority.

5.2 Sanitary Sewer Studies

When requested by the Development Manager or the Planning Manager, the Applicant shall prepare and submit, a sanitary sewer study to the Service Authority's Project Engineer for review and acceptance. The sanitary sewer study shall include, but not limited to, the downstream sanitary sewer collection system, trunk mains, interceptor mains, and sewage pumping station(s). The study shall demonstrate that the hydraulic capacity of the existing infrastructure can accept the additional proposed flows. If the proposed and existing flows exceed the capacity of the downstream sanitary sewer mains or sewage pumping station(s), the Applicant shall design and construct off-site improvements in accordance with the Service Authority Development Review Process and System Improvement Policy (refer to *Appendix R*).

A. Sanitary Sewer Study Parameters

1. The scope of the sanitary sewer study will be established on a case by case basis by the Planning Manager and may include infrastructure beyond the limits of a Project Plan.
2. The Applicant's Engineer shall validate as-built data utilized for the sanitary sewer study.
3. Consumption data from the Service Authority or flow monitoring may be utilized for the purpose of establishing baseline flows in the existing sanitary sewer system. Flow monitoring requirements are determined by the Development Manager on a case by case basis. The adequacy of an existing sanitary sewer collection system is subject to the Service Authority's review and acceptance.

B. Sanitary Sewer Study Format

1. Title Page
 - a. Title the report with the same plan name and plan number matching the final engineering plans. Include the date the sanitary sewer study was last updated.
 - b. A Professional Engineer licensed in the Commonwealth of Virginia shall seal, sign, and date the title sheet.

2. Overview
 - a. State the purpose of the study.
 - b. Describe the proposed site development, location, densities (e.g. number of dwelling units) or metrics (e.g. acres) used to estimate tributary flows.
 - c. Report all pertinent background information for the development. Report all surrounding and known proposed developments that may impact, or could be impacted by, the proposed project.
 - d. Describe the existing sanitary sewer system being studied and report pertinent facility information.
 - e. Identify the existing sewer shed and sewage pump station(s) that will receive flows.
3. Design Criteria
 - a. Use the Manning's formula to calculate the sanitary sewer capacity.
 - b. Report how average daily flows are peaked.
 - c. Define a pipe being full when the ratio for depth of flow at peak flow to pipe diameter (d/D) is 0.80.
4. Assumptions
 - a. Report any assumptions used in the calculations or analysis.
 - b. Report any assumptions made about pipe condition.
 - c. Report how existing and proposed tributary flows are determined.
 - d. Report roughness coefficient for the pipe material used for calculations.
5. Analysis
 - a. Provide a narrative identifying the data and describe how it was used in the study.
 - b. Identify all constraints or uncertainties.
 - c. If applicable, report how flow monitoring data of the existing sanitary sewer was used in the study.
 - d. Provide gravity sanitary sewer design tables in accordance with *Chapter 5, Section 5.3*, for the following conditions:
 - i. Establish the existing sanitary sewer capacity prior to adding the proposed tributary flows.
 - ii. Report the combined effects of existing and proposed flows on the existing pipe capacity.
 - iii. If applicable, determine improvements needed to the existing sanitary sewer facilities to accommodate the proposed flows.
6. Results / Conclusions
 - a. Provide a summary of the results.

- b. If applicable, confirm the adequacy of the existing sanitary sewer collection system, interceptors, and sewage pumping stations.
 - c. If applicable, identify constraints and recommended solutions.
 - d. If applicable, provide a summary of all required improvements needed, to the existing sanitary sewer facilities, to accommodate the proposed flows.
- 7. Schematic
 - a. Provide a schematic plan on a 24-inch by 36-inch sheet with topographic contours, showing where tributary loadings have been applied to the existing sewer collection system, interceptors, and sewage pumping stations.

5.3 Gravity Sewer Hydraulic Design Criteria

A. General

Sanitary sewer mains 12-inch or larger in diameter are considered interceptors. Sanitary sewer mains less than 12-inches in diameter are considered collection mains.

The Applicant shall design sanitary sewer mains to carry peak tributary flows generated by the proposed development in addition to the peak flows from all contributing points within the sewer drainage area, including, but limited to, flows from an existing or planned sewage pumping station and future flows based on land use as outlined in the adopted PWC Comprehensive Plan.

B. Estimating Tributary Flows

1. Average Daily Sanitary Sewer Flows:

The Applicant shall calculate the average daily sanitary sewer flows by multiplying the appropriate flow factor in Table 5-1 by the number of applicable units and report the average flow in units of gallons per day. The unit flows in Table 5-1 include infiltration.

The values listed for office, industrial, and commercial development are rules of thumb and useful for preliminary planning. The Applicant shall use actual values, such as land use, density, and floor-to-area ratios, to more accurately estimate the sanitary sewer flows.

When the expected land use will generate a higher projected tributary flow, the Applicant shall include a description for the deviation from Table 5-1 with the sanitary sewer main design in the Project Plans. In all scenarios, the Applicant shall design the sanitary sewer mains for the highest average day tributary flow.

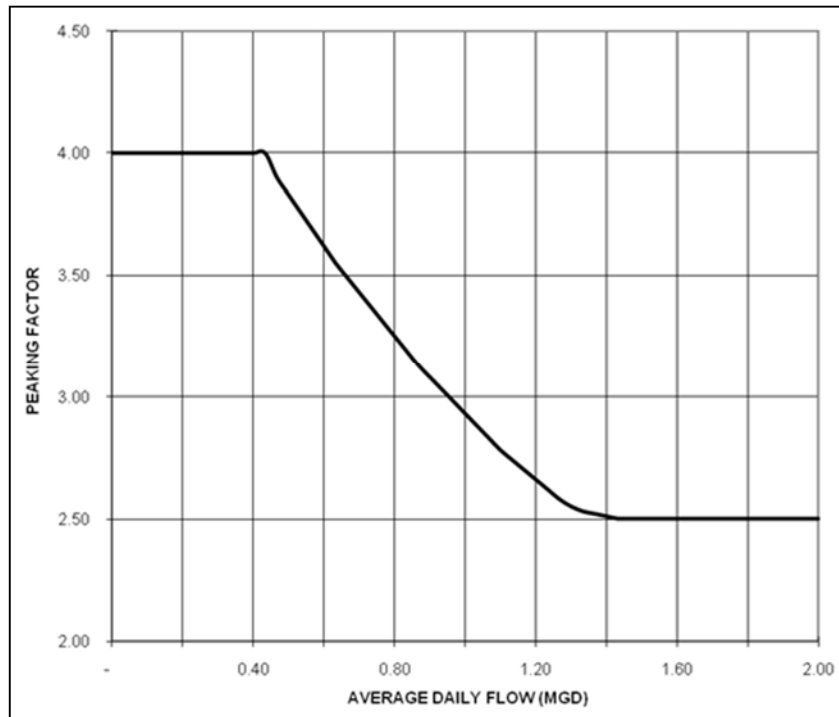
2. Peak Daily Sanitary Sewer Flows:

The Applicant shall calculate peak daily sanitary sewer flows by multiplying the average daily flow by the appropriate peaking factor from Figure 5-1 and report the peak flow in units of gallons per day.

Table 5-1: Average Daily Sanitary Sewer Flows

Land Use Category	Density (Unit/Acre)	Unit	Flow/Unit (gpd)
<i>Residential</i>			
Urban (UR)	15–30	Dwelling unit	300
Suburban—High (SRH)	8–15	Dwelling unit	350
Suburban—Moderate (SRM)	4–8	Dwelling unit	350
Suburban—Low (SRL)	1–4	Dwelling unit	390
Semi-rural (SRR)	0.2–1	Dwelling unit	390
Rural (RR)	0.1–0.2	Dwelling unit	390
Agricultural/Estate (AW)	0.1	Dwelling unit	390
<i>Office</i>			
Regional Employment (REC)	—	Acre ^a	2,000
Office/Flex (OF)	—	Acre ^a	2,000
Community (CEC)	—	Acre ^a	2,000
Office (O)	—	Acre ^a	2,000
<i>Industrial</i>			
Heavy (HI)	—	Acre ^a	2,000
Light (LIF)	—	Acre ^a	1,500
<i>Commercial</i>			
Regional (RCC)	—	Acre ^a	2,000
Community (CC, NC)	—	Acre ^a	2,000
“Acre” refers to gross acreage. For specific flow factors not covered in this table, refer to the Virginia Department of Health Sewage Collection and Treatment Regulations, 12 VAC 5-581-520, Table 3. ^a Office use assumed at a floor-to-area ratio of 0.2 unless otherwise specified by the Development Manager.			

Figure 5-1: Peak Flow Factors



C. Main Velocity

1. The Applicant shall design all sanitary sewer mains with slopes sufficient to provide a velocity during peak flow conditions of at least 2.25 fps and a maximum velocity not to exceed 10-fps.

D. Sizing Sanitary Sewer Mains

1. The minimum size for sanitary sewer mains is 8-inches in diameter.
2. The Applicant shall design all sanitary sewer mains with a depth of flow, at peak flow, to pipe diameter (d/D) ratio of 0.80 or less.

E. Roughness Coefficient

1. The Applicant shall use a roughness coefficient (n) of 0.013 for all pipe materials.

F. Hydraulic Calculations

The Applicant shall submit sanitary sewer design calculations for all proposed sanitary sewer mains as part of the Project Plans. The Applicant shall provide a sewer shed map for the proposed and existing sanitary sewer systems if requested by the Service Authority's Project Engineer.

1. The Applicant shall calculate the actual flow velocity, full flow velocity, and capacity of the pipe using Manning's formula, see Figure 5-2.

Figure 5-2: Manning's Formula

$$v = (1.49/n) R^{2/3} S^{1/2}$$

$$Q = 646,272 (1.49/n) A R^{2/3} S^{1/2}$$

Where:

v = velocity (feet per second)
 n = roughness coefficient 0.013
 R = hydraulic radius
 S = slope (feet per foot)
 A = cross-sectional area (square feet)
 Q = flow rate (gallons per day)

- Total cumulative peak flows are calculated by combining the peak daily flows with the anticipated peak day discharge of any connected sewage pumping station. Total cumulative peak flows are reported in units of gallons per day. Cumulative peaks flows over one (1) million gallons per day may be reported in million gallons per day.
- The Applicant shall present the design calculations in a sanitary sewer design table, in the format shown in Figure 5-3, in the Project Plans.

Figure 5-3: Gravity Sanitary Sewer Design Tables

Gravity Sanitary Sewer Design Table (Part 1)										
"n" factor = 0.013										
From Manhole	To Manhole	Units or Area	Flow / Unit	Avg. Flow Increment	Avg. Flow Total	Peak Factor	Q Total (GDP)	Pipe Size (in.)	Length (ft.)	Slope (%)

Gravity Sanitary Sewer Design Table (Part 2)										
							PWCSA Use Only			
Actual Vel. (fps)	Full Flow Vel. (fps)	Capacity (gpd)	q/Q (%)	d/D (%)	Invert Upper	Invert Lower	Date Line Installed	Date Line Passed Test	MH ID	Date MH Pass Vac. Test

5.4 Design

A. General

1. Inverted siphons are not permitted.
2. In accordance with Virginia Waterworks Regulations, sanitary sewer mains shall not pass within 50-feet of a potable water supply source (i.e. a well). All existing and proposed potable and non-potable wells, within 100-feet of all sanitary sewer mains or sanitary sewer easements, are identified in the Project Plans.
3. The Service Authority retains final decision authority for proposed connection point to existing sanitary sewer infrastructure.

B. Slope

1. Sanitary sewer mains shall have a uniform slope and straight alignment between manholes and be designed to be free flowing with a hydraulic grade below the crown of the pipe.
2. Sanitary sewer mains shall only be designed with minimum slopes when conditions require such to reach an existing sanitary sewer or to avoid excessive depth, see Table 5-2 for allowable minimum required slopes. When possible, twice the minimum slope shall be provided with sanitary sewer mains running to a drop connection at a manhole.

Table 5-2: Minimum Required Slopes

Sewer Diameter (in.)	Minimum Slope (ft per 100 ft)
8	0.47
10	0.34
12	0.26
16	0.18
18	0.14
21	0.113
24	0.088
30	0.062
36	0.048
42	0.040
For sewers larger than 42-inches in diameter, compute the minimum slope using $S = v^2 / (1.49R^{2/3}/n)^2$, where $v = 2.25$ fps.	

3. Upper or terminal sewer runs shall have a minimum slope of 0.80 percent unless there is a force main connection or a distinct possibility that the sanitary sewer will be extended in the near future.
4. Sanitary sewer mains with a slope of 20 percent shall be anchored to the ground. The structural and installation details for the anchors shall be provide in the Project Plans.
5. Sanitary sewer mains are not designed with a slope greater than 20 percent.

C. Layout

1. Routes for sanitary sewers shall be selected so as to provide the required separation from buildings and other utilities, while minimizing the use of manholes and the number of crossings with curbs and sidewalks. Sanitary sewer routes and manhole placements are selected so that manholes will be accessible for maintenance operations. Where sanitary sewers are in an easement and beyond the street, the Service Authority's Project Engineer will determine the extent of vehicular access needed to accomplish maintenance operations. Where determined necessary, vehicular access is provided from the street to the easement.
2. Where sanitary sewer passes adjacent to a building or structure, the design will ensure that the sanitary sewer can be excavated for repair or replacement, without undermining the building's foundation. The Applicant shall provide sectional views of the existing building and/or structure's loading plane. For proposed buildings or structures, the Applicant shall provide clear specifications on the site plan, stating the highest elevation at which the foundation will bear. In no case shall the building or building footings encroach into the sanitary sewer easement.
3. Any necessary relocation of existing sanitary sewer facilities is the responsibility of the Applicant and will be replaced in kind, in the form of a new, parallel facility.
4. The Applicant shall place manholes along the centerline of the street. However, manholes may be placed in the center of a travel lane to accommodate the utility separation requirements of this Manual.
5. For secure sites requiring indirect routes of travel for Service Authority personnel to access its facilities, the Director or designee may require a site specific access agreement and route map prior to placing the system into Beneficial Use.

D. Extensions and Access

1. Sanitary sewer mains shall be extended beyond all site improvements to accommodate future extensions with minimal disruptions.
2. Temporary termination of a public sewer is made at a manhole. Easements for future extensions are provided to the site or subdivision boundary and conveyed to the Service Authority.

E. Soil Corrosivity Analysis

Reserved for future use.

5.5 Gravity Sanitary Sewer Mains and Appurtenances

A. General

1. All proposed pipe material is subject to approval by the Service Authority. The Applicant shall show, on the Project Plans, the type or types of pipe material proposed for use on the project.
2. Pipe material and dimension ratio (DR), or thickness class if applicable, shall remain uniform between manholes with the exception of an inside drop connections. Pipe materials for an inside drop connection shall be provided in accordance with the details of this Manual

B. Polyvinyl Chloride (C-900) Pipe

1. Materials

Polyvinyl Chloride (C-900) sanitary sewer mains are manufactured in accordance with AWWA C900. The DR rating of the pipe is specified for the allowable depth of cover, see Table 5-3.

2. Joints

All joints for C-900 pipe are a standard “push-on” joint and are in accordance with AWWA C-900. Joints and gaskets of standard C-900 pipe are in accordance with ASTM D-3139 with gaskets in accordance with ASTM F477. No pipe deflection is permitted in the joints or pipe.

3. Fittings

All fittings for C-900 pipe are manufactured as a one piece injection molded Polyvinyl Chloride (PVC) fitting in accordance with ASTM D1784 and AWWA C907. Fittings shall match the DR rating of the pipe.

C. Ductile Iron Pipe

1. Materials

Pressure rated DIP, Class 52, sanitary sewer mains are manufactured in accordance with AWWA C151 (ANSI A21.51) and used for the following applications:

- a. DIP are used at all stream crossings.
- b. DIP are used for all aerial crossings.
- c. DIP are specified where cover is in excess of 25 feet.

DIP mains are double-lined with cement mortar, in accordance with AWWA C104 (ANSI A21.4), and have a protective exterior coating with no defects, gouges or damage.

2. Joints

All joints for ductile iron pipe are standard “push-on” or “mechanical” joint and are in accordance with AWWA C151 (ANSI A21.51). Joints and gaskets of standard mechanical joint pipe are in accordance with ANSI A21.11.

3. Fittings

Fittings for DIP are in accordance with AWWA C110 (ANSI A21.10) or AWWA C153 (ANSI A21.53).

D. Restraint

1. Sanitary sewer pipe joints are fully restrained for the following applications:
 - a. For pipe installation in a casing.
 - b. For pipe installation with a slope of 15 percent or greater.
 - c. For pipe installation at a stream crossing.
 - d. For pipe installation at an aerial crossing.
 - e. Joints are fully restrained where determined appropriate by the Development Manager or designee.
2. When pipe joint restraint is required, sanitary sewer mains are restrained against movement with mechanical restraining glands as listed in *Appendix C: USM Approved Products List*.
3. Proprietary joint restraint, by the pipe manufacturer, may be used in lieu of an external restraining gland. Factory restrained joints, high-strength ductile iron tee-head bolts, hex nuts, ductile iron glands, and rubber gaskets are as the pipe manufacturer has furnished them.
4. The use of gasket restraining devices is only permitted on a case-by-case basis with the approval of the Inspections Manager or designee.

E. Corrosion Protection

1. External Corrosion Protection

DIP, fittings, and appurtenances shall be encased with 4-mil high-density, cross-laminated, polyethylene tube wrap (polywrap) in accordance with AWWA C105 (ANSI A21.5). In addition, all fasteners and appurtenances are completely coated with Roskote R28 rubberized mastic.

2. Internal Corrosion Protection (Linings)

- a. DIP aerial sanitary sewer mains are installed with a cured-in-place pipe lining.
- b. A cured-in-place lining are installed in all existing non-PVC sanitary sewer mains between lined manholes.

3. Where DIP is proposed in areas within 100-feet of gas transmission mains with impressed current, rectifiers, or other potential sources of stray current, the Applicant shall provide additional engineering analysis by a NACE-certified Engineer to determine a suitable means to protect the sanitary sewer main.

F. Separations and Crossings

Sanitary sewer mains and sanitary sewer manholes shall not come into contact with any part of a water main.

1. Parallel Installations:

- a. The Applicant shall provide sanitary sewer mains and manholes at least 10-feet horizontally from a water main; the distance is measured edge-to-edge. In unusual conditions that prevent a horizontal separation of 10-feet, the sanitary sewer mains and manholes may be installed up to 7.5-feet from the water main, provided the bottom of the water main is a minimum of 18-inches above the top of the sanitary sewer main. Where this vertical separation cannot be obtained, the following is applied:
 - i. The sanitary sewer main is constructed of AWWA-approved water main and pressure tested in place without leakage prior to backfilling.
 - ii. The sanitary sewer manhole is of watertight construction and tested in place without leakage.
- b. A 10-foot separation from other utilities (i.e. storm drainage, gas mains, electric, telecommunications, etc.) is desirable by the Service Authority. In conditions that prevent a horizontal separation of 10-feet between other utilities and the sanitary sewer main or manhole, the sanitary sewer main or manhole may be installed up to 7.5-feet from other utilities.

2. Utility Crossings:

- a. Sanitary sewer mains shall cross below water mains with a minimum of 18-inches of separation between the bottom of the water main and the top of the sanitary sewer main. When conditions prohibit an 18-inch vertical separation, sanitary sewer mains that pass under water mains are constructed of an AWWA-approved water main and pressure tested in place without leakage.
- b. In unusual conditions, where the sanitary sewer main passes over a water main, the Applicant shall use the following construction methods:
 - i. Vertical separation of at least 18-inches between the bottom of the sewer main and the top of the water main is provided.
 - ii. Sanitary sewer main is constructed of AWWA-approved water main and pressure tested in place without leakage.
 - iii. Structural support for the sanitary sewer main is provided to prevent excessive deflection of the joints and the settling on and breaking of the water main.
 - iv. The length of the sanitary sewer main is centered at the point of the water main crossing so that the joints are equidistant and as far as possible from the water main.

- c. At utility crossings other than water mains, a minimum vertical separation of 12-inches is maintained between the other utilities and the sanitary sewer main.
 - d. When a sanitary sewer main crosses a gas transmission main, the Applicant shall dig test pits on the gas transmission main at the proposed crossings and show the test pit information on the Project Plans. Sanitary sewer mains are installed in a non-metallic casing pipe running the width of the gas transmission main easement (unless otherwise directed by the gas company). If the gas transmission main is constructed of steel pipe, the Applicant shall show the distance to the nearest anode bed on the Project Plans.
3. Streams Crossings:
- a. The Applicant is responsible for obtaining all required Local, State, and Federal approvals and permits to install a sanitary sewer main designed as a surface water crossing.
 - b. All sanitary sewer mains crossing surface water are installed with a minimum of 2-feet under the invert of the stream bed when the creek bed is composed of rock and 3-feet below the invert of the stream bed when the stream bed is composed of unconsolidated material.
 - c. All sanitary sewer main crossings shall have restrained, watertight joints as determined by the Development Manager or designee.
 - d. Sanitary sewer mains shall cross the stream at a 90 degree angle, where possible.
 - e. Sanitary sewer mains and their appurtenances located along streams are designed to be protected against a 100-year storm event.
 - f. Sanitary sewers parallel to streams are of sufficient depth so that future extensions can be made under the stream bed while maintaining minimum cover requirements. Anticipated future extensions are shown on the Project Plans with corresponding surveyed stream bed depths.

G. Aerial Gravity Sanitary Sewer Crossings

- 1. Aerial sanitary sewer crossings are installed on piers across ravines or streams and approved on a case-by-case basis by the Development Manager or designee when Applicant demonstrates that no other practicable alternative exists.
- 2. Full structural support is provided under each sanitary sewer pipe joint.
- 3. The Applicant shall provide the design information and details of the aerial crossing and piers, including security and safety measures to prevent trespassing onto the aerial crossing, on the Project Plans.
- 4. The Applicant is responsible for obtaining all required Local, State, and Federal permits to install a sanitary sewer main designed as an aerial crossing.

H. Depth of Cover

1. Sanitary sewer mains are designed with a minimum cover of 5-feet above the top of the main.
2. In unusual conditions, sanitary sewer mains may be designed with a minimum cover of 3.5-feet above the top of the main.
3. The Applicant shall not design sanitary sewer mains at depths greater than the depths shown in Table 5-3.

TABLE 5-3: Allowable Depth of Cover

Pipe Diameter	Depth (ft)	
	ANSI/AWWA C900 PVC ^a	
	DR25	DR14
8	18	25
10	18	25
12	18	25
14	18	25
15	—	—
16	18	25
18	18	25
20	18	25
21	—	—
24	18	—
27	—	—
30	18	—
Applicant shall provide design calculations for pipe designed at depths greater than values shown in this table.		

4. Laterals are not connected to sanitary sewer mains at depths greater than 18-feet.
5. All grade changes, greater than 12-inches, over existing sanitary sewer mains are shown in the plan and profile.
6. The Applicant shall provide design calculations, when directed by the Service Authority's Project Engineer, to confirm that the proposed cover will not affect the structural condition of the existing sanitary sewer main(s).

I. Casings

Refer to *Chapter 4, Section 4.4 H*, for information about main installations in casings.

5.6 Sanitary Sewer Manholes

A. General

1. The Applicant shall provide manholes at all junctions with other sanitary sewer mains, for changes in alignment or grade, and at the terminal point of the main.
2. The maximum distance between manholes is 600-feet.
3. A manhole vent shall be provided a minimum of every 1,000-feet for watertight systems installed outside of paved areas, in accordance with the details of this Manual.

B. Design

1. The minimum height for a standard manhole with a cone section is 5 feet. Where deemed acceptable by the Development Manager or designee, the minimum height for a flat top manhole is 4 feet.
2. The minimum inside diameter is 4-feet.
3. A manhole diameter 5-feet or greater is required when connecting sanitary sewer mains greater than 12-inches in diameter.
4. A manhole diameter of 5-feet is required for all new manholes with an inside drop connection for sanitary sewer mains 8 to 12-inches in diameter, or when manhole depths exceed 18-feet.
5. For sanitary sewer mains 24-inches or greater in diameter, the Applicant shall provide a specially designed manhole structure with a manhole transition coupler, if needed.
6. Manholes constructed on fill shall have a false bottom extending to undisturbed ground. For fill depths in excess of 8-feet, the Applicant shall provide an alternative design for a support system (e.g. spread footing) to prevent manhole settlement.

C. Manhole Locations

1. Where possible, locate manholes in paved areas.
2. To the extent possible, locate manholes outside the limits of residential lots.
3. Do not locate manholes in areas where storm runoff backs up in the street during a rain event, such as the spread area in front of storm drainage inlets.
4. Do not locate manholes in curb, gutter pan, parking spaces, sidewalks, trails, or other pedestrian travel ways.

D. Manhole Frames and Covers

1. Manholes located outside of pavement
 - a. The Applicant shall furnish watertight frames and covers for manholes located in remote locations and open areas in accordance with the details in this Manual.
 - b. The Applicant shall set the rim elevation 2-feet above finished grade, unless directed otherwise by the Development Manager or designee.
2. Manholes located in pavement
 - a. Applicant shall furnish street frame and covers.
 - b. The Applicant shall set the rim elevation flush with the final grade.
 - c. The Applicant shall provide a waterproof manhole insert. Refer to *Appendix C: USM Approved Products List*.
3. The maximum elevation adjustment permissible, with the use of adjustment rings, is 1-foot. Elevation adjustments greater than 1-foot shall require using precast sections. Concrete adjustment rings are not permitted. Refer to *Appendix C: USM Approved Products List* for approved manufacturers.

E. Manhole Connections

1. Sanitary sewer connections to manholes shall have an angle of entry no less than 90 degrees to the downstream invert-out of the manhole.
2. Applicant shall provide a smooth transition between the inverts.
3. For sanitary sewer mains up to 12-inches in diameter, provide a minimum 0.2-foot difference between the invert-in and the invert-out to account for hydraulic losses.
4. For sanitary sewer mains larger than 12-inches in diameter, the Applicant shall calculate the hydraulic losses at intersections and transitions of sanitary sewer mains separately and submit the calculations to the Development Manager or designee for acceptance.
5. No connections are permitted within 6-inches of a sanitary sewer manhole joint or within the range of 12 to 30-inches above the invert-out.
6. Specify connections made 30-inches or more above the invert as an inside drop connection.
7. Match the crowns of pipes when a smaller sanitary sewer main discharges into a manhole with a larger sanitary sewer main.
8. Manhole connections shall not obstruct the use of existing manhole steps.

F. Manhole Linings for Force Mains

1. Manhole Linings
 - a. For new manhole installations subject to a force main discharge, a cast-in-place high-density polyethylene liner consisting of Agru Sure Grip or GSE Stud Liner is required.
 - b. For Existing manholes downstream of a force main discharge, the manhole shall have a spray-on liner consisting of Raven 405 or Cor+Gard.
2. The Applicant is required to provide manhole linings according to the following:
 - a. Manhole lining is not required when the force main discharge is less than 700-gallons per day (for example, one or two single-family dwellings).
 - b. Manhole lining is required in the first manhole when the force main discharge flows range between 701 and 1,750-gallons per day (for example, three to five single-family dwellings).
 - c. Manhole lining is required for the first three downstream manholes within 1,000-feet of a force main discharge when discharge flows range between 1751 and 8,750-gallons per day (for example, 6 to 25 single-family dwellings).
 - d. Manhole lining is required for all manholes within 1,000-feet of a force main discharge when discharge flows are greater than 8,750-gallons per day.

5.7 Sanitary Sewer Lateral Connections

A. Materials

1. The Applicant shall construct sanitary sewer lateral connections with the same material as the sanitary sewer main to which the lateral is connecting.
2. Sanitary sewer laterals are connected by one of the following means: a manhole connection, pre-manufactured tee or wye connection, or saddle-type connection.

B. Design

1. Sanitary sewer lateral connections installed by the Applicant from the sanitary sewer main to the property line or right-of-way shall have a minimum 4-inch diameter. Each lot shall have its own separate sanitary sewer connection to the sanitary sewer main. A building sanitary sewer connection to the sanitary sewer shall not tie into the vertical cleanout riser at the property line. No more than three (3) sanitary sewer lateral connections at permitted at terminal manholes. The Applicant shall avoid sanitary sewer lateral connections to in-line manholes.
2. The Applicant shall provide details pertaining to sanitary sewer laterals in the form of a sanitary sewer lateral table in the Project Plans. The table shall include the lot number, invert of the lateral at the sewer main; the finished floor elevation of the proposed buildings; the size, length, slope of each lateral; and the difference between the lowest floor elevation and the invert at the sewer main. The lowest floor elevation of any structure to be served by gravity shall be a minimum of 4-feet above the invert elevation of its sanitary sewer lateral connection at the sanitary sewer main or a

pumped sanitary sewer operation shall be utilized.

3. The Applicant shall not connect sanitary sewer laterals directly into sanitary sewer mains greater than 12-inches in diameter unless approved by the Director or designee. The Applicant shall not connect sanitary sewer laterals to sanitary sewer mains installed between lots, unless approved by the Development Manager or designee.
4. Sanitary sewer lateral connection shall have an angle of entry no less than 90 degrees to the downstream flow in the sewer main.
5. Cleanouts are required for all laterals at the property line adjoining a public right-of-way for new construction as well as new connections to existing stubbed out sanitary sewer laterals. All property line cleanouts shall have a brass cap. The Applicant shall not locate cleanouts in a sidewalk, driveway entrance, or in a state right-of-way.

C. Sanitary Sewer Connections with Private Wells

1. The Service Authority requires a water meter between the private well and the building, at the Applicant's expense, prior to making a connection to the sanitary sewer system.
2. The Applicant shall furnish the water meter box and all appurtenances necessary for meter installation in accordance with the details in this Manual.

5.8 Low Pressure Force Mains

A. General

1. A low pressure force main (LPFM) system is defined as a pressurized sanitary sewer main serving multiple grinder pump connections by different property owners and does not double as a discharge force main from a centralized sewage pumping station facility. LPFM systems are used only where a gravity sanitary sewer system is not possible or feasible as determined by the Director or designee with concurrence from the Director of Operations and Maintenance.
2. The Service Authority shall accept the maintenance responsibility for a LPFM as well as the connection facilities (which includes the tap, the line to the flush station, and the flushing station) that can serve more than one property, provided that the LPFM is installed in a public right-of-way or in a dedicated Service Authority sanitary sewer easement.

B. Grinder Pumps

1. The Service Authority does not provide, install, inspect, maintain, or own grinder pumps for new connections to the sanitary sewer system (*refer to Appendix J: Low Pressure Force Main and Grinder Pump Policy*).

2. All grinder pumps are privately owned and maintained by the property owner who is responsible for procurement, installation, and inspection of the pump and associated appurtenances connected to the property line flushing station. The property owner shall obtain and satisfy the requirements of all required permits from the appropriate Building Official (i.e. PWC, Town of Dumfries, etc.) or permitting agency.

C. Design

The Applicant shall provide LPFM design calculations in the Project Plans sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia, when a new LPFM is proposed in excess of 300 feet or cumulative tributary flows are estimated in excess of 1,750 gallons per day.

1. Each property shall have a separate grinder pump and a separate property line flushing station with a 1.5-inch service connection to the common LPFM. Buildings or facilities on separate properties shall not share a grinder pump or LPFM connection.
2. The installation and future maintenance of LPFMs shall not negatively impact the foundations of buildings or other structures.
3. Estimated tributary flows for LPFM calculations are based on Table 5-1.
4. The LPFM system shall maintain a minimum scour velocity of 2-fps and shall not exceed a maximum velocity of 8-fps.
5. The design of a LPFM system cannot exceed a total dynamic head of 60 psi.
6. If the total retention time in the LPFM exceeds 72-hours, the Applicant shall provide a 10-foot-by-10-foot easement area for a future automatic flushing station in the location designated by the Development Manager or designee.
7. Design calculations shall consist of a LPFM design table and accumulative retention time table submitted in the following format:

a. LPFM Design Table:

Low Pressure Force Main Design Table (Part 1)								
Zone Number	Connections to Zone	Number of Pumps in Zone	Accum. Pumps in Zone	Gallons/Day per Pump	Max. Flow per Pump (gpm)	Max. No. of Simultaneous Operations	Max Flow (gpm)	Pipe Size (in.)

Low Pressure Force Main Design Table (Part 2)								
Max Velocity (fps)	Length of Pipe this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum. Friction Loss (ft)	Max. Main Elevation	Min. Pump Elevation	Static Head (ft)	Total Dynamic Head (ft)

b. Accumulative Retention Time Table:

Accumulative Retention Time Table (Part 1)					
Zone Number	Connections to Zone	Accumulative Pumps in Zone	Gallons/Day per Pump	Pipe Size (in.)	Length of Zone

Accumulative Retention Time Table (Part 2)				
Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (hours)	Accumulated Retention Time (hours)

- c. The Applicant shall submit a schematic of the LPFM system which shows the layout and identifies the pipe sizes of the proposed and existing, if applicable, LPFM. The schematic shall identify all properties and pumps connected to the LPFM and their associated zone.

D. Connections to An Existing LPFM System

1. Existing LPFM systems were typically sized for the properties the system was originally designed to serve. When the total tributary flows in a LPFM system are in excess of 1,750 gallons per day, the Applicant shall provide the following to confirm the existing LPFM system can accept additional pumped flows:
 - a. Provide design calculations demonstrating that the existing LPFM system meets the criteria in *Chapter 5, Section 8.C*.
 - b. Collect information on the existing pumps connected to the existing LPFM system necessary for the design calculations.
 - c. Confirm that the increased total dynamic head does not overpower the existing pumps connected to the existing LPFM system.
2. No connections are permitted to a force main from an existing or proposed sewage pumping station.

E. Sizes, Pipe Materials, and Fittings

1. The minimum LPFM size is 1.5-inches. The maximum size for a LPFM is 4-inches.
2. Provide Schedule 40 PVC pipe, with a minimum pressure rating of 200 psi, with solvent welded bell and spigot joints.
3. Provide Schedule 80 PVC fittings that are manufactured as a one piece injection molded PVC compound meeting ASTM 1784. Fittings shall have a minimum pressure rating of 320 psi.

F. Separation and Crossings

1. Parallel Installations: Refer to *Chapter 5, Section 5.5.F.*
2. Utility Crossings: Refer to *Chapter 5, Section 5.5.F.*
3. Stream Crossings: Refer to *Chapter 5, Section 5.5.F.* In addition, the Applicant shall install LPFMs in a casing pipe at all stream crossings.

G. Depth of Cover

1. Install LPFMs at a minimum depth of 3.5-feet, where possible, from finished grade to the top of the pipe without creating intermediate high and low points.
2. LPFM shall not be installed at depths greater than 8-feet.
3. The Applicant shall provide a profile of all grade changes, greater than 12-inches, over an existing LPFM. The Applicant shall test pit the elevation of the existing LPFM, as necessary, for the Applicant to certify an accurate profile and include the test pit information in the Project Plans prior to acceptance.

H. Casings

1. Refer to *Chapter 4, Section 4.4.H.*

I. Valves

1. Applicant shall provide valves at all connecting intersections of LPFMs: four valves at crosses and three valves at a tee.
2. Provide valves that are true union Schedule 80 PVC ball valves. All ball valves shall withstand a working pressure of at least 235 psi.
3. Valves are not permitted within the limits of any curb, gutter pan, driveway, sidewalk, trail, or parking space.

J. Flushing Stations

1. All flushing stations shall consist of a valve, piping, and a 1-inch National Pipe Thread plug. The assembly shall extend upward 12-inches from the LPFM pipe in accordance with the details in this Manual.
2. Applicant shall provide a property line flushing station at the property line for each connection to the LPFM pipe in accordance with the details in this Manual.
 - a. Tees are required with the construction of a new LPFM for proposed sanitary sewer connections.
 - b. A ball valve and stainless steel saddle are required for service connections installed on existing LPFMs.

3. The Applicant shall provide an in-line flushing station at junctions of two (2) or more LPFMs, at low points, and for each 1000-foot run of LPFM and additional valves and/or flushing stations, as directed by the Development Manager or designee, to enable directional flushing.
4. The Applicant shall provide a terminal flushing station at the termination of each LPFM in accordance with the details in this Manual.

K. Air/Vacuum Release Valves

The Applicant shall provide an automatic air release valve at all high points to release trapped air, and where intermediate high points occur and column separation is possible, a combination automatic air/vacuum release valve in accordance with the details in this Manual. Refer to *Appendix C: USM Approved Products List* for approved manufacturers.

L. Discharge to a Manhole

1. A LPFM shall not discharge to an in-line manhole.
2. The LPFM shall connect to a gravity lateral prior to discharging into a terminal manhole, in accordance with the details of this Manual, when either the terminus of the LPFM or terminal manhole are located outside a paved vehicular travel way. The clean-out stack for the gravity lateral shall be located out of the pavement.
3. The LPFM shall connect directly to a terminal manhole and discharge to the manhole invert when both the terminus of the LPFM and terminal manhole are located within a paved vehicular travel way. When the manhole inverts are deeper than 8 feet, the LPFM shall turn downward with a 90-degree bend inside the manhole and installed as inside drop connection. The inside drop connection shall be secured to the manhole wall.
4. The terminal manhole receiving the LPFM discharge shall have no additional receiving inverts.
5. Manhole Linings: Refer to *Chapter 5, Section 5.7.F*.

M. Enclosures

1. When valves, flushing stations, or air/vacuum release valves are located within a paved vehicular travel way, the Applicant shall provide these items in a 48-inch (minimum size) standard manhole with a standard manhole frame and cover. A stone base for drainage is required in accordance with the details in this Manual. The Applicant shall provide a minimum of 6-inches between the inner wall of the enclosure and any valves, flushing stations, or air/vacuum release valves.
2. When valves, flushing stations, or air/vacuum release valves are located outside a paved area and outside areas subject to vehicle loading, the Applicant shall provide these items in a 36-inch crock with a standard manhole frame and cover, when the depth to the valves in the enclosure is no greater than 3.5-feet. If the depth to the valves exceeds 3.5-feet, the Applicant shall install these items in a 48-inch (minimum size) standard manhole with standard manhole frame and cover. The Applicant shall

provide a minimum of 6-inches between the inner wall of the enclosure and any valves, flushing stations, or air/vacuum release valves.

3. Enclosures are not permitted in walkways, sidewalks, driveways, curbs, or gutter pans.
4. Once LPFMs are placed into service through the Beneficial Use or Partial Beneficial Use processes, valve enclosures must remain accessible at all times. At no time shall valve enclosures be buried, paved over or obstructed by construction equipment, debris, or storage of materials.
5. If street surfaces are renewed or replaced while on bond, the Applicant shall immediately re-adjust valve enclosure covers to their proper elevation relative to the new street surface as directed by the Field Inspector.

N. Tracer Wire, Test Stations, and Detectable Warning Tape

The Applicant shall provide tracer wire, test stations, and detectable warning tape in conjunction with LPFM systems. Applicant shall show on the Project Plans the location of needed test stations and provide a table listing the test station with the corresponding station number of the LPFM alignment. Before the LPFM is accepted by the Service Authority for Beneficial Use and prior to placing the LPFM into service, the Field Inspector shall confirm that the LPFM can be located.

1. Tracer Wire:

- a. Tracer wire shall consist of #12 solid copper wire insulated with 45-mil polyethylene.
- b. The Applicant shall provide tracer wire along the entire length of the LPFM and along the service connections to the property line flushing station. The Applicant shall loop tracer wire in the property line flushing station enclosure so that it can be extended a minimum of 18-inches above the top of the enclosure.
- c. The Applicant shall secure tracer wire to the pipe with plastic cable ties no greater than 10-feet apart. The Applicant shall provide tracer wire at the 12 o'clock position of the pipe.

2. Test Stations:

- a. The Applicant shall provide tracer wire test stations at all junctions of LPFMs or as directed by the Development Manager. Where possible, install all test stations within 5-feet of the LPFM location.
- b. Test stations are not permitted in curbs, gutter pans, driveways, sidewalks, trails, bike paths, or any pedestrian travel way.
- c. When test stations are located outside the right-of-way and outside of a paved area, the Applicant shall use Green Rhino TriView test stations with a five-post internal terminal block. The Applicant shall spool 48-inches of tracer wire inside the test station to allow the removal of the terminal block for testing.

- d. When test stations are located in the right-of-way (whether in a paved or unpaved area), the Applicant shall use Bingham and Taylor ground-level test stations with a cast iron rim, a turning, locking lid, a seven-post terminal block, with a 5-inch shaft. The Applicant shall spool 48-inches of tracer wire inside the test station to allow removal of the terminal block for testing. Additionally, when test stations are located in the right-of-way and in an unpaved area, the Applicant shall provide a 2-foot by 2-foot concrete pad (3,000 psi, 4-inches thick) around the test station.
3. Warning Tape:

The Applicant shall provide detectable warning tape labeled “CAUTION BURIED SEWER LINE BELOW” that is a minimum of 6-inches wide and installed 1-foot above and over the entire length of the LPFM.

5.9 Force Main

A. General

1. A force main system is defined as a pressurized sanitary sewer main, owned and operated by the Service Authority, from a centralized sewage pumping station.
2. The Service Authority may accept the maintenance responsibility for a force main and associated appurtenances when the force main is installed in a public right-of-way or in a dedicated Service Authority sanitary sewer easement.

B. Design

1. The Applicant shall provide force main design calculations as part of the sewage pumping station plans that are sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia. The Applicant shall size force mains to meet the flow, pressure and velocity requirements of the specific sewage pumping station and the requirements in this Chapter.
2. The force main system shall maintain a minimum scour velocity of 2-fps and shall not exceed a maximum velocity of 8-fps.
3. The Applicant shall design the force main with a minimal the number of high points, low points, and bends.
4. The Applicant shall determine head losses by using the Hazen-Williams equation with a roughness coefficient (C) of 120 for pipes 12-inches in diameter and larger and a roughness coefficient (C) of 100 for pipes smaller than 12-inches in diameter. All minor losses from valves and fittings are calculated as part of the total dynamic head for the sewage pumping station.

C. Connections

1. The Applicant shall provide a bypass connection downstream of the flowmeter on the sewage pumping station site.
2. The proposed force main shall discharge to the bottom of a terminal manhole with no additional receiving inverts. Refer to *Chapter 5, Section 5.7.F* for required manhole lining information.
3. Connections from a grinder pump or LPFM to a force main are not permitted.
4. Two or more force mains shall not manifold together into a single force main.

D. Sizes, Pipe Materials, and Fittings

1. The minimum diameter for a force main is 4-inches.
2. Force main material: DIP, Class 52. Refer to *Chapter 4, Section 4.4.A*.

E. Restraint Calculations

1. The Applicant is responsible to calculate, specify, and certify the amount of restraint in the Project Plans for a given design. Refer to *Chapter 4, Section 4.4.C*.
2. The Applicant shall anchor force mains within the sewage pumping station.
3. The Applicant shall provide restrained joints at all bends and other required locations.

F. Corrosion Protection

1. External Corrosion Protection: Refer to *Chapter 5, Section 5.5.E*.
2. Internal Corrosion Protection (Linings):

Provide DIP force mains and associated fittings with an interior coating of a minimum 40 mils (dry film thickness) ceramic epoxy lining.

- a. The ceramic epoxy is a high-build, multicomponent, Amine-cured Novolac epoxy lining, Protecto 401, or other approved by the Products Committee.
 - b. Protect all DIP gasket areas and spigot ends (6-inch maximum) with six (6) mils nominal (10 mils maximum) Protecto Joint Compound. The Applicant shall apply all material according to manufacturers' specifications.
 - c. The Applicant shall repair the internal lining in accordance with manufacturer's requirements and recommendations when a ceramic epoxy coated pipe is cut or tapped.
3. Where DIP is proposed in areas within 100-feet of gas transmission mains with impressed current, rectifiers, or other potential sources of stray current, the Applicant shall provide additional engineering analysis by a NACE-certified Engineer to determine a suitable means to protect the force main.

G. Separation and Crossings

1. Parallel Installations: Refer to *Chapter 5, Section 5.5.F.*
2. Utility Crossings: Refer to *Chapter 5, Section 5.5.F.*
3. Streams Crossings: Refer to *Chapter 5, Section 5.5.F.*

H. Depth of Cover

1. Refer to *Chapter 5, Section 5.8.G.*

I. Casings

1. Refer to Chapter 4, Section 4.4.H.

J. Valves

The Applicant shall provide an eccentric plug valve on the force main just outside the flowmeter vault. Applicant shall provide an eccentric plug valve for each 1,000-foot interval of force main installed. Additional eccentric plug valves shall be installed as directed by the Development Manager.

1. Provide eccentric plug valves with all force mains. Reference the Approved Products List for acceptable products.
2. Eccentric plug valves shall withstand a working pressure of at least 150 psi.
3. Eccentric plug valves shall have a wall thickness conforming to AWWA 504 and constructed of either cast iron (ASTM A126) or ductile iron (ASTM A536), with 304 stainless steel fasteners.
4. Mechanical joint ends are required in accordance with AWWA C111.
5. The wrench nut shall turn counterclockwise to open the valve.
6. The valve body interior and exterior surfaces shall be fusion-bonded, epoxy-coated in accordance with AWWA C550.

K. Air/Vacuum Release Valves

1. Refer to *Chapter 5, Section 5.8.K.*

5.10 Sanitary Sewer Construction

A. Existing Conditions

1. When sanitary sewer construction requires offsite (on property not owned by Applicant) disturbance within a Service Authority easement, the Applicant, prior to the start of construction, shall fully comply with the Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities Policy. The Applicant shall photograph or video record the

work area to document the existence and condition of structures or facilities and submit a copy to the Inspections Manager in electronic format by e-mail to inspectionsmanager@pwcsa.org. The Applicant shall date the photo/video record to document conditions.

2. Prior to and during construction operations, the Applicant shall properly locate, protect, brace, support, restore and maintain all underground pipes, conduits, drains, and other underground structures uncovered or otherwise affected by the construction work being performed to ensure they are protected from any damage, in accordance with the Virginia State Code 20VAC5-309-140.
 - a. The excavator shall plan the excavation in such a manner to avoid damage to, and minimize interference with, underground utility lines in and near the construction area;
 - b. The excavator shall expose the underground utility line to its extremities by hand digging within the excavation area when excavation is expected to come within 2-feet of the marked location of the underground utility line;
 - c. The excavator shall not use mechanized equipment within 2-feet of the extremities of all exposed utility lines;
 - d. The excavator shall maintain a reasonable clearance, to include the width of the utility line, if known, plus 24-inches, between the marked or staked location of an underground utility line and the cutting edge or point of any mechanized equipment, considering the known limit of control of the cutting edge or point to avoid damage to the utility line; and
 - e. The excavator shall provide proper support for underground utility lines during excavation activities. During backfill operations, the excavator shall use the same or similar backfill material that was originally around the utility line, ensure there is proper compaction around the utility line, protect all tracer wires, and protect or replace warning tapes.
3. The Applicant shall protect, restore and maintain all pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, and other surface structures (including all sod and shrubs in yards and parks) crossed by or adjacent to the utility under construction.
4. The Inspections Manager shall observe and document the extent of damage resulting from the Applicant's construction activities based on photographs or video recording provided the by Applicant or Service Authority Field Inspector. (Refer to *Chapter 2, Section 2.8*)
5. The Applicant is responsible for the cost to replace, repair, or restore any of the elements listed in *Chapter 2, Section 2.8* to their existing condition or better with new materials for elements that have been removed or damaged. The Applicant shall, without delay, coordinate with the property owner, agency, or authority having jurisdiction, to replace, repair, or restore all damaged surface or subsurface structures to the satisfaction of the property owner, agency, or authority having jurisdiction.

B. Materials

1. The Applicant shall provide sanitary sewer mains and appurtenances within the Service Authority's Service Area in accordance with approved Project Plans, specifications, and USM requirements in effect at the time of installation and inspection. All construction improvements are inspected and subject to acceptance by the Field Inspector.
2. The Applicant shall provide new materials, fittings, appurtenances, and equipment, direct from the manufacturer, unused, and free of defects, and shall submit proof of purchase to the Field Inspector. The Applicant shall provide a list of all materials and product technical details to be used on the project is required.
3. The Field Inspector may reject any materials found to be defective, damaged, improperly stored or handled, or determined to not meet the requirements of this Manual or current Service Authority System requirements.

C. Storing and Handling of Materials

1. The Applicant shall follow manufacturer's recommendation for handling and storage of materials. The Applicant shall protect all materials, including all pipe, fittings, and other appurtenances stored onsite or in a storage yard, from foreign materials, animals, insects, soil, sun, and water at all times.
2. The Applicant shall prevent shocking or damaging any materials during handling and shall load and unload pipe, fittings, and appurtenances by lifting them with hoists or skidding. The Applicant shall handle pipe so that the coating and lining are not damaged.

D. Line and Grade Stakes

Before an approved sanitary sewer main is constructed by the Applicant, the Applicant's Virginia-licensed Surveyor shall place line and grade stakes identifying dedicated easements, main, service connections, and other appurtenances to ensure the system is constructed in accordance with the approved Project Plans.

E. Cut Sheets

1. The Applicant shall submit a set of cut sheets in hard copy or electronically, sealed, signed and dated by a Professional Engineer licensed in the Commonwealth of Virginia, or Virginia-licensed Surveyor, to the Field Inspector for review and acceptance. The Applicant shall prepare cut sheets at 100-foot station intervals and contain all data pertinent to the construction of the sanitary sewer main, such as the station and length of service connections and appurtenances; including all fittings and finished grade elevations for manhole rims.
2. The Professional Engineer or Surveyor who seals and signs the cut sheets shall also provide the following statement on all sets: "The professional seal and signature appearing on this document certifies that information shown conforms to the approved Project Plan and/or actual field conditions."

3. The Applicant shall submit a revision to the approved Project Plans when field conditions require the horizontal location, alignment, or grade of any main, structure, or appurtenance is to be constructed outside of an existing easement, as shown in the approved Project Plans. The Applicant shall provide a revised Project Plan, sealed, signed and dated, by a Professional Engineer licensed in the Commonwealth of Virginia, and include the dedication of all additional property rights. The Applicant shall submit the revised Project Plan to the Development Manager or designee for review and acceptance prior to constructing the changes.
4. Field changes that do not change existing easement requirements may be approved by the Field Inspector without a Project Plan revision.

F. Excavation, Bedding, and Backfill

1. The Applicant shall excavate trenches, provide pipe, backfill excavation, and compact the trench in accordance with the details in this Manual. The Applicant shall provide trenches that are wide enough to accommodate timber supports, sheeting, bracing, and handling of special fittings or appurtenances.
2. The Applicant shall provide bell holes at each joint to ensure the bell and spigot are installed properly.
3. The Applicant shall excavate all trenches to the depth required to provide a uniform and continuous bedding with 4 to 6-inches of #57 stone or crushed aggregate of 1-inch or less on solid and undisturbed ground at every point between bell holes; it is permissible, however, to disturb the finished subgrade surface over a maximum length of 18-inches near the middle of each length of pipe to withdraw pipe slings or other lifting tackle. Under such circumstances, the Applicant shall restore the finished subgrade with #57 stone or crushed aggregate of 1-inch or less.
4. The Applicant shall remove ledge rocks, boulders, and large stones to provide a clearance of at least 6-inches below and on each side of all pipe and sanitary sewer appurtenances for pipe up to 24-inches in diameter. The Field Inspector may direct a greater clearance for pipes larger than 24-inches in diameter.
5. The Applicant shall not install pipe in standing water or when, in the determination of the Field Inspector, trench conditions are unsuitable. The Applicant shall remove and replace pipe installed in unsuitable trenches when rejected by the Field Inspector once proper trench conditions are established.
6. Backfill within an existing or proposed right-of-way shall conform to all applicable VDOT standards.
7. Backfill in areas subject to vehicular traffic or structural loading shall begin at the top of the granular bedding and be placed in lifts no greater than 8-inches thick. Compact each lift to 95 percent of the maximum dry density as determined by ASTM-D698, American Association of State Highway and Transportation Officials (AASHTO)-T99, or (Virginia Test Method-1) VTM-1. The Applicant shall provide backfill material that is free of organic materials, frozen clods, highly plastic silts or clays, and other unsuitable materials. Backfill shall consist of #57 stone or crushed aggregate of 1-inch or less. The Applicant shall provide bedding that is 4 to 6-inches deep, along the side wall, and a minimum of 24-inches above the crown of the pipe as directed by the

Field Inspector.

8. The Applicant shall not use stone or rock larger than 10-inches in any dimension in any backfill.
9. The Applicant shall compact backfill in areas not subject to vehicular traffic to 90 percent of the maximum dry density as determined by ASTM-D698, AASHTO-T99, or VTM-1.
10. The Applicant shall legally dispose of all surplus materials and debris. The disposal of surplus materials or debris on Service Authority easements or property is prohibited.

G. Pipe and Fitting Installations

1. The Applicant shall inspect pipe, fittings, and appurtenances for defects and notify the field inspector of any defects prior to installation. Before inserting gaskets and joining pipe sections, the Applicant shall clean the outside of the spigot and the inside of the bell. The Applicant shall ensure spigots are dry and free from oil and grease before pipe is installed.
2. When installing pipe or manholes in the trench, the Applicant shall use proper implements, tools, and facilities satisfactory to the Field Inspector and as recommended by the manufacturer for the safe and convenient execution of the work. The Applicant shall carefully lower pipe, manholes, fittings, and appurtenances into the trench, piece by piece, by means of a derrick, ropes, slings, or other suitable tools or equipment and in such a manner to prevent damage to pipe, manholes, fittings, and appurtenances, as well as their protective coatings and linings.
3. The Applicant shall take special care to prevent any foreign materials from entering the pipe. The Field Inspector will not accept pipe with any visible debris. At the end of each workday, the Applicant shall cap pipe ends with a push-on joint plug or mechanical joint cap or plug to match pipe joint (ensuring the seal is water tight).
4. The Applicant shall follow manufacturers' instructions for connecting pipe segments. After placing a length of pipe in the trench, the Applicant shall center the spigot end in the open bell of the pipeline and push the pipe to the manufacturer-recommended homing mark. The Applicant shall lay pipe true to line and grade, with bells facing the direction of laying.
5. The Applicant shall use the proper equipment, per manufacturer's recommendation, to cut pipe for inserting valves, fittings, or closure pieces; cuts must be made without damaging the pipe and must leave a smooth end at a right angle to the axis of the pipe. After the pipe is cut, the Applicant shall bevel the outside cut-end of the pipe to remove any sharp edges or burrs to avoid damage to the gasket.
6. The Applicant shall fully flush a sanitary sewer main that is being removed from service. The Applicant shall install a plug with buttress in the cut end of pipe that is abandoned in place.

H. Manholes, Frames and Covers

1. Provide manholes in accordance with the details in this Manual.
2. Sanitary sewer manholes shall consist of precast reinforced monolithic concrete sections, an eccentric conical section, and an expanded base section. Manholes shall conform to ASTM C478 and be free of defects. Repairs of defective sections are not permitted. Install base sections on a compacted granular foundation prepared in a manner similar to that required for the proper installation of sanitary sewer mains. Manholes shall have lifting lugs or keyways. Lifting holes through the manhole wall are not permitted.
3. Manhole joint design shall meet the requirements of ASTM C443, and gaskets shall meet the requirements of ASTM C361 or ASTM C1619. Provide manhole joints that are formed entirely of concrete using a rubber gasket and, when assembled, shall be self-centering and make a uniform watertight joint. In addition to the manufacturer's approved rubber type gasket, use a cold-applied joint sealer to seal the joint from internal and external hydrostatic pressure. Mortared joints or repairs of any kind are not permitted. The exterior of all precast manhole sections shall have a bitumastic coating.
4. Provide smooth and semicircular invert channels that conform to the inside diameter of the adjacent sanitary sewer main invert. Construct changes in the direction of flow with a smooth radius of maximum size. Changes in the size and grade of the channels are made by the Applicant as directed by the Field Inspector. The invert of the flow channel(s) shall match the inverts of the sanitary sewer mains. Provide an even float finish on the bench of the manhole outside of the invert channels and slope the bench toward the invert of the channel with a minimum slope of 0.25-inch per foot of run. Provide a bench height of at least 80 percent (%) of the diameter of the pipe. Drop connections are installed in accordance with the details in this Manual.
5. The Applicant shall install a plug and seal the invert inside an existing manhole with a masonry bulkhead when a sanitary main is removed from service. The sanitary sewer main shall be cut and capped within two feet of the outside of the existing manhole, unless directed otherwise by the Inspection Manager.
6. The Applicant shall provide manholes with manhole frames, covers, and stainless steel orange-rubber-coated manhole steps in accordance with the details in this Manual. Adjustment rings may be used by the Applicant, up to a maximum of 12-inches, to bring the top of the manhole to the final grade, in accordance with the details in this Manual. The Applicant shall use riser sections for adjustments greater than 12-inches. Chimney seals are not permitted.
7. The Applicant shall furnish standard covers or watertight covers in accordance with the details in this Manual. The Applicant shall provide waterproof manhole inserts for all standard frames and covers in accordance with the details in this Manual.
8. The Applicant shall provide manhole frame and cover castings of the best-quality, tough, gray iron, be free from imperfections, and meet the requirements of ASTM A-48, Class 30. The Applicant shall provide castings that are sound, true to form and thickness, sandblasted clean, and neatly finished, with bearing surfaces machine ground and finished to ensure satisfactory seating and anti-rocking. Manhole frame

and covers shall have one coat of factory-applied black asphaltum paint.

I. Pipe Connections at Manholes

1. The Applicant shall provide manholes with an approved flexible pipe connection suitable for the pipes and manholes specified. The flexible gasket for pipe connections shall meet the requirements of ASTM C923. The flexible connection is secured to the pipe by means of a stainless steel clamp.
2. The Applicant shall provide precast manholes that are manufactured for the specified number and proper location of connections required. The Applicant shall make connections to existing manholes by coring the manhole and installing a rubber boot. New manholes with extra connections or openings, that must be bulk headed and/or reconfigured, are not acceptable.
3. DIP is required for the first full length of incoming main when an inside drop connection is designed and approved.

J. Service Connections

1. The Applicant shall construct service connections in accordance with the details in this Manual.
2. The Service Authority provides full and complete inspection service for service connections to the property line and for lateral replacements.
3. The Service Authority provides TV lateral inspection of all new service connections from the property line to the building to meet, in part, the conditions for acceptance by PWC.
4. The Applicant shall provide strap-on type saddles with an O-ring seal and stainless steel strap when installing a sewer service connection on an existing sanitary sewer main. The Applicant shall provide saddles that are specifically designed to adapt to the type of pipe used. The Applicant shall secure the saddle to pipe with a 24-gauge by 2.5-inch-wide stainless steel strap and silicon bronze or stainless steel T-bolts and nuts.
5. The Applicant shall cut and cap abandoned laterals at the sanitary sewer main or as directed by the Field Inspector.

K. Cleanouts

1. Cleanouts shall have brass caps.
2. The Applicant shall install a traffic-rated cleanout box and lid when cleanouts are located in a paved area or subject to vehicular loading. The Applicant shall not cause any damage or disruption to existing sewer mains or private property.

5.11 Acceptance Tests

A. General

The Field Inspector will inspect sanitary sewer mains to determine if any deviation from line and grade has occurred. The Service Authority will inspect all gravity sanitary sewer mains using closed-circuit television prior to Partial/Full Beneficial Use and final acceptance/bond release. The Applicant shall correct any deficiencies, such as sags (bellies) in the pipe, rolled joints, leaks, damaged pipe, and out of round pipe, prior to Partial/Full Beneficial Use, and final acceptance/bond release.

An acceptance test is required for all sanitary sewer mains and manholes. Acceptance tests are not permitted by the Applicant until the sanitary sewer, manholes, and required sewer service connections, as shown on the approved Project Plans, have been installed and sewer trenches backfilled and compacted to finished sub-grade. The testing methods are: air testing for sanitary sewer mains, in accordance with ASTM F1417 and vacuum testing for manholes, in accordance with ASTM C1244.

The Applicant shall furnish weirs, standpipes, pipe plugs, water, pressure gauges, stop watches, air compressors, hoses, and other materials and assistance required to perform these tests. The Applicant shall conduct all acceptance tests in the presence of the Field Inspector.

The Applicant shall completely remove all sanitary sewer mains, structures, facilities, and related appurtenances not meeting the requirements of these standards and replaced with new materials.

Whenever it has been necessary for the Applicant to construct under drains or place gravel under pipelines to dewater the trench during construction of the sanitary sewer mains, the acceptance test is not permitted until pumps and pipes (which have been used in the dewatering process) have been disconnected and removed by the Applicant.

Applicant shall schedule all acceptance tests with the Field Inspector at least 48 hours in advance. Testing of each section of completed sanitary sewer is required. Generally, sanitary sewer mains are tested from manhole to manhole.

B. Air Testing Procedure for Sanitary Sewer Mains

The Applicant shall introduce air into the sealed mains until the internal pressure is four (4) psi and maintain this pressure for a period of at least five (5) minutes without leakage.

C. Manhole Vacuum Testing

Applicant shall:

1. Provide the vacuum testing equipment per the manufacturers' requirements. The manhole is tested from the rim of the cover frame to the invert.
2. Use either mechanical or pneumatic plugs capable of resisting test pressures.
3. Secure test plugs against the manhole wall to ensure no movement during the test.

4. Ensure all manhole boots, stub-outs, and pipe plugs are secured to prevent movement while vacuum is drawn.
5. Draw and maintain a vacuum of 10-inch Hg for 60 seconds.

D. Force Main Testing

Fill all force mains with water and pressure test for one (1) hour without leakage.

1. Low-pressure PVC force mains are pressure tested at 100 psi.
2. All DIP force mains are pressure tested at 100 psi above the maximum operating pressure, but not less than 150 psi.

E. Private Sanitary Sewer Mains

Private sanitary sewer mains and manholes are permitted when they fully reside on the property they serve with no additional connections from another property.

1. The Applicant shall install non-PWCSA manhole lids on all private manholes.
2. The Applicant shall arrange for all private sanitary sewer mains and manholes to be inspected by a qualified third party Inspector. All private sanitary sewer mains and manholes shall be tested for leakage in accordance with this Manual.
3. All private sanitary sewer mains shall be flushed clean with catch basins temporary installed on downstream sanitary sewer main prior to being placed into service.
4. A copy of the inspection reports from the qualified third party Inspector, NASSCO certified TV inspection, and test results shall be provided to the Field Inspector.

5.12 Sewage Bypass Pumping Requirements

A. General

The Applicant shall safely and adequately bypass sanitary sewer flows around any sanitary sewer main, manhole, or sewage pumping station(s) to be taken out of service for inspection, construction, lining, or any other purpose and shall complete the work without causing or contributing to any spills, discharges, overflows, leaks, or deposits of sewage into the environment, including the land, surface water, groundwater, or backups into public or private buildings/property (collectively, “sewage spill(s)”).

The Applicant shall take precautions to protect the public health and protect the sanitary sewer system from damage resulting from sewer surcharging. Further, the Applicant shall take precautions to ensure bypass flow control operations do not cause flooding or damage to public or private property. The Applicant is responsible for all damage resulting from the bypass flow control operations.

The Applicant shall furnish all labor, materials, equipment, and supplies, and shall perform all work related to control the bypass operation. Bypass pumping plans are subject to review by the Development Manager or designee prior to starting work. The bypass pumping system shall meet the requirements of all codes and regulatory agencies

having jurisdiction.

B. Required Submittals

As part of the Service Authority's bypass pumping requirements, Applicant shall provide the following submittals:

1. Bypass pumping plan – refer to *Chapter 5, Section 5.12.D*.
2. A signed statement by the Applicant that he/she assumes all responsibility and liability for the design, installation, and operations to safely bypass sanitary sewer flows without causing or contributing to any sewage spills. The Applicant shall confirm in writing that if the company they represent cannot complete the work, the Service Authority has the right to complete the work and the Applicant's company shall reimburse the Service Authority for all costs.

C. Flow Control

1. The Applicant shall provide Xylem Dewatering USA (Godwin) pumps for bypass pumping. The Applicant shall arrange the bypass pumps to prevent flows from interfering with the work to be performed on a given portion of the sanitary sewer system. In cases where flow control includes the operation of a public and/or private sewage pumping station(s) to control flows in the system, the Applicant shall coordinate with the Water and Wastewater Facilities Manager for public sewage pumping stations and/or the operator(s) for private sewage pumping stations; coordination shall take place prior to acceptance of any sewage bypass pumping plan.
2. The Applicant shall provide bypass piping that is watertight and fully restrained.

D. Bypass Pumping Plans

The Applicant shall submit a complete sewage bypass pumping plan to the Service Authority's Project Engineer, for review and comment, at least 14 calendar days prior to commencing work. The submittal shall include a cover sheet with the project name, project number, a narrative, a sketch plan of the proposed bypass routing, supporting calculations and equipment materials list to include, but not limited to:

- Calculations demonstrating that the sewer bypass plan is sufficient to accommodate peak flows. Provide calculations that are derived from field measurements or an assumed full pipe. Provide field measurements that are based upon peak flow conditions including inflow and infiltration during a rain event. Design shall ensure adequate storage to anticipate variations in pump start up time and associated pump rate to avoid a sewage spill. The Applicant shall provide additional storage and/or containment measures as directed by the Field Inspector (e.g. a berm).
- Capacities of pumping equipment.
- Equipment list and shop drawings. Identify a spare pump in the equipment list.
- Road crossing details, including paved or unpaved roads, driveways, entrances, or other travel ways, if applicable.

- Sewer plugging methods and bypass time duration for each sewer section. Inflatable plugs will have an external hose to inflate the plug along with an external gauge to monitor pressure. The Applicant shall appropriately secured all test equipment to the manhole to the satisfaction of the Field Inspector.
- Size, length, material, and method of installation for suction and discharge piping.
- Use of sound attenuated bypass pumping equipment to limit noise level to 60 decibels within 50-feet of the equipment.
- Bypass pumping locations.
- Method and equipment utilized to provide 24-hour monitoring of the bypass system.
- Equip each pump, including the backup pump, with its own auto-dialer alarm system. An auto-dialer alarm system cannot be shared among pumps.
- Demonstrate that manholes and equipment are protected from flooding, vandalism, vehicular and pedestrian traffic, or snow removal operations.
- Lock and secure all equipment and controls.
- Statement that the contractor will provide a written schedule to the Field Inspector within 72 hours of the scheduled start date and end date that the bypass system will be in operation.
- The contact name, company name, job title, 24-hour contact number for the person(s) responsible for monitoring the bypass system and their response time to the site.

The pumps and alarms systems are designed, provided by the Applicant to independently meet firm capacity with a minimum of 100 percent redundancy. Increased reliability may be required by the Development Manager.

E. Monitoring and Equipment

The Applicant shall provide 24-hour monitoring. The bypass pumping plan submittal shall specify the means of providing 24-hour monitoring of the bypass pumping system. The Service Authority may require 24-hour onsite personnel for monitoring of the bypass system depending upon existing flows and pipe capacity, the location and number of bypass pumps and the duration of planned bypass operations. All pumps and equipment provided by the Applicant are to be maintained by an individual who is trained and qualified to start, stop, refuel, and maintain the bypass system equipment and monitored with an auto-dialer alarm system.

F. Required Notifications

The contractor shall provide a written schedule to the Field Inspector within 72 hours (excluding holidays and weekends) of the scheduled start date and end date that the bypass system will be in operation. The Field Inspector shall notify customers 48 hours in advance of planned service interruptions (excluding weekends and holidays). The notice shall include the project name, Inspections Manager's and Field Inspector's contact information, and the emergency number for dispatch. Provide the notice in both English and Spanish.

G. Emergency Response Requirements

In the event of a sewage spill occurring in connection with the work being performed by the Applicant, the Applicant shall immediately:

1. Notify the Service Authority Emergency Dispatch at (703) 335-7982 and the Inspections Manager and comply with the currently adopted version of all Federal, State, and Local regulations to include required notifications. All costs associated with a sewage spill are the responsibility of the Applicant and at no cost to the Service Authority.
2. Clean up all spilled solid material, disinfect the affected area, and repair any damage to property in conformance with all applicable regulatory agency requirements.
3. Provide an oral report to the VADEQ within 24-hours from the time Applicant becomes aware of the sewage spill, at the telephone number listed below, and a submit a written report to VADEQ, with a copy to the Inspections Manager, within five (5) days of discovery at the following address:

Department of Environmental Quality
Northern Virginia Regional Office
13901 Crown Court
Woodbridge, VA 22193
(703) 583-3800 (voice) or (703) 583-3821 (fax)

For reports to VADEQ outside normal working hours, Applicant shall leave a message to fulfill the immediate notification requirement. If a sewage spill is considered to be an emergency, based on volume, spill location, or public health concerns, or the sewage spill takes place after normal business hours, on a weekend, or on a holiday, the Applicant shall call the Virginia Department of Emergency Services at its 24-hour telephone service at 1 (800) 468-8892.

The written report shall contain the following:

- Description of discharge and location
- Whether discharge reached state waters; if so, name of affected waterbody
- Cause of discharge
- Date of discharge
- Duration of discharge
- Volume of discharge
- Whether the discharge is continuing; if so, how long it is expected to continue
- Expected total volume of discharge
- Steps planned or taken to reduce, eliminate, and prevent reoccurrence of current or future discharges

The Service Authority will back-charge the Applicant for any fines, penalties, or other costs or damages incurred by the Service Authority as a result of a sewage spill occurring in connection with the work being performed by the Applicant.

5.13 Sanitary Sewer Main Easements

A. General

The Applicant shall dedicate easements and convey ownership to the Service Authority for all sanitary sewer facilities and appurtenances that are not within a public right-of-way. The Applicant shall convey ownership to the Service Authority for all sanitary sewer facilities and appurtenances that are within a public right-of-way. The Applicant shall provide the deed of easement in accordance with the template in *Appendix L: Omnibus Deed of Easement Template* and *Appendix M: Off-site Easement Acquisition Policy*. The easement plat is reviewed as part of the Project Plan review and acceptance process. After plans are accepted by the Service Authority, signed deeds and accompanying plats are to be submitted directly to the Development Department for review and signature.

1. Easements are not required for sanitary sewer laterals or low-pressure force main service lines to property line flushing stations when they fully reside on the property they serve or if they are located within a public right-of-way.
2. Applicant shall submit proof of recorded easements prior to placing utilities into service with the Full/Partial Beneficial Use process.
3. Other easement requirements are described in the Service Authority policies that include, but not limited to, the following: *Appendix I: Service Connection Policy*, *Appendix L: Omnibus Deed of Easement Template* and *Appendix M: Off-Site Easement Acquisition Policy*.

B. Easement Widths

1. Applicant shall dedicate a minimum easement width of 15-feet for force mains and LPFM.
2. The Applicant shall dedicate a minimum easement width of 20-feet for sanitary sewer mains. For sanitary sewer mains installed deeper than 10-feet, 5-feet of additional easement width is required for each 5-feet of additional depth in accordance with Table 5-4.

Table 5-4: Required Easement Widths by Sanitary Sewer Depth

Depth to Bottom of Sewer (ft)	Easement Width (ft)
Up to 10	20
10.5–15	25
15.5–20	30
20.5–25 ^a	35
25.5–30 ^a	40
^a Sanitary sewer mains must have written approval from the Director or designee for installation at depths greater than 25 feet.	

3. The Applicant shall center sanitary sewer mains, force mains, and LPFMs in the easement unless the Development Manager or designee permits an offset within the easement.
4. Increased easement area may be required as deemed necessary by the Director or designee.

C. Easement Exclusions and Offsets

1. The Applicant shall not place trees, fences, monuments, signs, entrance features, sheds, decks, overhanging canopies, light poles, or permanent structures in easements dedicated for sanitary sewer utilities without the written approval of the Director or designee.
2. The Applicant shall offset Service Authority utilities and their easements to avoid undermining structural foundations or requiring the use of shoring to support structural foundations when utility re-excavation is needed.
3. Project Plans that cannot provide the required easement area shall require a variance and is subject to additional mitigation as directed by the Director or designee.

D. Easement Access

1. The Applicant shall provide all necessary easements to the Service Authority for adjacent property access and/or extension of the sanitary sewer system. Easements shall extend to the property line as directed by the Development Manager or designee.
2. As deemed necessary by the Development Manager or designee, and to ensure routine and emergency maintenance access, Applicant shall provide permanent access (ingress/egress) easements to utility easements and facilities to be owned, operated, and maintained by the Service Authority.
3. The Applicant is responsible for maintaining all easements serving the development site until final acceptance and bond release by the Service Authority. Maintenance shall include, but not limited to, cutting vegetation, removing trees, controlling erosion, maintaining access to all utilities, and grading sufficiently to allow maintenance vehicles to traverse the easement for routine and emergency maintenance.

E. Overlap with Other Easements

1. Easements of other entities can overlap Service Authority easements, but the physical location of non-Service Authority underground utilities shall remain outside the Service Authority's defined easement; however, crossings are permitted. The Applicant shall confirm the location of such underground utilities to ensure that excavations shall pose no danger of undermining the Service Authority's utilities.
2. Although Service Authority easements are non-exclusive, the location and separation requirements of underground utilities shall comply with Virginia State Code 20VAC5-309-140.

3. Buffers, tree-save, conservation, resource protection areas, or other land use-restricting easements shall not overlap Service Authority easements. The Applicant shall not restrict the Service Authority's prescribed easement and access rights.

5.14 Sanitary Sewer Information Required in Project Plans

The Applicant shall provide a sealed, signed and dated, by a Professional Engineer licensed in the Commonwealth of Virginia, Project Plans for sanitary sewer main construction. Project Plans must be submitted to the Development Department for review. The Applicant shall provide additional information, details, and/or specifications requested by the Development Department Manager or designee to support the review of the Project Plans. The Service Authority shall accept and permit Project Plans prior to the Applicant executing work in the field. At a minimum, Project Plans shall contain the following:

A. Cover Sheet

1. For site plan submission to PWC, the Applicant shall provide a fully completed standard cover sheet. The PWC cover sheet can be obtained at:
<http://www.pwcgov.org/government/dept/publicworks/pages/site-development-forms.aspx>
 - a. The Service Authority will assign a plan number after the first review; the Applicant shall add the Service Authority plan number to the title block.
2. For Project Plan submission within an incorporated Town, the following is reported in the cover sheet:
 - a. A vicinity map and site location.
 - b. Plans shall have a unique title.
 - c. The Service Authority will assign a plan number after the first review; the Applicant shall add the Service Authority plan number to the title block.
 - d. Identify the Town where the project resides and the contact information of the Town representative managing the plan application.
 - e. Title block with the property address and GPIN, owner information, developer information, and Engineer's information.

B. Plan View

1. The Applicant shall provide plan views at 1:30 scale (1-inch to 30-feet). Other scales are only permitted with written permission from the Development Manager or designee.
2. The Applicant shall provide sanitary sewer designs in context with site grading, right-of-way limits, structures, buildings, walls, light poles, traffic controls, sidewalks, trails, walkways, concrete pads, and fences.
3. The Applicant shall place sanitary sewer main design information in either the grading and/or utility plan sheets.

4. Show and correctly identify all existing sanitary sewer mains, manholes, laterals, cleanouts, force mains, valves, flushing stations, air releases, sewage pumping stations, energy dissipation structures, and private potable wells within 100 feet of the project limits or plan sheet limits, whichever is greater.
5. Show all proposed and existing sanitary sewer mains and manholes with the designated line type and symbol per Table 5-5.

Table 5-5: Sanitary Sewer Main and Manhole Line Type and Symbol

EXISTING SANITARY SEWER	
PROPOSED SANITARY SEWER	

6. Show and label proposed sanitary sewer main segments with the pipe size, material, and direction of flow.
7. Place hatch layer, x – x – x – x, over the sanitary sewer mains that are to be removed and hatch layer, // - // - // - //, over the sanitary sewer mains that are to be abandoned in place.
8. Show and label all existing manholes with the Service Authority's assigned manhole number. Show and label all proposed manholes with a unique identifier that can be matched to the profile.
9. Show sanitary sewer laterals for all buildings and miscellaneous facilities connected to a sanitary sewer main.
10. Show cleanouts at the property line for residential use.
11. Show and label all multi-family, mixed use, student housing, or non-residential building's proposed sanitary sewer laterals as private. Show and label the lateral size and material. Show cleanout locations in compliance with the applicable plumbing or building code.
12. Show and label external grease traps, oil separators, and volatile liquids separators.
13. Show and label all existing and proposed sanitary sewer easements, both on-site and off-site. Provide the recordation number, with the easement identifier, for existing easement.
14. Show and label all multi-family, mixed use, student housing, or non-residential buildings. Label building use, address, square footage, height, and number of dwelling units, if applicable.

C. Profile View

1. The Applicant shall provide profile views at 1:5 vertical scale (1-inch to 5-feet) and 1:50 horizontal scale (1-inch to 50-feet). Other scales are only permitted with written permission from the Development Manager or designee.
2. Profile sanitary sewer mains separately from road, storm, and water main profiles.
3. Profile the existing and proposed grade over the center of existing and proposed sanitary sewer mains.
4. Profile interim and final grade elevations over the sanitary sewer main if grading is subject to change with a future Project Plan.
5. Show and label all existing manholes with the Service Authority's assigned manhole number. Show and label all proposed manholes with a unique identifier that can be matched to the plan view.
6. Show and label elevations of existing manhole tops. If an existing manhole top is to be adjusted, specify the new elevation for the top of manhole.
7. Show and label watertight manhole frames and covers, where applicable.
8. Show and label manhole vents, where applicable.
9. Show and label inside drop connections, where applicable.
10. Show and label existing manhole diameters and proposed manhole diameters.
11. Show and label cast-in-place or spray-on lining for manholes where the manhole is subject to the effects of a force main discharge.
12. Show and label all existing and proposed manhole invert elevations.
13. Show proposed sanitary sewer mains match the crown of a larger sanitary sewer main that enters the same manhole.
14. Show and label the pipe size, material, DR rating or pressure class, slope and length for each run of sanitary sewer main.
15. Specify polyethylene encasement and internal protective lining for DIP sanitary sewer mains, if applicable.
16. Specify the pipe size and material for each force main segment. Identify the force main profile with a unique identifier that can be matched to the plan view.
17. Show and label all proposed laterals, valves, reducers, flushing stations, air releases, and vacuum breakers with corresponding stationing in profile and plan view.
18. Show and label all utility crossings in the profile.
19. Show casing pipes graphically in the profile and label with the following: stationing of casing ends, diameter, material, and length.

20. Show and specify vertical separation from other utilities, which are less than 2-feet, in the profile.
21. Show and label limits of engineered fill graphically and include compaction requirements.
22. Show and specify false bottoms and spread footers for manholes proposed in fill areas.

D. PWCSA Information Sheet

1. A completed PWCSA Information Sheet is required for all plan submissions. Reference the PWCSA Information Sheet at <https://www.pwcsa.org/service-authority-standard-plan-sheets>
2. Complete the sanitary sewer design table, if applicable. Refer to *Chapter 5, Section 5.3*
3. Complete the sanitary sewer lateral table, if applicable. Refer to *Chapter 5, Section 5.7.B*. Profiles of laterals for non-residential buildings may be submitted in place of a sanitary sewer lateral table.

E. Landscape Sheets

1. The Applicant shall not show trees in any existing or proposed Service Authority easement.
2. Trees are not permitted within 5-feet of a sanitary sewer lateral running in the road right-of-way or within 5-feet of a LPFM service line between the property line flushing station and the LPFM connection.
3. The Applicant shall not grant conservation areas, storm water Best Management Practice (BMP) areas, or any other land use dedication that would restrict the use of a Service Authority existing or proposed easement.

F. Unit Price Sheet

1. The Applicant shall calculate bond values for all sewer facilities using the values shown on the current PWC Unit Price Sheet.
2. The Unit Price Sheets must clearly communicate if the Schedule of Values is being posted as new bond, changing quantities of an existing bond, or adding quantities to an existing bond.

-- end of Chapter 5 --

Chapter 6: Sewage Pumping Station

6.1 Scope

A. Intent

The sewage pumping station (SPS) design standards are intended to assist the Applicant in the development of plans and specifications. The materials, configurations, and features described here represent the minimum acceptable level of quality expected in pump station design and reflect the goal of standardizing Service Authority equipment. These standards should not be construed as being a complete description of the necessary features for a particular pump station design. The Director, or designee, shall approve all deviations from these standards and has the final authority regarding the acceptability of any particular pump station design within the financial thresholds established by the Service Authority.

B. Review and Approval

The Service Authority has established a procedure for reviewing and approving eligible sewage pumping station plans under Local Review Authority. The Applicant shall meet with the Development Manager before starting a pumping station design to discuss the Service Authority's procedures and requirements, including architecture design requirements of the community in which they are built. The sewage pumping station plans shall include all of the structural, electrical, and mechanical design information and details necessary to construct the station.

C. Regulations

The Applicant shall design sewage pumping stations to be in conformance with the Sewage Collection and Treatment (SCAT) Regulations, as published by the Commonwealth of Virginia. All sewage pumping stations within the Occoquan Watershed shall further comply with the design requirements of the Occoquan Policy, 9 VAC 25-410. The Service Authority will not approve structures that are tributary to a proposed sewage pumping station for a water meter installation until the pumping station has been placed into Beneficial Use status, for a Developer constructed pump station, or a Certificate of Substantial Completion has been issued by the Service Authority Project Manager, for a pump station constructed under the Capital Improvements Program.

6.2 Reference Standards

The Applicant shall comply with all relevant industry standards and federal, state and local regulations, including, but not limited to the following standards:

- Sewage Collection and Treatment (SCAT) Regulations, as published by the Commonwealth of Virginia
- Virginia Building Code
- Virginia Water Control Board: *Occoquan Policy*
- VDOT: *Road and Bridge Specifications*

- NFPA: 820 Standard for Fire Protection in Sanitary Sewer Treatment and Collection Facilities
- New Source Performance Standards in 40 CFR 60 Subpart IIII
- RICE MACT in 40 CFR 63 Subpart ZZZZ
- Prince William County: DCSM
- Regulations of the Occupational Safety and Health Administration (OSHA)
- Service Authority SCADA Design & Configuration Standards
- USM *Appendix C: USM Approved Products List*
- USM *Appendix D: Approved Equipment Manufacturers*
- USM *Appendix H: Service Authority Customer Handbook and Rates and Fees for New Connections (Developer Fees)*
- USM Appendix R: Development Review Process and System Improvement Policy

6.3 Suggested References

Additional standards and regulations to be considered, incorporated herein by reference are as follows:

- Hydraulic Institute Standards
- American Concrete Institute (ACI) 308-01, Guide to Curing Concrete
- ACI 318, Building Code Requirements for Structural Concrete
- ACI 530-02, Building Code Requirements for Masonry Structures and Specifications for Masonry Structures
- ACI 350, Code Requirements for Environmental Engineering Concrete Structures
- National Electric Code (NEC)
- National Electric Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- Standard Rules of American Institute of Electrical Engineers
- Environmental Protection Agency (EPA)
- International Building Code (IBC)
- American National Standards Institute (ANSI)
- American Institute for Steel Construction (AISC)
- National Association of Corrosion Engineers (NACE)

6.4 Required Meetings

The Service Authority has established a procedure for the review of the sewage pumping station plans. The Applicant shall meet with the Service Authority prior to starting the design to go over the design procedures and requirements and shall schedule the following meetings during the design phase of all sewage pumping stations:

- Initial Planning/Kickoff Meeting
- Preliminary Design Report Presentation/Comment Review Meeting
- 100 percent Design Discussion Meeting/Comment Review Meeting
- Public Outreach Meetings (as required)
- Additional meetings as requested by Development Manager or Project Manager

It is the responsibility of the Applicant to contact the Project Manager for a list of Service Authority attendees and to schedule the room. At the Initial Planning/Kickoff Meeting, the

Project Manager shall deliver to the Applicant the Service Authority's current start-up check list from the WWF Manager and SCADA specifications SCADA Manager to incorporate in the design documents.

6.5 General Requirements

Prior to final sewage pumping station plan approval and issuance of a Certificate to Construct (CTC) by the Service Authority, the Applicant shall submit a construction schedule for review and acceptance. The schedule shall establish a start and completion date for the construction of the station. Prior to acceptance of the station by the Service Authority, the Applicant shall demonstrate through startup and testing that the station is fully functional and operational for its intended use. Following successful start-up and testing, the Applicant shall provide the Design Engineer's certification that the station has been constructed in accordance with the approved sewage pumping station plan. As a pre-requisite to Service Authority issuance of the Certificate to Operate (CTO), the Applicant shall place the station in Beneficial Use within six (6) months of the Service Authority providing written notice of its readiness to place the station in service.

The Applicant shall provide new materials, fittings, appurtenances, and equipment, direct from the manufacturer, unused, and free of defects and shall submit proof of purchase to the Field Inspector. The Applicant shall provide a list of all materials and product technical details to be used on the project. Applicant shall provide a list of all materials and product technical details to be used on the project. Refer to *Appendix D: Approved Equipment Manufacturers*.

The Service Authority will reject any materials found to be defective, damaged, improperly stored or handled, or determined to not meet the requirements of this Manual or current Service Authority System requirements.

The Applicant is responsible for following and meeting all safety requirements as established by regulatory agencies with jurisdiction over workplace safety.

The Applicant shall design and locate a permanent sewage pumping station to serve the entire sewer shed. A permanent sewage pumping station may not be initially constructed with capacity for the entire sewer shed; however, the Applicant shall design and construct the major structures in the facility to accommodate the ultimate capacity of the station.

A. Location

The Applicant shall locate sewage pumping stations above the level of the 100-year-flood/wave action. The Applicant shall subdivide and convey the land parcel encompassing the sewage pumping station to the Service Authority as fee simple. The Applicant shall fence and screen/landscape the sewage pumping station lot as required by the DCSM and in accordance with this Manual.

B. Alarm Systems

The Applicant shall provide monitoring equipment for all pump stations in accordance with the Service Authority's SCADA Design & Configuration Standards. The Operations and Maintenance Director or designee shall establish all required alarm points that the Applicant must tie into the SCADA system.

C. Instructions and Equipment

The Operations and Maintenance Director or designee and VADEQ, as required, shall review and approve the Operations and Maintenance Manual. The Applicant shall submit two (2) copies of the approved Operations and Maintenance Manual to the Service Authority prior to completion of the station in both hard copy and electronic format (PDF). The Operations and Maintenance Manual shall contain all necessary information documenting the sewage pumping station construction, equipment, and operations and at a minimum shall contain the following:

1. Introduction
 - Purpose and Scope of the Manual
 - Project Background and Parameters for the Pump Station Design
 - Adherence to the Occoquan Policy, 9 VAC 25-410 (if applicable)
 - Permits and Waivers
 - References
2. Personnel Requirements
 - Outline of Responsibilities (e.g. Operators, Maintenance Crew, Supervisor)
 - Frequency of Personnel Station Monitoring
3. Facility Description
 - Pump Station Design
 - Design Criteria for the Pump Station, Force Main and Pumps
 - Manufacturers' Pump Curve for the Installed Pumps
 - Combined Pump and System Curve for the Pump Station
 - Description of Primary Equipment (e.g. Comminutor, Wet Well, Pumps, Controls, Check Valves, and Back-Up Power Supply)
 - Operational and Equipment Data Summary (e.g. Comminutor, Wet Well, Pumps, Controls, Flow Meter, Major Valves, Telemetry, and Generator)
4. Facility Operation
 - Unit Operations(e.g. Comminutor, Pumps, Controls, Flow Meter, Telemetry, and Generator)
 - Alarm List
 - Start-up Procedures
 - Commons Operating Problems
 - Troubleshooting Guide
 - Emergency Operations
5. Maintenance
 - Introduction
 - Maintenance Records
 - Daily Maintenance Routine
 - Spare Parts Inventory
 - Corrosion Control
 - Typical Forms
6. Records and Reporting
 - Operating Logs

- Reporting Requirements
 - State Agencies
 - Other Contacts
7. Safety
 - General
 - Sewers
 - Electrical Hazards
 - Mechanical Equipment Hazards
 - Explosion and Fire Hazards
 - Bacterial Infection
 - Oxygen Deficiency and Noxious Gases
 - Potentially Hazardous Materials
 8. Appendix A: Permits & Service Area
 - Final Preliminary Engineering Report for the Pump Station
 - Certificate to Construct
 - Map Exhibit of the Sanitary Sewer Shed for the Pump Station
 9. Appendix B: Record Drawings
 - A Reduced Set of the Pump Station Plans
 - As-built Drawings of the Pump Station and Force Main
 - As-built of Electrical and Control Schematics
 10. Appendix C: Arc Flash Study
 11. Appendix D: Manufacturer's Operation & Maintenance Manuals
 12. Appendix E: Equipment Warranties

D. Sump Pumps

In installations where sump pumps are required by the Service Authority, the Applicant shall provide Zoeller 98-0006, Model M98-B, with grating cover, or other product approved by the Products Committee, with a minimum discharge rate of 40 gpm.

E. Protective Coatings

The project specifications shall specify a paint or other protective coating for all corrodible materials not otherwise protected. The type, color, and thickness of the paint or other protective coating are subject to the Operations and Maintenance Director's or designee's approval.

6.6 Pump Station Selection Criteria

The following are two (2) basic styles of acceptable pump stations: submersible pump station and conventional wet well/dry well pump station. In cases where ultimate flows are 150,000 gpd or less, consideration may be given to alternative pump station designs, subject to the Director's or designee's approval.

A. Design Flow

The Applicant shall design pump stations for the ultimate build-out peak flow from the drainage area, which is a minimum of 2.5 times the average daily flow unless otherwise directed by the Service Authority. The Applicant shall include pump curves, flow calculations, system curves and a drainage area map in the sewage pumping station plans.

The Applicant shall design pump stations with a peak design flow of 1 MGD (ADF) or less as **submersible stations**. The Applicant shall design pump stations with a peak design flow of greater than 1 MGD as a **wet well/dry well** configuration.

All sewage pumping stations shall have a minimum of two (2) pumps and shall follow the SCAT regulations.

B. Design Limitations

The following design limitations should be observed for each style of station.

1. Site Configuration for Vehicle Access

- a. The pump station shall be configured to permit a 38 foot long truck to exit the travel way and pull up to the security gate without stopping or impeding traffic.
- b. The station layout shall permit trucks with a minimum 42 foot turning radius the ability to ingress and egress the site and the ability to turn the truck around, if necessary, to re-enter the travel way.

2. Submersible Pump Stations

a. Definition:

Submersible stations are defined here as those where the pumps are "submerged" in the wet well. Because the pumps operate under water in the wet well, there is no need for a separate pump room. The Applicant shall provide guide rails to enable the pumps to be raised and lowered into place without requiring entry into the wet well by personnel under normal circumstances.

b. Configuration:

The Applicant shall design submersible pumping stations with an above ground control building for electrical equipment and controls near, but external to the wet well structure. When possible, the comminutor basin, wet well, and valve vault shall be separate subsurface structures connected with the necessary piping. When the site area precludes such a layout, a single subsurface structure is permitted with a common wall separating the comminutor basin from the wet well and pipe running through a common wall between the wet well and valve vault.

A sluice gate shall be provide in the comminutor basin with the operating stem extended up to grade level, to isolate flows from the wet well. Influent sewage shall flow into a channel with a hydraulically driven comminutor for grinding debris. Channels within the comminutor basin are configured to allow aluminum or stainless steel slide gates to divert the influent sewage from the comminutor to a bypass channel with a bar screen as a bypass. The comminutor basin shall have a walkway spanning the length of the chamber. Pumps shall be mounted on stainless steel guide rails inside the wet well with stainless steel lifting chains. Chains must be tagged with the lifting capacity to meet OSHA requirements.

The valve vault shall contain the pump discharge shut-off and check valves along with the flow meter. The Applicant shall provide a surge relief valve on the discharge force main before the piping leaves the station. Surge relief valves and piping shall discharge to the wet well. An emergency generator shall be provided.

Aluminum hatches shall be installed at the top the comminutor basin, wet well, and valve vault. Aluminum hatches shall be sized to remove the largest piece of equipment. The comminutor basin and valve vault shall each have grab bars from grade level to the ladder or walkway leading down into each chamber. Each grab bar shall have safety extension poles.

c. Special Conditions:

When specific site conditions limit access to the sewage pumping station for chemical deliveries, remote chemical feeds shall be provided when directed by the Development Manager or Project Manager. When site conditions prevent access of Service Authority vehicles with mobile cranes, fixed or portable jib cranes with their associated mounting base shall be provided with the comminutor basin, wet well, and valve vault.

3. Wet Well/Dry Well Configuration Pump Stations

a. Definition:

Wet Well/Dry Well configuration pump stations are defined here as pumping stations in which the wet well and dry well structures are formed and poured onsite.

b. Configuration:

The Applicant shall design the wet wells with two (2) chambers connected by a sluice gate in the divider wall, with operating stem extended up to grade level, so as to enable one of the chambers to be taken out of service for maintenance without taking the station off-line. Influent sewage should flow into an influent channel with sluice gates or slide gates to enable sewage to flow to one or both of the chambers. The Influent channel shall have a hydraulically driven comminutor for grinding debris, a bypass channel, and a trash rack. Wet wells shall have a walkway spanning the length of the wet well. Each chamber shall have grab bars from grade level to the walkway and from the walkway down into each chamber and each grab bar shall have safety extension poles.

The Applicant shall locate all electrical equipment above grade in a room above the dry well. The Applicant shall provide an access hatch, located in the floor and directly above the pumps, for pump removal. The Applicant shall provide a monorail and crane, sized to accommodate the weight of the largest pump, to facilitate removal of the pumps. The Applicant shall provide dry pit submersible

type pumps with liquid-cooled motors and design the dry well with at least one unused space for a future pump to accommodate future upgrades. The electrical/control room should be designed with extra space to accommodate future upgrades. The Applicant shall connect the pump suction piping to the dry pit sump to enable one of the pumps to be used for dewatering of the dry pit. The valve for opening this dry pit suction connection as well as the pump suction isolation valve shall have extended operator stems up to the control room floor. The Applicant shall provide a surge relief valve on the discharge force main before the piping leaves the station. Surge relief valves and piping shall discharge to the wet well. An emergency generator shall be provided along with a concrete pad for a chemical tank and associated controls.

6.7 Design Criteria for Pump Stations

A. Pump Selection

Pumping Units

All pump stations shall have at least two (2) pumps providing 100 percent reliability in accordance with SCAT regulations. The Applicant shall provide a non-prorated warranty from the pump manufacturer for all pumps against defects in workmanship and material for a period of five (5) years or 10,000 hours of operation by the Municipal Sanitary Sewer Permanent Installation Warranty Policy under normal use, operation, and service, effective from the earlier date of acceptance by the Service Authority or placement in Beneficial Use. The Applicant shall provide Flygt or ABS submersible pumps (Refer to *Appendix D: Approved Equipment Manufacturers*) and provide oversized bearings (Class B) for all submersible pumps designed with a center shaft.

Pump Openings

All pumps shall have openings and passages large enough to permit the passage of a 3-inch-diameter sphere. All pumps shall have cleanout ports.

B. Protection Against Clogging

The Applicant shall equip all pumping stations with a comminutor basin at the influent end of the station. The Applicant shall provide a JWC comminutor or another manufacturer approved by the Products Committee (Refer to *Appendix D: Approved Equipment Manufacturers*), sized for the estimated peak flow into the station (refer to Table 5-1), and designed as follows:

- To be easily removable from the flow channel without disturbing any piping connections
- To settle out grit upstream of the screening area
- For continuous operation and to automatically restart after power failures
- With a JWC Controller as the standard programmable logic controller (PLC) program type.

The Applicant shall equip the comminutor basin with a bypass channel, manual bar screen, and flow diverter so that the comminutor can be taken out of service for repair and maintenance. The clear openings on the bar screen shall not exceed 2.5-inches in any dimension.

C. Wet Well

The Applicant shall divide wet wells at stations three (3) MGD or larger into two (2) interconnected sections to facilitate repairs and cleaning. The effective capacity of the wet well should be so that one pump shall run continuously at least five (5) minutes of every 30 minute period at the minimum flow. The wet well fillets shall have a minimum slope of one-to-one to the hopper bottom and have a hopper bottom no larger than necessary for the proper installation and function of the inlet. All wet wells shall have a coating or a liner system, as determined and approved by the Operations and Maintenance Director or designee, to prevent corrosion. The Applicant shall design the wet well size and control settings to avoid heat buildup in the pump motor due to frequent starting and to avoid septic conditions due to excessive detention times. Provide a visual gauge for the wet well level.

D. Emergency Storage

Reserved for future use.

E. Surge Analysis

In a pressurized Sanitary Sewer system, events that create pressure surges include:

- Pump power failure
- Pump shutdown/startup cycles
- Pipeline rupture.

When pumps cycle off or there is a power failure, transient surge pressures can damage piping. Reduced voltage solid state starters may be required to reduce surge pressures. As backup protection, a surge relief valve may be required at the pump station, to provide for events of power failure, or a failure of the soft start/stop equipment. The Applicant shall perform a surge analysis of the discharge force main when the velocity exceeds 3.5 fps and/or the total dynamic head (TDH) imparted by the pumping system is anticipated to exceed 150 feet when the pump station is operating at peak flow (*i.e.*, for a three-pump station using Variable Frequency Drives (VFDs), the TDH produced when two (2) pumps are operating at 100% speed and the wet well level calling for lag pump on is reached).

F. Valves and Piping

The Applicant shall provide eccentric plug valves on the suction and discharge lines of each pump to allow the pump to be isolated. The Applicant shall provide a check valve on each discharge line between the pump and the eccentric plug valve. The velocity in the suction line shall not exceed six (6) fps, and the velocity in the discharge line shall not exceed eight (8) fps. The Applicant shall provide pressure gauges with isolation valves on the discharge side of the check valve. The Applicant shall provide gauge taps with valves on the suction and discharge side of each pump. Where necessary, the Applicant shall provide a surge relief valve (Refer to *Appendix D: Approved Equipment Manufacturers*). The Applicant shall install the surge relief valve so that it can be taken out of service without shutting down the force main. The Applicant shall provide flexible connections for all below-grade pipe connections to concrete structures. The Applicant shall provide a tee and necessary valving on the discharge force main downstream of the valve vault to allow the force main to be drained and used as an emergency bypass connection.

G. Lighting

Light-emitting diode (LED) lighting levels shall meet minimum building and electrical code requirements or as required by the Operations and Maintenance Director or designee during plan review. The Applicant shall provide lighting fixtures rated for the environment in which they are installed. The Applicant shall provide vapor-proof, corrosion-resistant lighting mounted with stainless steel hardware/fasteners in comminutor basins, wet well/dry well configurations, and valve vaults. All lighting fixtures shall be located in an accessible areas for maintenance.

Interior lights, exterior pole lights, and lights around the control building shall be activated by an intrinsic exterior photoelectric switch. All exterior lights shall be wired to independent switches inside the control building that can manually keep the lights off. Lighting design is subject to the review and approval by the Operations and Maintenance Director or designee to account for the specific site conditions. When requested, the Applicant shall provide shrouding around exterior lights and provide a lighting analysis documenting the lighting levels.

H. Flow Measurement

The Applicant shall provide a magnetic flowmeter that has an output of four (4) to 20 milliamperes direct current (mADC), refer to *Appendix D: Approved Equipment Manufacturers*. All flowmeters shall have manufacturers' startup and calibration. The Applicant shall provide valves and couplings on each side of the flowmeter, and a bypass around the flowmeter. The Applicant shall provide a human-machine interface touch screen that is designed to trend the flow data from the pumps and has the capability to chart and totalize the flows.

The Applicant shall provide magnetic meters with grounding rings on each side of the sensor. The Applicant shall locate flow metering equipment, except for the sensor, in the control building. The Applicant shall retain the manufacturer's field service technician to seal the flowmeter termination, which shall prevent migration of groundwater through the raceway into the equipment. The flow meter shall be commissioned by the manufacturer's field service technician at the station.

I. Controls

The Applicant shall provide pumps that are controlled by two ultrasonic or a submersible level transducers in a stilling well. Primary pump control shall consist of a Modicon M340 PLC with required memory and functional capacity to perform the specific sequence of operation with scheduled input and outpoint points in accordance with a human-machine interface touchscreen for backup control, in accordance with the latest edition of the Service Authority SCADA Design & Configuration Standards. The Operations and Maintenance Director or designee shall provide control narrative and all control and monitoring points that are required for the design. The Applicant is to obtain the latest version of SCADA Design & Configuration Standards from the Service Authority.

J. SCADA Field-wired Circuits

The Operations and Maintenance Director, or designee shall approve all control narratives and PLC specifications. All desired control and monitoring points to be provided and installed by the Applicant.

K. Ventilation

The Applicant shall provide ventilation for all pump stations for those periods when the station is occupied. When pumps are installed below ground, mechanical ventilation is required and arranged to independently ventilate all of the basins, wells, and vaults at the station. (Refer to *Appendix D: Approved Equipment Manufacturers*).

The Applicant shall not use dampers on the exhaust or fresh air ducts, nor any fine screens or other obstructions in the ducts that may cause clogging. Ventilation equipment shall be a ducted style centrifugal fan, backward-curved, with the air flow path making a 90-degree turn inside the fan. The Applicant shall ensure the switches for operating the ventilation equipment are well marked and above grade near the entrance hatches. The Applicant shall provide interlocking lighting and ventilation switches on all wet wells. If three-phase service is available, the Applicant shall provide three-phase motors on the exhaust fans. The Applicant shall provide time clock switches to allow a programmed run time for the exhaust fans. The Applicant shall provide a thermostat for Control building fans. Interconnection between the ventilation systems in the wet well and dry well are not permitted.

1. In Wet Wells

Ventilation may be either continuous or intermittent. If continuous, ventilation shall provide at least 12 complete air changes per hour; if intermittent, at least 30 complete air changes per hour. The Applicant shall provide explosion-proof electrical equipment and devices for all wet wells applications. The Applicant shall provide wet well ventilation fans and ducts constructed of either stainless steel or fiberglass reinforced plastic. If the motor is in direct contact with the air stream, the motor must be designed to survive the corrosive moist environment of the wet well air. (Per VADEQ SCAT Regulations)

2. In Dry Wells

Ventilation may be either continuous or intermittent. If continuous, ventilation shall provide at least six (6) complete air changes per hour; if intermittent, at least 30 complete air changes per hour.

L. Water Supply

The Applicant shall extend public water to the pumping station for wash down and cleanup operations. The Applicant shall provide water service into the station with either a 2-inch, Type K copper service pipe or a 4-inch ductile iron service pipe and have a 1.5-inch water meter, provided by the Service Authority, set in accordance with the details of this Manual. If public water is not available, the Applicant shall provide a well at the site and the Applicant is responsible for securing all required regulatory permits. The Applicant shall take appropriate cross-connection measures to ensure that no physical connection exists between any potable water supply and a sewage pumping station that,

under any conditions, might contaminate the potable water supply. Applicant shall provide a hose rack at the control building and, when required by the Operations and Maintenance Director/designee or building code, provide restroom facilities inside the sewage pumping station.

M. Structures

The Applicant shall provide a layout of the station for the Service Authority's approval to accommodate working clearances to maintain or install equipment. The Applicant shall locate access hatches in the station appropriately sized to facilitate the removal, installation and maintenance of the pumps, motor, and other equipment in the station without disrupting the operation of the facility. The Applicant shall provide aluminum hatches with stainless steel hardware/fasteners, locking hasps, and automatic hold-open arms. The Applicant shall include floor drains in the comminutor basin, valve vault, and flowmeter vault. Floor drains shall have a P-trap and shall discharge to the wet well and be installed with a check valve or flapper valve to prevent sewage from entering the structures if the wet well floods. The Applicant shall provide a 50-foot antenna pole near the control building for exclusive use by the Service Authority.

N. Odor Control

The Applicant shall provide odor control measures as part of the station design. The Operations and Maintenance Director or designee shall determine required odor control measures during the review of the plans for the station that may include, but are not limited to, carbon filter odor control unit and/or an Evoqua chemical feed system. At a minimum, an appropriate structured and sized concrete pad shall be provided for a future chemical tank and associated controls

O. Noise Control

The Applicant shall provide noise control measures as part of the station design. The Operations and Maintenance Director/designee and/or building code requirements shall determine the required noise control measures during the review of the plans. At a minimum the hydraulic pack for the comminutor and the generator shall each be installed in a sound-attenuated enclosure.

P. Control Building

The Applicant shall provide or construct a precast or brick and block building as approved by the Development Manager or designee or other development conditions required by PWC or community association covenants. The Applicant shall provide a building that is consistent with the architectural style of the community which is sized to accommodate all proposed equipment and to provide adequate space for personnel to operate and repair the equipment in the building with the access doors closed. A standing seam metal roof shall be provided with a 35-year finish warranty. The Applicant shall provide thermostatically controlled cooling and heating equipment in the building and locate the thermostats controlling all heating, ventilation, and air conditioning (HVAC) equipment in an easily accessible area. Equipment in the control building shall be electrically grounded separately from the lightning rod and telecommunication systems.

Q. HVAC

The HVAC unit shall be size appropriately per the engineered heat load calculation and design for industrial corrosive environments. The equipment should have corrosion resistant coating on the evaporator coil & condenser coil, the coating should protect the coil from leakage and premature failure. The system shall be design to operate and maintain ambient temperature of below 85F and humidity conditions ranging from between 30 and 60 percent.

The HVAC equipment manufacture shall be Lintern Corporation or equally engineered HVAC equipment manufacture. The HVAC systems shall be tested and certified acceptable performance before placing it in to normal operation.

R. Soft Starts/VFDs

Soft starts shall automatically restart after power failures. Pumping units shall have soft start/stop controls or VFDs as approved by the Operations and Maintenance Director or designee. (Refer to *Appendix D: Approved Equipment Manufacturers*.)

S. Reliability

All sewage pump station shall be provided with a SCADA system in accordance with this Manual to permit the continuous monitoring by the Service Authority's SCADA system have a permanently mounted backup generator and automatic transfer switch as is required for all Reliability Class 1 stations

All pumping stations shall have 100 percent back-up power reliability (Class 1 reliability) provided and installed by the Applicant. The Applicant shall provide electric power to the station by distribution lines and by an emergency generator. Both power sources shall provide sufficient power to operate the pumps, lighting, and ventilation systems during maximum design flow conditions.

The distribution lines and the generator shall have a means of being disconnected before the generator switch gear. The generator shall automatically switch online in the event of a power failure. The Applicant shall provide generator switch gear that is fully automatic with the ability to sense a single-phase power condition and switch to the generator power system with a minimum time delay. The Applicant shall protect both power sources with fuses or breakers before the transfer switch (Refer to *Appendix D: Approved Equipment Manufacturers*).

T. Pump Station Power System Design

The Applicant shall protect the station's power supply and equipment from lightning by providing a lightning protection system with a separate and isolated ground. The Applicant shall provide a final step-down transformer on each electric feed line with adequate physical separation between them to prevent a common mode failure. The Applicant shall provide a separate buss for each power source. The electric transmission line and the emergency generator shall remain separate and form separate distribution substations up to the internal buss system transfer switch to preclude a common mode failure of both sources.

The Applicant shall coordinate breaker settings or fuse ratings to effect sequential tripping so that the breaker or fuse nearest the fault shall clear the fault before the other breakers or fuses are activated. The Applicant shall pad mount all lighting transformers and shall configure the load distribution panel so it is not an internal part of the transformer. The Applicant shall provide an automatic transfer switch equipped with a manual bypass.

U. Electrical Equipment Type

The electrical equipment in the generator and control building, wet well, dry well, and valve vault shall comply with the appropriate requirements of the National Electrical Code as well as the Virginia Uniform Statewide Building Code in effect. Aluminum buss bars, wire, connectors, or lugs are not permitted.

The Applicant shall protect three-phase motors and their starters from electric overload and short circuits on all three phases. All motors shall have a low-voltage protection device that shall cause and maintain the interruption of power to the motor upon the reduction or loss of voltage. The Applicant shall provide temperature detectors in the stators and bearings of larger motors (50 hp or more) to indicate overheating.

All wires installed in underground conduits shall have moisture-resistant insulation as identified in the National Electrical Code. The Applicant shall provide thermoplastic high-heat-resistant nylon (THHN) stranded wire for all wiring installed in raceways. The Applicant shall provide all Type-SO electrical cables with sunlight and ultraviolet protection. All four (4) to 20 mADC signal cables shall have shielding properly terminated on one end of the cable run.

The Applicant shall provide control and operating equipment and safety devices constructed of corrosion-resistant materials; stainless steel, aluminum, or fiberglass. The Applicant shall paint all surfaces not otherwise protected, such as concrete, using a two-step process: primer and then paint. Approved primer is Sherwin Williams Macropoxy® 646; approved paint is Sherwin Williams ACROLON™ 218 HS. The Applicant shall include a painting schedule in the sewage pumping station plans.

The Applicant shall provide Crouse Hinds cast device boxes constructed of non-corrosive materials for all surface-mounted electrical device boxes and small junction boxes subject to moisture. All boxes shall have mounting lugs; mounting holes drilled in the back of the box are unacceptable. The Applicant shall provide covers with gaskets and stainless steel screws for all boxes and provide covers from the same manufacturer as the boxes. The Applicant shall install all boxes with stainless steel hardware/fasteners. Moisture-proof bell boxes are not acceptable.

The Applicant shall provide a stainless steel wire mesh strain relief fitting that is properly sized for the cable for any cable subject to stress or strain. The Applicant shall protect all cables from stress, crush, and abrasion. The Applicant shall provide provisions to mitigate the migration of liquids and gases into the equipment from all cables installed in raceways.

The Applicant shall size the emergency back-up power supply generators to provide 100 percent reliability to fully operate the station (Refer to *Appendix D: Approved Equipment Manufacturers*). The Applicant shall provide an adjustable time delay between all functions and transitions for the generator, which shall include the capability

of holding in the “neutral” position for an adjustable time period between all transitions. The Applicant shall provide sound-attenuated enclosures for generators located outside the building. Applicant shall fill the generator’s fuel tank after all startup testing is completed.

The Applicant shall provide Cutler Hammer or Square-D for all electrical distribution equipment. The Applicant shall provide electrical equipment that is protected by a Solid State Advanced Control Phase Monitor, PLMU11 or ATC/Diversified model SLU-100-ASA and be consistent with the Service Authority SCADA Design & Configuration Standards.

The Applicant shall provide NEMA 4 for indoor electrical enclosures, NEMA 4X for electrical enclosures below grade and outside, and explosion-proof and corrosion-resistant electrical enclosures located in a wet well. The Applicant shall provide PVC coated pulling devices and junction boxes for wet well applications.

The Applicant shall provide 0.75-inch diameter or greater conduit for all wiring conduit. Galvanized rigid conduit is permitted, except in the wet well, where PVC-coated rigid conduit is required. The Applicant shall size conduits to facilitate wiring for the ultimate design conditions. The Applicant shall recoat PVC-coated rigid conduit, where the coating was removed during the installation of the conduit with PVC. The Applicant shall provide PVC coated conduit straps for wet well applications and corrosion-resistant conduit straps for all other applications. The Applicant shall provide aluminum, or other material approved by the Operations and Maintenance Director or designee, for channels used to mount electrical equipment or conduits.

The Applicant shall identify all foreign sources of electrical power entering a control cabinet or motor control cabinet and provide a means of disconnecting the power.

V. Electrical Equipment Location

The Applicant shall install electrical switch gear and controls in the building. Any equipment remotely located from the distribution panel shall have a lockable service disconnect on the line side. The Applicant shall locate the emergency back-up power supply generator on a concrete pad inside the pump station lot and provide a prefabricated sound-attenuated enclosure to protect the generator from the weather and a skid-mounted tank for storing its fuel. The Applicant shall provide skid-mounted tanks that are double-walled for leak containment, sized to hold adequate fuel to run the generator for 24 hours at 100 percent load and which meets all VADEQ and U.S. Environmental Protection Agency regulations. The Applicant shall provide a fuel storage level indicator in the generator and control building and point tie it to the Service Authority’s SCADA system for monitoring. The Applicant shall equip the generator with a block coolant heater, battery charger, and an alarm indicator to display the cause of a generator failure. The Applicant shall provide controls for starting the emergency generator completely independent of the normal electric power source. The Applicant shall provide a starting system that is sufficient to start the generator a minimum of three times without recharging and be alarmed and instrumented to indicate a loss of readiness.

The Applicant shall protect all motors and control enclosures from moisture, weather, and water under pressure in accordance with the manufacturer’s recommendations. The Applicant shall provide splash-resistant motors for indoor applications.

The Applicant shall provide all equipment in accordance with the approved sewage pumping station plans and the manufacturers' recommendations. When laying out the location of the equipment in the control and generator building, the Applicant shall consider the necessary separation between devices to provide adequate ventilation and the location of door, hatches, and panel covers to avoid conflicts among these items when they are opened and closed. The Applicant shall provide provisions for housekeeping pads to keep equipment off the floor.

The Applicant shall provide a moisture-proof, NEMA 4X enclosure constructed of non-corrosive materials for all equipment located outside the control building. For submersible sewage pumping stations, cable trays shall be provided between the pumps and outside controls to permit cables from the pumps to be unwired and removed. The Applicant is required to maintain the integrity of these enclosures.

W. Controlled Overflow Diversion

The Applicant shall provide a retention basin at all pump stations in the Occoquan Watershed unless this requirement is waived by VADEQ. The Applicant shall size the retention basin to hold the estimated 24-hour flow volume.

X. Access and Security

The Applicant shall provide a 12-foot-wide paved access road to the pump station. The minimum road section shall consist of a compacted sub-grade, 6-inches of VDOT 21-A stone, and 2-inches of compacted VDOT SM-2A bituminous concrete. The grade on the road shall not exceed 10 percent (10%). The Applicant shall provide unrestricted ingress and egress to the Service Authority from a public right-of-way to the pumping station. On long access roads, Applicant shall provide, at the entrance to the access road from the public right-of-way, a locking gate that has been reviewed and approved by the Service Authority.

An unrestricted, all-weather access road to the station is constructed and maintained by Applicant until the permanent access road is complete and accepted by the Service Authority. The Service Authority staff shall have access to the station at all times.

The Applicant shall provide an 8-foot-high brown vinyl- or black vinyl-coated chain link security fence topped with three strands of barbed wire around the pumping station lot. The requirement to use vinyl coating applies to all fabric, posts, ties, and fittings; galvanized fencing is not permitted. Privacy slats may be required to be provided and installed by the Applicant depending upon the location and the application as determined by the Director of Operations and Maintenance or designee. The Applicant shall equip the fence with a top rail and a bottom tension wire. The Applicant shall provide access to the station with a 12-foot wide, lockable gate. The Applicant shall key all door locks and padlocks in the station to the Service Authority's standard keys as provided by the Operations and Maintenance Director or designee.

The Applicant shall provide a minimum of 3.5-foot separation between the security fencing and structures or as required for building and grounds maintenance and future equipment removal and maintenance.

6.8 Testing, Acceptance, and Warranties for Sewage Pumping Stations

A. Pre-Testing, Start-Up, and Beneficial Use Inspections of Sewage Pumping Stations

For new sewage pump stations constructed for new development where there is no existing source of influent sewage, the Applicant shall successfully complete the following testing and inspections requirements. Prior to beginning testing, the Applicant must complete the following:

- Substantially complete all construction.
 - Pass all building trade inspections and acquire all related permits from the governing authorities.
 - Achieve Beneficial Use status for the sewage pumping station force main.
 - Ensure all sanitary sewer mains receiving the force main discharge are placed in Beneficial Use status or are in a status of being owned and operated by the Service Authority.
1. Pre-testing to prepare for start-up:
 - a. Independently verify complete operation of the sewage pump station.
 - b. Conduct successful pretesting of the SCADA system with the SCADA Manager or designee.
 - c. Acquire a start-up check list from the WWF Manager and SCADA Manager for reference.
 - d. Conduct required testing necessary for the Engineer to certify the station was built in conformance with substantial completion and operates as designed.
 2. Start-up testing and inspection:
 - a. Schedule and facilitate training of Service Authority staff by the equipment manufacturers.
 - b. Successfully tests all major pieces of equipment including pumps, generator, automatic transfer switch, comminutor, flow meter, check valves, control system, and SCADA system to the satisfaction of the WWF Manager, SCADA Manager, and Inspection Manager, or their designee.
 - c. Verifies all sensors, alarms, SCADA, and start-up of equipment operate as designed for various operational scenarios.

If the sewage pumping station is not placed into Beneficial Use within 90 days of successful start-up testing, the Applicant must go through start-up procedures again before being placed into Beneficial Use.

3. Beneficial Use inspections to place the sewage pumping station into service:
 - a. Pass all Service Authority inspections for Beneficial Use (see Chapter 2, Section 2.9).
 - b. Provide written certification by the Engineer that sewage pumping station was built in substantial conformance with the plans and specifications.
 - c. Acquire a CTO for the sewage pumping station (see Chapter 3, Section 3.5).
 - d. Submit a temporary flushing plan for the sewage pumping station to exercise the pumps and minimize the retention time in the force main.
 - e. Deliver Operations and Maintenance Manuals for the sewage pump station (see Chapter 6, Section 6.5).
 - f. Transfer property and access rights for the sewage pumping station to the Service Authority (see Chapter 6, Section 6.5).
 - g. Submit information for the sewage pumping station's electrical account to the Service Authority's Project Engineer or Project Manager so that the account can be assigned to the Service Authority.
 - h. Provide the Development Manager a schedule of values for the sewage pumping station in accordance with Service Authority Finance Division reporting requirements.

The Applicant has six (6) months to address all punch list items and to place sewage pumping station into Beneficial Use. If all punch list items are not addressed or the station is not placed into Beneficial Use within the six (6) months, a new and full inspection is required.

The Service Authority will only permit a sewage pumping station to go into Beneficial Use status if tributary flows are to be delivered to the station within 60 days of Beneficial Use. The Service Authority will not place a station into service via Beneficial Use nor commence the start of warranties until flows are delivered to the station and operations by the Service Authority are necessary.

Sewage pumping stations are not eligible for Partial Beneficial Use status

B. Five (5)-Day Acceptance Testing of Sewage Pumping Stations

When a new sewage pumping station is replacing an existing station or is to receive flow from an existing source of sewage, the Applicant shall conduct a five (5)-day acceptance test prior to Beneficial Use inspections. Existing sewage flows are temporarily diverted to the new station to conduct testing by a controlled method.

The purpose of the five (5)-day acceptance test is to operate the sewage pumping station in an operational mode for five (5) days. The intent is to test all pumping station components, control systems, and SCADA system (including alarm notifications) under conditions as close as possible to normal operating conditions.

1. Following the successful completion of the start-up testing and inspection, the Applicant shall submit a detailed plan for the five (5)-day acceptance test and obtain

the Engineer's and Service Authority's approval of the detailed plan. After the testing plan is accepted by the Engineer and the Service Authority's Project Engineer or Program Manager, the Applicant shall schedule a five (5)-day acceptance test for the sewage pumping station in coordination with the Engineer and the Service Authority.

- a. The Applicant shall not schedule the five (5)-day acceptance test during any observed Federal Holiday, weekend day, or during scheduled manufacturer training.
 - b. The cost for the five (5)-day acceptance test is at the Applicant's expense.
 - c. All major pieces of equipment shall be tested including pumps, generator, automatic transfer switch, comminutor, flow meter, check valves, control system, and SCADA system.
2. A successful five (5)-day acceptance test, performed by the Applicant, certified by the Engineer, and accepted by the Service Authority's Project Engineer or Program Manager, is required prior to placing the project into Beneficial Use status. A successful five (5)-day test shall include a detailed report indicating that:
 - a. All the major equipment worked, as specified, for the duration of the five (5)-day acceptance test.
 - b. The control systems worked, as specified, for the duration of the five (5)-day acceptance test.
 - c. The SCADA systems worked, as specified, for the duration of the five (5)-day acceptance test.

C. Final Acceptance & Project Closeout

1. The conditions of final acceptance and project closeout shall include the following:
 - a. Bond release shall not be requested until 6 months after Beneficial Use acceptance.
 - b. Pump station functions as designed and no longer requires flushing.
2. The Applicant must request and pass a final inspection for final acceptance by the Service Authority.
 - a. The Applicant has six (6) months to address all punch list items from a final inspection. If all punch list items are not addressed within six (6) months, a new and full inspection is required prior to final acceptance.
 - b. The Applicant shall request re-inspection from the Service Authority after addressing all punch list items.
 - c. The Service Authority's Project Engineer or Project Manager shall issue a formal letter of acceptance on behalf of the Service Authority once all punch list items have been satisfactorily addressed.

D. Sewage Pumping Station Warranty

1. The Applicant shall warranty the pump station for a period of one year for all materials, equipment, and workmanship, effective at the date of Beneficial Use acceptance.
 - a. The Applicant shall repair or replace defective materials, equipment, or workmanship within 60 days of written notice by the Service Authority at the cost of the Applicant.
 - b. New materials shall be used to repair or replace defects or equipment the by original equipment manufacturer or Service Authority approved qualified contractor.
 - c. If the Service Authority must immediately repair or replace defects or equipment to maintain operation of the sewage pump stations, the Applicant shall pay all associated Service Authority expenses.
 - d. Final acceptance of the sewage pumping station by the Service Authority, does not alieve the Applicant of the one year warranty responsibilities.
2. The Applicant shall provide a five (5) year warranty for the pumps and the generator from the manufacturer. The Applicant shall purchase an extended warranty from the manufacturer, as necessary, to provide a five (5) year warranty coverage from the date of Beneficial Use acceptance.
3. All written warranties from the equipment manufacturers shall be provided with the equipment manuals delivered with the Operation and Maintenance Manual.

6.9 Spare Parts, Supplies and Special Tools

The Applicant shall supply all spare parts for all major equipment, as indicated on the spare parts list created by the Operations and Maintenance Director or designee after its review of the equipment submittals for the pump station. The Applicant shall provide all special tools required for a given station that uses special (non-standard) equipment. The Operations and Maintenance Director or designee shall specify such special tools during its review of the pump station plans. The Applicant shall provide the following list of supplies with the pump station:

- Brooms (one push, one regular) and dustpan
- 36-inch curved squeegees with 55-inch handle (two)
- mop and mop bucket with wringer
- 50-feet of 5/8-inch heavy duty hose with fire hose type nozzle (two), with hose reel (outside near hose bib) and hose hanger (inside near hose bib)
- step ladder (sized to reach interior light fixtures)
- extension ladder (sized to access wet well with three (3) feet of ladder above top of slab, stored on wall hangers on outside of building – mounted out of view of the general public)
- industrial grade storage cabinet (general purpose, 48-inches wide by 78-inches high by 24- inches deep or equivalent)
- fire proof cabinet (30-gallon or equivalent)
- single pedestal desk with chair; two-drawer file cabinet; cordless phone with answering machine; bulletin board (combo: 1/2 dry-erase, 1/2 cork)
- 55 gallon trash can with lid and dolly

- 50-feet of 12 gauge electrical extension cord
- paper towel dispenser and soap dispenser (near sink)
- face shields (ratchet headgear with crown extension and clear polycarbonate lens)
- fire extinguishers (suitable for electrical fires in control panels; include minimum of one extinguisher per floor level)
- First Aid Kit, OSHA approved (one per floor level)
- ear muff hearing protectors (two per generator room with storage cabinet mounted outside generator room door)

-- end of Chapter 6 --

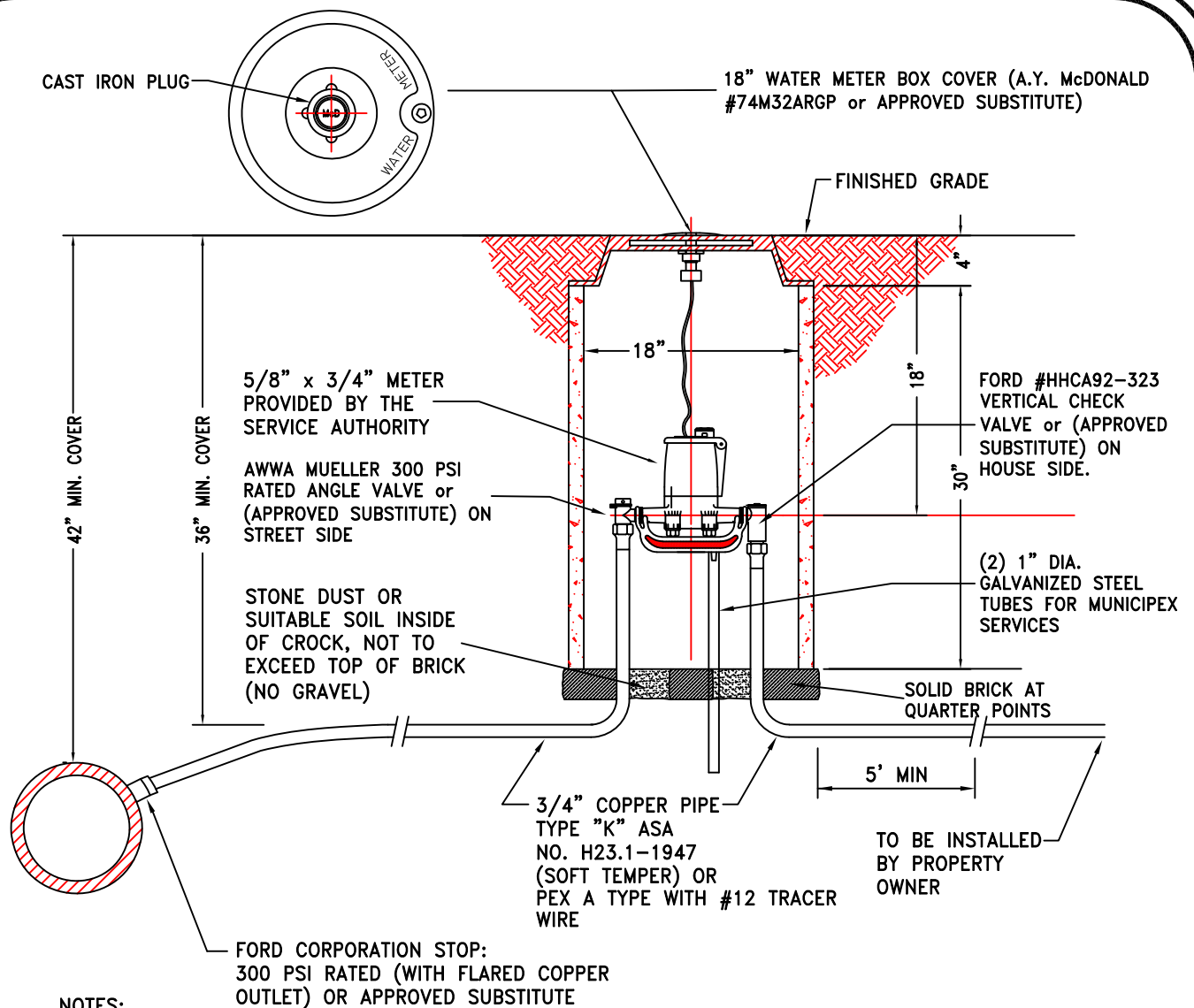
Appendix A: List of Water Distribution System Details

Refer to the Service Authority's Water Details
by using Control + Click to follow the link

[Water Details](#)

<u>Detail No.</u>	<u>Detail Title</u>
W-1	5/8-inch by 3/4-inch Residential Meter
W-2	1-inch Meter in 1-inch Residential Service for Fire Suppression
W-3	5/8-inch by 3/4-inch Meter in 2-inch Copper Setter for Commercial Use (Only)
W-4	1-inch, 1 1/2-inch and 2-inch Meter in 2-inch Copper Setter for Residential Fire Protection
W-5	1-inch Meter in 2-inch Copper Setter for Commercial Use (Only)
W-6	Water Distribution System 1 1/2-inch Meter in 2-inch Copper Service
W-7	Water Distribution System 1 1/2-inch and 2-inch Meter in D.I.P. Service
W-8	3-inch or 4-inch Master Meter Vault
W-9	6-inch, 8-inch, or 10-inch Main Line Meter Vault
W-10	5/8-inch by 3/4-inch and 1-inch Water Meter and Monitor Frame and Cover Detail
W-11	3/4-inch Water Service Connection Detail
W-12	4-inch D.I.P. Service Connection Detail
W-13	Temporary Blow-off Assembly
W-14	Permanent Blow-off Assembly
W-15	Typical Valve and Valve Box
W-16	Water Distribution System Air Release Valve
W-17	Joint Restraint Device
W-18	Buttresses for 22 1/2° Horizontal Bend
W-19	Buttresses for 45° Horizontal Bend
W-20	Buttresses for 90° Horizontal Bend
W-21	Buttresses for Tees, Plugs, and Caps
W-22	Buttress for 11 1/4°, 22 1/2° and 45° Lower Vertical Bends
W-23	Anchorage for 11 1/4°, 22 1/2° and 45° Upper Vertical Bends
W-24	Dead End Anchor Detail
W-25	Typical Fire Hydrant Installation for Depths Between 3.5 to 5.0 Feet
W-25A	Typical Fire Hydrant Installation for Depths Between 5.1 to 10.0 Feet
W-26	Typical Fire Hydrant Location with Curb and Gutter or Ditch Line

<u>Detail No.</u>	<u>Detail Title</u>
W-27	Typical Fire Hydrant Location in Island and Parking Area
W-28	Typical Fire Hydrant Location on Street
W-29	Typical Fire Hydrant Post Protection
W-30	Tapping Sleeve and Valve Detail
W-31	5/8-inch by 3/4-inch and 1-inch Sub-meter Detail
W-32	Lowering Water Main or New Installation
W-33	Trace Wire Test Station
W-34	Water Line Bedding and Backfill
W-35	Access Gate Details
W-36	Electronics at Magnetic Meter
W-37	T-Bolts and Nuts



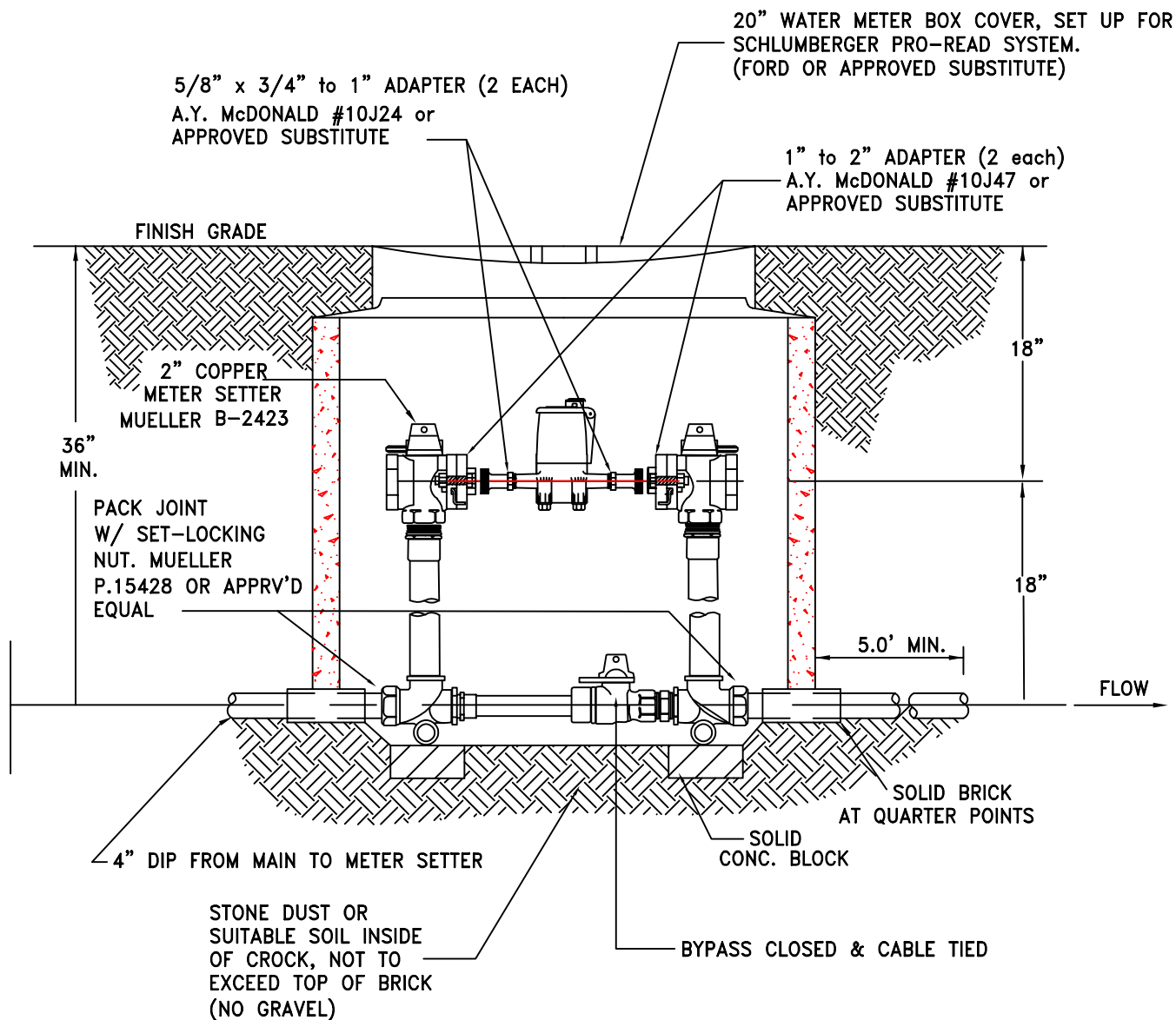
NOTES:

1. ALL WATER METERS SHALL REGISTER IN GALLONS AND BE SET LEVEL - METERS PROVIDED BY PWCSA.
2. 36" OF COVER SHALL BE REQUIRED OVER SERVICES FROM DISTRIBUTION MAIN TO METER BOX.
3. METER BOX SHALL BE ONE PIECE CONSTRUCTION OF CONCRETE, PVC, OR RIGID FIBERGLASS. (NOT ORANGEBURG)
4. METER YOKE SHALL INCLUDE ONE 3/4" ANGLE VALVE AND ONE BACKFLOW PREVENTER.
5. ALL FITTINGS SHALL BE FLARED. (SOLDERED FITTINGS WILL NOT BE PERMITTED)
6. SERVICE LINE LEAVING METER BOX SHALL BE STUBBED OUT AT LEAST 5' WITH TYPE "K" COPPER OR MUNICIPEX PIPE.
7. METER SET BEHIND SIDEWALK - NOT IN DRIVEWAY, WALKWAYS, ETC.
8. THE SERVICE LINE BETWEEN THE MAIN AND THE METER WILL BE ONE CONTINUOUS PIECE OF PIPE. (NO JOINTS WILL BE PERMITTED)
9. ALL YARD IRRIGATION CONNECTIONS WILL BE MADE AT THE END OF THE 5-FOOT STUB ON THE HOUSE SIDE. (NO CONNECTIONS WILL BE PERMITTED INSIDE THE METER BOX)
10. FORD 500P SERIES (OR EQUIVALENT) YOKE AND 1" DIAMETER GALVANIZED STEEL TUBING TO BE USED WITH MUNICIPEX SERVICES.
11. FORD FB600-X-NL CORPORATION STOP TO BE USED WITH COPPER SERVICE.
10. FORD FB1000-XX-NL CORPORATION STOP TO BE USED WITH MUNICIPEX SERVICES.



5/8" X 3/4" RESIDENTIAL METER
N.T.S.

W-1
REV-2018



NOTES:

1. WATER METERS AND ADAPTERS ARE PROVIDED AND INSTALLED BY THE SERVICE AUTHORITY.
2. 36"W x 30"H ONE PIECE BOX MUST BE USED.
3. GASKETS PROVIDED WITH THE WATER METER SETTERS ARE THE CONTRACTOR'S RESPONSIBILITY.
4. METER BOX MATERIAL: CONCRETE, PVC or RIGID FIBERGLASS.
5. COPPER METER SETTER (MUELLER #B-2423 or APPROVED SUBSTITUTE) TO BE USED.
6. NO FIELD ADJUSTMENTS OF METER SETTER IS PERMITTED.
7. ONLY 2" METER SETTER TO BE INSTALLED.



5/8" x 3/4" METER IN 2" COPPER SETTER
for COMMERCIAL USE (ONLY)

N.T.S.

W-3
REV-2020

- 1" TO 2" ADAPTER (2 EACH)
A.Y. McDONALD #10J47 or
APPROVED SUBSTITUTE
PROVIDED BY CONTRACTOR

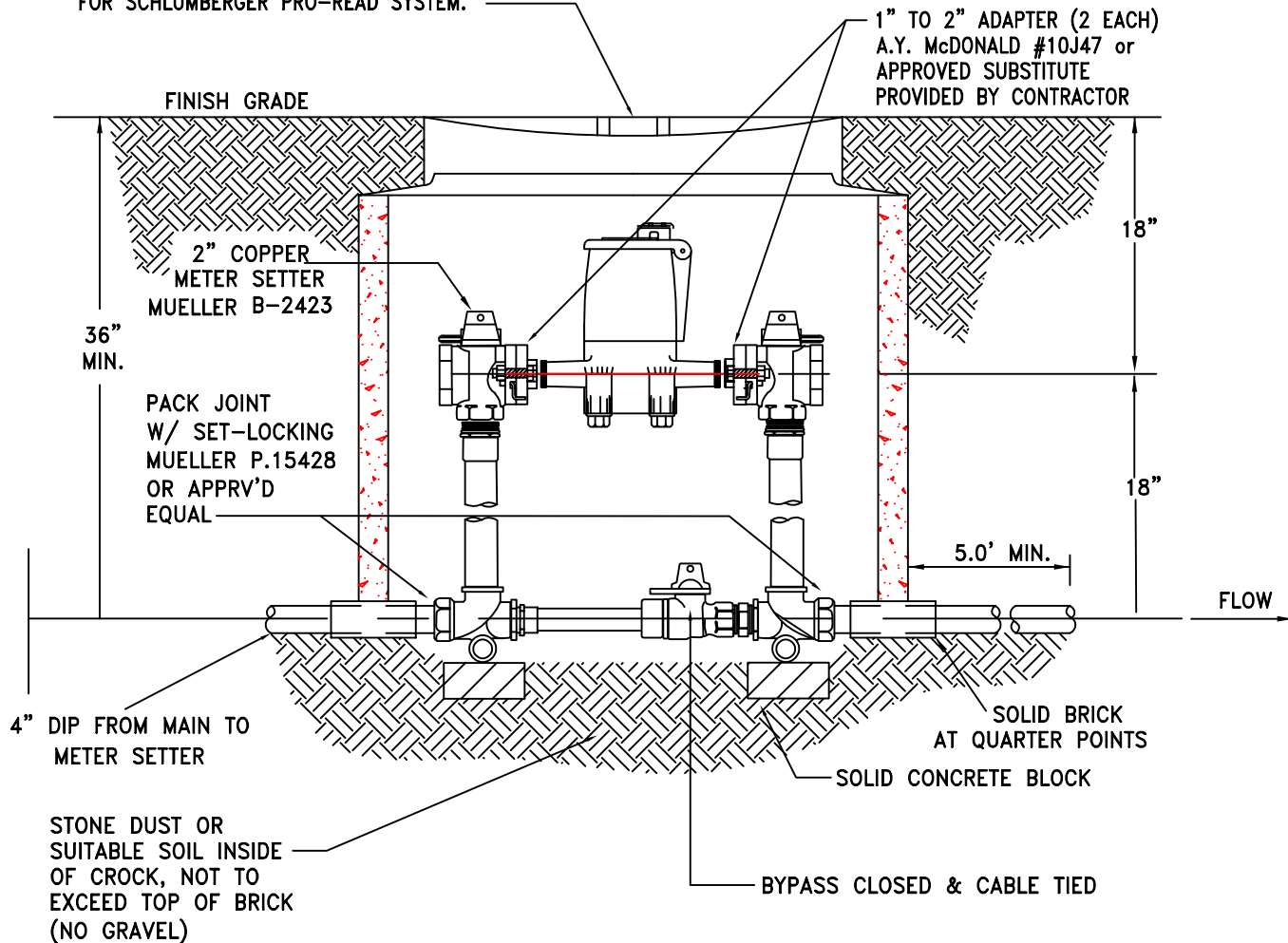


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W-4
REV-2020

20" WATER METER BOX COVER (A.Y. McDONALD #74ML20RGP or APPROVED SUBSTITUTE) SET-UP FOR SCHLUMBERGER PRO-READ SYSTEM.

1" TO 2" ADAPTER (2 EACH)
A.Y. McDONALD #10J47 or
APPROVED SUBSTITUTE
PROVIDED BY CONTRACTOR



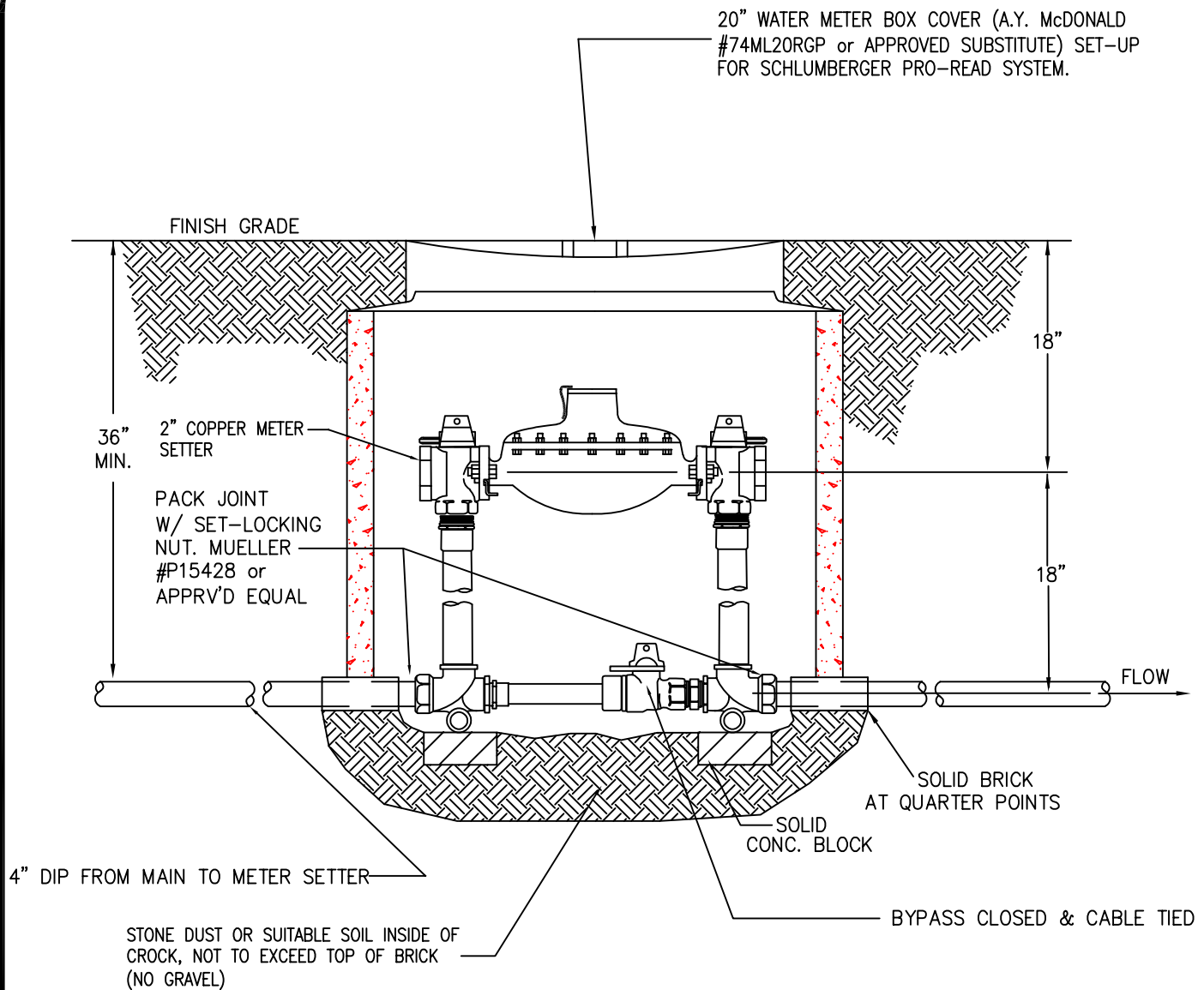
NOTES:

1. WATER METERS AND ADAPTERS TO BE PROVIDED AND INSTALLED BY THE SERVICE AUTHORITY.
2. 36"W x 30"H ONE PIECE BOX MUST BE USED.
3. GASKETS PROVIDED WITH THE WATER METER SETTERS ARE THE CONTRACTOR'S RESPONSIBILITY.
4. METER BOX MATERIAL: CONCRETE, PVC or RIGID FRP.
5. COPPER METER SETTER TO BE MUELLER B-2423 OR APPROVED EQUAL.
6. NO FIELD ADJUSTMENT OF METER SETTER IS PERMITTED.
7. ONLY 2" METER SETTER IS TO BE INSTALLED.



1" METER IN 2" COPPER SETTER
for COMMERICAL USE (ONLY)
N.T.S.

W-5
REV-2020



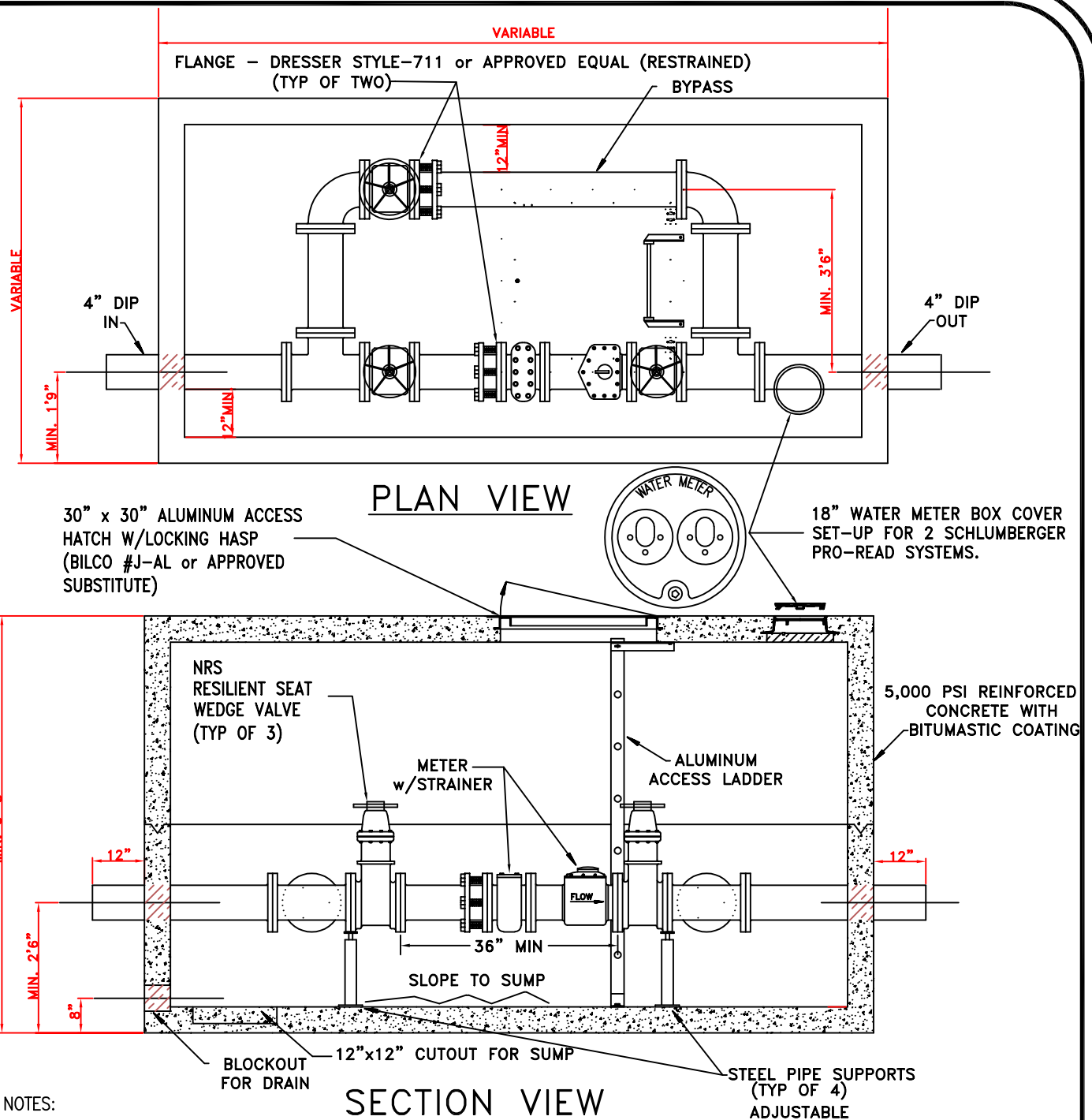
NOTES:

1. WATER METERS AND ADAPTERS ARE PROVIDED AND INSTALLED BY THE SERVICE AUTHORITY.
2. 36"W x 30"H ONE PIECE BOX MUST BE USED.
3. GASKETS PROVIDED WITH THE WATER METER SETTERS ARE THE CONTRACTOR'S RESPONSIBILITY.
4. INSTALLER MAY SUBSTITUTE TYPE "K" SOFT COPPER FOR BRASS SHOWN, PROVIDED APPROPRIATE FITTINGS AND VALVES ARE USED.
5. METER BOX MATERIAL: CONCRETE, PVC or RIGID FRP.
6. COPPER METER SETTER TO BE MUELLER B-2423 OR APPROVED EQUAL.
7. NO FIELD ADJUSTMENT OF METER SETTER IS PERMITTED.
8. ONLY 2" METER SETTER IS TO BE INSTALLED.



WATER DISTRIBUTION SYSTEM
 1½" METER IN 2" COPPER SETTER
 N.T.S.

W-6
 REV-2020



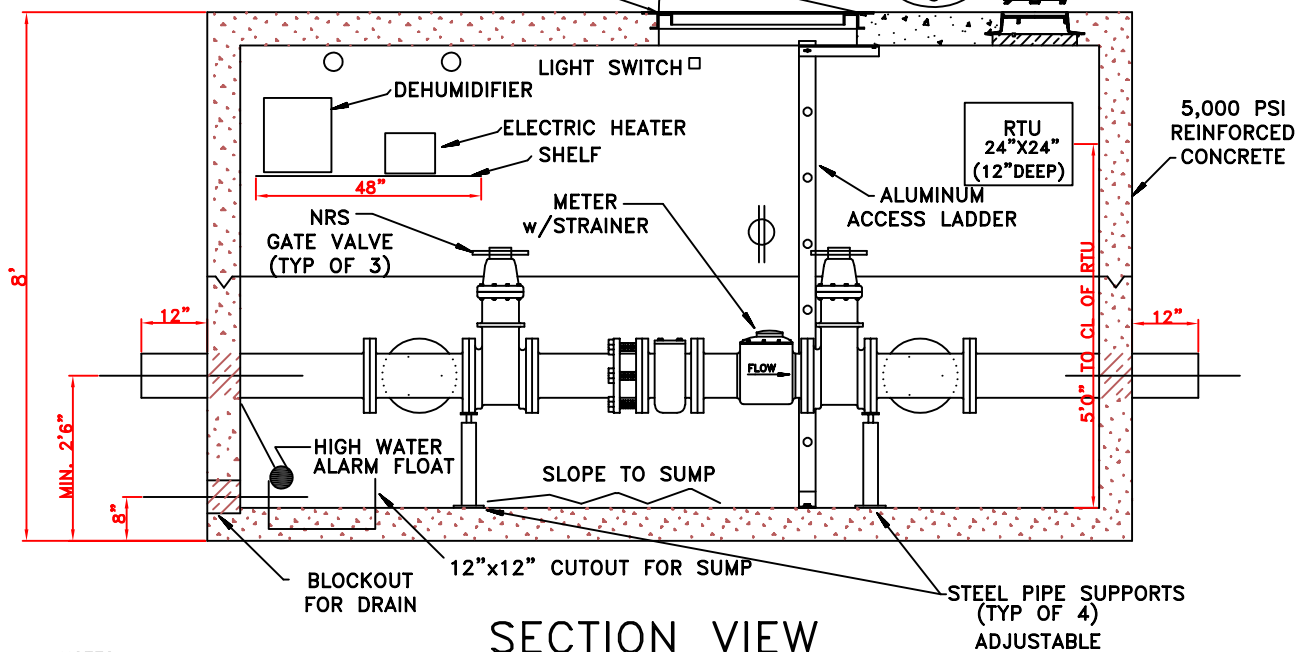
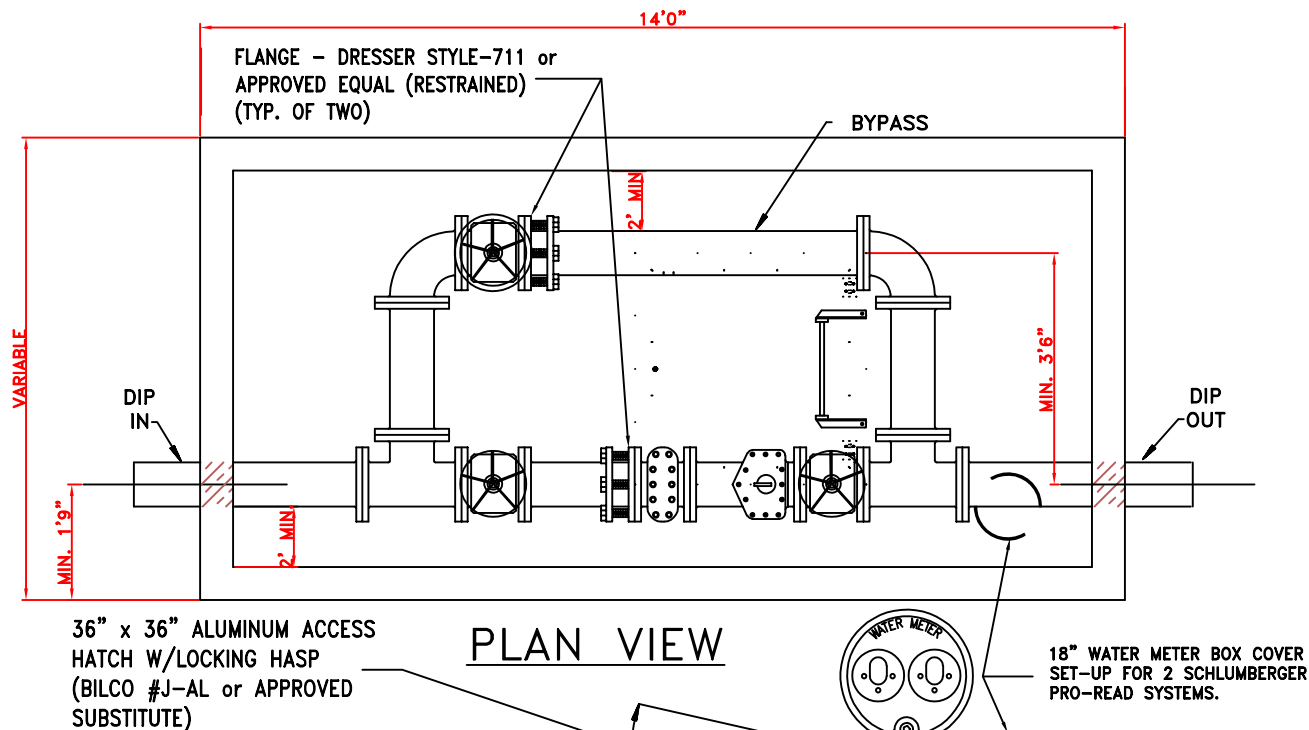
NOTES:

1. PIPING UP TO AND LEADING OUT OF VAULT WILL BE RESTRAINED USING MEGA-LUGS SERIES 1100 or APPROVED SUBSTITUTE. CALCULATIONS FOR RESTRAINT BASED ON DEAD END LINE.
2. SHOP DRAWINGS FOR VAULT AND PIPING MATERIALS WILL BE SUBMITTED TO THE PWCSA FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
3. 4" x 3" REDUCERS REQUIRED BETWEEN VALVES FOR 3" METER APPLICATION.
4. WATER METERS WILL BE PROVIDED AND INSTALLED BY THE SERVICE AUTHORITY.
5. FLOOR WILL BE DESIGNED TO DRAIN TO SUMP AREA. PROVIDE GRAVITY DRAIN TO DAYLIGHT.
6. THE STRUCTURE SHALL NOT BE INSTALLED WHERE SUBJECT TO VEHICULAR OR PEDESTRIAN TRAFFIC.
7. THE EXTERIOR OF ALL METER VAULTS SHALL HAVE A BITUMASTIC COATING.



3" or 4" MASTER METER VAULT
N.T.S.

W-8
REV-2020



NOTES:

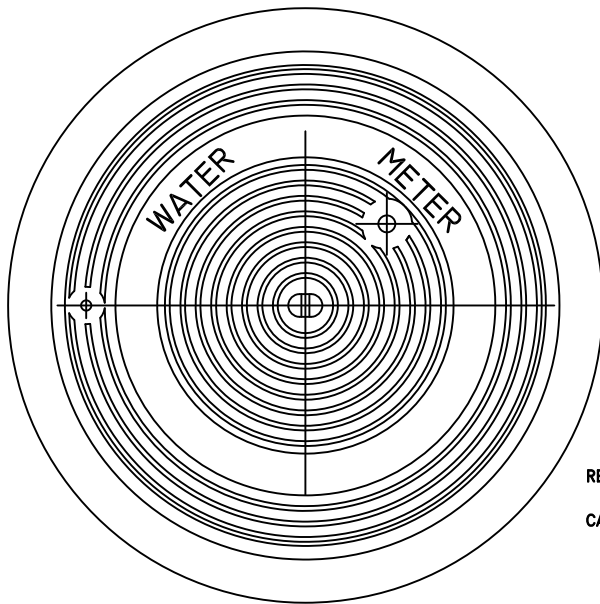
1. PIPING UP TO AND LEADING OUT OF VAULT WILL BE RESTRAINED USING MEGA-LUGS SERIES 1100 or APPROVED SUBSTITUTE. CALCULATIONS FOR RESTRAINT BASED ON DEAD END LINE.
2. SHOP DRAWINGS FOR VAULT AND PIPING MATERIALS WILL BE SUBMITTED TO THE PWCSA FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
3. WATER METERS WILL BE PROVIDED AND INSTALLED BY THE SERVICE AUTHORITY.
4. FLOOR WILL BE DESIGNED TO DRAIN TO SUMP AREA. PROVIDE GRAVITY DRAIN TO DAYLIGHT.
5. THE STRUCTURE SHALL NOT BE INSTALLED WHERE SUBJECT TO VEHICULAR OR PEDESTRIAN TRAFFIC.
6. APPROVED FLEXIBLE JOINT REQUIRED ON ALL PIPE CONNECTIONS IN STRUCTURE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS.



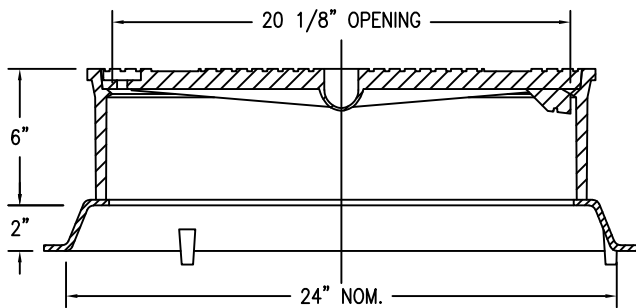
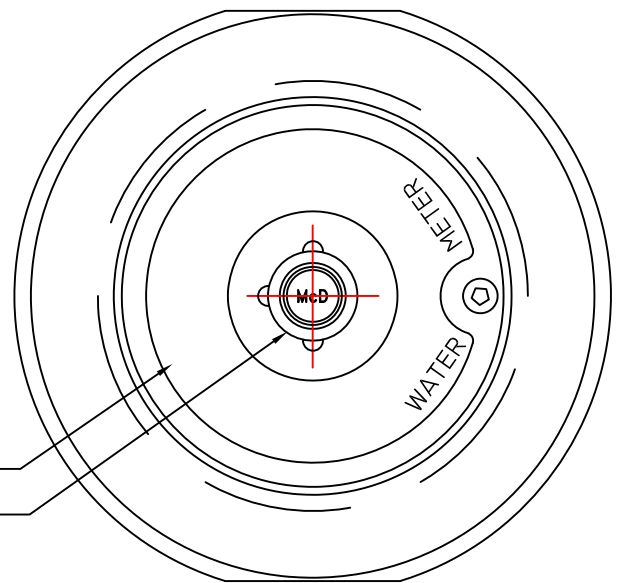
6", 8", OR 10" MAIN LINE
METER VAULT

N.T.S.

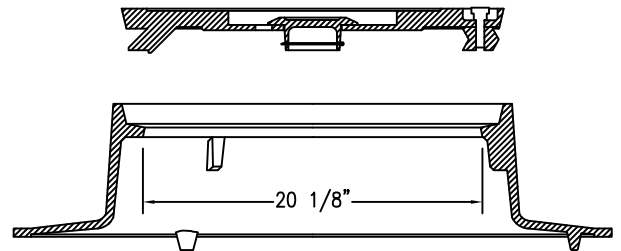
W-9
REV-2020



RECESSED COVER
CAST IRON PLUG

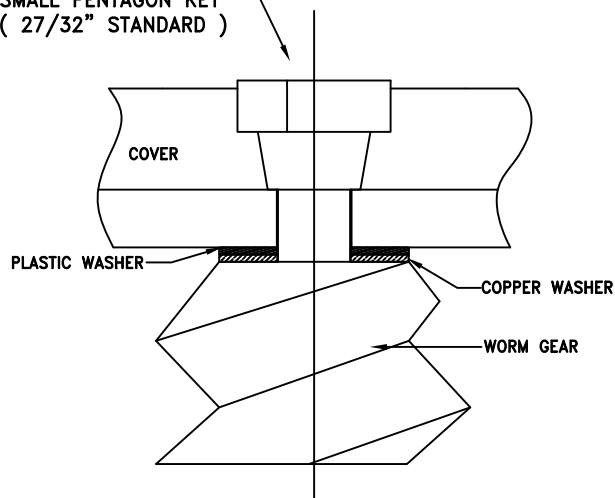


74M24 MONITOR FRAME & COVER

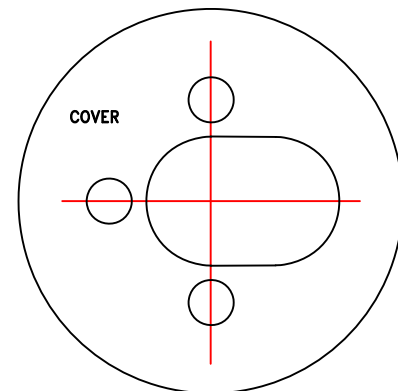


74M32ARGP METER BOX FRAME & COVER

SMALL PENTAGON KEY
(27/32" STANDARD)



WORM GEAR LOCKING ASSEMBLY DETAIL

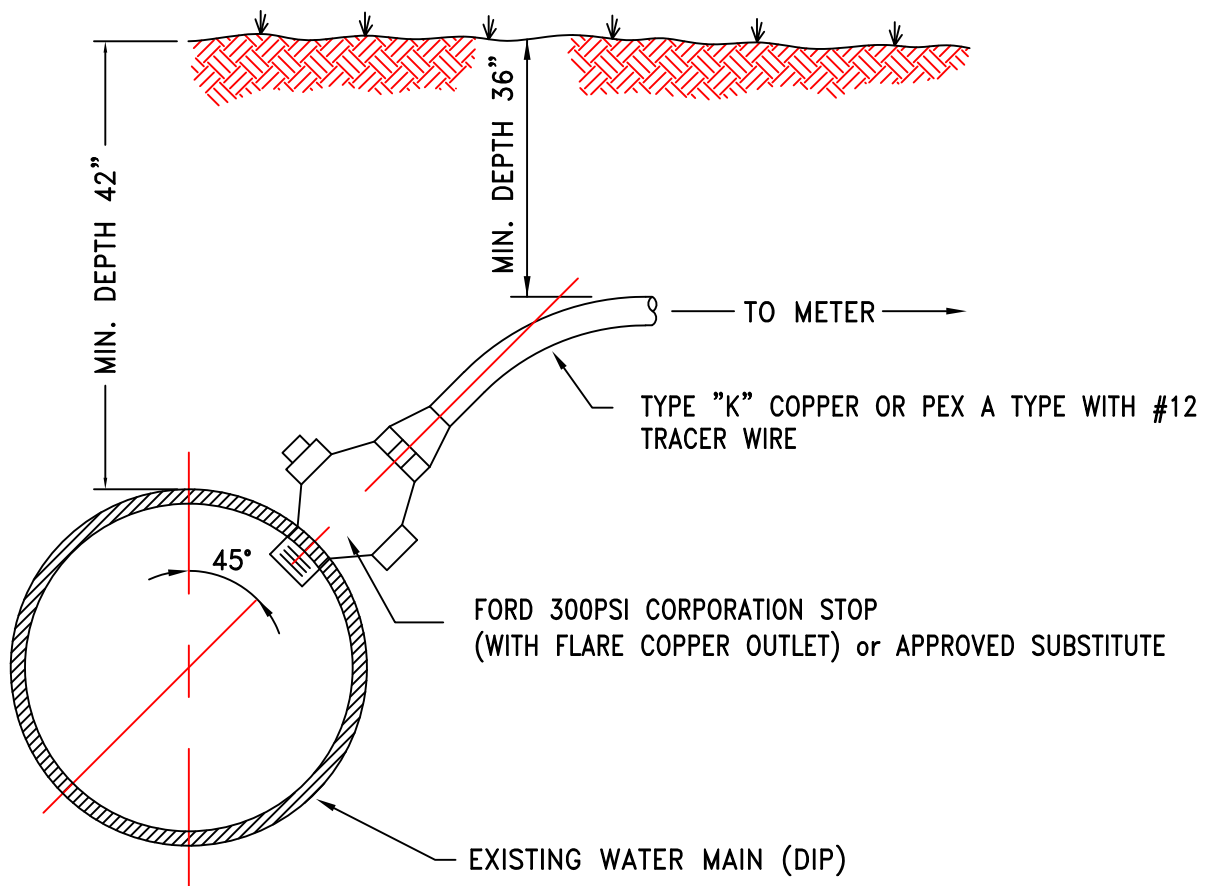


COVER CENTER HOLE DETAIL



$\frac{5}{8}$ " x $\frac{3}{4}$ " AND 1" WATER METER AND MONITOR
FRAME & COVER DETAIL
N.T.S.

W-10
REV-2018



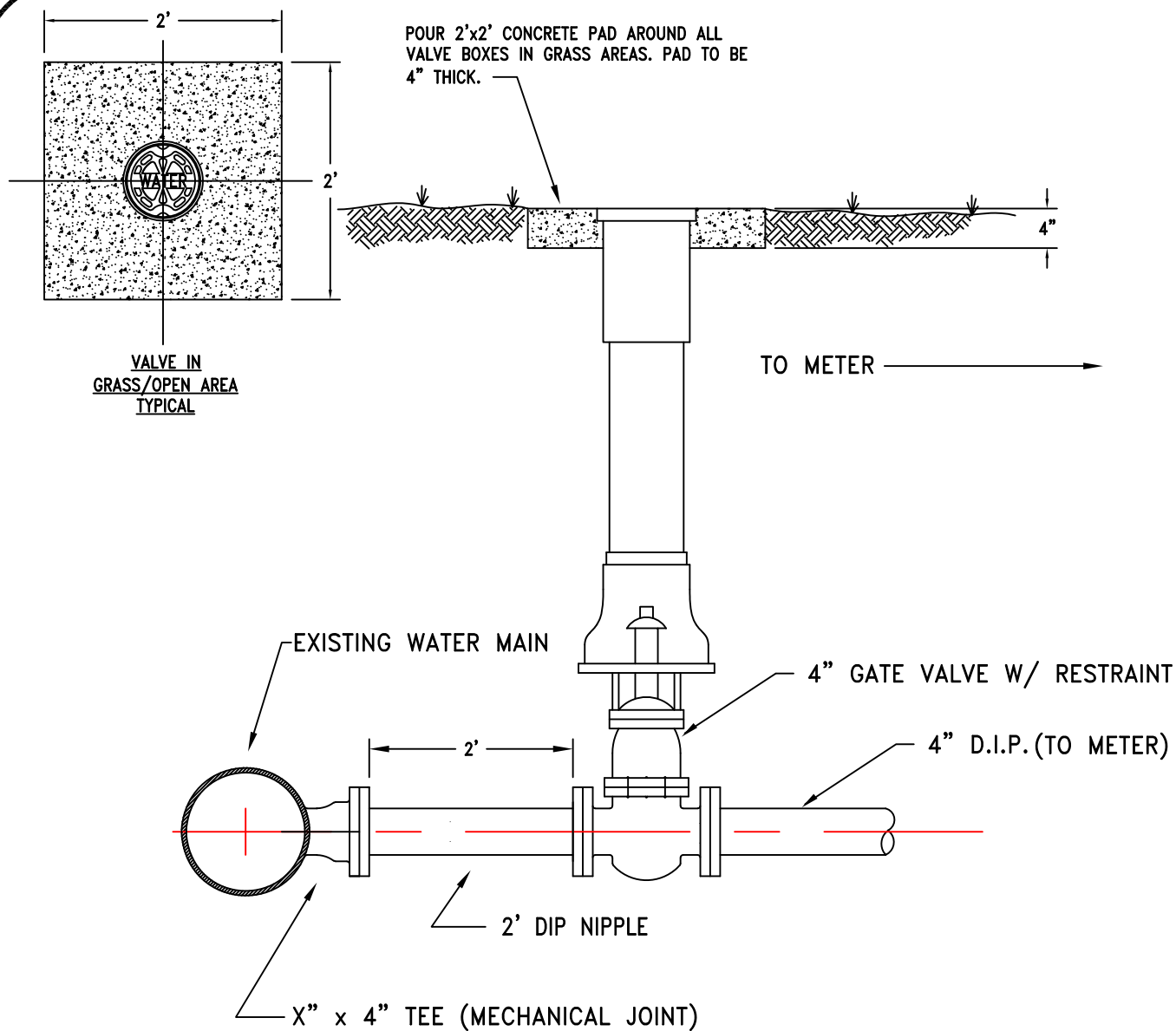
NOTE:

1. THE SERVICE LINE BETWEEN THE MAIN AND THE METER WILL BE ONE CONTINUOUS PIECE OF PIPE. (NO JOINTS WILL BE PERMITTED)
2. BACK TO BACK TAPS ON A WATER MAIN ARE NOT ALLOWED.
3. TAPS SHALL BE SPACED A MINIMUM OF 24 INCHES.
4. IF USE OF C-900 IS PERMITTED BY PWCSA. INJECTION MOLDED TEES SHALL BE USED FOR DOMESTIC TAPS ON C-900 PIPE.
5. FORD FB600-X-NL CORPORATION STOP TO BE USED WITH COPPER SERVICES.
6. FORD FB1000-XX-NL CORPORATION STOP TO BE USED WITH MUNICIPEX SERVICES.



$\frac{3}{4}$ " WATER SERVICE
CONNECTION DETAIL
N.T.S.

W-11
REV-2018



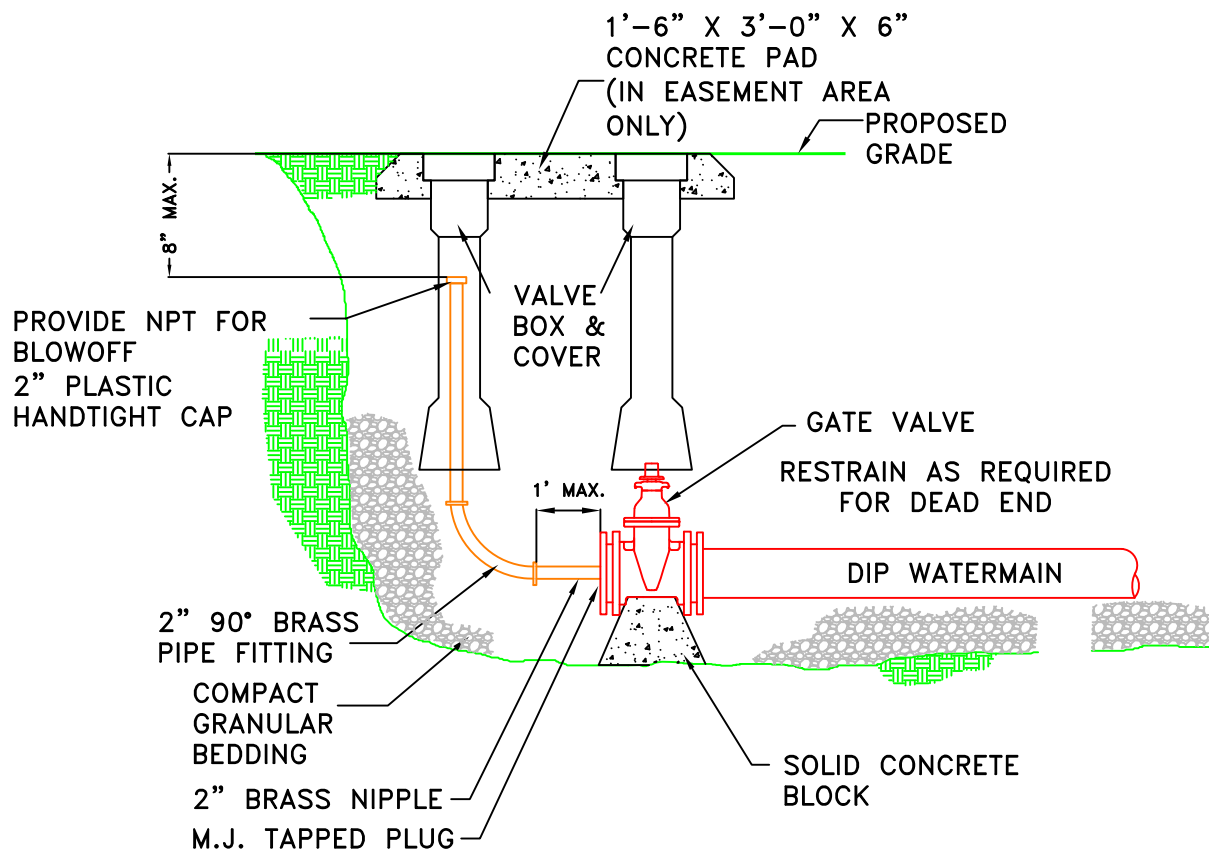
NOTE:

1. ALL JOINTS FROM THE MAIN TO THE METER WILL BE RESTRAINED USING AN APPROVED RESTRAINING GLAND.



4" D.I.P. SERVICE
CONNECTION DETAIL
N.T.S.

W-12
REV-2018



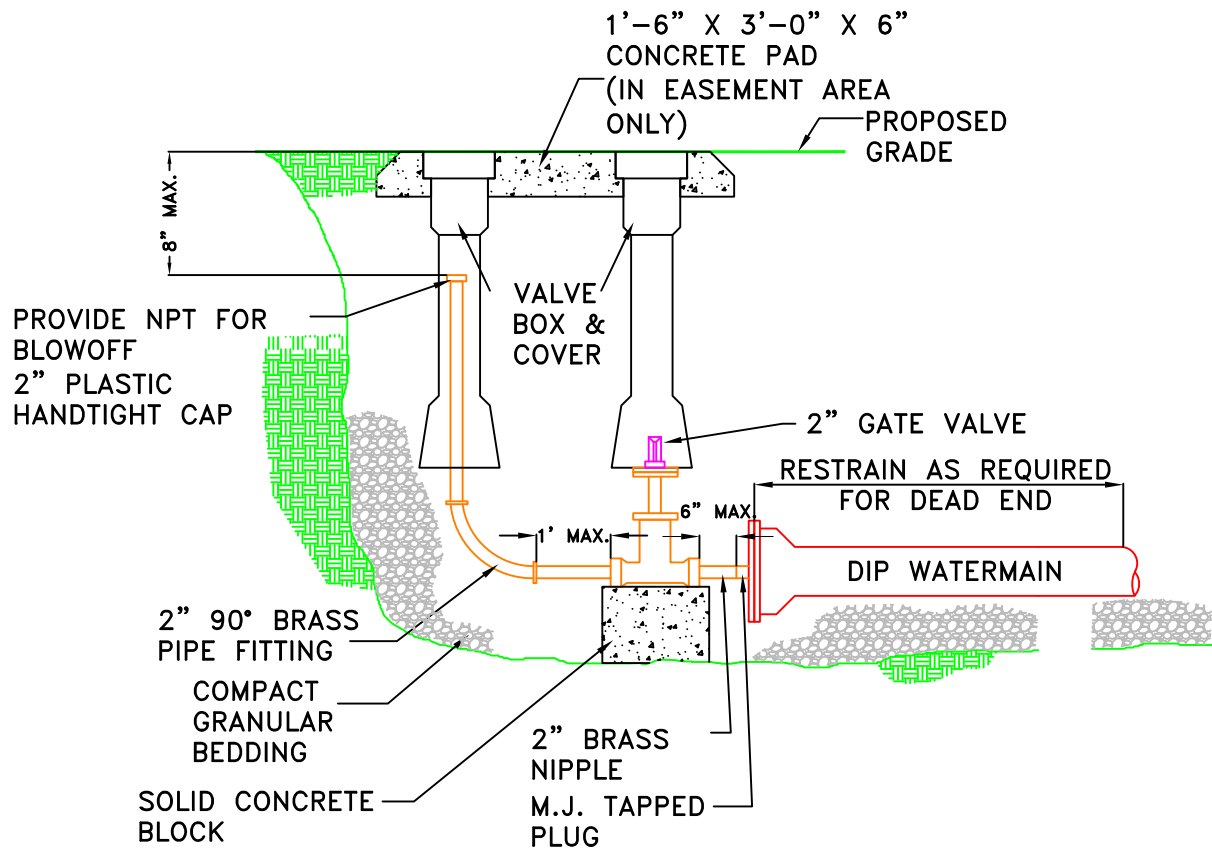
NOTES:

1. ALL 2" PIPE TO BE WITH I.P. THREAD.
2. PROVIDE RESTRAINT IN ACCORDANCE WITH DEAD END LINE,
ACCORDING TO MAIN LINE SIZE.



TEMPORARY
BLOW-OFF ASSEMBLY
N.T.S.

W-13
REV-2018



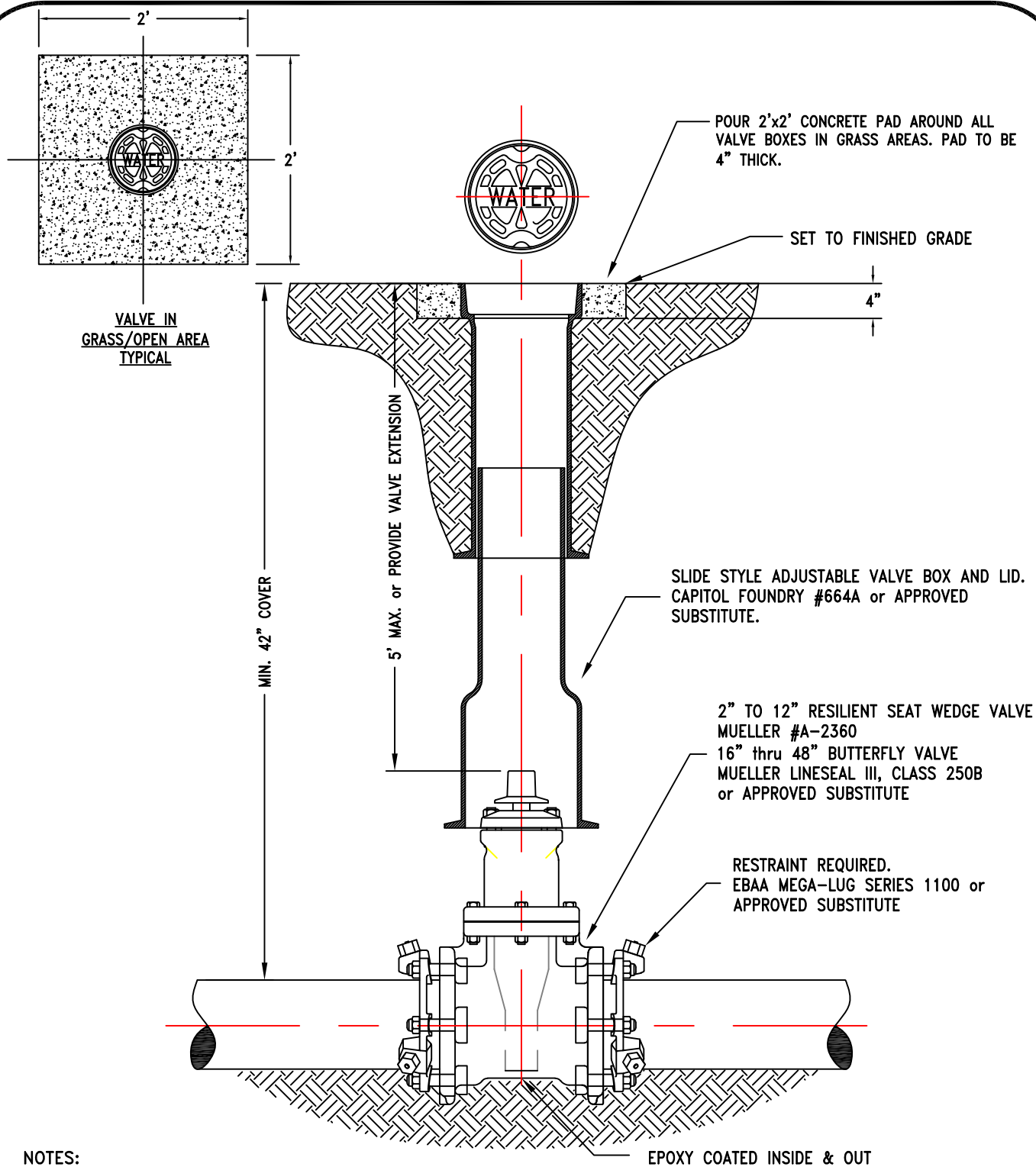
NOTES:

1. ALL 2" PIPE TO BE WITH I.P. THREAD.
2. PROVIDE RESTRAINT IN ACCORDANCE WITH DEAD END LINE,
ACCORDING TO MAIN LINE SIZE.



PERMANENT
BLOW-OFF ASSEMBLY
N.T.S.

W-14
REV-2018



NOTES:

1. VALVES THAT ARE NORMALLY CLOSED, PROVIDE ACCESS INSERT AND PAINT TOP OF VALVE BOX RED.
2. VALVE AND PIPE SHALL HAVE SAME NOMINAL DIAMETER.
3. VALVE EXTENSIONS TO BE ONE ROD ONLY, USE OF MULTIPLE EXTENSIONS IS PROHIBITED.

ONLY SERVICE AUTHORITY TO ACCESS AND OPERATE ANY OPERATIONAL VALVE



TYPICAL VALVE AND VALVE BOX N.T.S.

W-15
REV-2018

GRADE

STD. MANHOLE FRAME & COVER MARKED "WATER" (SEE DETAIL S14.07.01). USE EASEMENT TYPE (BOLT DOWN FRAME & COVER)

1' MIN.

STD. MANHOLE WITH FLAT TOP OR ECCENTRIC TOP. TOP SHALL CONFORM TO STANDARD MANHOLE DETAIL.

MANHOLE STEPS CAST IN PLACE

5' DIAMETER DOGHOUSE MANHOLE

12" TO 16" (TYP.)

2" AIR RELEASE VALVE

2" DIP

56" MIN.

CORPORATION STOP

AY MCDONALD 2030T 2" BALL VALVE WITH HANDLE OR APPROVED EQUIVALENT.

8"

6" MIN (TYP.)

#57 STONE

4-4"x8"x16" SOLID CINDER BLOCKS EQUALLY SPACED AROUND RISER

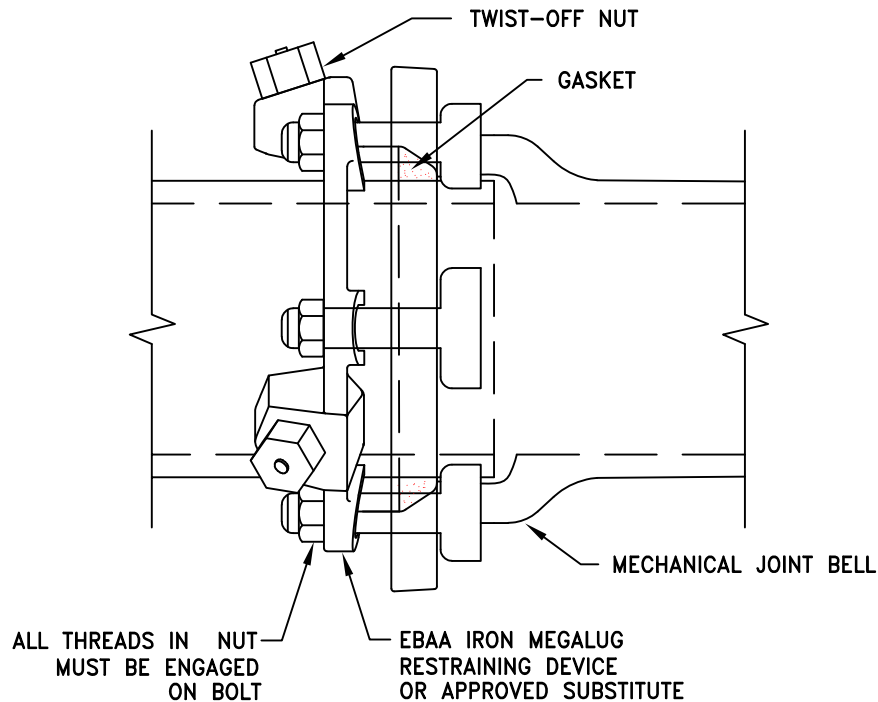
DUCTILE IRON SERVICE SADDLE WITH STAINLESS STEEL DOUBLE STRAPS & BOLTS.

1. AIR RELEASE VALVE SHALL BE SIMPLEX TYPE "AV" "CRISPIN UNIVERSAL" OR APPROVED SUBSTITUTE. VALVE SHALL HAVE 2" DIAMETER SCREWED CONNECTION AND SHALL FUNCTION AT WORKING PRESSURE UP TO 150 PSI.
2. PIPE TO BE GROUTED IN AT DOG HOUSE OPENINGS.
3. DUCTILE IRON SERVICE SADDLE WITH STAINLESS STEEL DOUBLE STRAPS AND BOLTS SHALL BE "MUELLER DR2S" OR APPROVED SUBSTITUTE.
4. 2" PIPE SHALL BE THREADED DUCTILE IRON MADE BY HARCO OR APPROVED SUBSTITUTE.
5. MANHOLE STEPS TO BE AMERICAN STEP COMPANY ML-10-TDS-SSR OR APPROVED EQUIVALENT.



WATER DISTRIBUTION SYSTEM
AIR RELEASE VALVE
N.T.S.

W-16
REV-2018



NOMINAL PIPE SIZE (INCHES)	NUMBER OF TWIST-OFF NUTS	NUMBER OF T-BOLTS	RATED PRESSURE
3	2	4	350 PSI
4	2	4	350 PSI
6	3	6	350 PSI
8	4	6	350 PSI
10	6	8	350 PSI
12	8	8	350 PSI
16	12	12	350 PSI
18	12	12	250 PSI
24	16	16	250 PSI
30	20	20	250 PSI
36	24	24	250 PSI
42	28	28	250 PSI

NOTES:

1. MAKE ANY JOINT DEFLECTION NECESSARY BEFORE TORQUING THE T-HEAD BOLTS.
2. TIGHTEN T-HEAD BOLTS, BOTTOM FIRST, THEN TOP, SIDES AND REMAINDER.
3. REPEAT NOTE #2 UNTIL ALL T-BOLTS ARE PROPERLY TORQUED.
4. TIGHTEN TWIST-OFF NUTS SO THAT ALL WEDGES FIRMLY CONTACT PIPE.
5. TIGHTEN TWIST-OFF NUTS IN ALTERNATING MANNER, SHEARING OFF NUTS.
6. MEGALUG MAY BE RESET OR REUSED BY ASSEMBLY AS DESCRIBED ABOVE AND TORQUING WEDGE BOLTS TO 90 FT. LBS.



JOINT RESTRAINT DEVICE N.T.S.

W-17
REV-2018

SOIL PROPERTIES	SIZE	CONCRETE BLOCK DIMENSIONS AT 150 PSI PRESSURE				ADD TO DIMENSION D FOR EACH ADD 50 PSI PRESSURE UP TO 300 PSI	Adjustment For Conc. Area For Different Height HC To Be Measured From Grade to Q Of Pipe			
		D	E	F	G		Up To 8'	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
CS = 1000 PSF $\phi = 15^\circ$ SOFT SILTY CLAY OR BETTER	3"	6"	1'-0"	6"	7"	2"	CONC. BLOCK AREA = 1.0 X D X E	CONC. BLOCK AREA = 0.875 X D X E	CONC. BLOCK AREA = 0.75 X D X E	CONC. BLOCK AREA = 0.625 X D X E
	4"	6"	1'-0"	6"	7"	2"				
	6"	8"	1'-2"	6"	8"	2"				
	8"	1'-0"	1'-4"	8"	8"	4"				
	10"	1'-3"	1'-6"	8"	10"	4"				
	12"	1'-6"	1'-8"	1'-0"	1'-0"	6"				
	16"	2'-0"	2'-0"	1'-0"	1'-3"	6"				
	20"	2'-6"	2'-6"	1'-0"	1'-6"	9"				
	24"	3'-0"	3'-0"	1'-0"	1'-6"	9"				
	30"	4'-0"	3'-6"	1'-4"	1'-9"	1'-0"				
CS = 0 $\phi = 15^\circ$ LOOSE SILTY SAND	3"	1'-0"	1'-6"	6"	9"	2"	CONC. BLOCK AREA = 1.0 X D X E	CONC. BLOCK AREA = 0.5 X D X E	CONC. BLOCK AREA = 0.375 X D X E	CONC. BLOCK AREA = 0.25 X D X E
	4"	1'-6"	2'-0"	6"	9"	2"				
	6"	2'-0"	2'-0"	6"	1'-0"	2"				
	8"	3'-4"	2'-0"	8"	1'-0"	4"				
	10"	4'-2"	2'-3"	8"	1'-0"	4"				
	12"	4'-8"	2'-9"	1'-0"	1'-6"	6"				
	16"	5'-9"	3'-6"	1'-0"	1'-6"	6"				
	20"	7'-10"	4'-0"	1'-0"	2'-0"	9"				
	24"	9'-10"	5'-0"	1'-6"	2'-0"	9"				
	30"	11'-8"	6'-0"	2'-0"	2'-0"	1'-0"				

DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA.

DIMENSION F & G SHALL REMAIN SAME.

DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.

NOTES:

1. FC = 3,000 PSI AT 28 DAYS.
2. CS = SOIL COHESION IN PSF AND ϕ = ANGLE OF INTERNAL FRICTION.
3. CARRY ALL BEARING SURFACES TO UNDISTURBED GROUND OR FIRM SUB-GRADE.
4. CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE SERVICE AUTHORITY FIELD INSPECTOR, AND WHEN JOINT RESTRAINT IS INADEQUATE OR INFEASIBLE.



BUTTRESSES FOR 22½° HORIZONTAL BEND

W-18
REV-2018

SOIL PROPERTIES	SIZE	Concrete Block Dimensions At 150 PSI Pressure				Add To Dimension D For Each Add 50 PSI Pressure Up To 300 PSI	Adjustment For Conc. Area For Different Height HC To Be Measured From Grade to ϕ Of Pipe			
		D	E	F	G		Up To 8'	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
CS = 1000 PSF $\phi = 15^\circ$ SOFT SILTY CLAY OR BETTER	3"	9"	1'-0"	6"	6"	4"	CONC. BLOCK AREA 1.0 X D X E	CONC. BLOCK AREA 0.875 X D X E	CONC. BLOCK AREA 0.75 X D X E	CONC. BLOCK AREA 0.625 X D X E
	4"	9"	1'-0"	6"	6"	4"				
	6"	1'-0"	1'-2"	6"	8"	4"				
	8"	1'-6"	1'-4"	8"	9"	6"				
	10"	2'-0"	1'-6"	8"	10"	6"				
	12"	2'-6"	1'-8"	1'-0"	1'-0"	9"				
	16"	3'-6"	2'-6"	1'-0"	1'-3"	9"				
	20"	4'-8"	2'-6"	1'-0"	1'-4"	1'-4"				
	24"	5'-0"	3'-0"	1'-0"	1'-9"	2'-0"				
	30"	6'-0"	4'-0"	1'-4"	2'-3"	2'-0"				
CS = 0 $\phi = 15^\circ$ LOOSE SILTY SAND	3"	1'-6"	1'-6"	6"	1'-0"	4"	CONC. BLOCK AREA 1.0 X D X E	CONC. BLOCK AREA 0.5 X D X E	CONC. BLOCK AREA 0.375 X D X E	CONC. BLOCK AREA 0.25 X D X E
	4"	2'-0"	2'-0"	6"	1'-0"	4"				
	6"	3'-0"	2'-0"	6"	1'-0"	4"				
	8"	4'-0"	2'-6"	8"	1'-0"	6"				
	10"	6'-0"	2'-6"	8"	1'-0"	6"				
	12"	7'-0"	3'-0"	1'-0"	1'-6"	9"				
	16"	11'-0"	4'-0"	1'-0"	1'-6"	9"				
	20"	11'-8"	5'-0"	1'-0"	2'-0"	1'-4"				
	24"	12'-6"	6'-0"	1'-6"	2'-0"	2'-0"				
	30"	20'-0"	6'-0"	2'-0"	2'-6"	2'-0"				

DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA.

DIMENSION F & G SHALL REMAIN SAME.

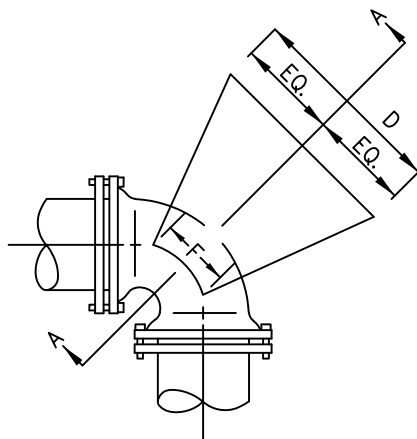
DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.

CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE SERVICE AUTHORITY FIELD INSPECTOR.

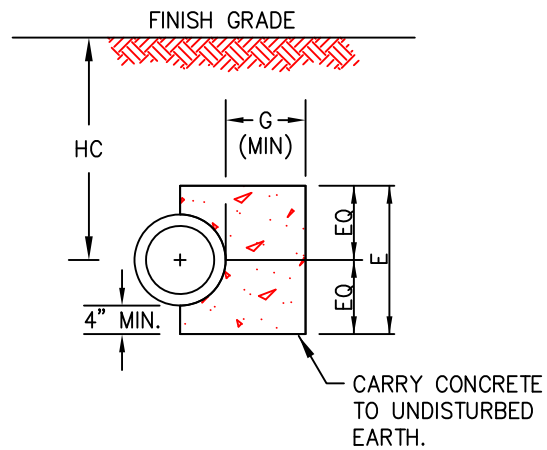


BUTTRESSES FOR 45° HORIZONTAL BEND

W-19
REV-2018



PLAN



SECTION A-A

SIZE	Concrete Block Dimensions At 150 PSI Pressure				Add to Dimension "D" For Each Add'l 50 PSI Pressure Up To 300 PSI	Adjustment for Conc. Area For Different Height (HC) To Be Measured From Grade To C of Pipe			
	D	E	F	G		Up To 8'-0"	8'-1" To 12'	12'-1" To 16'	16'-1" To 20'
3"	2'-6"	2'-0"	8"	1'-0"	6"	CONC. BLOCK AREA 1.0 X D X E	C. B. A. 0.5 X D X E	C. B. A. 0.375 X D X E	C. B. A. 0.25 X D X E
4"	3'-4"	2'-0"	8"	1'-0"	6"				
6"	5'-2"	2'-0"	1'-0"	1'-6"	6"				
8"	6'-8"	2'-6"	1'-0"	1'-6"	9"				
10"	10'-0"	3'-0"	1'-6"	1'-6"	9"				
12"	10'-0"	4'-0"	1'-6"	2'-0"	1'-0"				
16"	12'-6"	5'-0"	2'-0"	2'-0"	1'-0"				
20"	15'-10"	6'-0"	2'-0"	2'-0"	2'-0"				

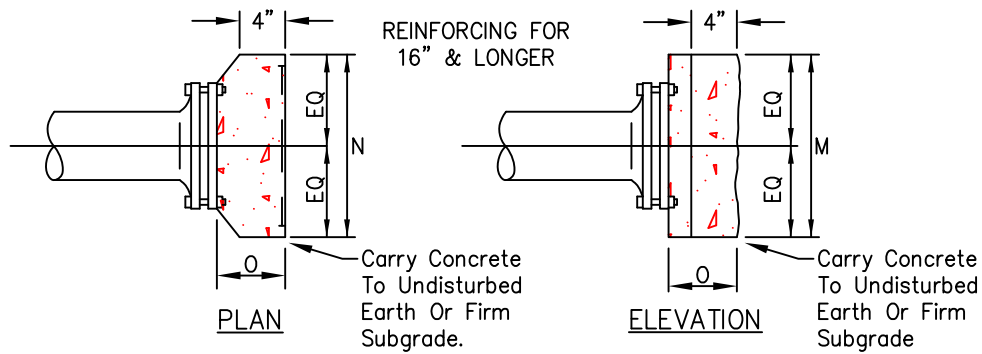
DIMENSION D & E SHALL BE ADJUSTED FOR REQUIRED AREA.
 DIMENSION F & G SHALL REMAIN SAME.
 DIMENSION D SHALL BE ADJUSTED FOR REQUIRED PRESSURE IN EXCESS
 OF 150 PSI BEFORE MAKING ADJUSTMENT FOR HEIGHT.
 SPECIAL DESIGN REQUIRED FOR LINES 24" OR GREATER IN DIAMETER.
 CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE
 SERVICE AUTHORITY FIELD INSPECTOR.



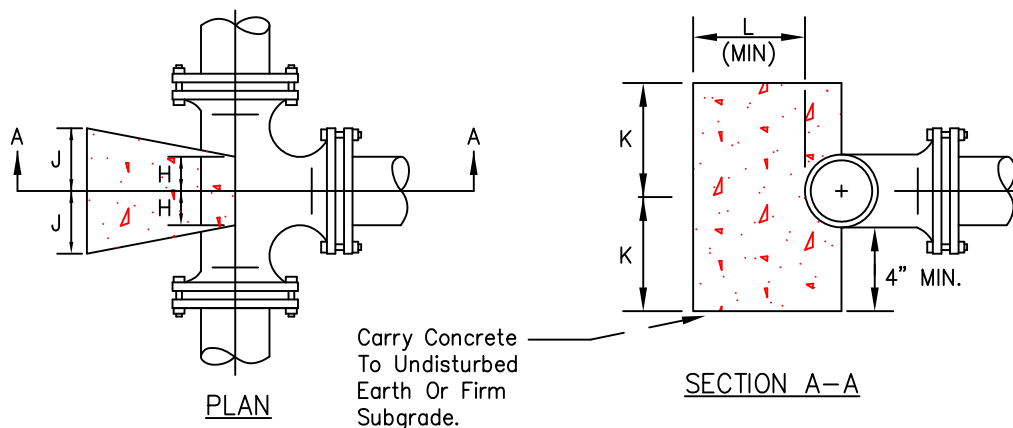
BUTTRESSES FOR 90° HORIZONTAL BEND

N.T.S.

W-20
REV-2018



BUTTRESS FOR PLUGS & CAPS										
	SIZE									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
M	*	*	*	2'-6"	2'-8"	3'-6"	4'-8"	6'-0"	6'-8"	8'-0"
N	*	*	*	1'-6"	2'-2"	2'-6"	3'-4"	4'-0"	5'-0"	6'-8"
O	*	*	*	10"	1'-0"	1'-2"	1'-4"	1'-6"	1'-8"	2'-0"
REINFORCE WITH 66" EW										



BUTTRESS FOR TEES										
	SIZE OF BRANCH									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
J	6"	6"	8"	9"	1'-1"	1'-3"	1'-8"	2'-0"	2'-6"	3'-4"
K	6"	8"	10"	1'-3"	1'-4"	1'-9"	2'-4"	3'-0"	3'-4"	4'-0"
L	6"	6"	8"	9"	10"	12"	1'-2"	1'-6"	1'-8"	2'-0"
H	4"	4"	6"	6"	6"	6"	8"	1'-0"	1'-0"	1'-0"

AREA OF BLOCK = 2J X 2K

NOTE: TAPPING ASSEMBLIES & SLEEVES
TO BE CONCRETE BLOCKED AS
COMPARABLE SIZED TEES

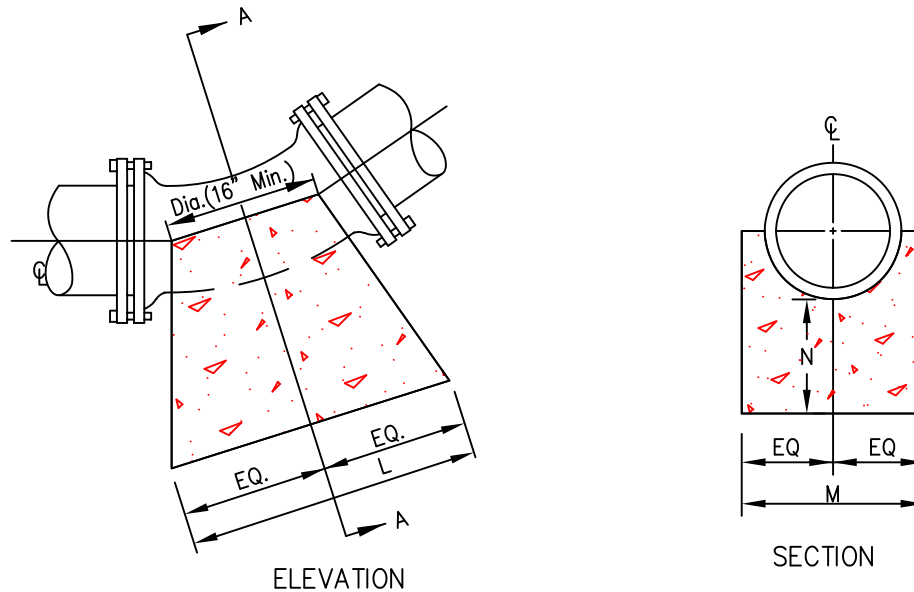
NOTES:

1. $F_c = 3000$ PSI AT 28 DAYS.
2. THE BUTTRESS DIMENSIONS ARE BASED ON THE WATER PRESSURE OF 150 PSI WHERE THE PRESSURE IS DIFFERENT, THE AREA OF BLOCK SHALL BE PROPORTIONED TO REQUIRED PRESSURE
3. CARRY ALL BEARING SURFACES TO UNDISTURBED GROUND OR FIRM SUBGRADE
4. CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE SERVICE AUTHORITY FIELD INSPECTOR.



BUTTRESSES FOR TEES, PLUGS, & CAPS N.T.S.

W-21
REV-2018



BUTTRESS FOR LOWER VERTICLE BENDS											
BEND		SIZE									
		3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11-1/4°	L	6"	6"	6"	8"	8"	8"	1'-1"	1'-5"	1'-10"	2'-8"
	M	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-0"	3'-4"
	N	8"	8"	8"	8"	8"	8"	9"	10"	12"	1'-2"
22-1/2°	L	6"	6"	10"	11"	1'-3"	1'-4"	2'-1"	2'-9"	3'-7"	3'-3"
	M	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-0"	3'-2"
	N	8"	8"	8"	8"	9"	9"	12"	1'-2"	1'-4"	1'-6"
45°	L	10"	1'-0"	1'-2"	1'-9"	2'-5"	2'-8"	4'-0"	5'-6"	6'-0"	8'-2"
	M	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-6"	4'-0"
	N	8"	8"	8"	8"	12"	1'-2"	1'-6"	2'-0"	2'-6"	3'-0"

NOTES:

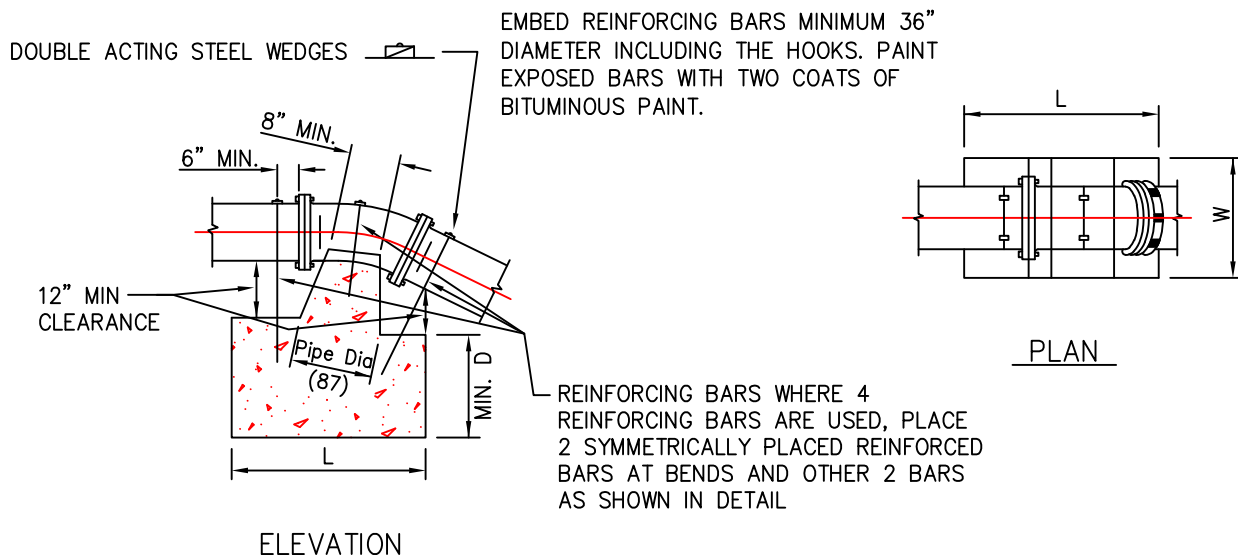
1. $F_c = 3000$ PSI AT 28 DAYS.
2. CARRY ALL BEARING SURFACES TO UNDISTURBED EARTH OR FIRM SUBGRADE.
3. THE BUTTRESS DIMENSIONS ARE BASED ON THE WATER PRESSURE OF 150 PSI AND SOIL BEARING PRESSURE OF 2500 PSI. WHERE THE WATER PRESSURE AND SOIL BEARING PRESSURE ARE DIFFERENT, THE AREA OF CONCRETE BLOCK (I.E. L & M) SHALL BE PROPORTIONED ACCORDINGLY. AREA ADJUSTMENT FOR REQUIRED PRESSURE SHALL BE MADE FIRST BEFORE MAKING ADJUSTMENT FOR SOIL BEARING PRESSURE.
4. CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE SERVICE AUTHORITY FIELD INSPECTOR.



BUTTRESS FOR 11¼°, 22½°, & 45° LOWER VERTICAL BENDS

N.T.S.

W-22
REV-2018



BEND		SIZE									
		3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11-1/4°	L	1'-6"	1'-6"	2'-0"	2'-0"	2'-3"	2'-6"	3'-3"	4'-0"	4'-6"	5'-0"
	W	1'-6"	1'-6"	2'-0"	2'-0"	2'-3"	2'-6"	3'-3"	4'-0"	4'-6"	5'-0"
	D	1'-6"	1'-6"	1'-6"	2'-0"	2'-0"	2'-3"	2'-6"	2'-6"	3'-0"	3'-0"
	REINFOR. BARS NO & SIZE	3 #5	3 #5	3 #5	3 #6	3 #6	3 #6	3 #6	3 #8	3 #8	3 #8
22-1/2°	L	1'-6"	2'-0"	2'-6"	2'-9"	3'-6"	4'-0"	4'-6"	5'-6"	6'-0"	7'-0"
	W	1'-6"	2'-0"	2'-6"	2'-9"	3'-6"	4'-0"	4'-6"	5'-6"	6'-0"	7'-0"
	D	1'-6"	1'-6"	2'-0"	2'-3"	2'-3"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"
	REINFOR. BARS NO & SIZE	3 #5	3 #5	3 #5	3 #6	3 #6	4 #6	4 #6	3 #8	4 #8	4 #8
45°	L	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	6'-0"	7'-6"	8'-6"	10'-0"
	W	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	6'-0"	7'-6"	8'-6"	10'-0"
	D	1'-6"	2'-0"	2'-0"	2'-6"	2'-9"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
	REINFOR. BARS NO & SIZE	3 #5	3 #5	3 #5	3 #6	4 #6	4 #6	4 #8	4 #8	4 #8	4 #9

NOTES:

1. $F_c=3000$ PSI AT 28 DAYS.
2. CARRY ALL BEARING SURFACES TO UNDISTURBED EARTH OR FIRM SUBGRADE.
3. THE ANCHORAGE DIMENSIONS ARE BASED ON THE WATER PRESSURE OF 150 PSI. WHERE THE PRESSURE IS DIFFERENT, THE VOLUME OF THE CONCRETE (I.E. $L \times W \times D$) SHALL BE PORPORTIONED TO REQUIRED PRESSURE.
4. CONCRETE THRUST BLOCKING TO BE USED ONLY AT THE DISCRETION OF THE SERVICE AUTHORITY FIELD INSPECTOR.



ANCHORAGE FOR 11¼°, 22½° and
45° UPPER VERTICAL BENDS
N.T.S.

W-23
REV-2018

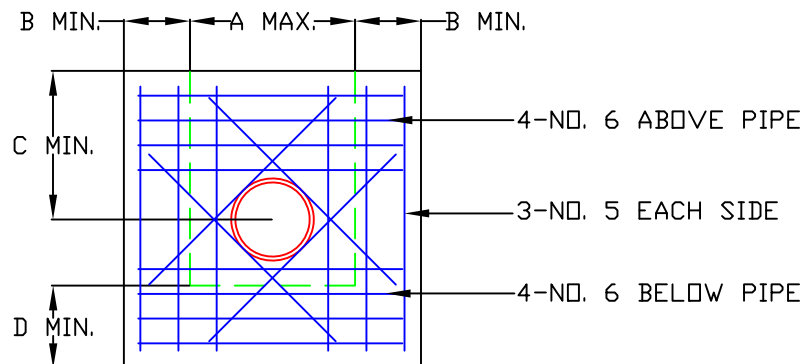
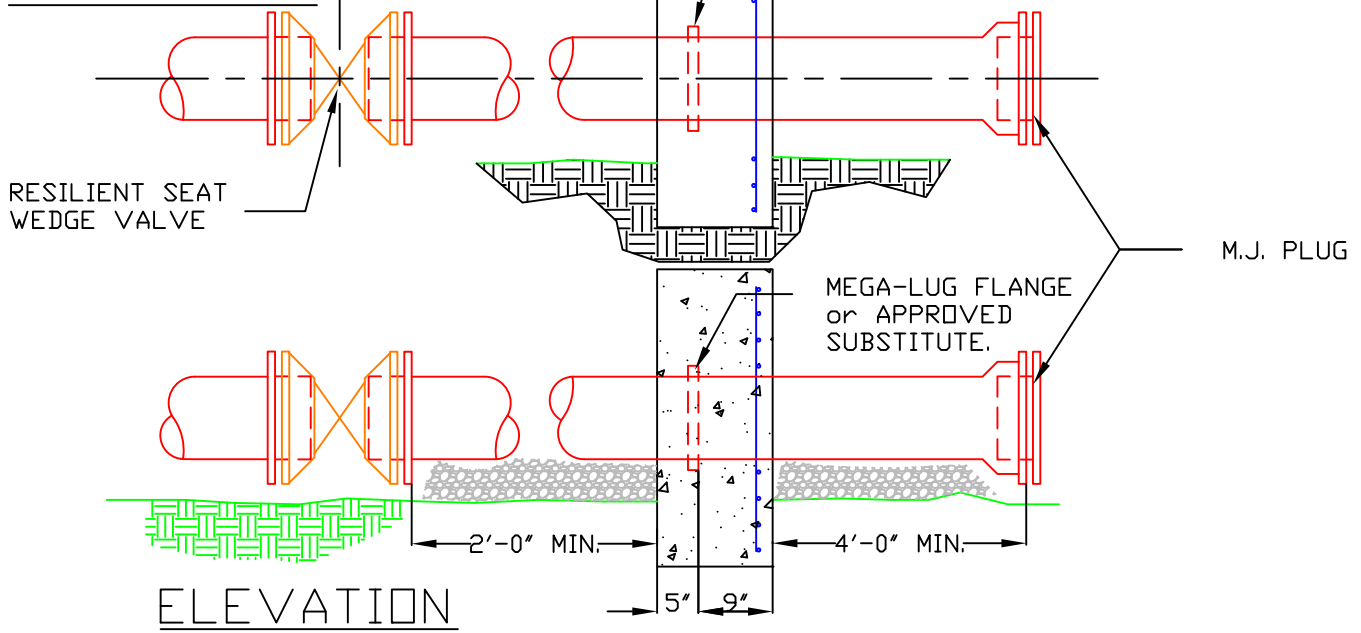
NOTES:

1. BEARING AREA IS BASED ON 200 PSI TEST PRESSURE OF 2,000 LBS. PER SQUARE FOOT. INCREASE BLOCK DIMENSIONS AS REQUIRED IN SOILS WITH LOWER BEARING VALUES.
2. EXTEND DEAD END ANCHOR AS NECESSARY INTO UNDISTURBED SOIL AS INDICATED ON CHART.
3. ADDITIONAL REINFORCEMENT SHALL BE AS SPECIFIED BY THE DESIGN ENGINEER AND APPROVED BY THE SERVICE AUTHORITY.
4. ALL FORM BOARDS SHALL BE REMOVED PRIOR TO BACK FILL.
5. ANCHOR SCHEDULE TO BE COMPLETED BY THE DESIGN ENGINEER.
6. NO ALLOWANCE SHALL BE MADE FOR FRICTION BETWEEN THE PIPE WALL AND THE THRUST COLLAR.

DEAD END ANCHOR SCHEDULE

LINE SIZE	A	B	C	D
6"				
8"				
10"				
12"				

PLAN VIEW



DEAD END ANCHOR DETAIL

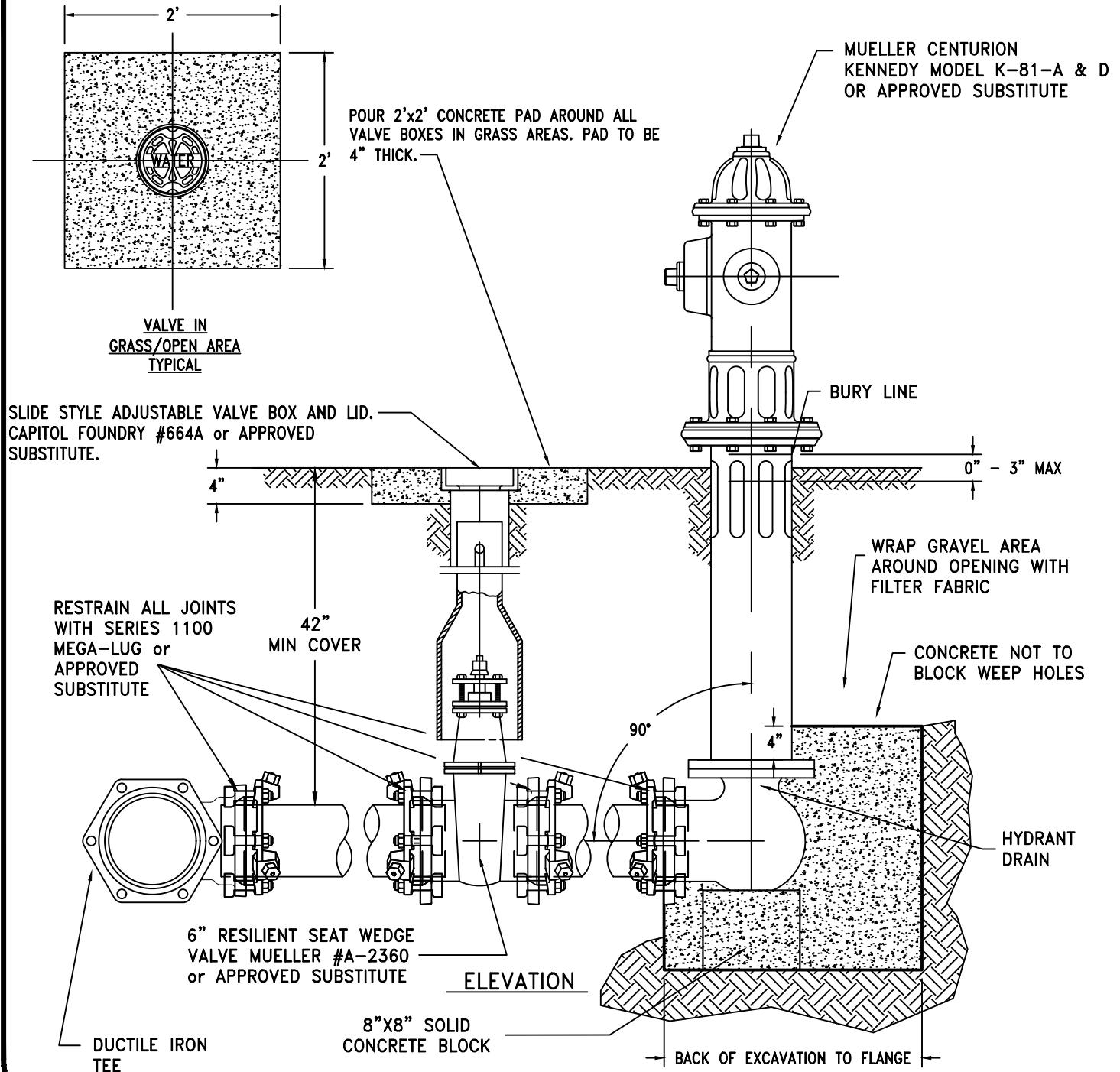
N.T.S.

W-24
REV-2018

NOTES:

1. FIRE HYDRANT TO BE SET PLUMB.
2. FINISHED GRADE NOT TO EXCEED 0 to 3" BELOW THE BURY LINE ON HYDRANT BARREL.
3. FIRE HYDRANT LEADS 50' OR GREATER SHALL HAVE AN ADDITIONAL VALVE WITHIN 6' OF HYDRANT.

4. HYDRANT BARRELS SHALL BE PAINTED SAFETY YELLOW WITH EITHER MCCORMICK COTE-ALL #335031P OR RUST-OLEUM #K7744402.



TYPICAL FIRE HYDRANT INSTALLATION DEPTHS BETWEEN 3.5 & 5.0 FEET

N.T.S.

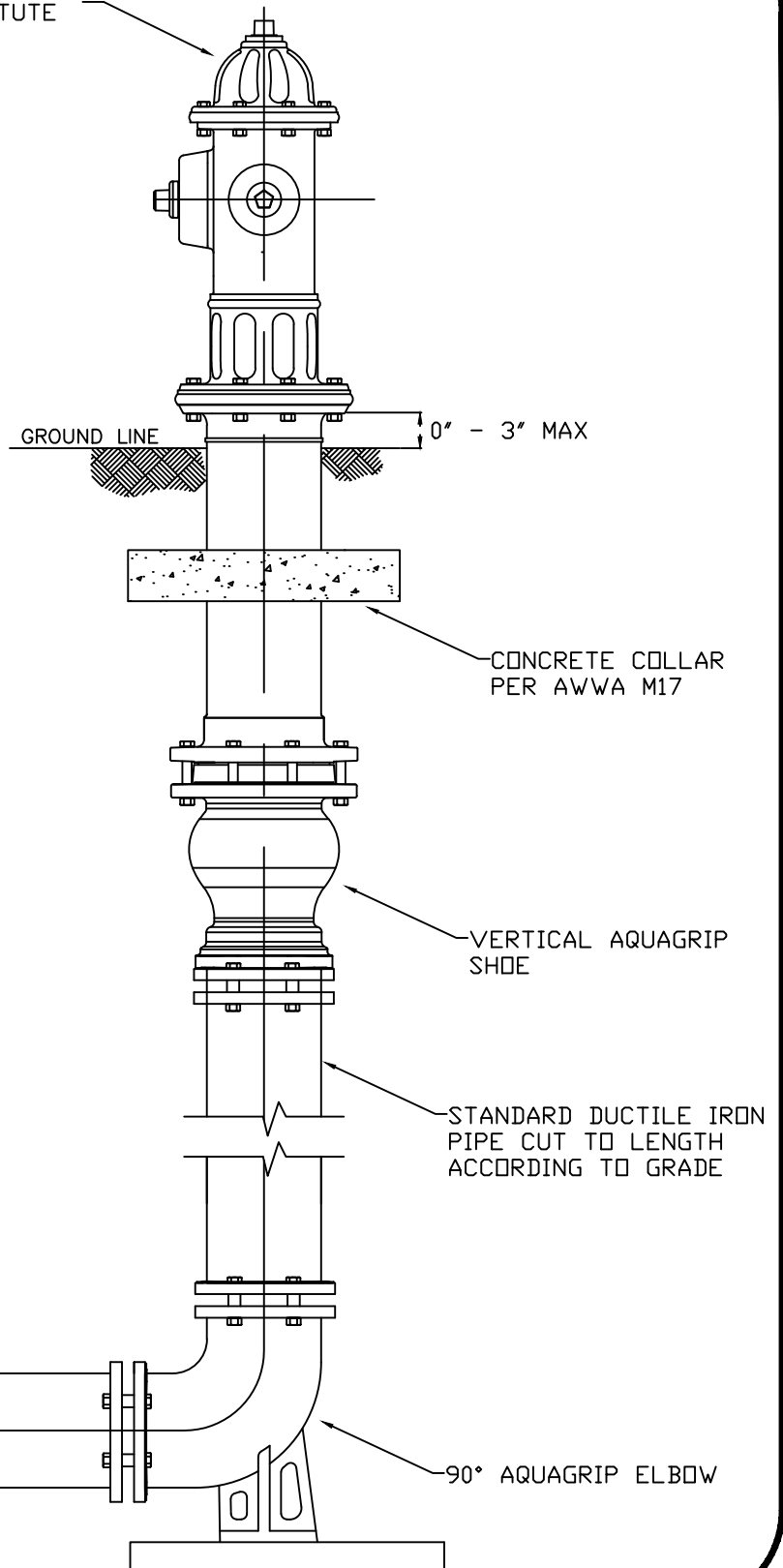
W-25
 REV-2020

MUELLER CENTURION
KENNEDY MODEL K-81-A & D
OR APPROVED SUBSTITUTE

NOTES:

1. FIRE HYDRANT TO BE SET PLUMB.
2. FINISHED GRADE NOT TO EXCEED
0 TO 3" BELOW THE BURY LINE ON
HYDRANT BARREL.
3. HYDRANT BARRELS SHALL BE PAINTED
SAFETY YELLOW EITHER MCCORMICK
COTE-ALL #335031P OR RUST-OLEUM
#K7744402.

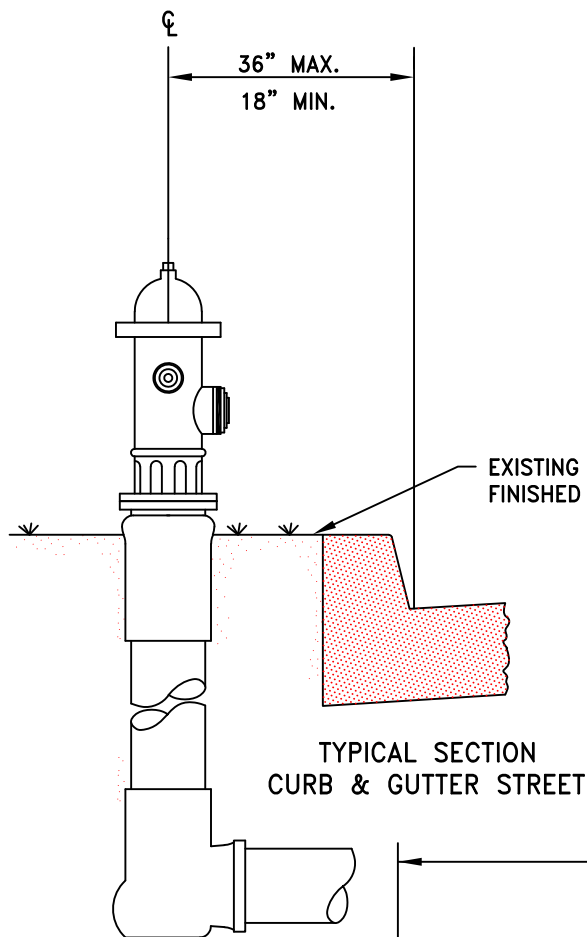
SEE DETAIL W-25
FOR GATE VALVE
REQUIREMENTS



TYPICAL FIRE HYDRANT INSTALLATION
DEPTHS BETWEEN 5.1 & 10.0 FEET

N.T.S.

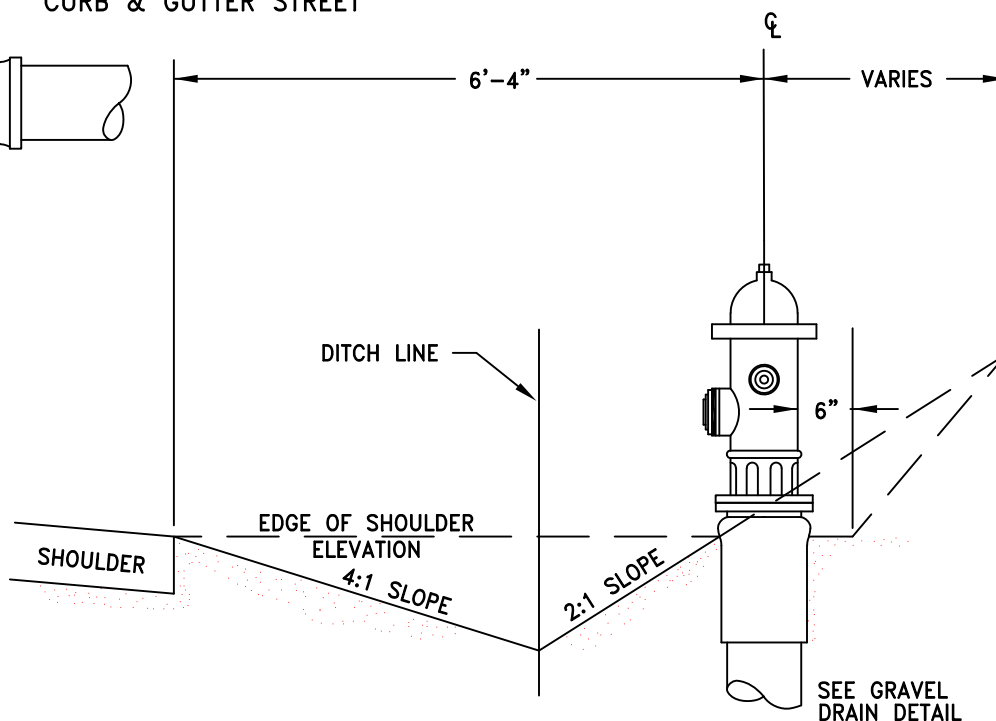
W-25A
REV-2020



NOTE:

HYDRANT SHALL CONFORM IN ALL
RESPECTS TO TYPICAL FIRE
HYDRANT DETAIL.

TYPICAL SECTION
CURB & GUTTER STREET



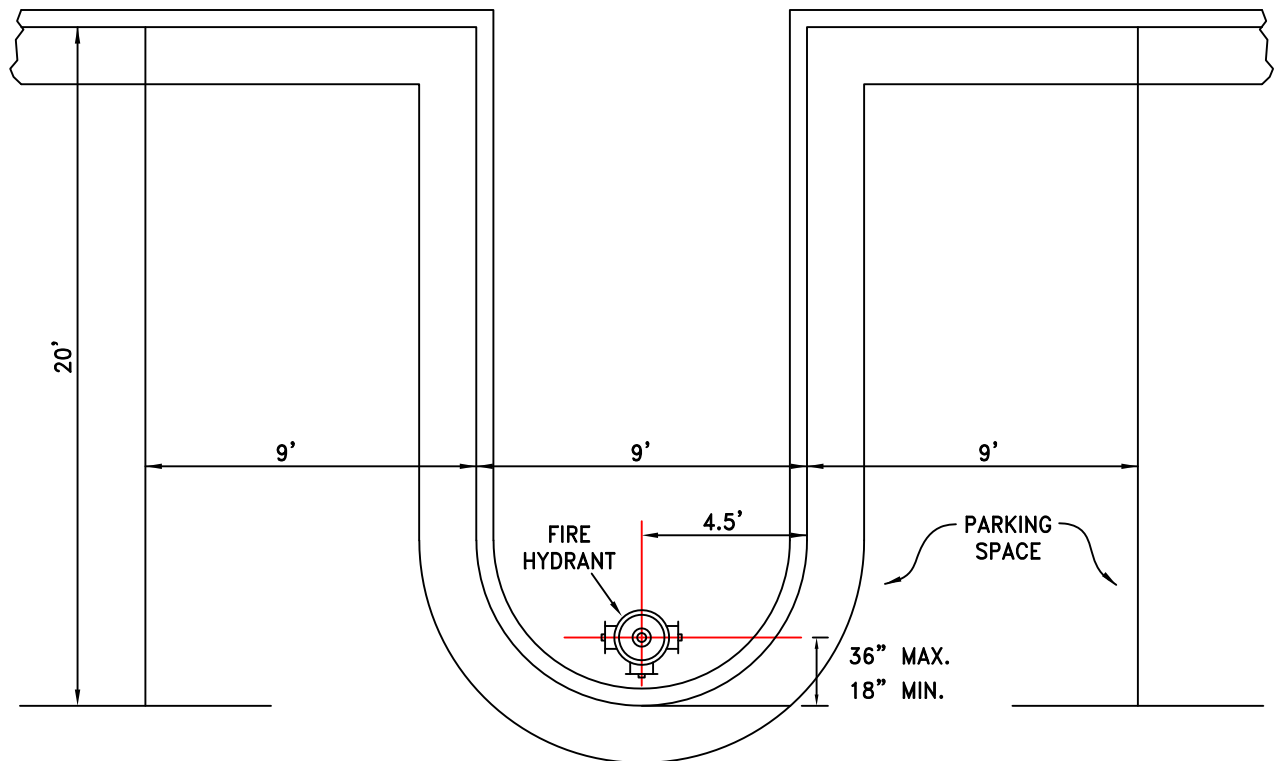
TYPICAL SECTION
STREET WITHOUT CURB & GUTTER



TYPICAL FIRE HYDRANT
LOCATION W/ CURB & GUTTER
OR DITCH LINE

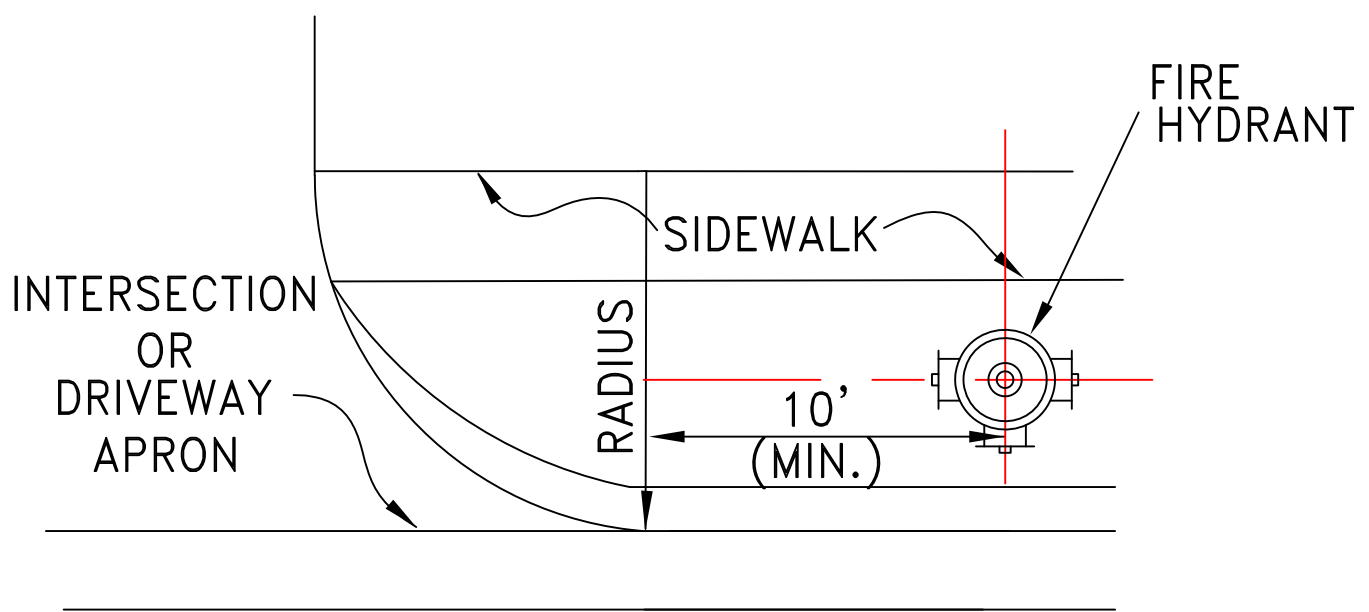
N.T.S.

W-26
REV-2018



TYPICAL FIRE HYDRANT LOCATION IN
ISLAND & PARKING AREA
N.T.S.

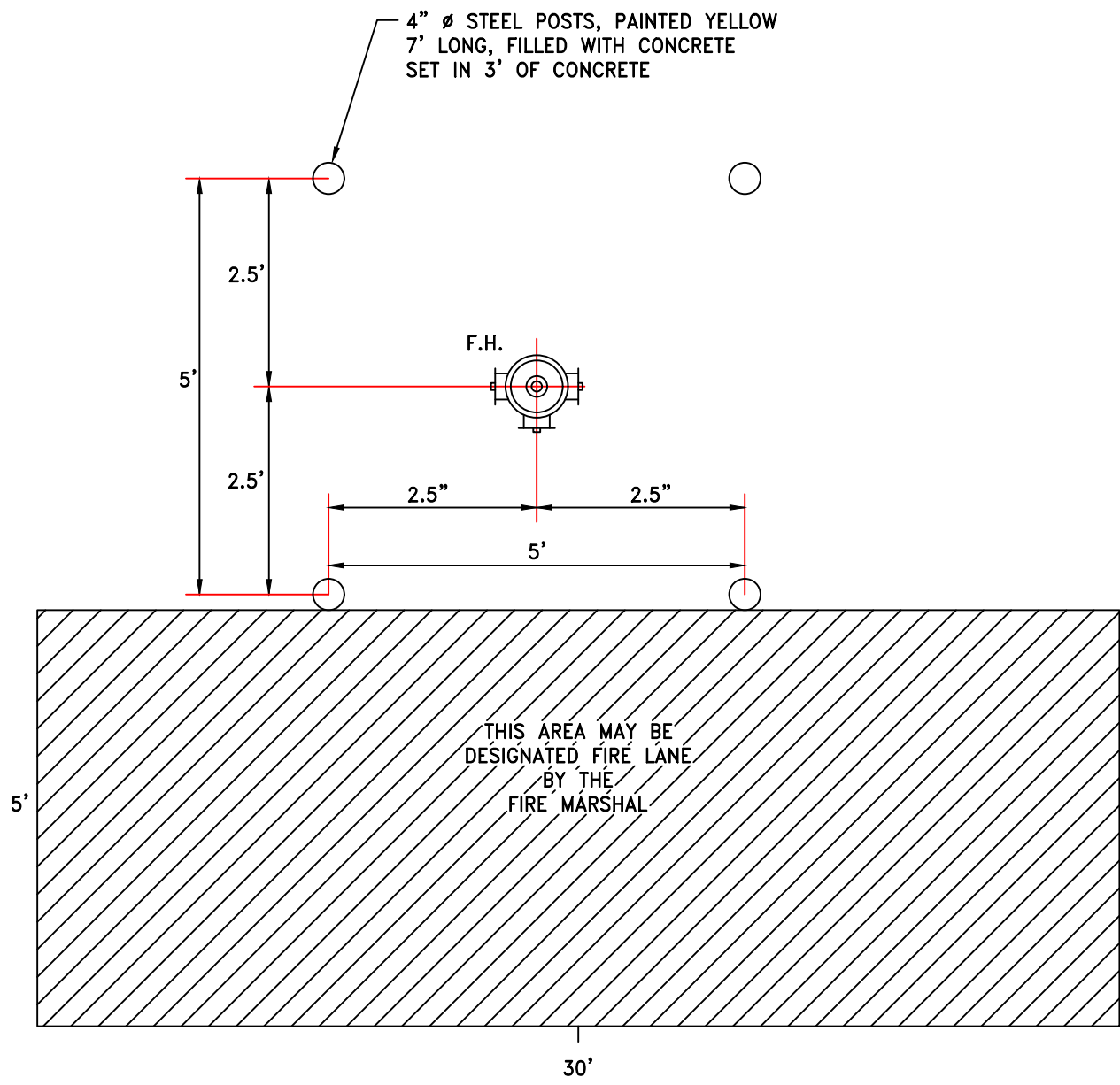
W-27
REV-2018



TYPICAL FIRE HYDRANT
LOCATION ON STREET
N.T.S.

W-28
REV-2018

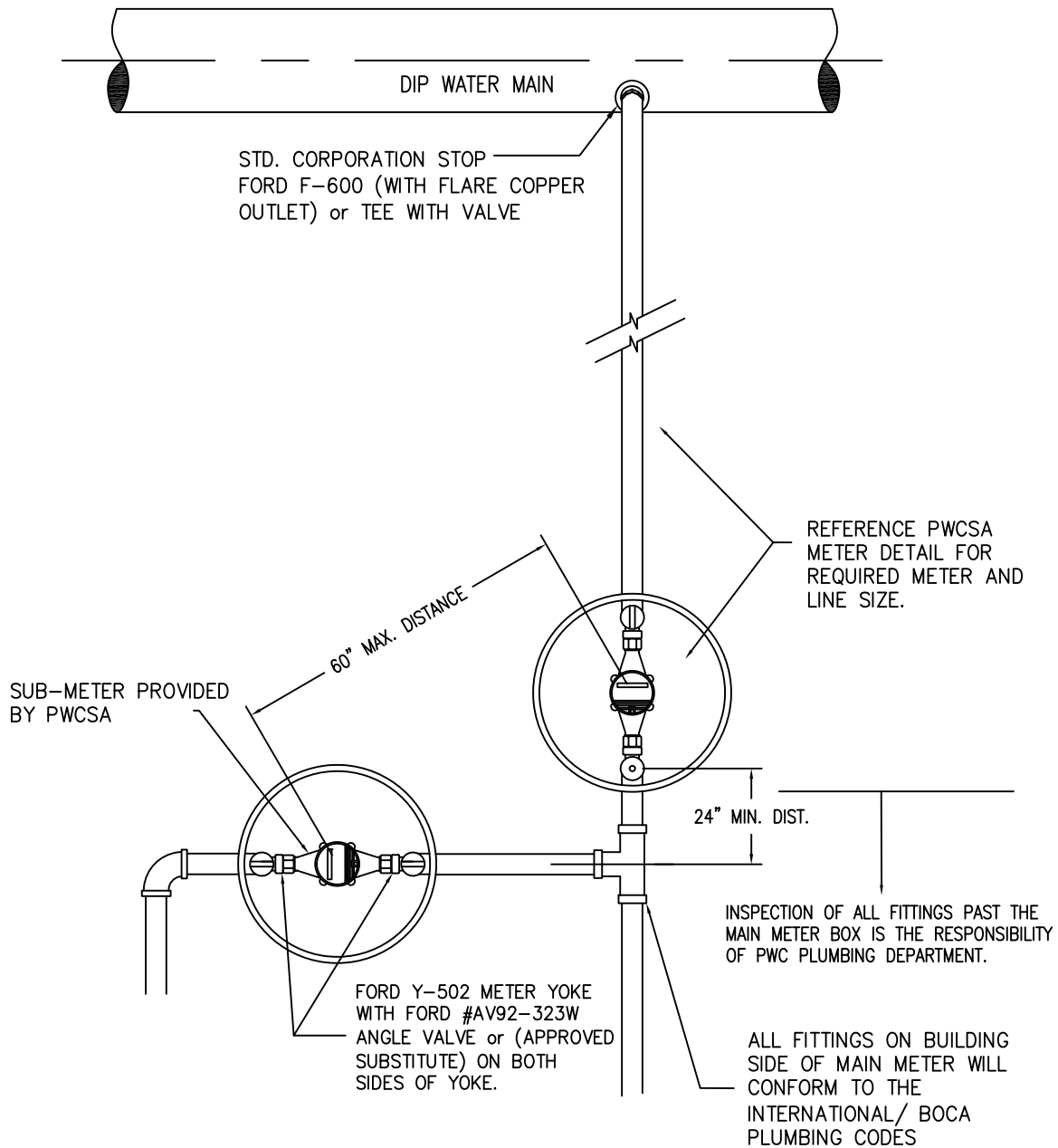
FOR INDUSTRIAL AND COMMERCIAL SITES
STEEL POSTS OF A MINIMUM 8" Ø
SHALL BE PLACED



TYPICAL FIRE HYDRANT POST PROTECTION

N.T.S.

W-29
REV-2020



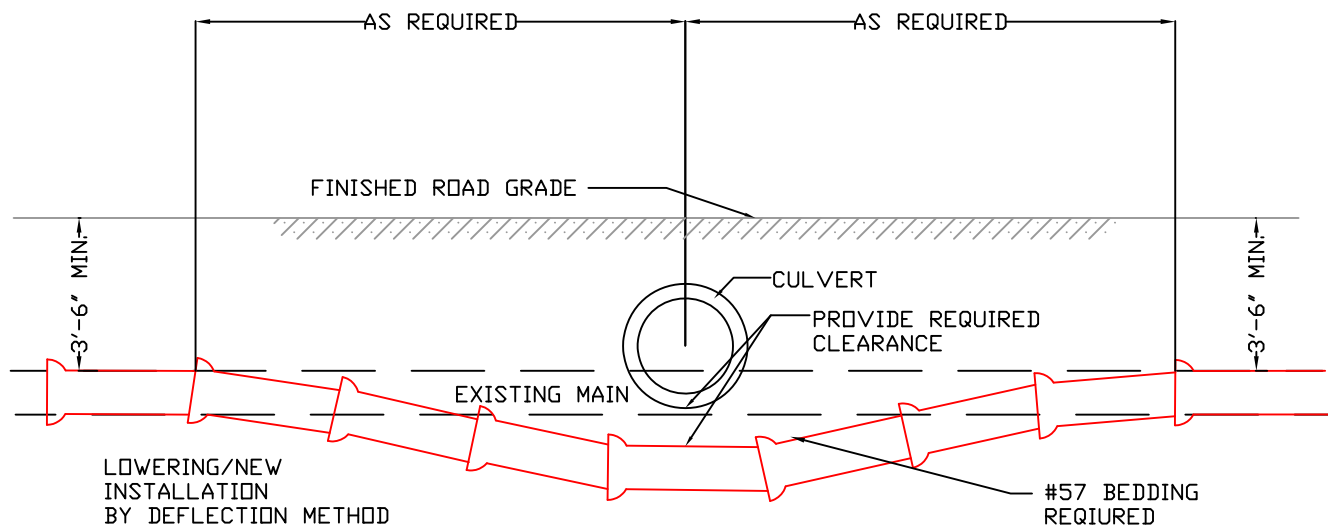
NOTES:

1. SUB-METERS FOR NEW CONSTRUCTION WILL BE LOCATED OUTSIDE WITHIN 5- FEET OF THE MAIN METER, NO EXCEPTION.
2. METERS MUST BE SET IN GRASS AREA. METERS ARE NOT PERMITTED TO BE PLACED IN PEDESTRIAN TRAVEL WAY.
3. METERS WILL BE PROVIDED BY PWCSA AND WILL REGISTER IN GALLONS.
4. METERS MUST BE SET LEVEL.
5. ONLY ONE SUB-METER IS PERMITTED PER ACCOUNT.



5/8" x 3/4" AND 1"
SUB-METER DETAIL
N.T.S.

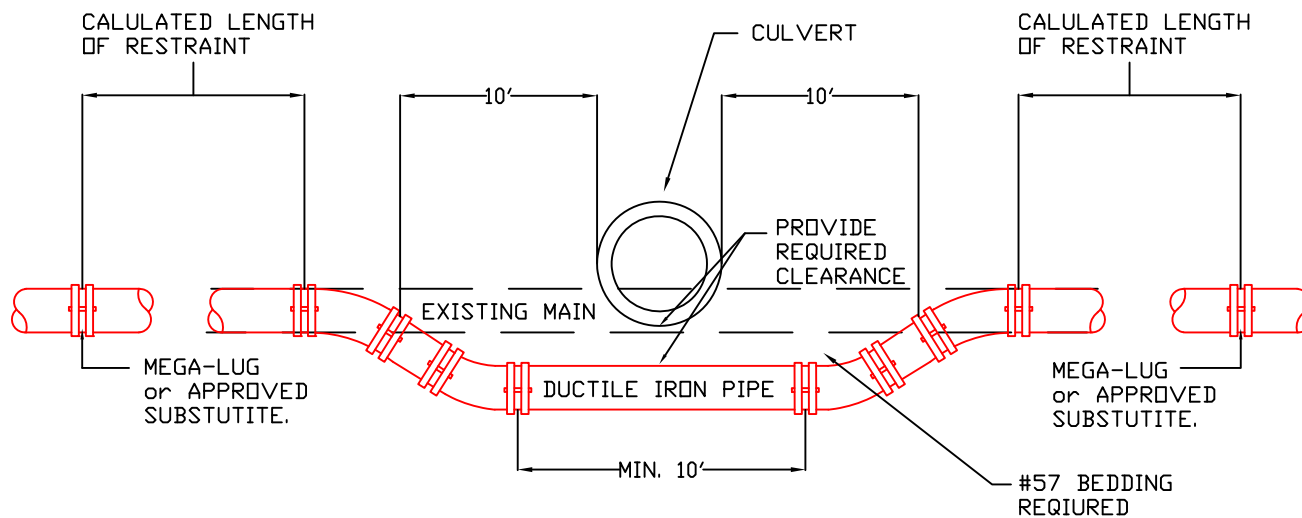
W-31
REV-2018



NOTE:

1. MAXIMUM DEFLECTION FOR EACH JOINT OF PIPE WILL NOT EXCEED MANUFACTURES RECOMMENDATIONS AND APPROVED BY PWCSA.

OR



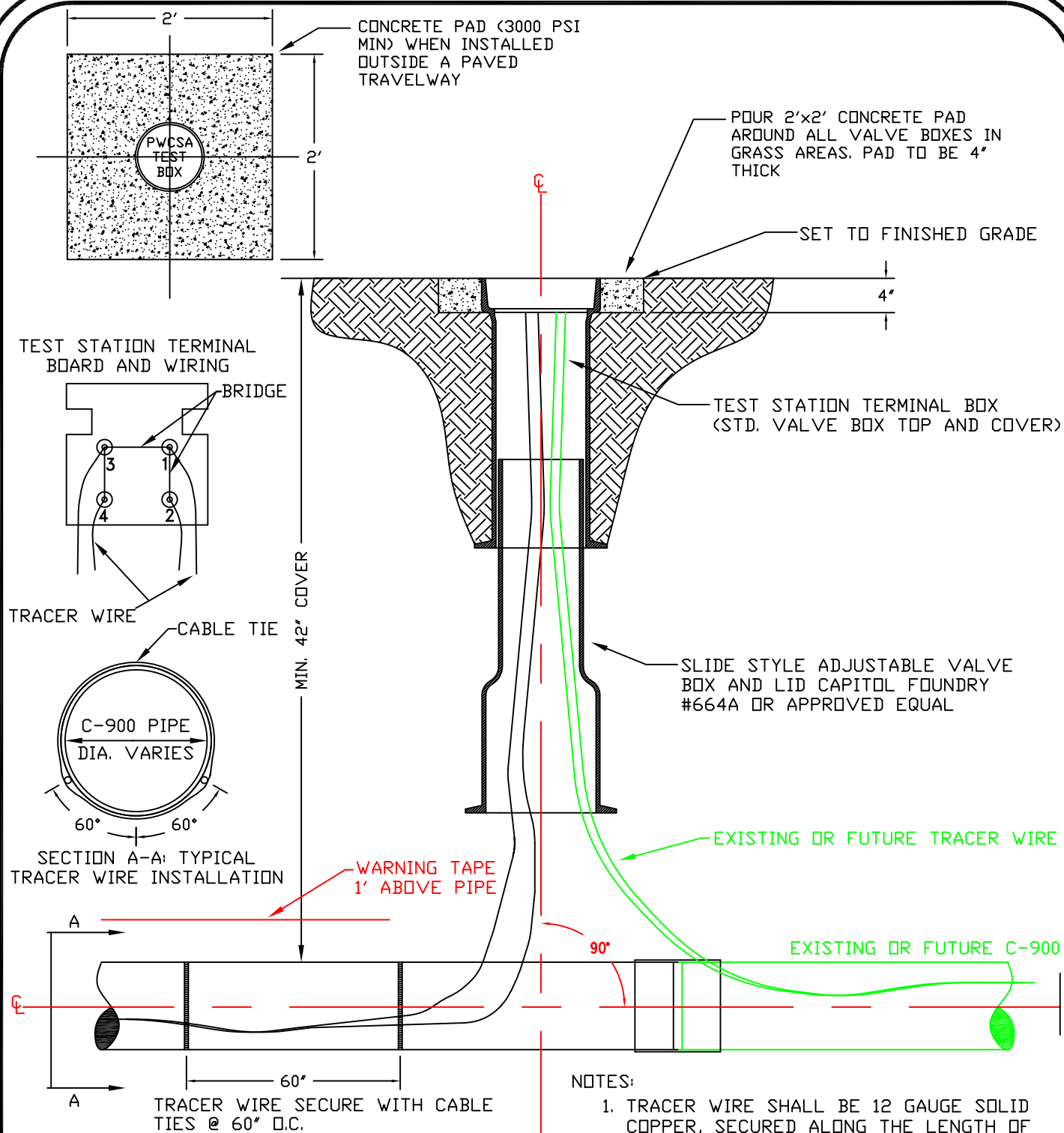
NOTE:

1. LOWERED SECTION TO BE OF DUCTILE IRON MECHANICAL JOINT PIPE WITH RESTRAINED JOINTS. THE ENGINEER SHALL CALCULATE LENGTH OF RESTRAINED SECTION.



LOWERING WATER MAIN OR NEW INSTALLATION

W-32
REV-2018



NOTES:

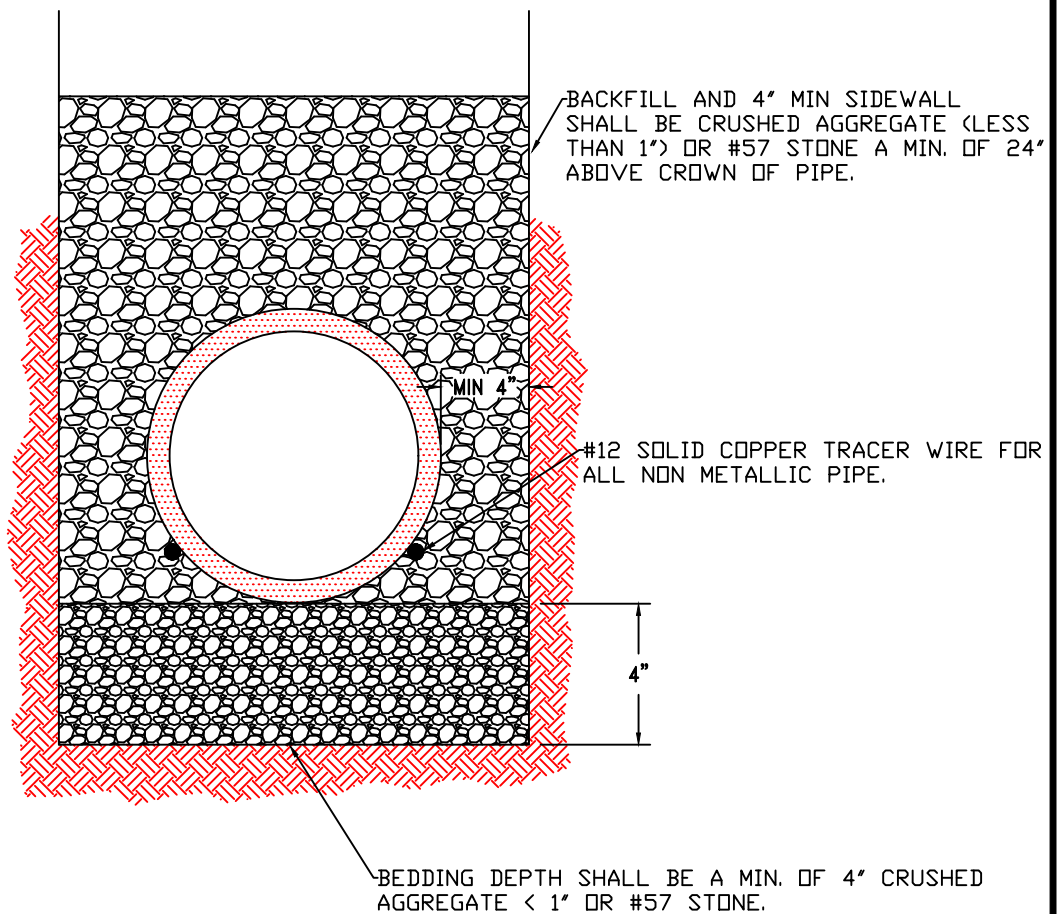
1. TRACER WIRE SHALL BE 12 GAUGE SOLID COPPER, SECURED ALONG THE LENGTH OF THE PIPE WITH CABLE TIES, 60" O.C.
2. TWO TRACER WIRES SHALL BE PROVIDED ALONG THE LENGTH OF THE PIPE. AT THE 4 AND 8 O'CLOCK POSITIONS (BOTH 60° FROM THE BOTTOM OF PIPE).



TRACER WIRE TEST STATION N.T.S.

W-33
REV-2018

BEDDING AND BACKFILL FOR ALL C-900 AND POLY-WRAPPED DIP



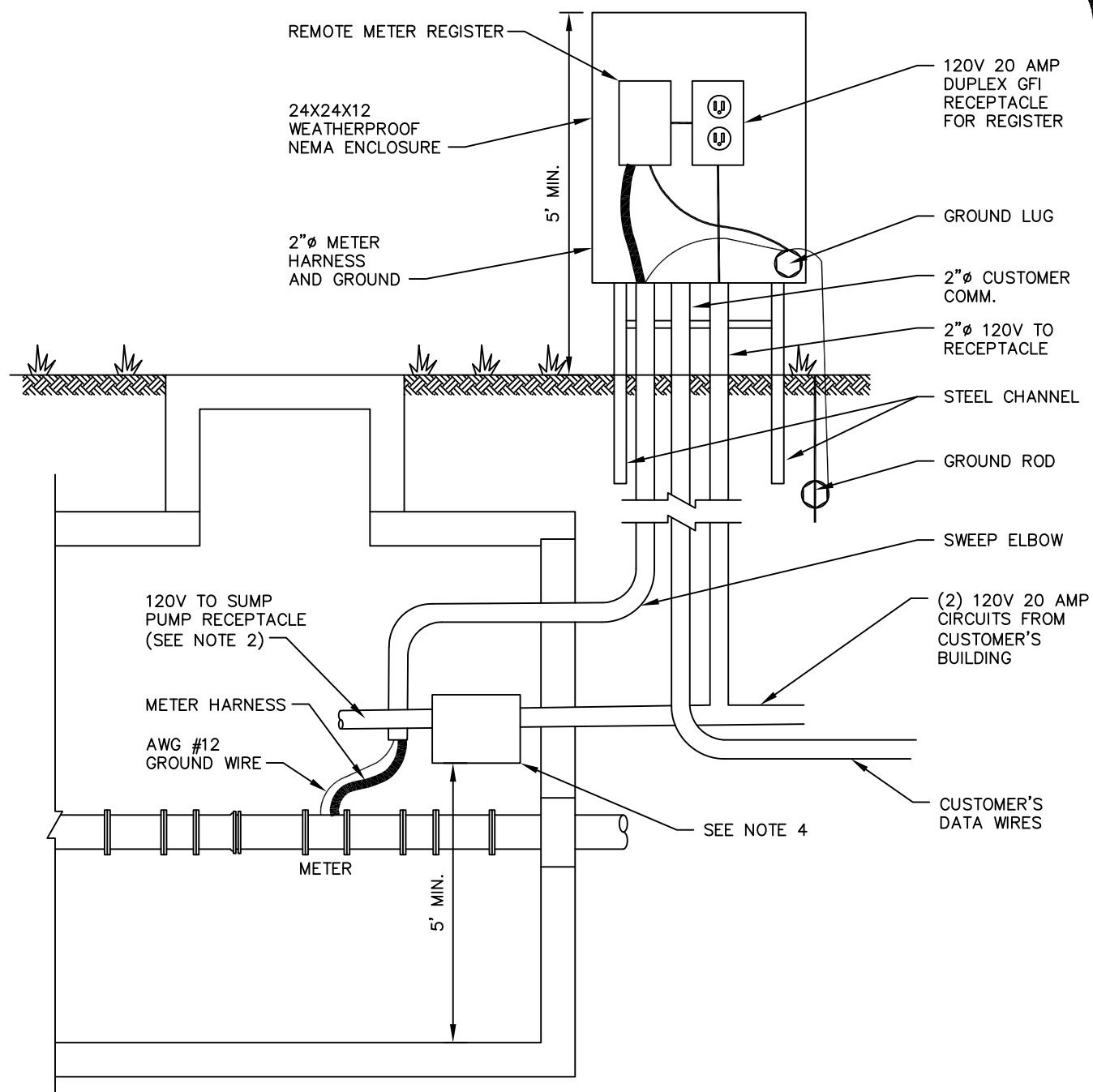
NOTES:

1. WHEN USING C-900 PIPE, MARKER BALLS TO BE PLACED AT ALL BENDS WITH A MAXIMUM DISTANCE OF 100'.
2. 6" WIDE DETECTABLE MARKING TAPE TO BE PLACED 2' ABOVE PIPE.



WATER LINE
BEDDING AND BACKFILL
N.T.S.

W-34
REV-2018



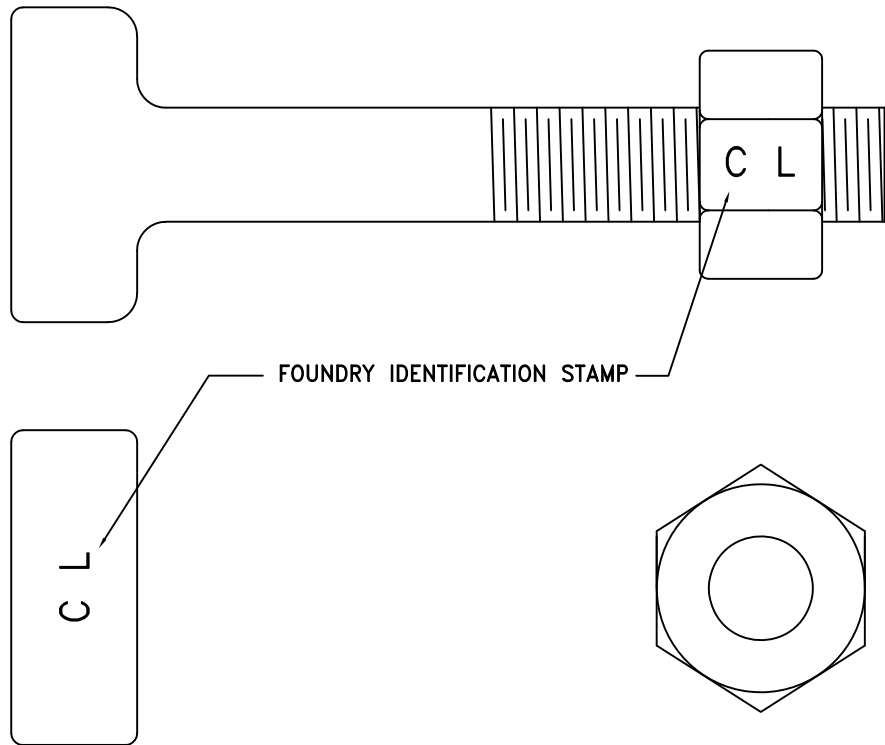
NOTES:

1. CONDUIT TO BE PVC SCHEDULE 40.
2. CONTINUE CIRCUIT TO GFI DUPLEX RECEPTACLE.
3. METER, METER HARNESS, AND CONVERTER ARE SUPPLIED BY PWCSA FOR INSTALLATION BY CONTRACTOR.
4. MUST BE WATERPROOF. MINIMUM 5' FROM BOTTOM; MULTIPLE BOXES ALLOWED.



ELECTRONICS AT
MAGNETIC METER
N.T.S.

W-36
REV-2018



SPECIFICATIONS:

1. BOLTS AND NUTS ARE MANUFACTURED IN ACCORDANCE WITH ANSI/AWWA C111/A21.11
2. MATERIAL IS HIGH STRENGTH LOW ALLOY STEEL PER ANSI/AWWA C111/A21.11
3. THREADS PER ASEM B1.1 UNIFIED STANDARD COARSE (CLASS 2A & 2B)

MECHANICAL PROPERTIES:

1. YIELD STRENGTH 45,000 PSI (MIN)
2. ELONGATION IN 2in. 20% (MIN)

CHEMICAL PROPERTIES:

CARBON	0.20% MAX
MANGANESE	1.25% MAX
SULFUR	0.05% MAX
NICKLE	0.25% MAX
COPPER	0.20% MAX
COMBINED	1.25% MAX (Ni, Cu, Cr)

OPTIONAL COATING:

T-BOLTS & NUTS HAVE A FLUROPOLYMER COATING MATERIAL WHICH IS VOC-COMPLIANT, RESIN-BONDED THERMALLY CURED AND DRYED LUDRICANT

COATING PHYSICAL PROPERTIES:

FILM THICKNESS	.03 TO .04 MIL PER COAT
NUMBER OF COATS	3 TO 4 COATS
ADHESION	1MM CROSS HATCH TEST + 5 PULLS. GOOD KNIF RESISTANCE
CURE TEST	50+ RUBS WITH MEK. NO SUBSTRATE EXPOSURE
PENCIL HARDNESS	4-6H
VOLATILE ORGANIC COMPOUNDS	2.74lbs/gal



T-BOLTS AND NUTS

HSLA STEEL

N.T.S.

W37
REV-2019

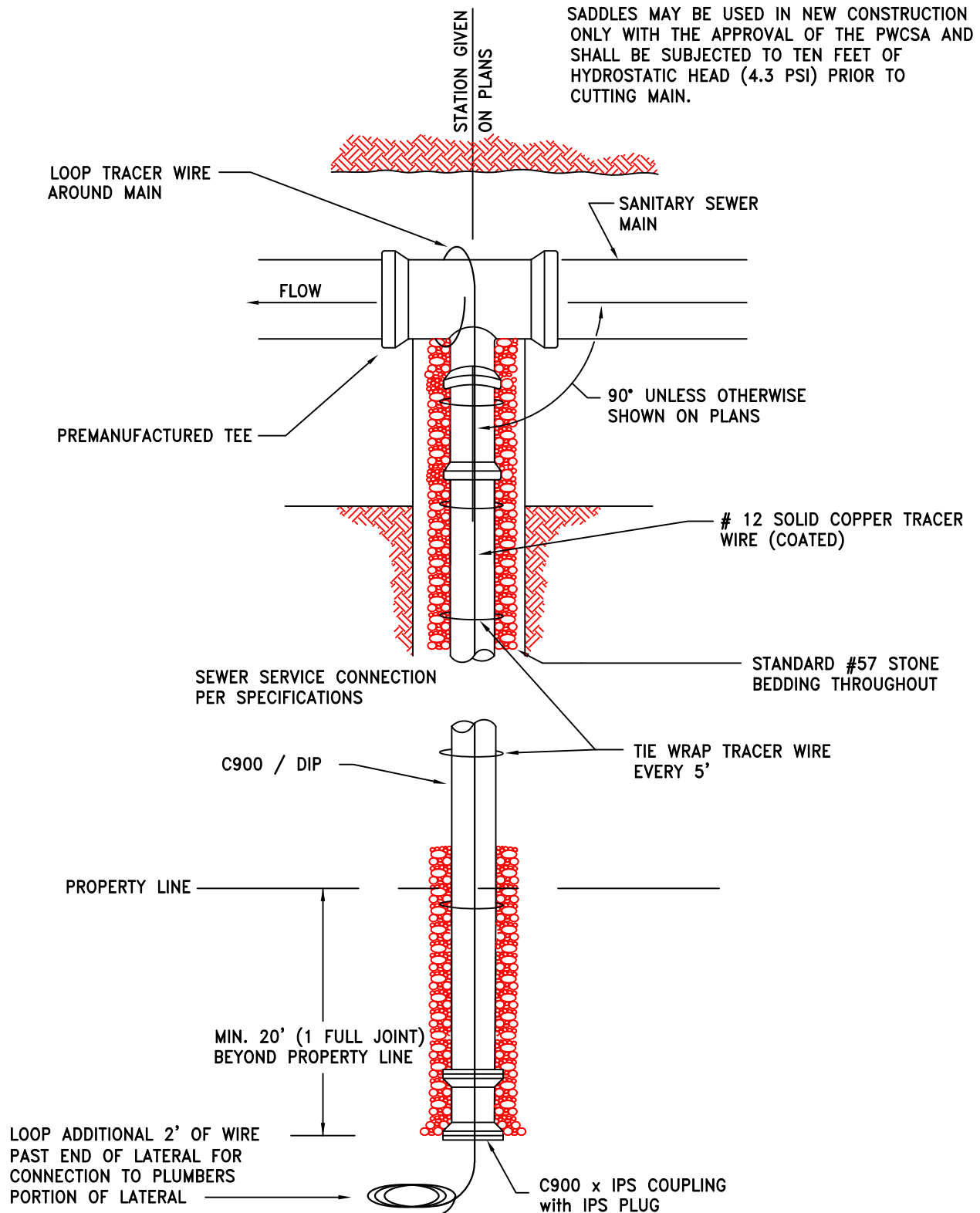
Appendix B: List of Sewer Collection System Details

Refer to the Service Authority's Sewer Collection System Details
by using Control + Click to follow the link

[Sewer Details](#)

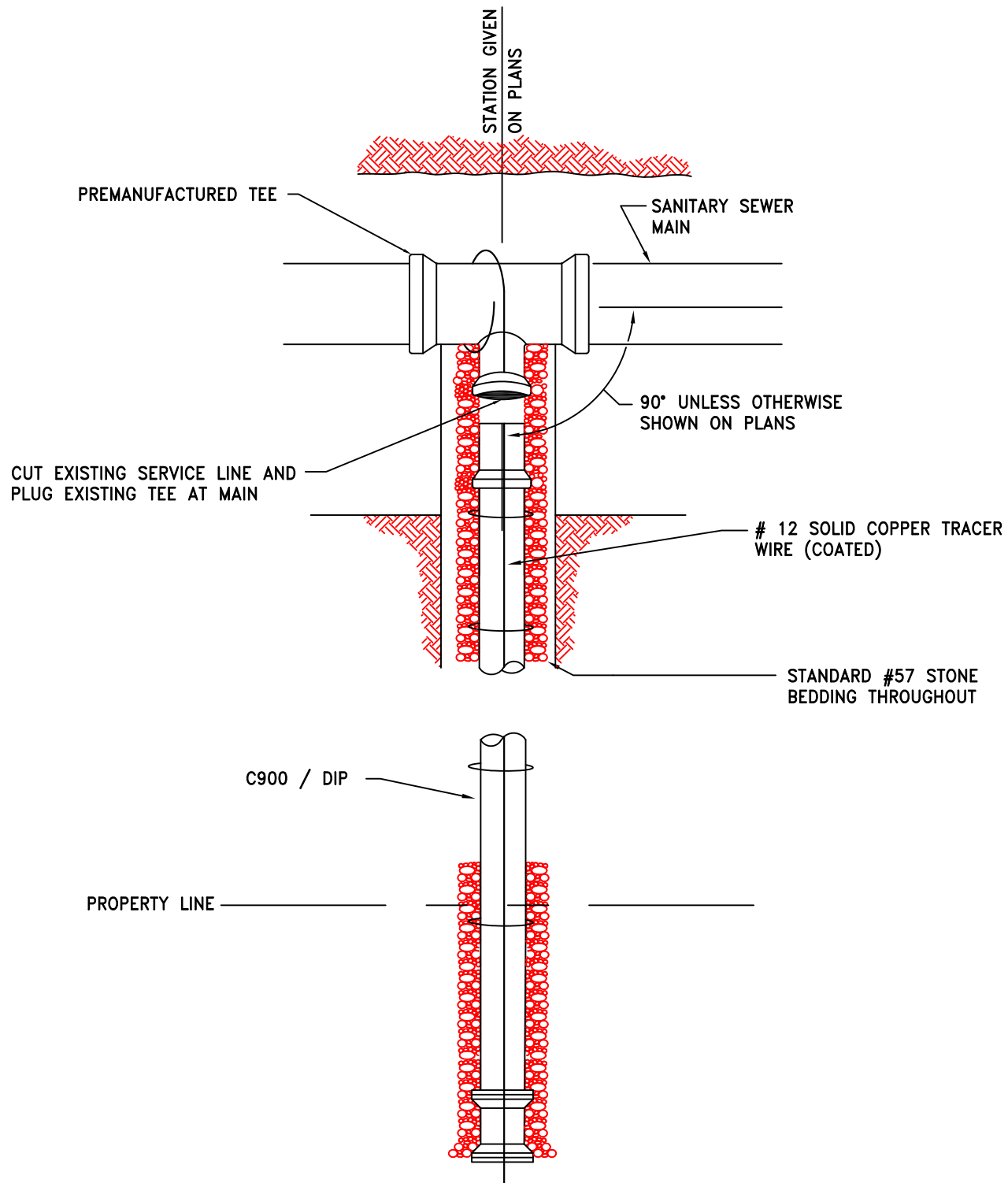
<u>Detail No.</u>	<u>Detail Title</u>
S-1	Sewer Service Connection Plan View for Non-Public Right-of-Way
S-2	Sewer Service Connection Termination
S-3	Sewer Service Connection/Replacement Plan View for Public Right-Of-Way
S-4	Sewer Service Connection/Replacement Profile View for Non-Public Right-Of-Way
S-5	Sewer Service Connection/Replacement Profile View for Public Right-Of-Way
S-6	Cleanout Cover for Paved Areas
S-7	Grinder Pump Connection to Gravity Sewer Main
S-8	Insert-a-Tee
S-9	Precast Concrete 4-foot-Diameter Manhole
S-10	Precast Concrete 5-foot- and 6-foot-diameter Manhole
S-11	Precast Concrete Cut-in Manhole
S-12	Construction of Manhole over Existing Sewer
S-13	Abandonment of Manhole
S-14	Precast Concrete Manhole Cone Section
S-15	Standard Manhole Frame and Cover
S-16	Watertight Manhole Frame and Cover
S-17	Pro Ring, Ladtech Ring, or Other
S-18	Waterproof Manhole Insert
S-19	Precast Concrete Manhole Flat Top
S-20	Precast Concrete Manhole Reducer
S-21	Precast Concrete Manhole Conical Reducer—5 Feet to 4 Feet
S-22	Inside Drop Manhole Detail
S-23	4-foot Manhole with Outside Drop Connection
S-24	Manhole Vent
S-25	Flushing Station and Grinder Pump Connection to Low Pressure Force Main
S-26	Sewage Force Main Air or Vacuum Release Assembly
S-27	Grease Trap
S-28	Concrete Cradle and Encasement
S-29	Steel Casing
S-30	Clay Dam Detail
S-31	PWCSA Logo
S-32	Low Pressure Force Main Valve Cluster Detail
S-33	Sewer Only Meter for Process Water

<u>Detail No.</u>	<u>Detail Title</u>
S-34	Sanitary Sewer Lateral Replacement
S-35	Termination of Sanitary Sewer Lateral
S-36	Sanitary Sewer Line Bedding and Backfill
S-37	Chain Link Fence Detail
S-38	Hatch Safety Features
S-39	Advance Blasting
S-40	Warning Water/Sewer Pipe Crossing



SEWER SERVICE CONNECTION
PLAN VIEW FOR NON-PUBLIC
RIGHT-OF-WAY
N.T.S.

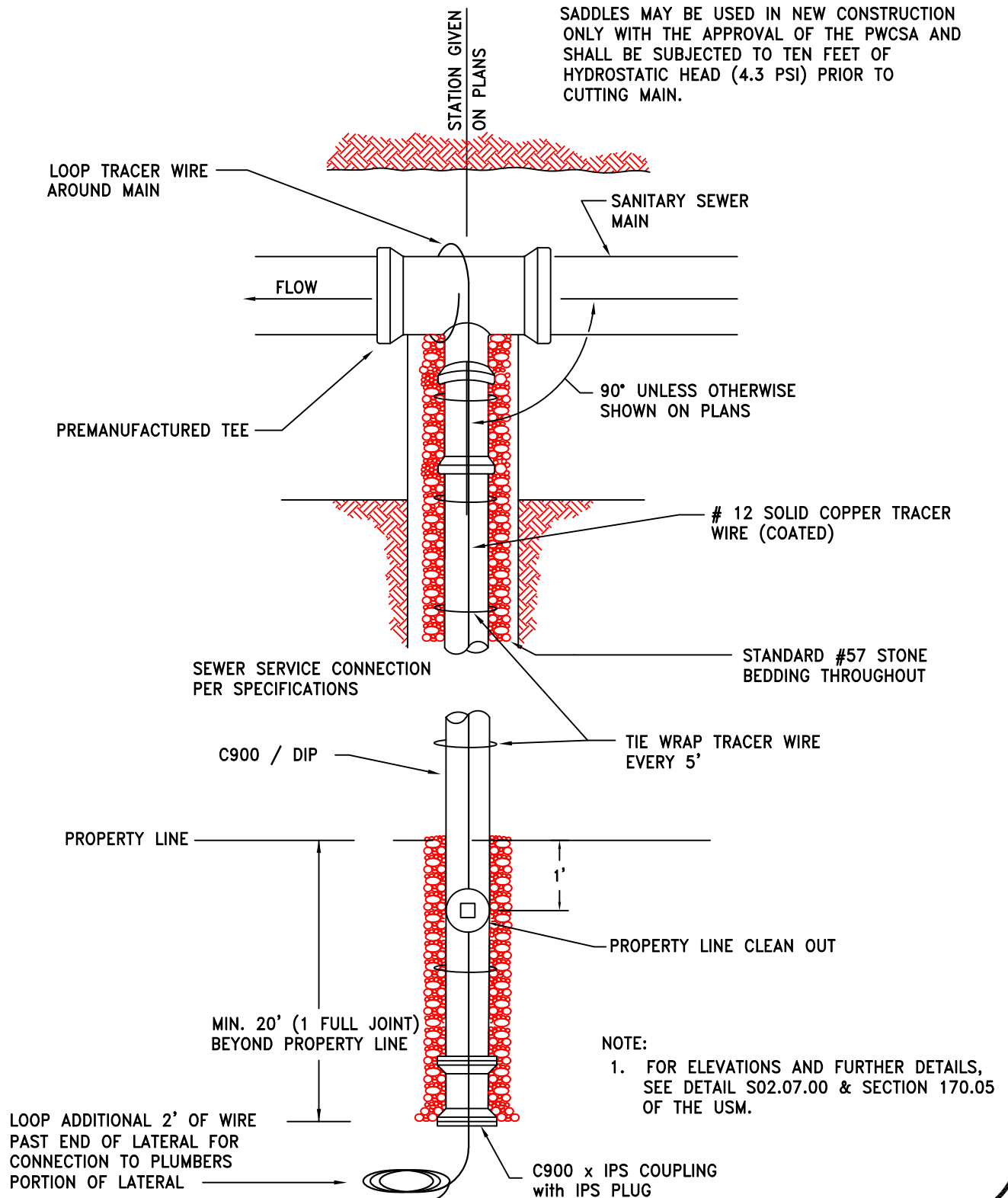
S-1
REV-2018



SEWER SERVICE CONNECTION TERMINATION

N.T.S.

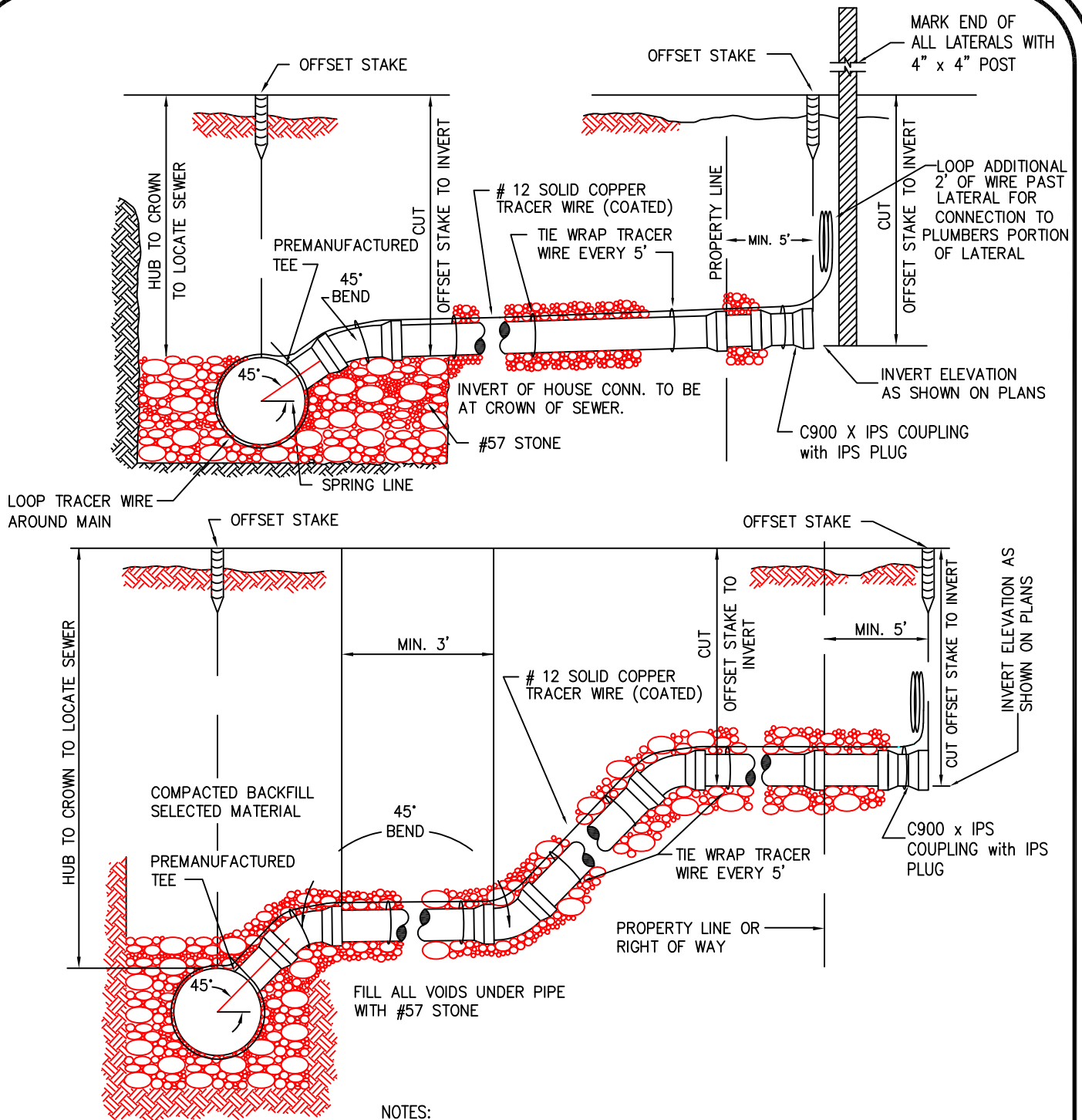
S-2
REV-2018



SEWER SERVICE CONNECTION/REPLACEMENT PLAN VIEW FOR PUBLIC RIGHT-OF-WAY

N.T.S.

S-3
REV-2018



NOTES:

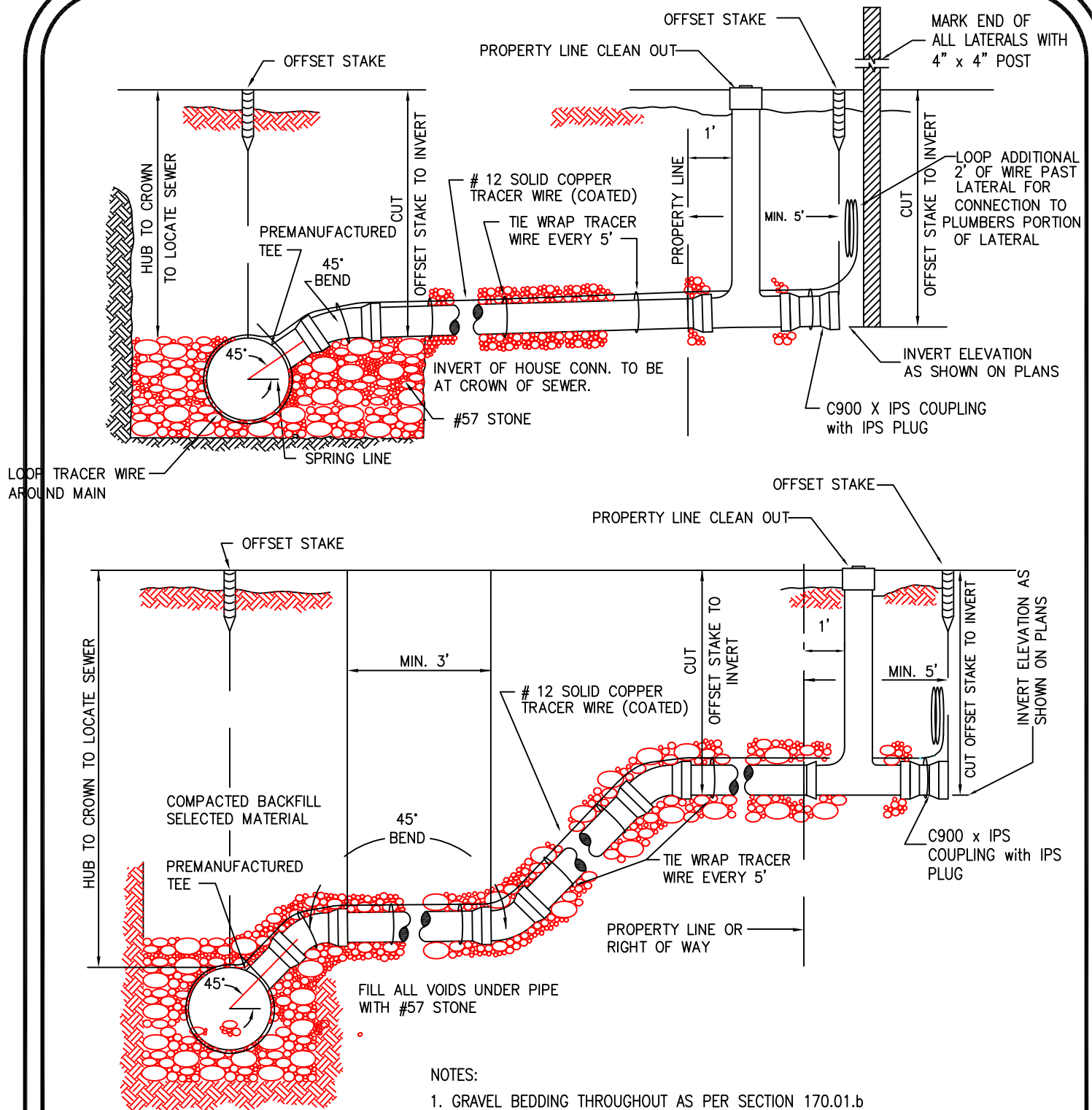
1. GRAVEL BEDDING THROUGHOUT AS PER SECTION 170.01.b
2. RISERS LOCATED DIRECTLY OVER THE SANITARY SEWER MAIN MUST BE NOTED ON THE PLANS.
3. 4" LATERALS MUST HAVE A MINIMUM GRADE OF 2.08%. 6" LATERALS MUST HAVE A MINIMUM GRADE OF 1.00%.
4. MARK ALL ENDS OF LATERAL WITH 4"x 4" WOODEN POST.



SEWER SERVICE CONNECTION
PROFILE VIEW FOR NON-PUBLIC
RIGHT-OF-WAY

N.T.S.

S-4
REV-2018



NOTES:

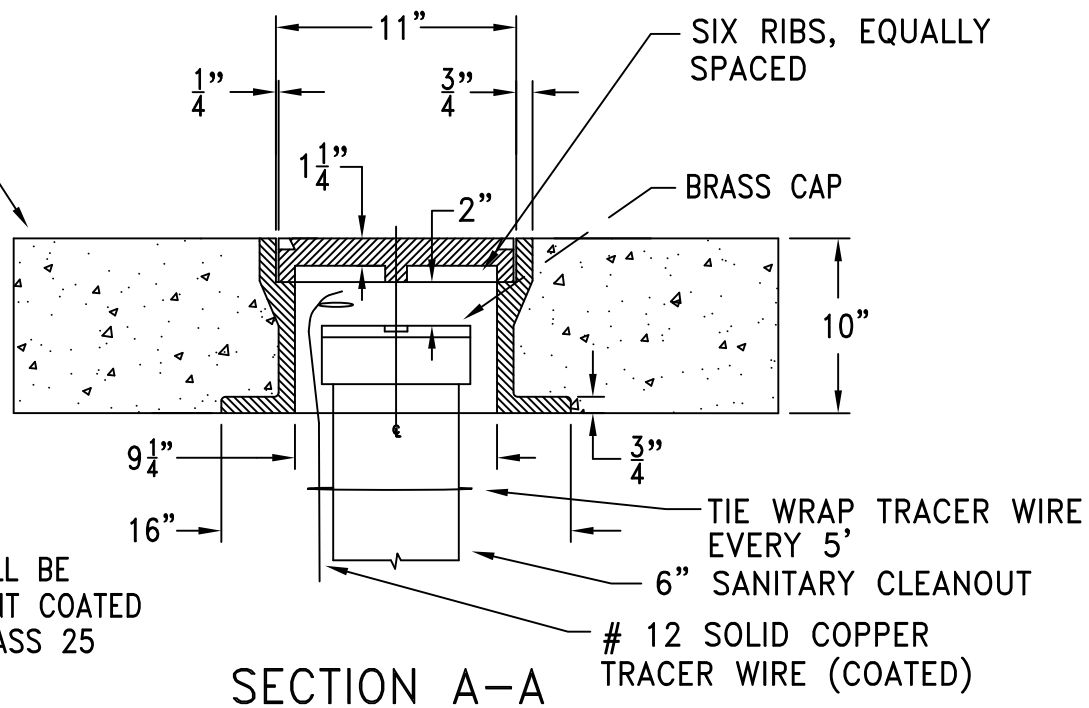
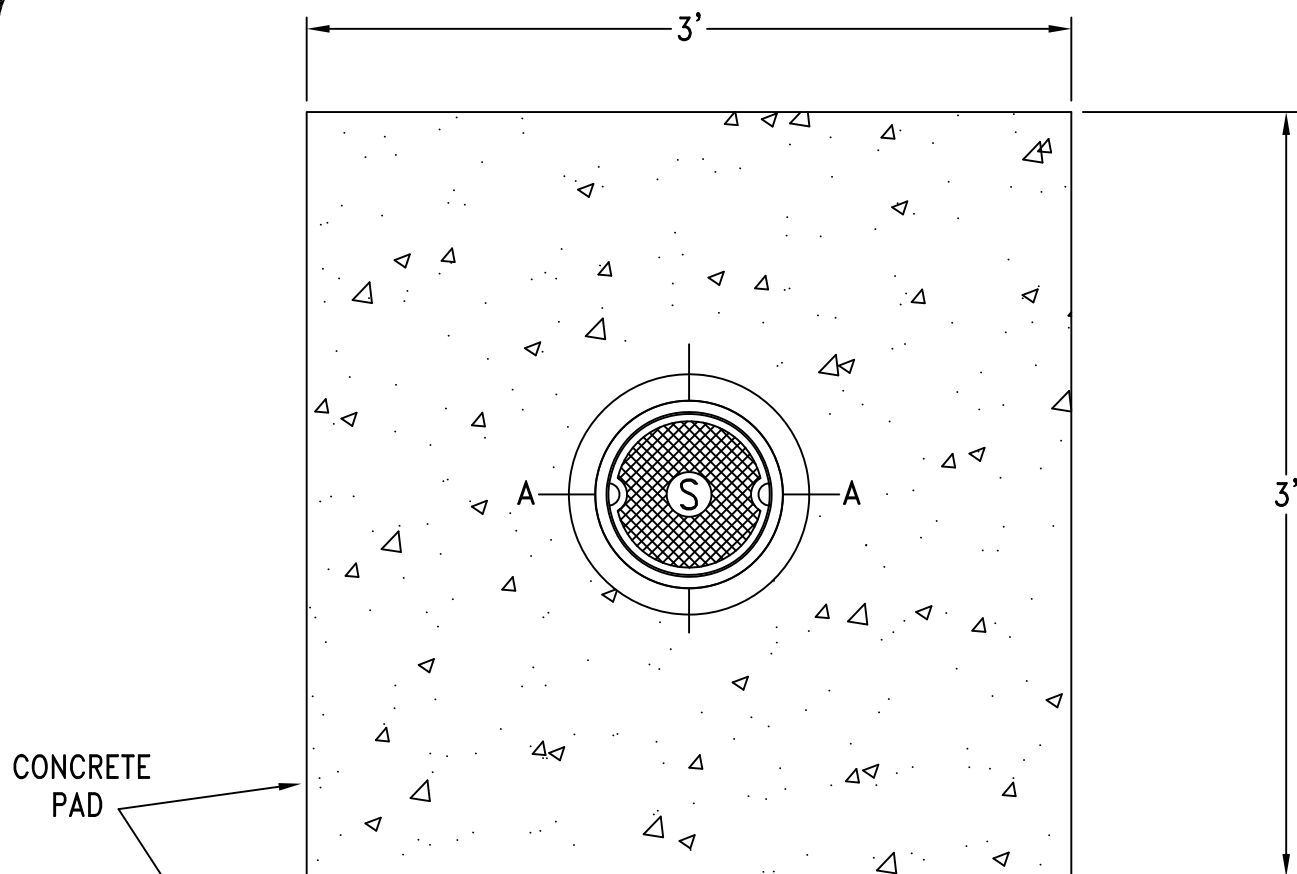
1. GRAVEL BEDDING THROUGHOUT AS PER SECTION 170.01.b
2. RISERS LOCATED DIRECTLY OVER THE SANITARY SEWER MAIN MUST BE NOTED ON THE PLANS.
3. 4" LATERALS MUST HAVE A MINIMUM GRADE OF 2.08%. 6" LATERALS MUST HAVE A MINIMUM GRADE OF 1.00%.
4. MARK ALL ENDS OF LATERAL WITH 4"x 4" WOODEN POST.



SEWER SERVICE CONNECTION/REPLACEMENT
PROFILE VIEW FOR PUBLIC
RIGHT-OF-WAY

N.T.S.

S-5
REV-2018



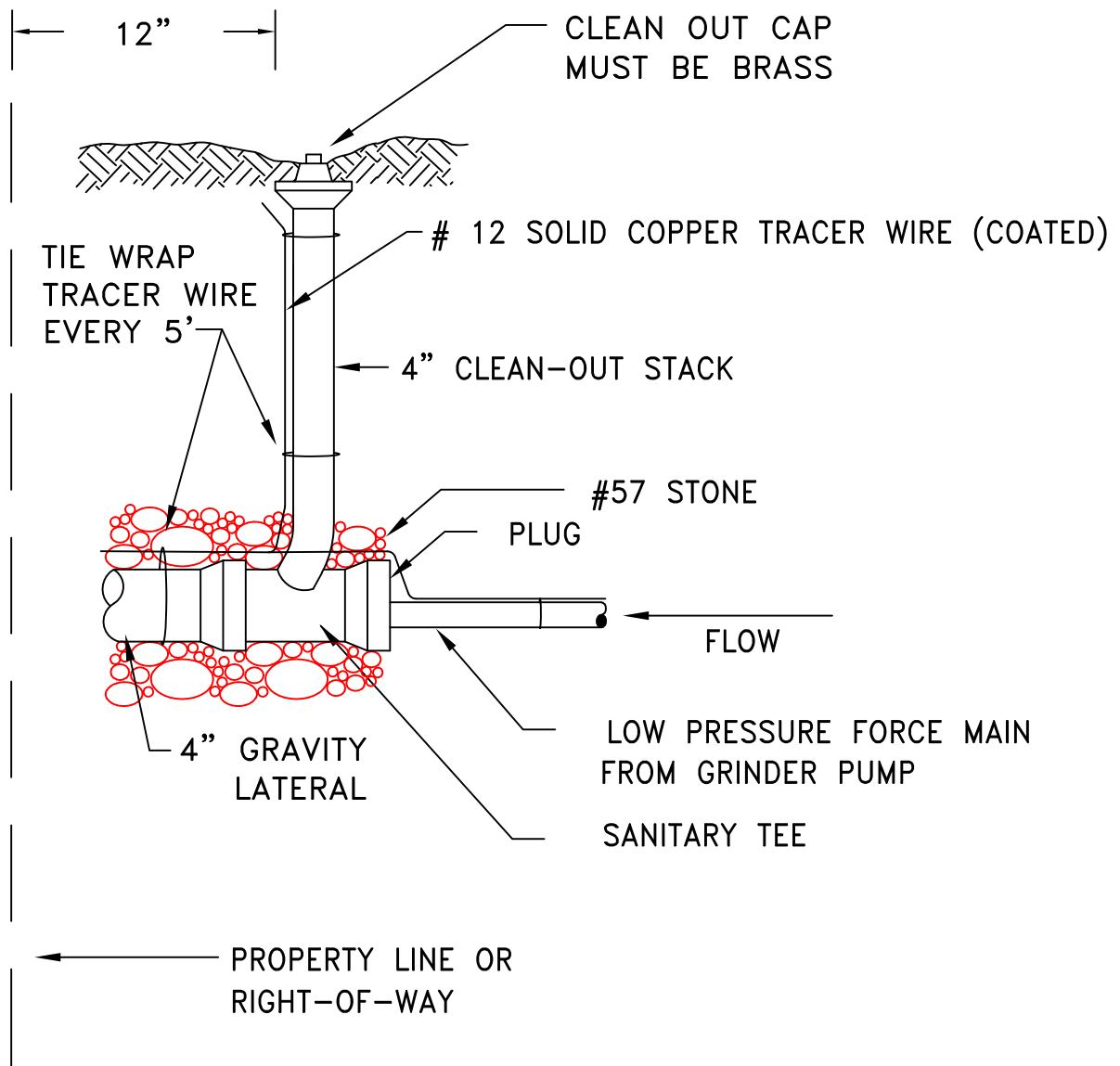
NOTE:

ALL PARTS SHALL BE
ASPHALTUM PAINT COATED
ASTM A-48, CLASS 25
CAST IRON.



CLEANOUT COVER FOR PAVED AREAS N.T.S.

S-6
REV-2018



NOTE:

GRAVITY LATERAL SHALL CONFORM TO SEWER
SERVICE CONNECTION DETAIL EXCEPT FOR
LOCATION RELATIVE TO PROPERTY LINE.



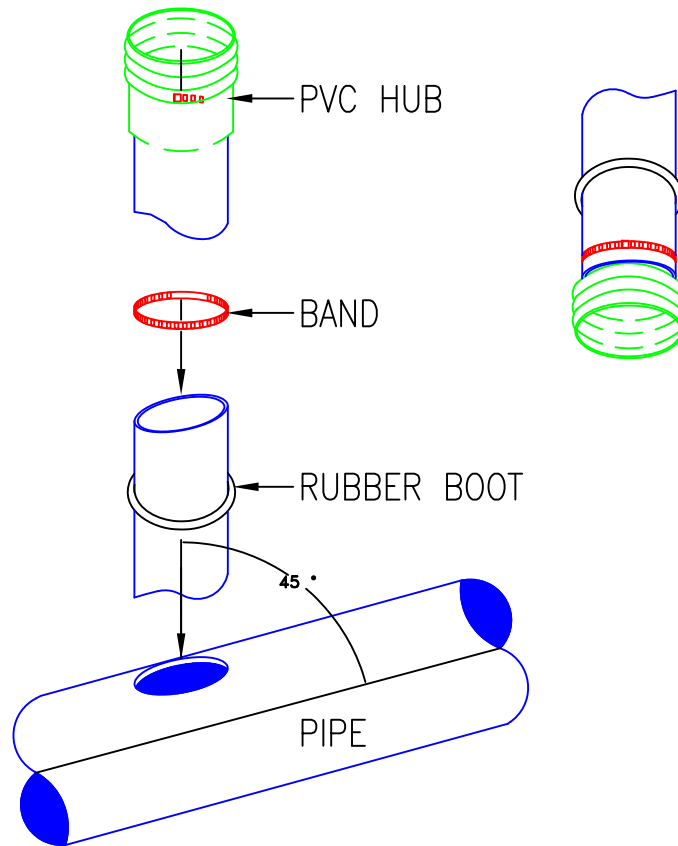
GRINDER PUMP CONNECTION TO GRAVITY SEWER MAIN

N.T.S.

S-7
REV-2018

NOTE:

THIS METHOD OF CONNECTION SHALL NOT TAKE PRECEDENT OVER USING TEES. THE APPLICATION SHOWN HERE IS FOR TAPPING EXISTING MAINS.



NOTE:

INSERT-A-TEE CAN BE CONNECTED TO PVC, PERMALOC, SPIROLITE, SLIP LINER, DUCTILE IRON, THIN WALL MAIN LINES, CONCRETE(MAINLINES AND MANHOLES), CLAY, ALL THICK WALLED MAIN LINES. IT IS A THREE PIECE CONNECTION THAT IS COMPRESSION-FIT INTO THE CORED WALL OF THE MAIN LINE. IT CONSISTS OF SIDE SERVICES OF 4" THROUGH 12" AND FITS ALL MAIN LINE DIAMETERS.



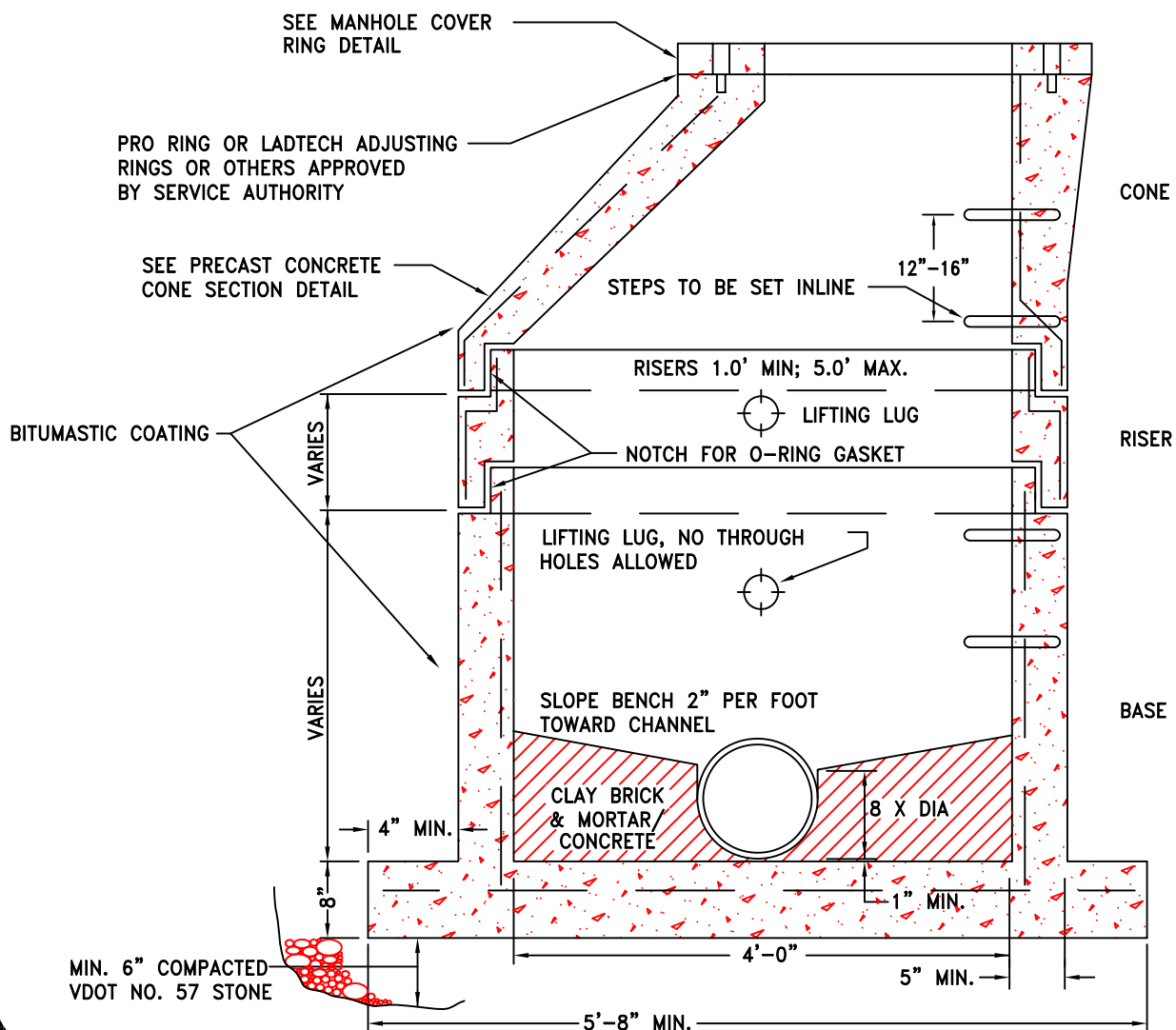
INSERT-A-TEE

N.T.S.

S-8
REV-2018

NOTES:

1. MANHOLE TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. C-478.
2. ALL REINFORCING STEEL TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. A-615.
3. CONCRETE TO BE 4000 PSI MINIMUM COMPRESSIVE STRENGTH.
4. TAPERED JOINT WITH O-RING GASKET TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. C-361 & C-443.
5. 301 MASTIC OR APPROVED EQUAL SHALL BE USED IN ADDITION TO THE JOINT SPECIFIED.
6. APPROVED FLEXIBLE JOINT REQUIRED ON ALL PIPE CONNECTIONS TO MANHOLES. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. STUB MAY BE USED AT THE APPROVAL OF THE INSPECTOR.
7. MANUFACTURER'S NAME TO BE ON THE INSIDE FACE OF ALL SECTIONS.
8. SET COVER FRAME ON PIONEER 301 MASTIC OR APPROVED SUBSTITUTE.
9. FASTEN WATERTIGHT FRAME TO 3/4" ANCHOR BOLTS (SET ACCORDING TO CONE SECTION DETAIL) WITH NUT AND 2" WASHER. CUT ANCHOR BOLTS OFF 1" ABOVE NUT.
10. KEYWAYS MAY BE SUBSTITUTED FOR LIFTING LUGS.
11. SHOP DRAWINGS ARE REQUIRED FOR MANHOLES USED WITH SEWER MAINS GREATER THAN 24" AND MUST BE APPROVED BY PWCSA.
12. MASONRY UNITS MAY NOT BE USED FOR ADJUSTMENTS.
13. MANHOLE STEPS SHALL BE AMERICAN STEP COMPANY ML-10-TDS-SSR OR APPROVED SUBSTITUTE.



PRECAST CONCRETE
4' DIAMETER MANHOLE
N.T.S.

S-9
REV-2018

NOTES:

1. CONCRETE MUST BE 4000 PSI COMPRESSIVE STRENGTH, MINIMUM.
2. PIPE CONNECTIONS TO MANHOLES TO BE APPROVED FLEXIBLE SLEEVES.
3. MANHOLES OVER 6' DIAMETER REQUIRE DETAILED DRAWING ON PLANS..
4. ALL REINFORCING MUST MEET CURRENT REQUIREMENTS OF ASTM SPEC. A-615.
5. MANUFACTURER'S NAME MUST BE ON INSIDE FACE OF ALL SECTIONS.
6. MANHOLE MUST MEET CURRENT REQUIREMENTS OF ASTM. SPEC. C-478.
7. PLACE 6" COMPACTED VDOT NO. 57 STONE UNDER BASE SECTIONS.
8. JOINT CONFIGURATION MAY BE CAST BELL-UP OR SPIGOT-UP.
9. MANHOLE STEPS TO BE AMERICAN STEP COMPANY ML-10-TDS-SSR OR APPROVED SUBSTITUTE.

PRO RING OR LADTECH ADJUSTING RINGS OR OTHERS APPROVED BY SERVICE AUTHORITY

STANDARD MANHOLE FRAME & COVER

STD. PRECAST CONC. 4' CONE

12"-16"

STEPS TO BE SET IN-LINE

BITUMASTIC COATING

O-RING JOINT
ASTM C-361
ASTM C-443

STD. PRECAST CONC. RISER - 4' DIA.

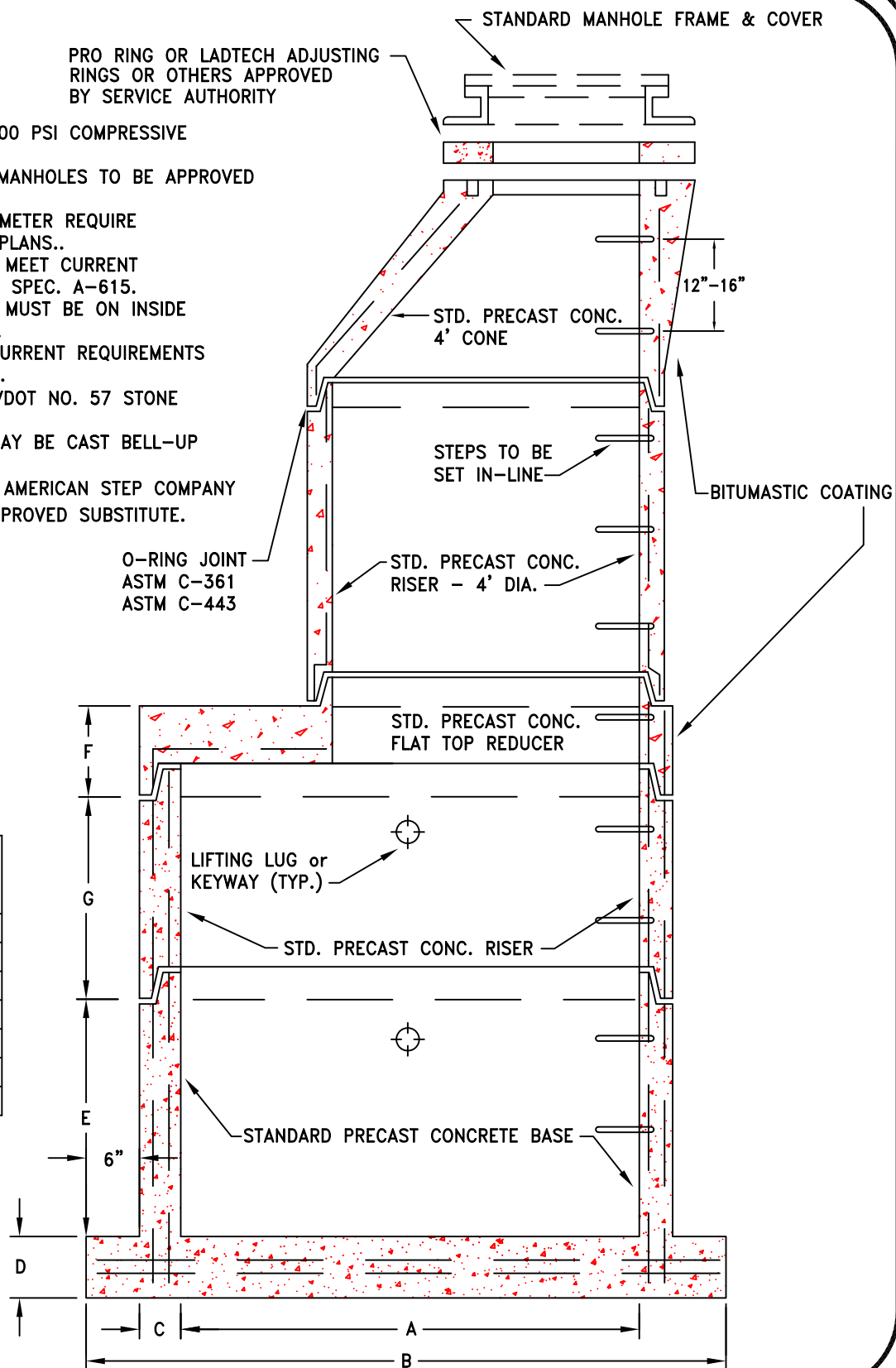
STD. PRECAST CONC. FLAT TOP REDUCER

LIFTING LUG or KEYWAY (TYP.)

STD. PRECAST CONC. RISER

STANDARD PRECAST CONCRETE BASE

MANHOLE DIAMETER IN FEET		
	5'	6'
A	60"	72"
B	84"	98"
C	6"	7"
D	8"	8"
E	VARIES	
F	13" MIN.	13" MIN.
G	VARIES	

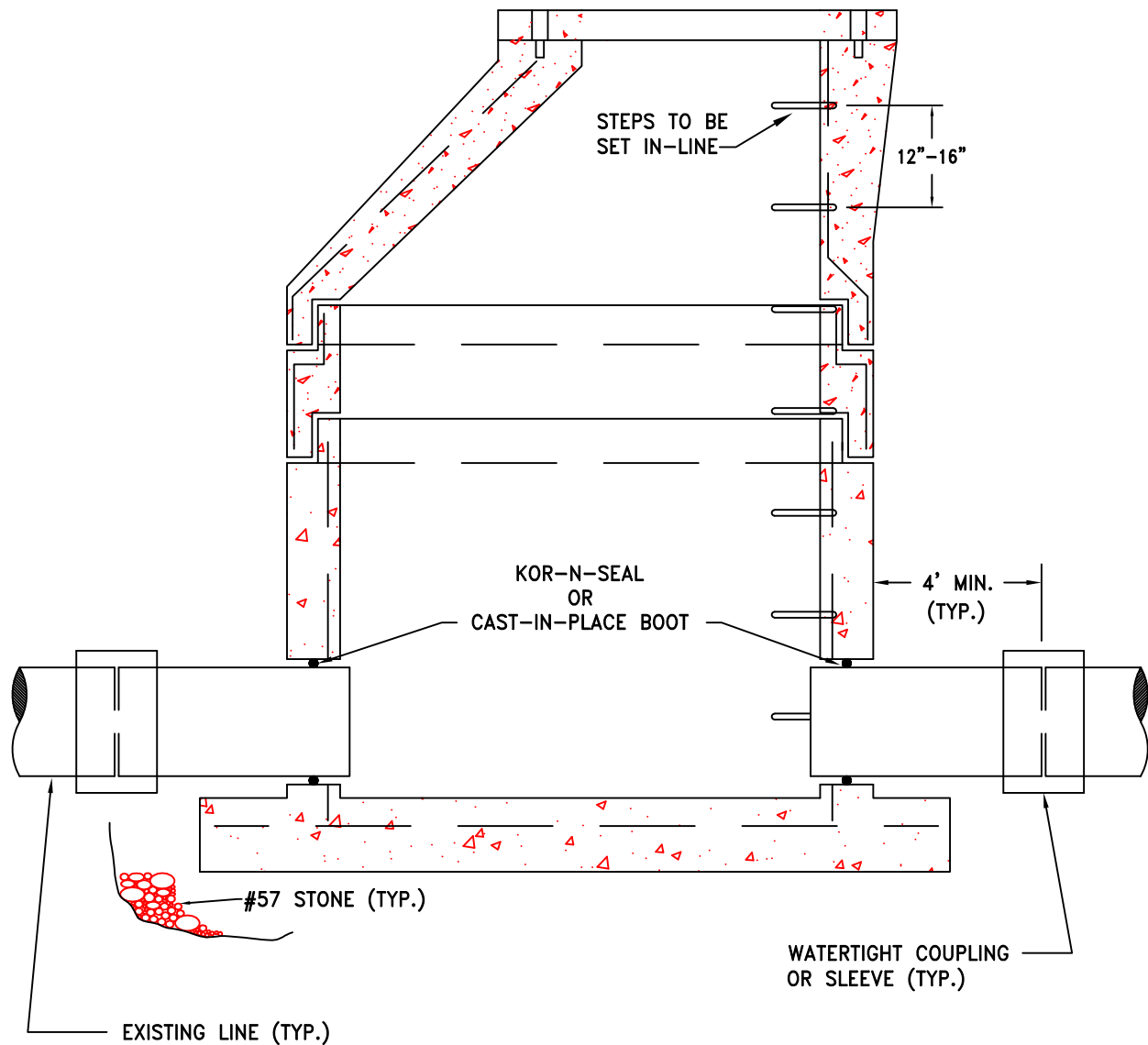


PRECAST CONCRETE
5' AND 6' DIAMETER MANHOLE
N.T.S.

S-10
REV-2018

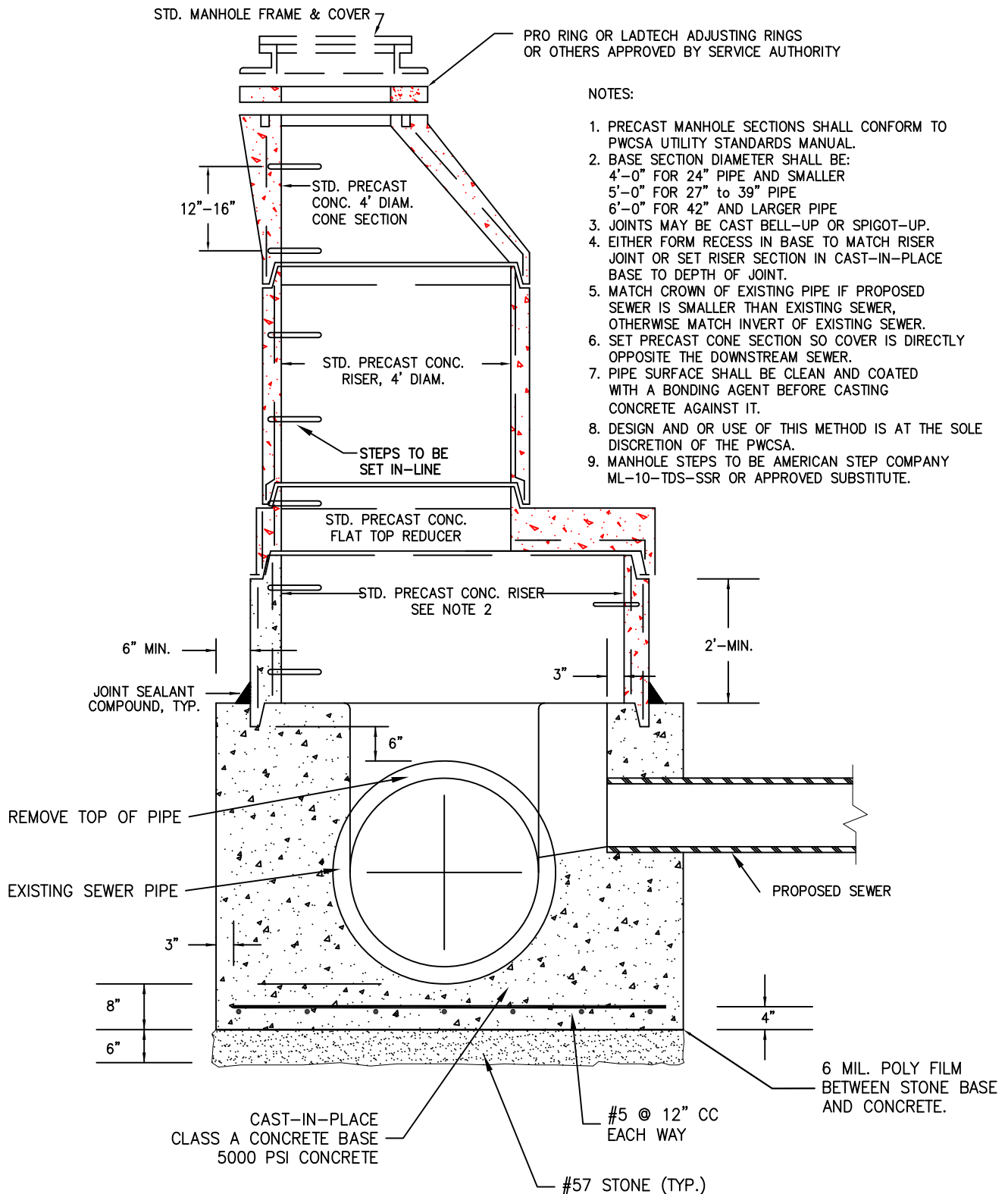
NOTES:

1. CONTRACTOR MUST HAVE ADEQUATE EQUIPMENT TO PUMP AROUND EXISTING LINE WHILE MANHOLE IS CUT IN.
2. PRECAST CONCRETE MANHOLE SHALL CONFORM IN ALL OTHER RESPECTS TO STANDARD PRECAST CONCRETE MANHOLES.
3. DOG HOUSE MANHOLES ARE NOT PERMITTED WITHOUT WRITTEN PERMISSION FROM THE PWCSA.
4. MANHOLE STEPS TO BE AMERICAN STEP COMPANY ML-10-TDS-SSR OR APPROVED SUBSTITUTE.



PRECAST CONCRETE
CUT-IN MANHOLE
N.T.S.

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REV-2018

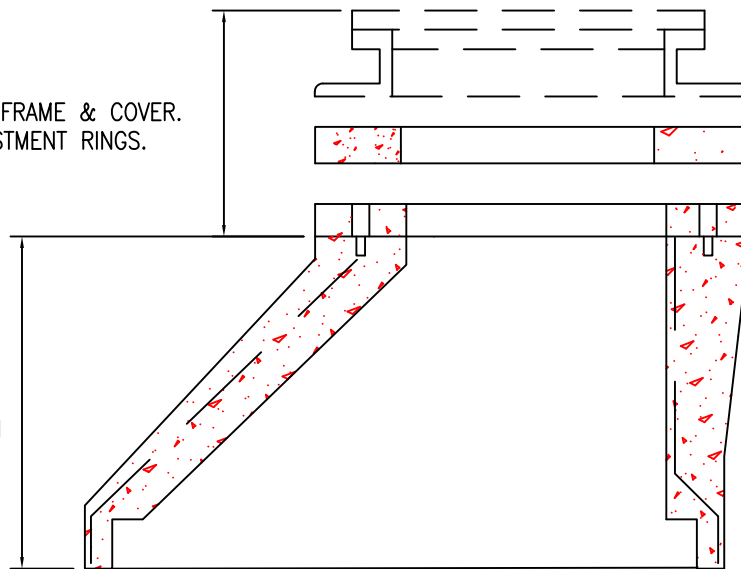


CONSTRUCTION OF MANHOLE OVER EXISTING SEWER N.T.S.

S-12
REV-2018

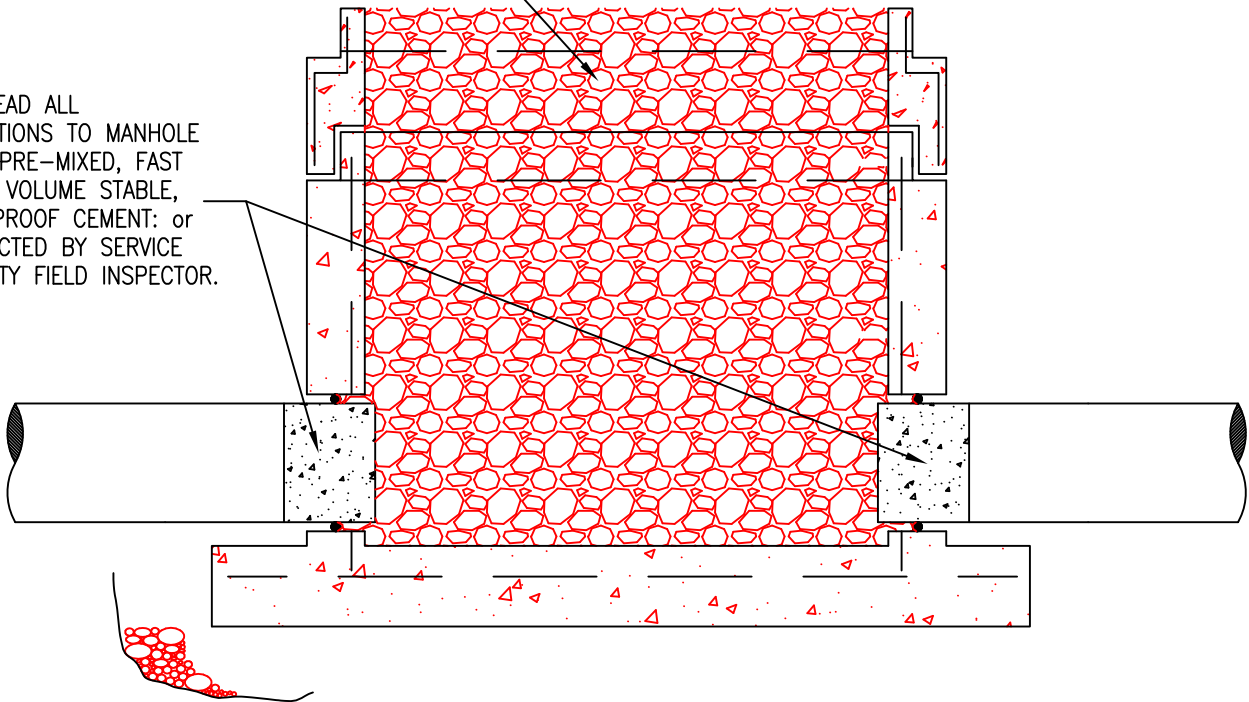
REMOVE MANHOLE FRAME & COVER.
REMOVE ALL ADJUSTMENT RINGS.

REMOVE MINIMUM 24" FROM
BLOCK OR BRICK MANHOLES.
REMOVE CONE SECTION FROM
PRECAST MANHOLES.



FILL REMAINING AREA WITH #57 STONE.

BULK HEAD ALL
CONNECTIONS TO MANHOLE
WITH A PRE-MIXED, FAST
SETTING VOLUME STABLE,
WATERPROOF CEMENT: or
AS DIRECTED BY SERVICE
AUTHORITY FIELD INSPECTOR.



NOTES:

1. WHERE MANHOLE IS LOCATED IN PAVEMENT, PAVEMENT SHALL BE RESTORED IN ACCORDANCE WITH VDOT STANDARDS.
2. MANHOLES LOCATED IN EASEMENT AREAS SHALL BE RESTORED SIMILAR TO SURROUNDING CONDITIONS.

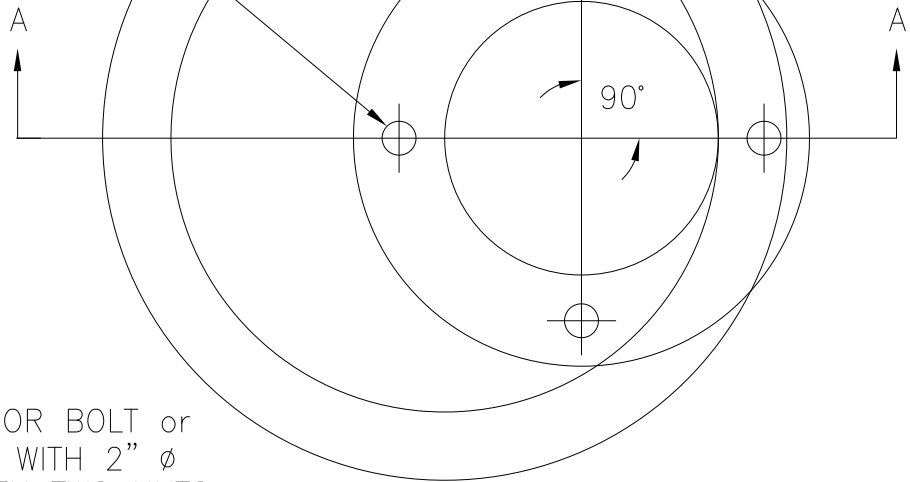


ABANDONMENT OF MANHOLE

N.T.S.

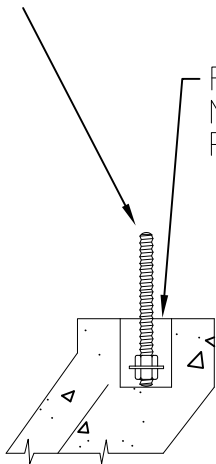
S-13
REV-2018

3" ϕ x 4" HOLE (TYP.)

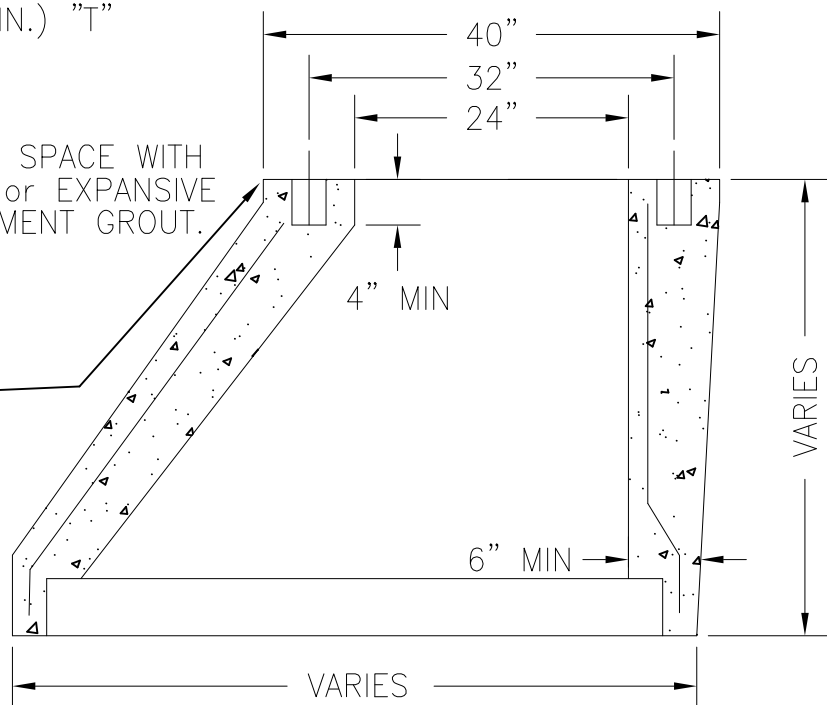


3/4" ϕ THREADED ANCHOR BOLT or
3/4" ϕ ALLTHREAD ROD WITH 2" ϕ
WASHER LOCKED BETWEEN TWO NUTS
AT EMBEDDED END OR 3/4" ϕ ALLTHREAD
WITH 3" LONG BY 1/2" ϕ (MIN.) "T"
WELDED ON EMBEDDED END.

FILL ANNULAR SPACE WITH
NON-SHRINK or EXPANSIVE
PORTLAND CEMENT GROUT.



ANCHOR BOLT DETAIL



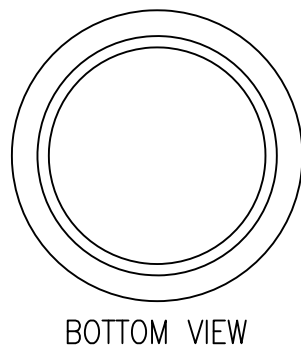
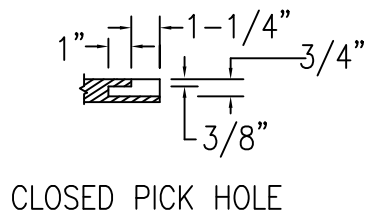
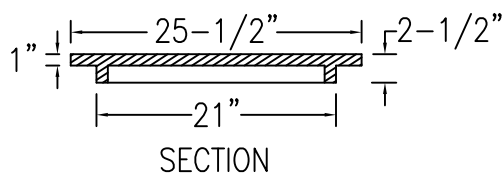
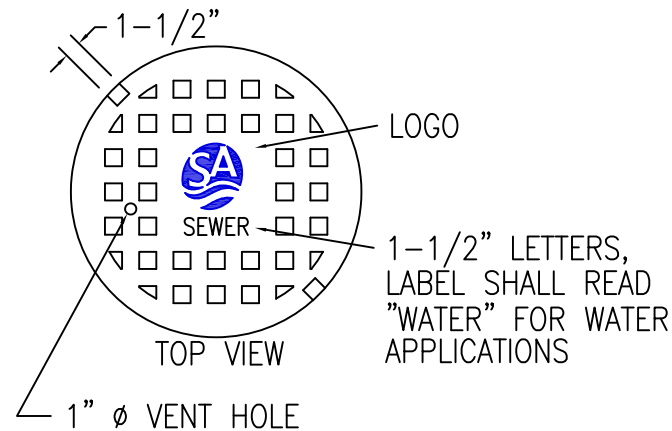
SECTION A-A



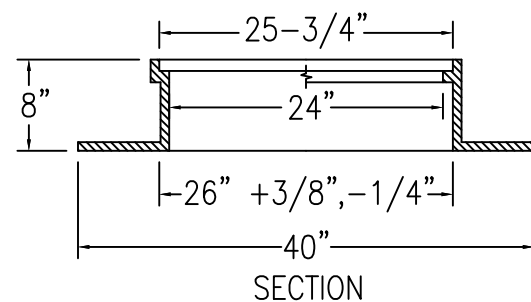
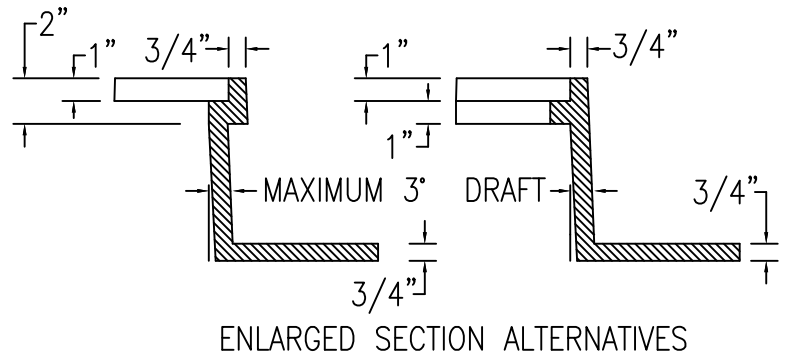
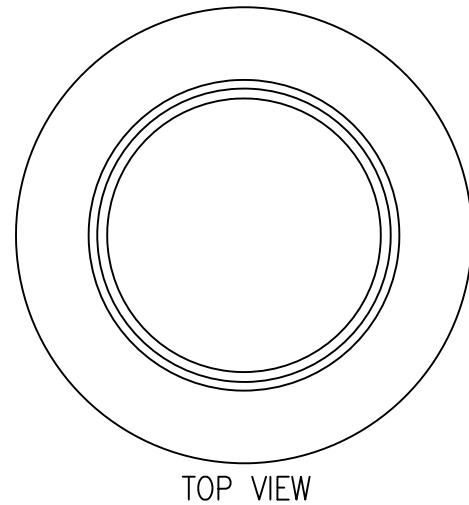
PRECAST CONCRETE
MANHOLE CONE SECTION
N.T.S.

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REV-2018

COVER



FRAME



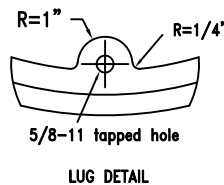
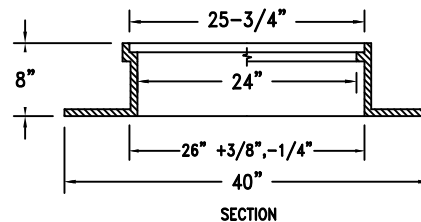
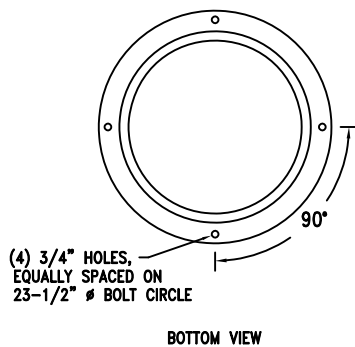
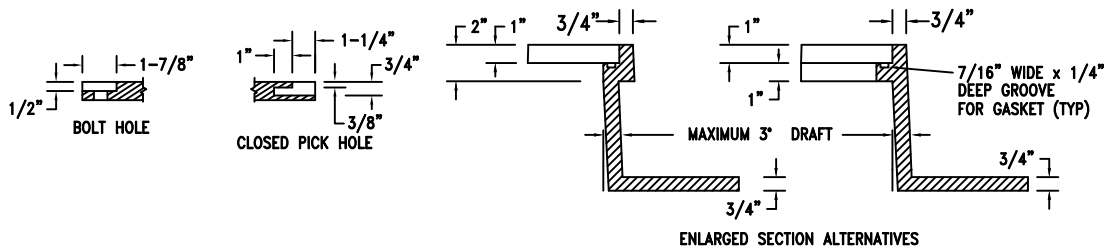
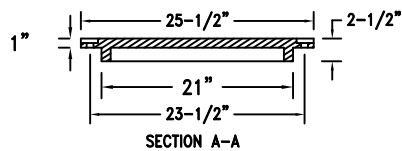
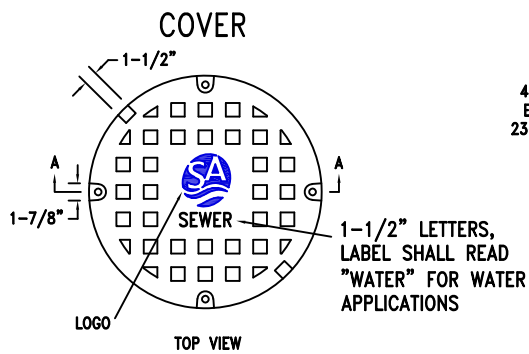
NOTES:

1. MACHINE ALL BEARING SURFACES TO BE TRUE AND LEVEL.
2. MANHOLE FRAME MAY BE GUSSETED.
3. USE ASTM A48 CLASS 30B GRAY IRON OR BETTER.
4. CERTIFY FRAME AND COVER FOR AASHTO H20 LOADING OR BETTER.
5. RECESS LABEL LETTERING AND LOGO.
6. ADJUSTABLE FRAME AND COVER AS PERMITTED BY SERVICE AUTHORITY.



STANDARD MANHOLE FRAME AND COVER N.T.S.

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REV-2018



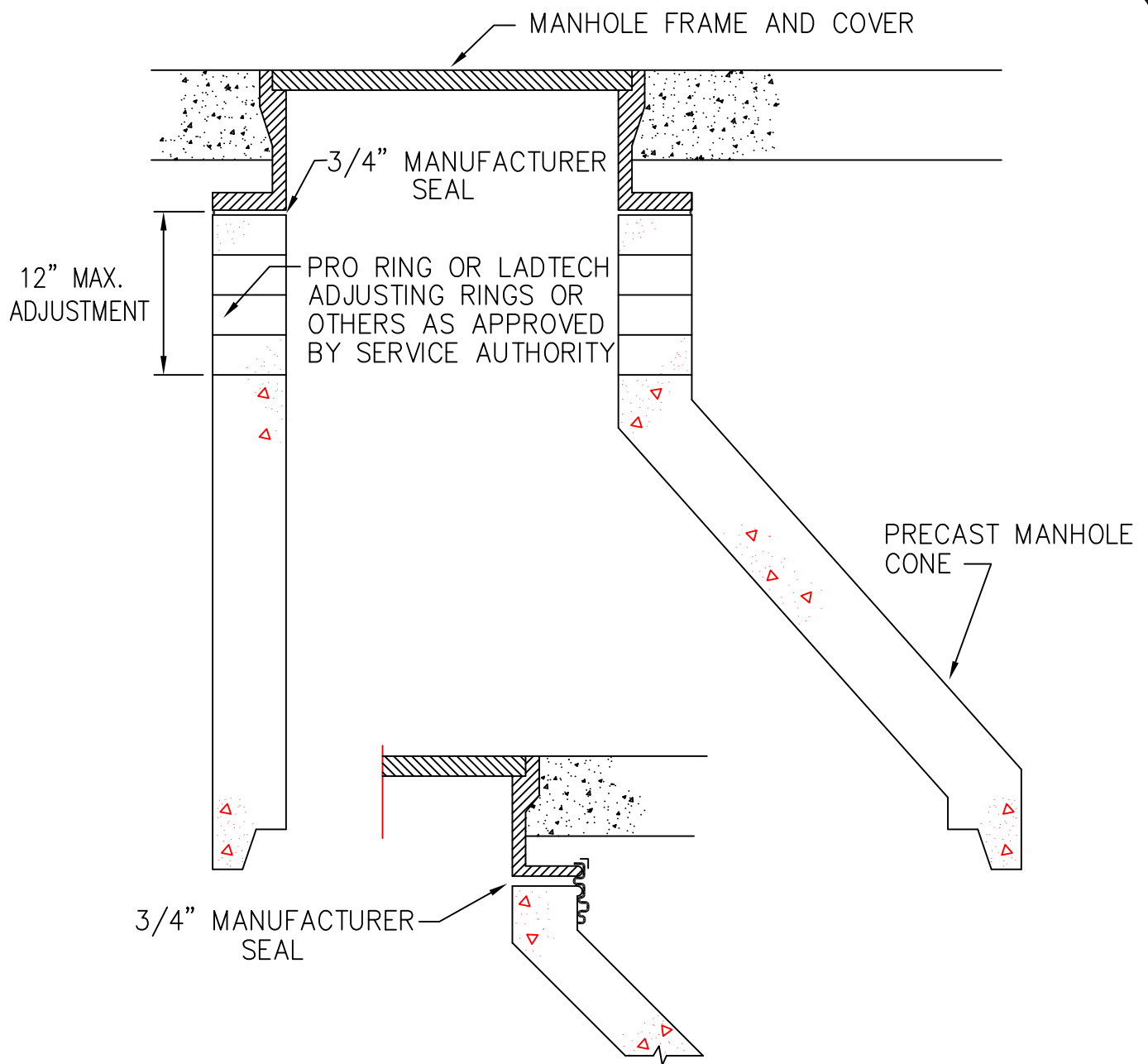
NOTES:

1. MACHINE ALL BEARING SURFACES TO BE TRUE AND LEVEL.
2. MANHOLE FRAME MAY BE GUSSETED.
3. USE ASTM A48 CLASS 30B GRAY IRON OR BETTER.
4. CERTIFY FRAME AND COVER FOR AASHTO H20 LOADING OR BETTER.
5. RECESS LABEL LETTERING AND LOGO.
6. PROVIDE 3/8" Ø RUBBER O-RING GASKET FOR MANHOLE SEAT.
7. PROVIDE FOUR 5/8-11 x 1-1/2" STAINLESS STEEL HEX HEAD BOLTS.



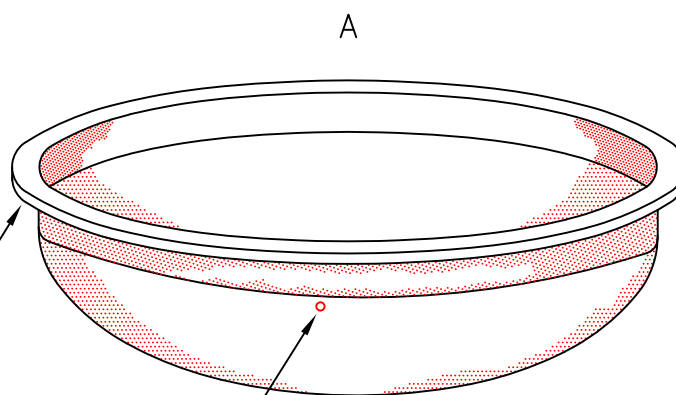
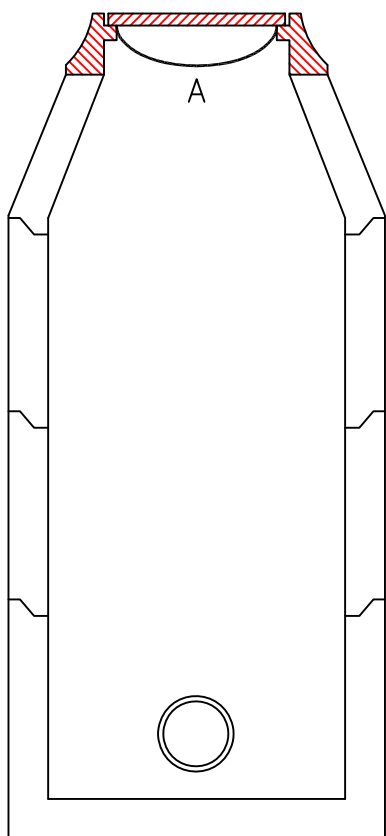
WATERTIGHT MANHOLE FRAME AND COVER N.T.S.

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REV-2018



PRO RING, LADTECH RING
OR OTHER
N.T.S.

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REV-2018



GASKET

1/8" DIAMETER HOLE (FOR PRESSURE RELIEF)
LOCATE HOLE NEAR TOP OF INSERT

NOTES:

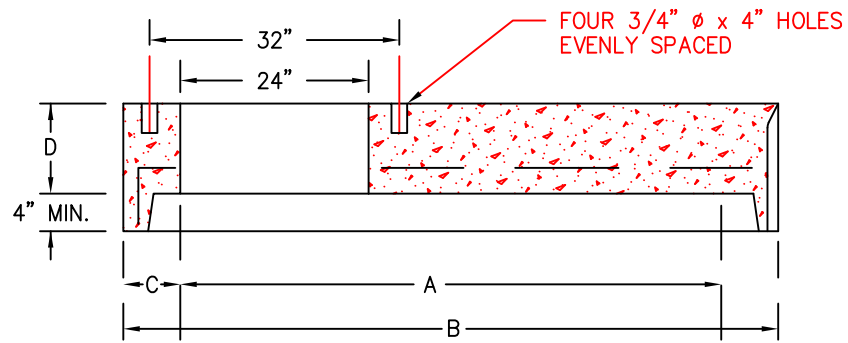
1. THE MANHOLE INSERT WILL BE MADE OF NON-CORRODABLE MATERIALS AND WILL NOT BE DAMAGED BY SEWER GASES OR ROAD OIL.
2. THE INSERT SHALL HAVE TWO NYLON STRAPS FOR LIFTING THE INSERT. THE STRAPS SHALL BE ATTACHED TO THE INSERT WITH STAINLESS STEEL RIVETS.
3. THE BOWL SHALL BE $\pm 1/8"$ THICK AND SHALL BE BETWEEN 6" AND 8" DEEP.
4. THE INSERT SHALL HAVE A GASKET TO SEAL BETWEEN THE INSERT AND THE LIP OF THE MANHOLE FRAME.



WATERPROOF MANHOLE INSERT N.T.S.

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REV-2018

SECTION A-A

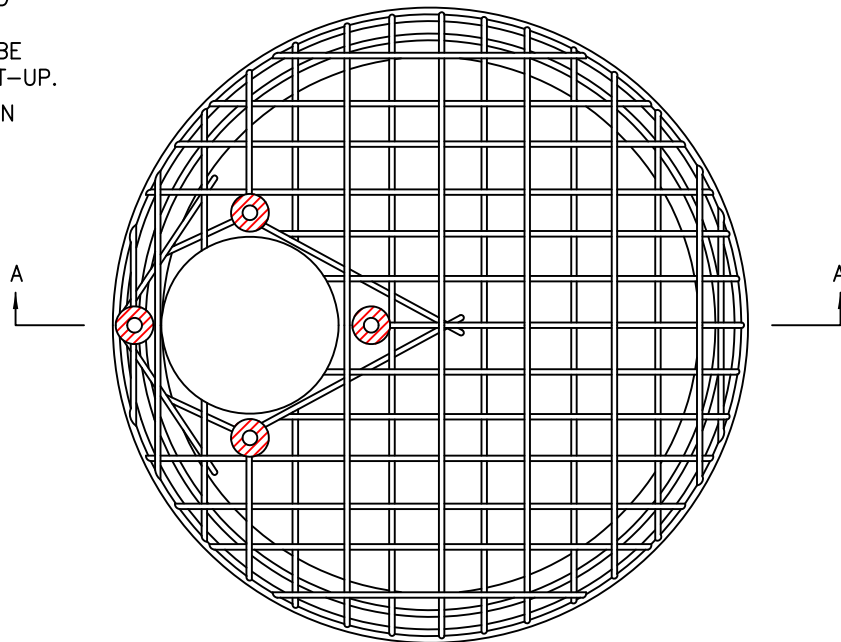


NOTES:

1. CONCETE TO BE 4000 PSI COMPRESSIVE STRENGTH, MIN.
2. ALL REINFORCING STEEL TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. A-615.
3. MANHOLE SECTIONS TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. C-478.
4. FLAT TOP SHALL BE USED ONLY WHEN SPECIFICALLY REQUIRED BY THE PLANS OR WHERE THERE IS HEIGHT OR INVERT CONFLICT As Determined By The CONTRACTOR AND APPROVED BY THE INSPECTOR.
5. JOINT CONFIGURATION MAY BE CAST BELL - UP OR SPIGOT-UP.
6. ANCHOR BOLTS AS SHOWN IN DETAIL S-14

MANHOLE SIZE

	4'	5'	6'
A	48"	60"	72"
B	58"	72"	86"
C	6"	6"	7"
D	6"	8"	8"

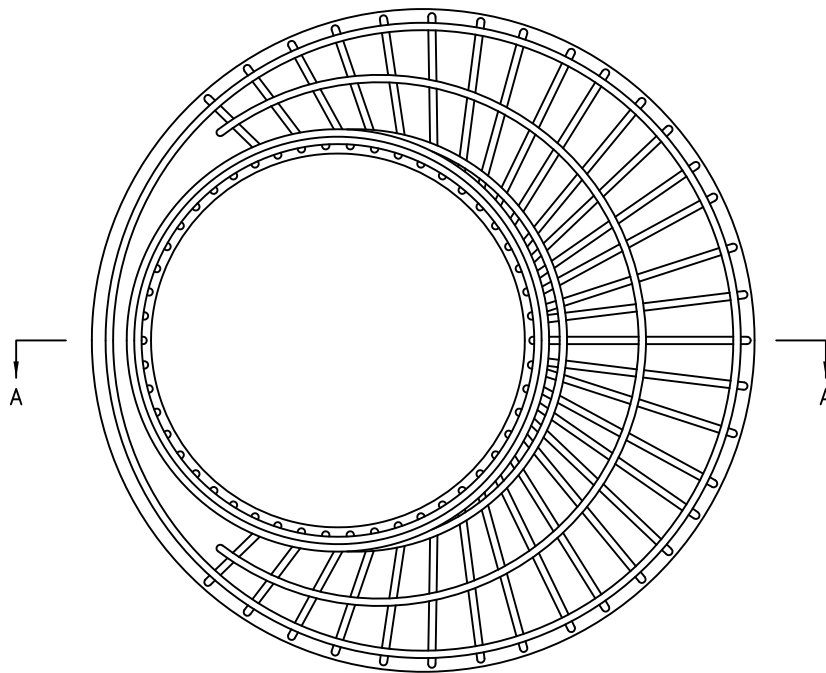


TOP VIEW



PRECAST CONCRETE
MANHOLE FLAT TOP
N.T.S.

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REV-2018



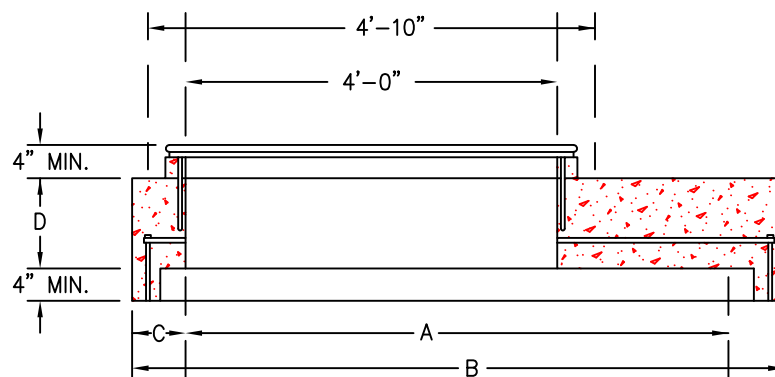
TOP VIEW

NOTES:

1. CONCRETE TO BE 4000 PSI COMPRESSIVE STRENGTH, MIN.
2. ALL REINFORCING STEEL TO MEET CURRENT REQUIREMENTS OF ASTM SPEC. A-615.
3. MANHOLE SECTION TO MEET CURRENT Requirements Of ASTM SPEC. C-478.
4. JOINT CONFIGURATION MAY BE CAST BELL-UP OR SPIGOT-UP.

DIMENSIONS

	5'-4"	6'-4"
A	60"	72"
B	72"	86"
C	6"	7"
D	8"	8"

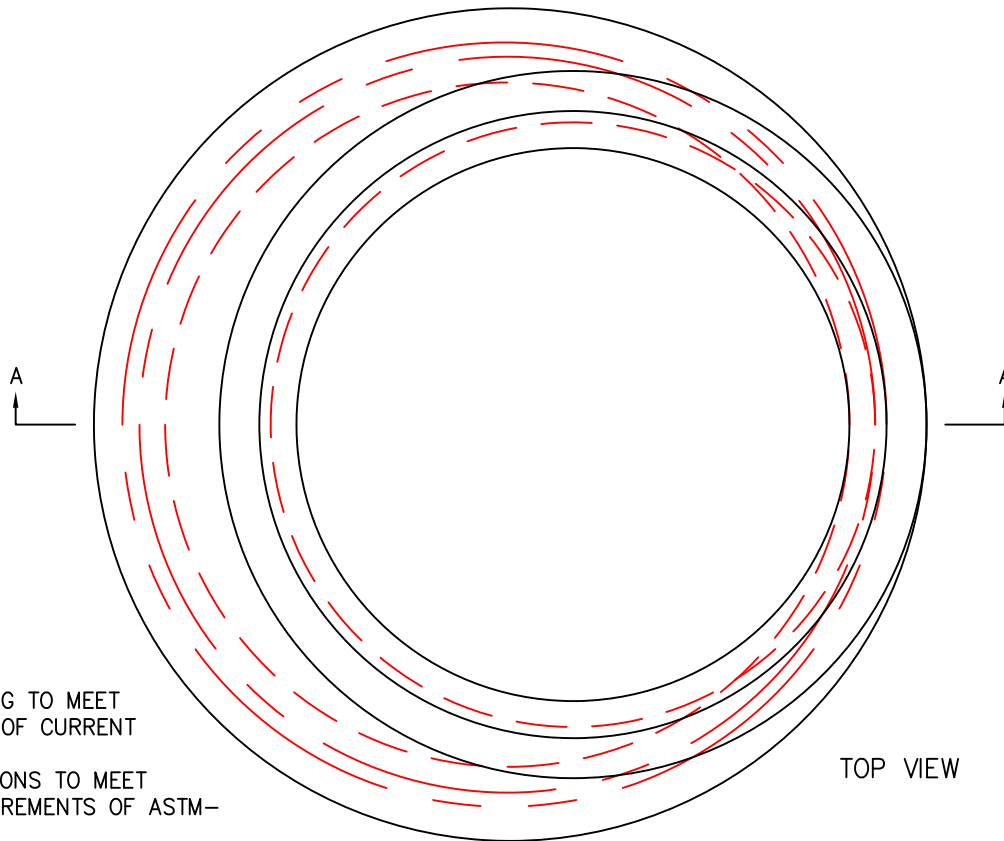


SECTION A-A



PRECAST CONCRETE
MANHOLE REDUCER
N.T.S.

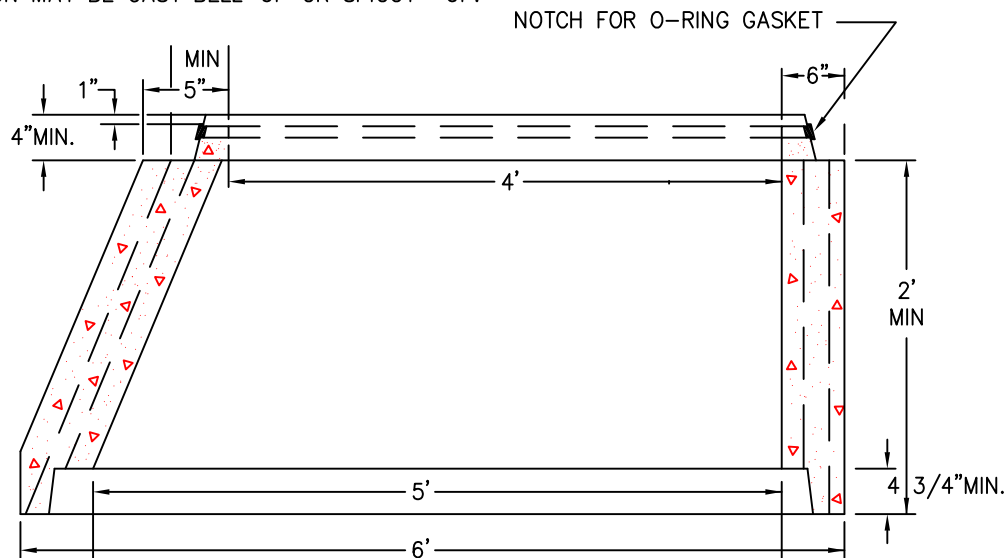
S-20
REV-2018



TOP VIEW

NOTES:

1. ALL REINFORCING TO MEET REQUIREMENTS OF CURRENT ASTM A-615.
2. MANHOLE SECTIONS TO MEET CURRENT REQUIREMENTS OF ASTM-Spec C-478.
3. TAPERED JOINT WITH O-RING GASKET TO MEET CURRENT REQUIREMENTS OF ASTM-C-361 SPEC.
4. JOINT CONFIGURATION MAY BE CAST BELL-UP OR SPIGOT -UP.



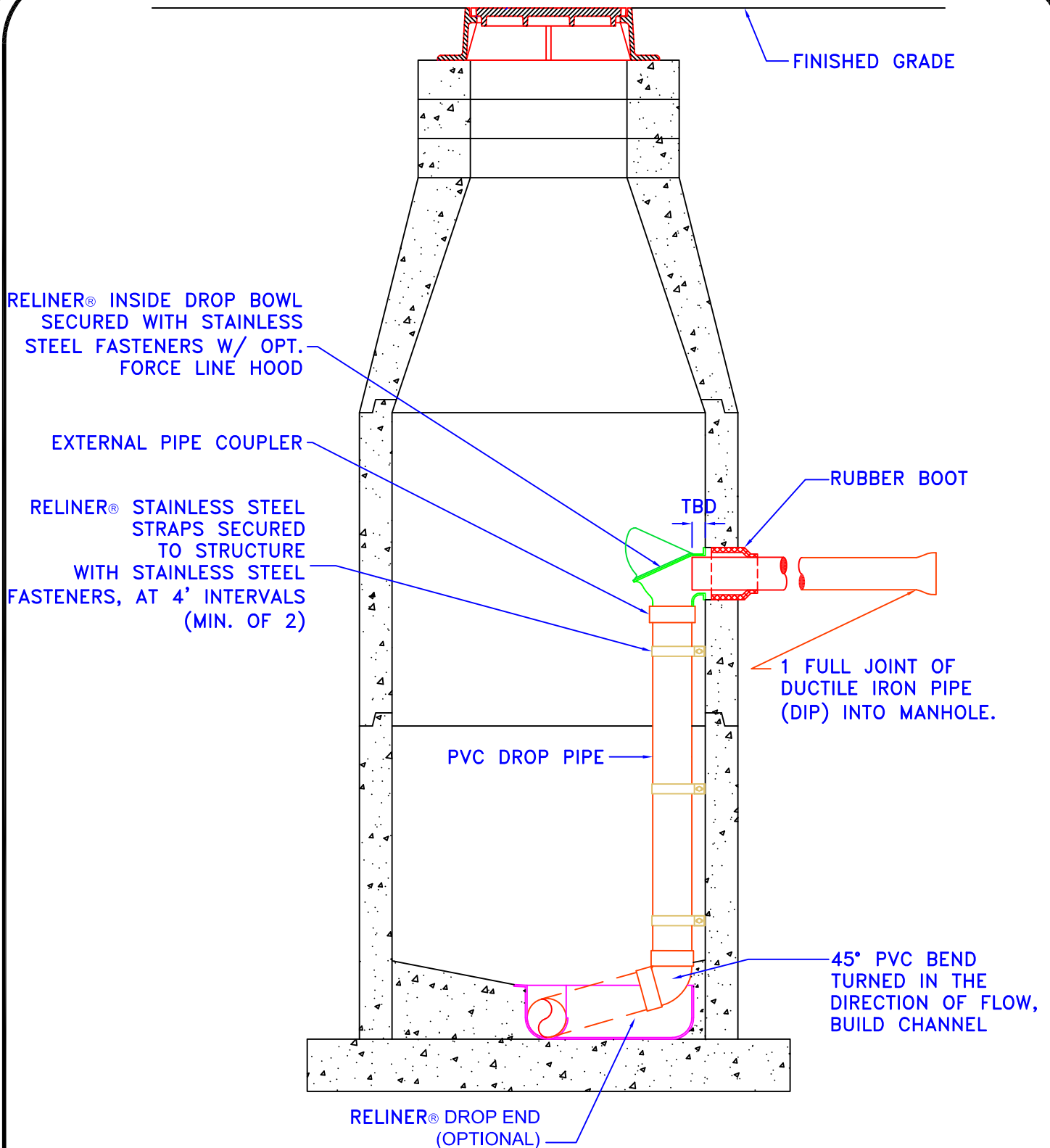
SECTION A-A



PRECAST CONCRETE MANHOLE
CONICAL REDUCER-5' TO 4'

N.T.S.

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REV-2018



INSIDE DROP MANHOLE DETAIL

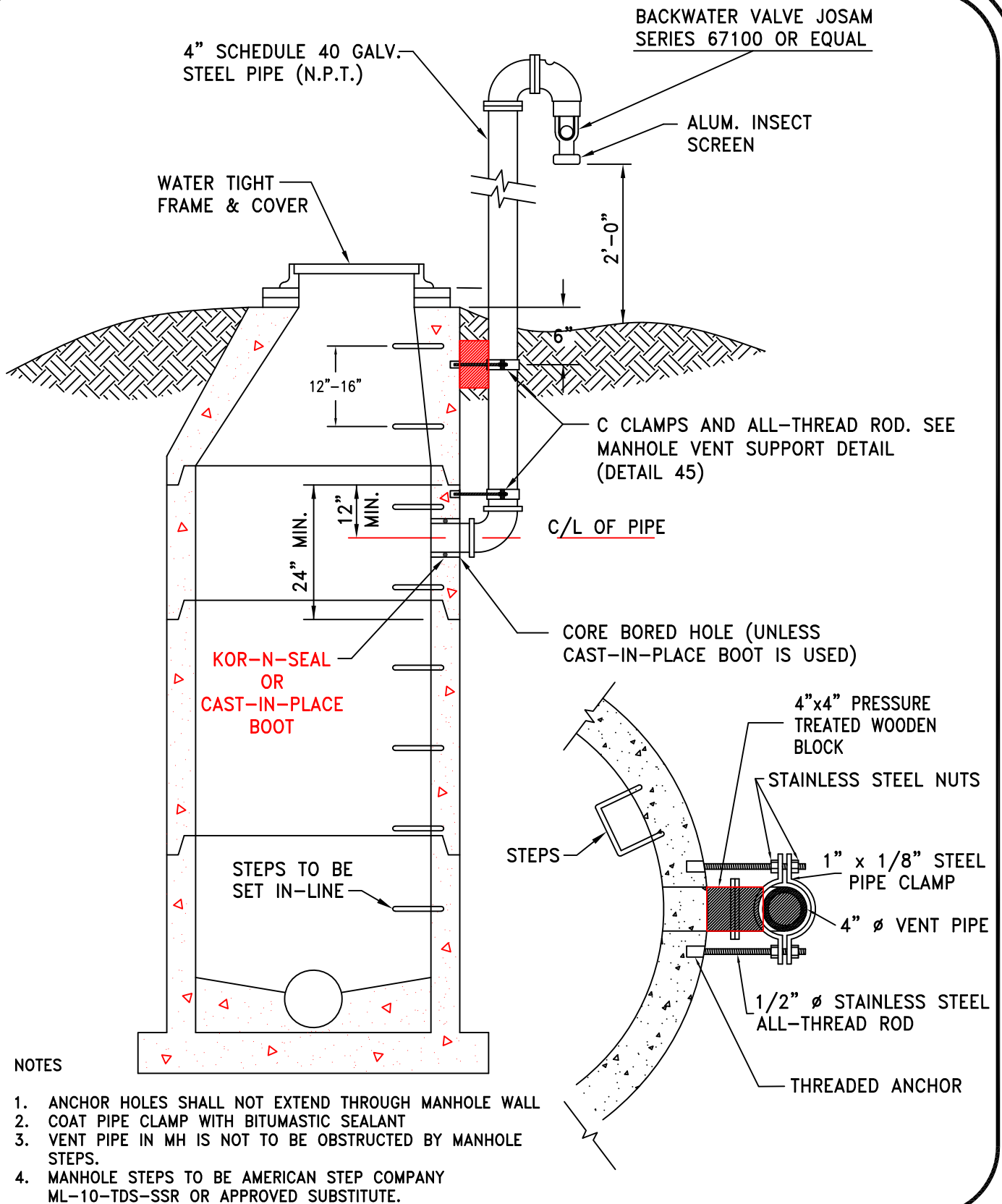
N.T.S.

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REV-2018

1. Fill drop connection trench with Class B concrete. Drop connection trench width to be same as approach trench.
2. Manhole shall conform in all other respects to STANDARD 4' I.D. PRECAST CONCRETE MANHOLE and CONE SECTION details.
3. Keep annular space between manhole and pipes free of concrete, mortar and grout.
4. Manhole steps to be American Step Company ML-10-TDS-SSR or approved substitute.

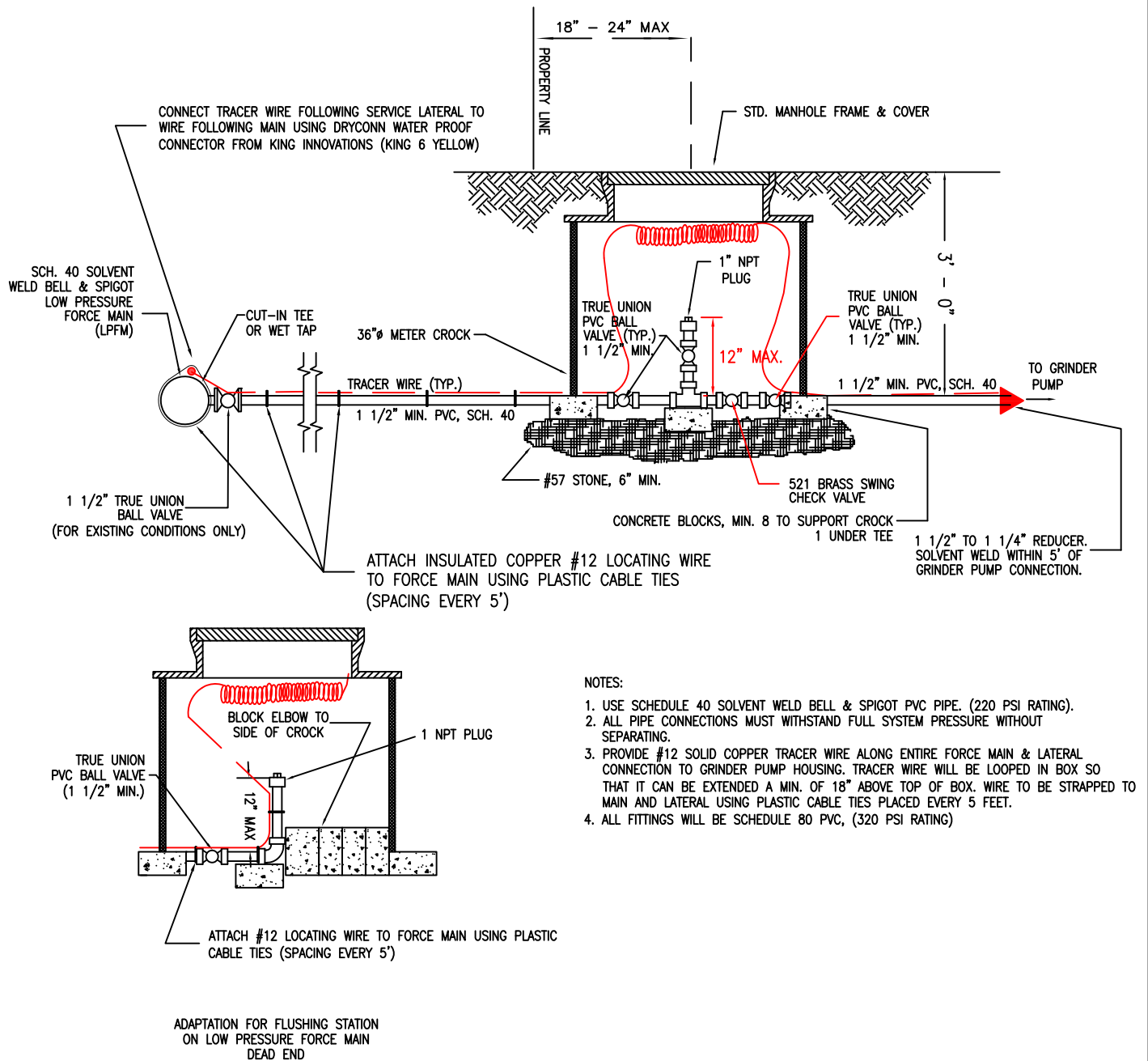


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REV-2018



MANHOLE VENT N.T.S.

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REV-2018



FLUSHING STATION AND GRINDER PUMP CONNECTION TO LOW PRESSURE FORCE MAIN

N.T.S.

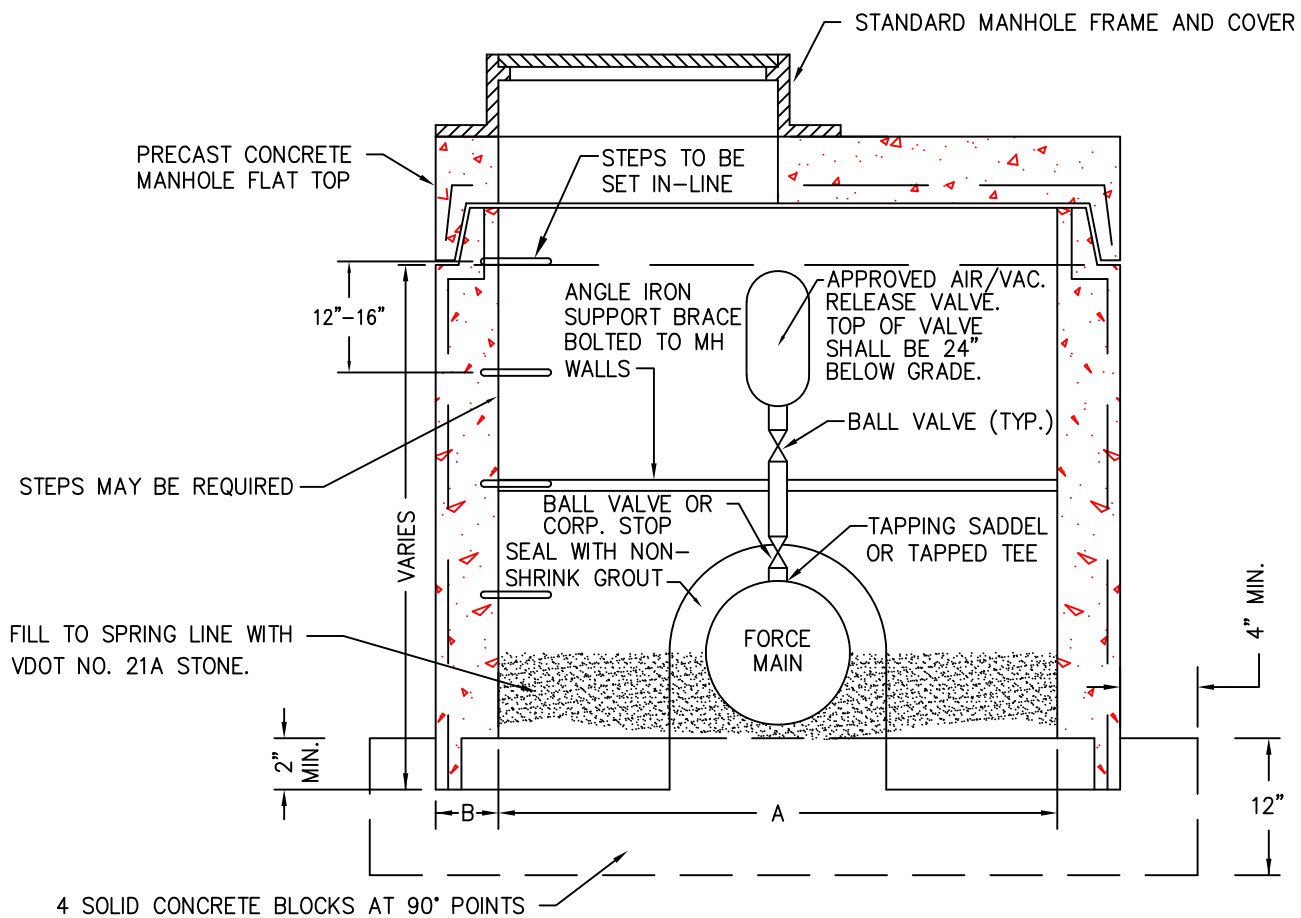
S-25
REV-2018

NOTES:

1. CONCRETE SHALL BE 4000 PSI COMPRESSIVE STRENGTH, MIN.
2. ALL REINFORCING SHALL MEET REQUIREMENTS OF CURRENT ASTM SPEC A-615.
3. MANHOLE SECTIONS SHALL MEET REQUIREMENTS OF CURRENT ASTM SPEC C-478.
4. TAPERED JOINT WITH O-RING GASKET SHALL MEET REQUIREMENTS ASTM SPECS C-361 & C-443.
5. CAST MANHOLE SECTION INTO BASE 2" OR DEPTH OF JOINT, WHICHEVER IS DEEPER.
6. JOINT CONFIGURATION MAY BE CAST BELL-UP OR SPIGOT-UP.
7. SIZE DOGHOUSE OPENINGS 4" MIN. AND 8" MAX. LARGER THAN PIPE O.D.
8. ALL AIR RELEASE PIPING SHALL BE BRASS.
9. FOR FORCE MAINS SMALLER THAN 6" DIAMETER, EXCEPT FOR DUCTILE IRON, CLAMP THE AIR/VACUUM RELEASE VALVE TO THE ANGLE IRON SUPPORT BRACE.
10. CAST BASE ON FIRM, UNDISTURBED SOIL.
11. STANDARD PRECAST BASE SECTION MAY BE USED FOR NEW FORCE MAIN CONSTRUCTION. BED STANDARD BASE ON MIN. 6" VDOT NO. 21A. CORE FOR PIPE MIN. 4" LARGER THAN PIPE O.D. CONFORM TO THIS DETAIL IN ALL OTHER RESPECTS.
12. MANHOLE STEPS TO BE AMERICAN STEP COMPANY ML-10-TDS-SSR OR APPROVED SUBSTITUTE.

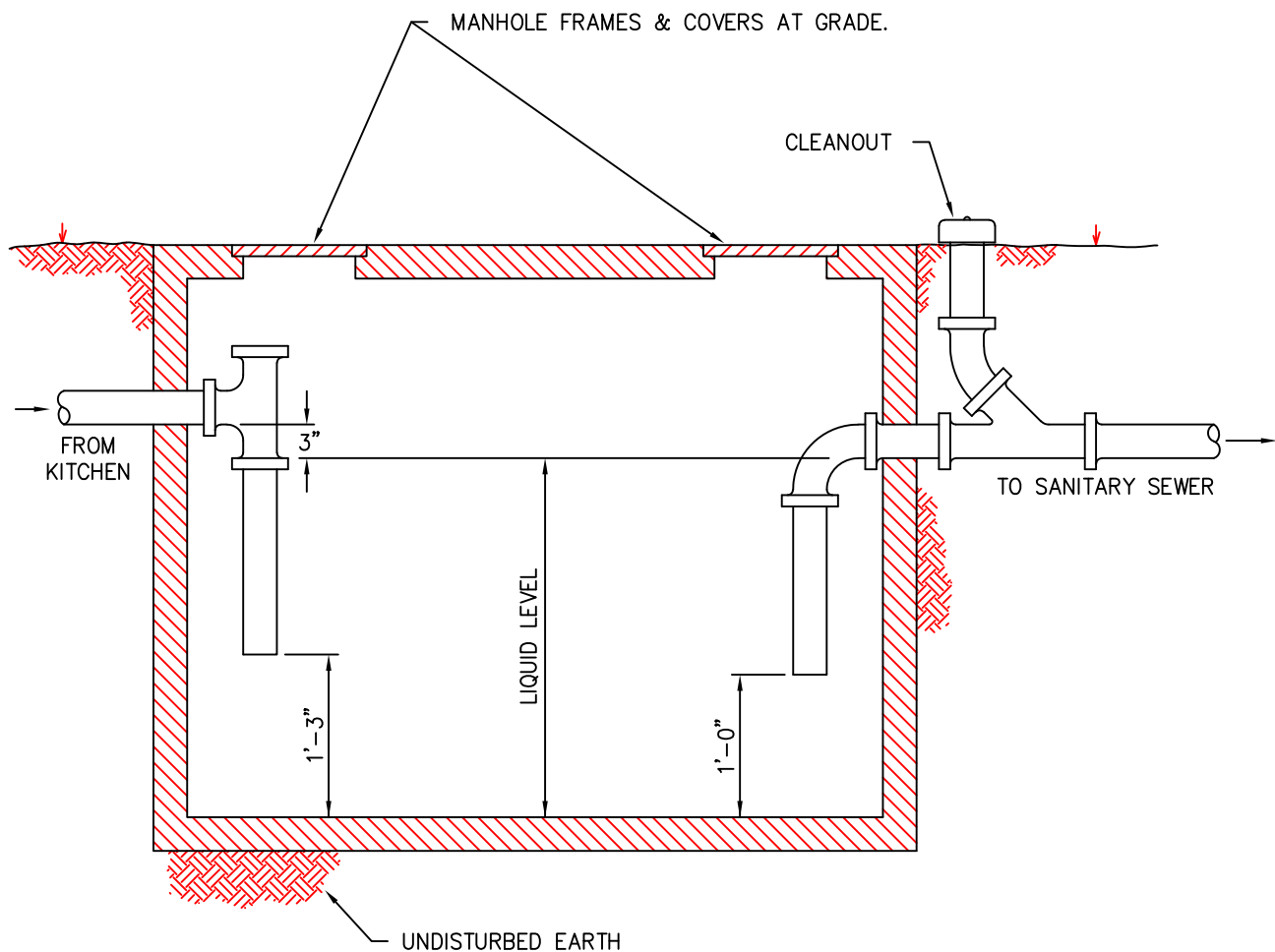
CHART A

MIN DIMENSIONS			
FM	TO 16"	TO 20"	TO 36"
MH	4'	5'	6'
A	48"	60"	72"
B	6"	6"	7"



SEWAGE FORCE MAIN AIR or
VACUUM RELEASE ASSEMBLY
N.T.S.

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REV-2018



NOTES:

1. DESIGN BASED ON COMMERCIALY AVAILABLE PRE-CAST SEPTIC TANK.
2. MINIMUM STORAGE 500 GALLONS.

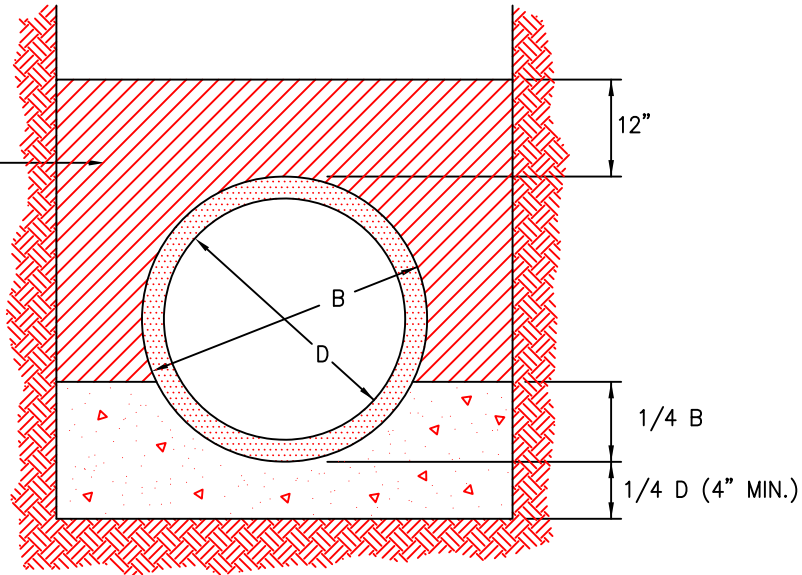


GREASE TRAP N.T.S.

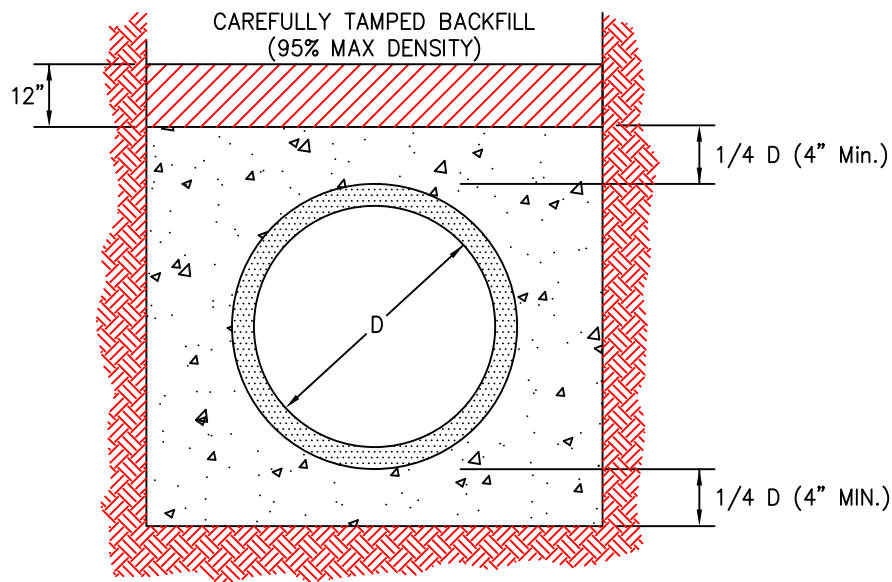
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REV-2018

ONLY ALLOWED WITH SPECIFIC PWCSA PERMISSION

CAREFULLY
TAMPED
BACKFILL
(95% MAX DENSITY)



STANDARD CONCRETE CRADLE



STANDARD CONCRETE ENCASEMENT
(FOR USE WHEN APPROVED BY DIRECTOR)

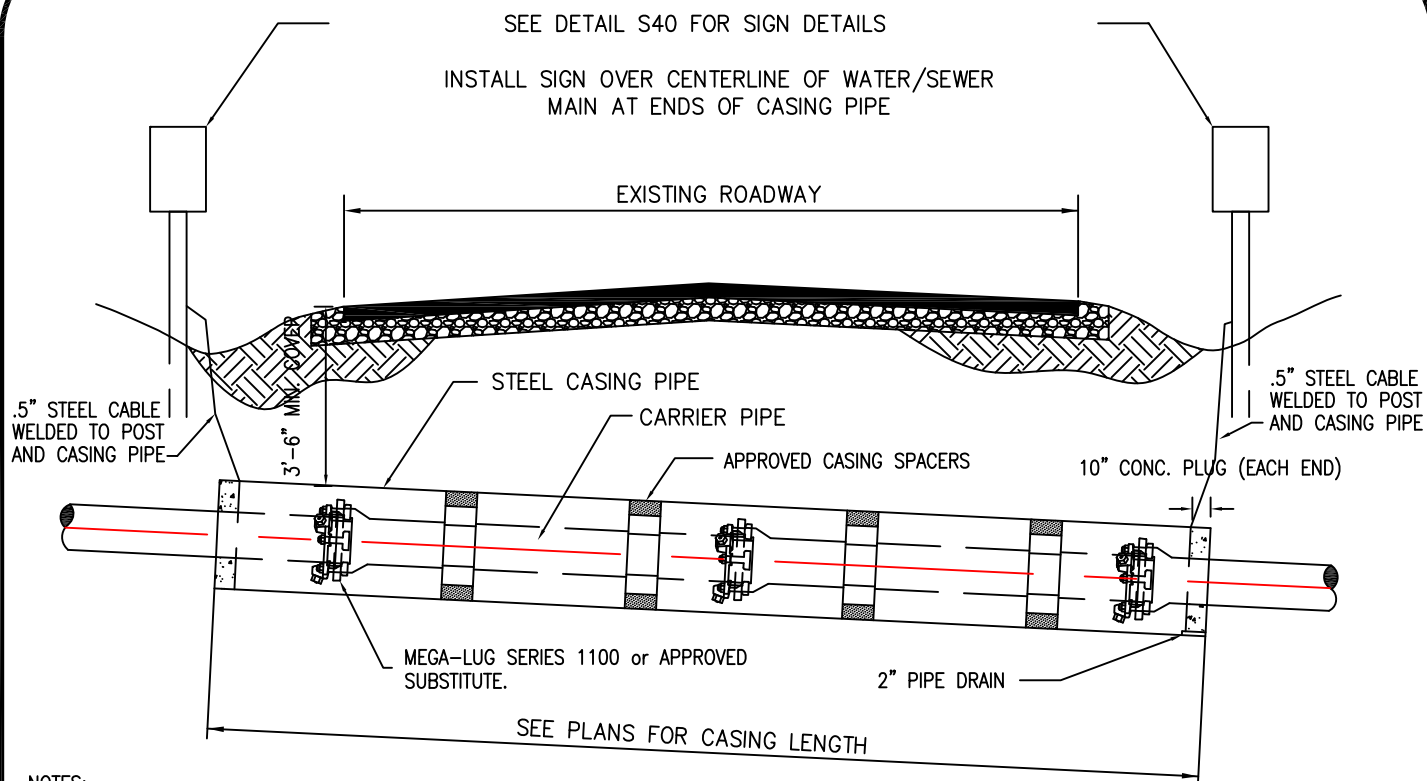
NOTES:

1. CONCRETE TO BE CLASS "B" UNLESS OTHERWISE SPECIFIED.
2. TRENCH WIDTH SHALL BE AS SPECIFIED OR AS SHOWN ON PLANS.



CONCRETE CRADLE
AND ENCASEMENT
N.T.S.

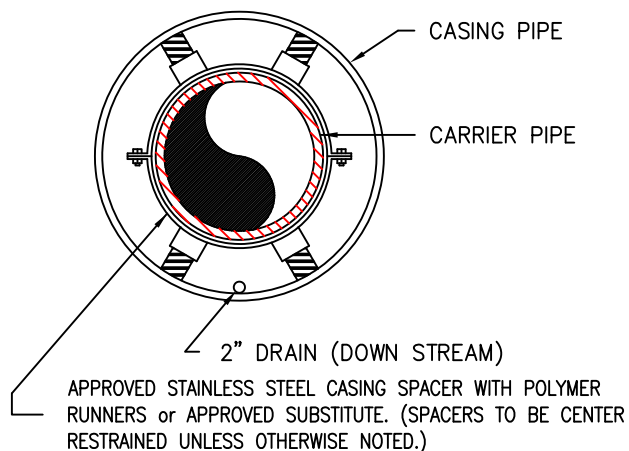
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REV-2018



NOTES:

1. SPACE CASING SPACERS ACCORDING TO PIPE OR SPACER MANUFACTURER'S RECOMMENDATION OR 2 PER SECTION OF PIPE, WHICHEVER REQUIRES MORE SPACERS, PLUS ONE (1) WITHIN TWO (2) FEET OF EACH END OF CASING.
2. PUSH OR PULL THE CARRIER PIPE THROUGH THE CASING SO THAT THE JOINTS ARE ALWAYS COMPRESSED.
3. ALL JOINTS WITHIN THE CASING WILL BE RESTRAINED USING MEGA-LUG SERIES 1100 RESTRAINING GLANDS or APPROVED SUBSTITUTE.
4. STEEL ENCASEMENT PIPE SHALL CONFORM TO ASTM A139 WITH A MINIMUM THICKNESS OF 0.5 INCH OR ASTM A53 STANDARD WEIGHT CLASS. PIPE FOR JACKING SHOULD BE OF SUFFICIENT STRENGTH, DIAMETER AND WALL THICKNESS TO ACCOMPLISH THE SPECIFIC TASK.

CARRIER PIPE	CASING PIPE	
	MINIMUM CASING PIPE O.D.	MINIMUM CASING THICKNESS
4	14	0.5"
6	16	0.5"
8	18	0.5"
10	18	0.5"
12	24	0.5"
14	24	0.5"
16	30	0.5"
18	30	0.5"
20	30	0.5"
24	36	0.5"
30	42	0.5"
36	48	0.5"
42	54	0.5"
48	60	0.5"
— —	— —	— —



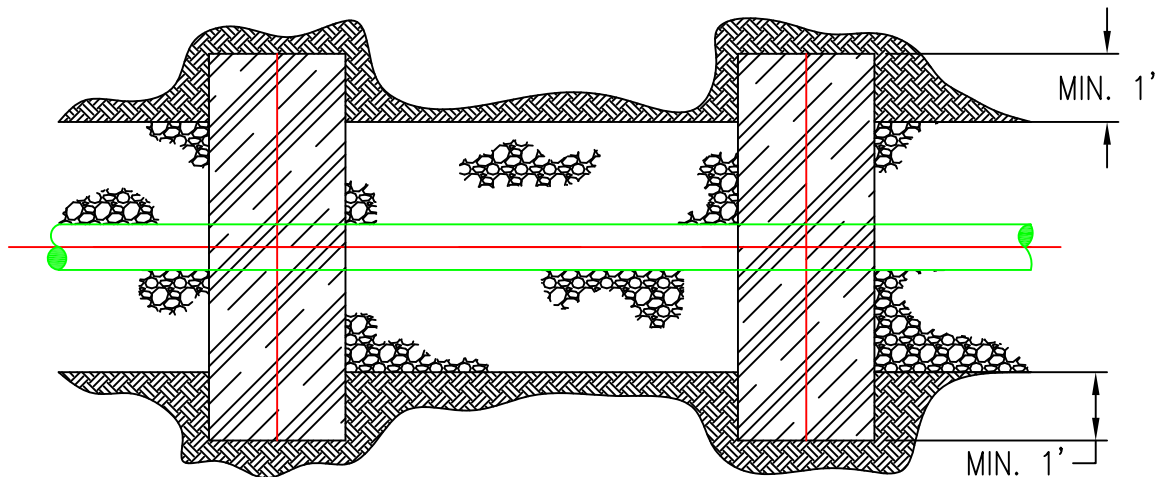
PIPE IN CASING END VIEW



STEEL CASING

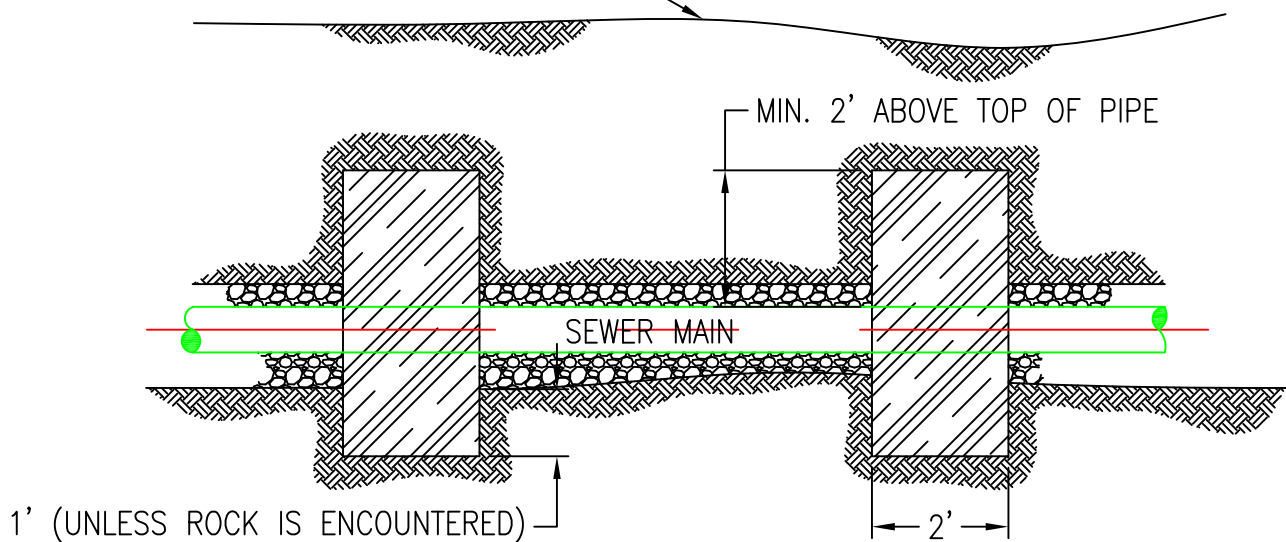
N.T.S.

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REV-2019



TOP VIEW

EXISTING GROUND ELEVATION



SIDE VIEW

NOTES:

1. SPACING TO BE DETERMINED BY THE DESIGN ENGINEER/INSPECTOR.
2. CLAY DAM (MIN. IMPERVIOUSNESS = 10^{-3} CM/SEC)
3. ALTERNATE MATERIALS INCLUDES SOIL MIXED WITH CEMENT AND CONCRETE. (MATERIALS TO BE APPROVED BY DESIGN ENGINEER PRIOR TO PLACING.)



CLAY DAM DETAIL

NTS

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REV-2018



PWCSA LOGO
N.T.S.

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REV-2018

The diagram shows a circular tank with a vertical internal pipe and a horizontal outlet pipe. The vertical pipe has two check valves, one above and one below the horizontal pipe. The horizontal pipe has one check valve. The flow direction is indicated by the check valves, showing flow from the tank into the horizontal pipe.

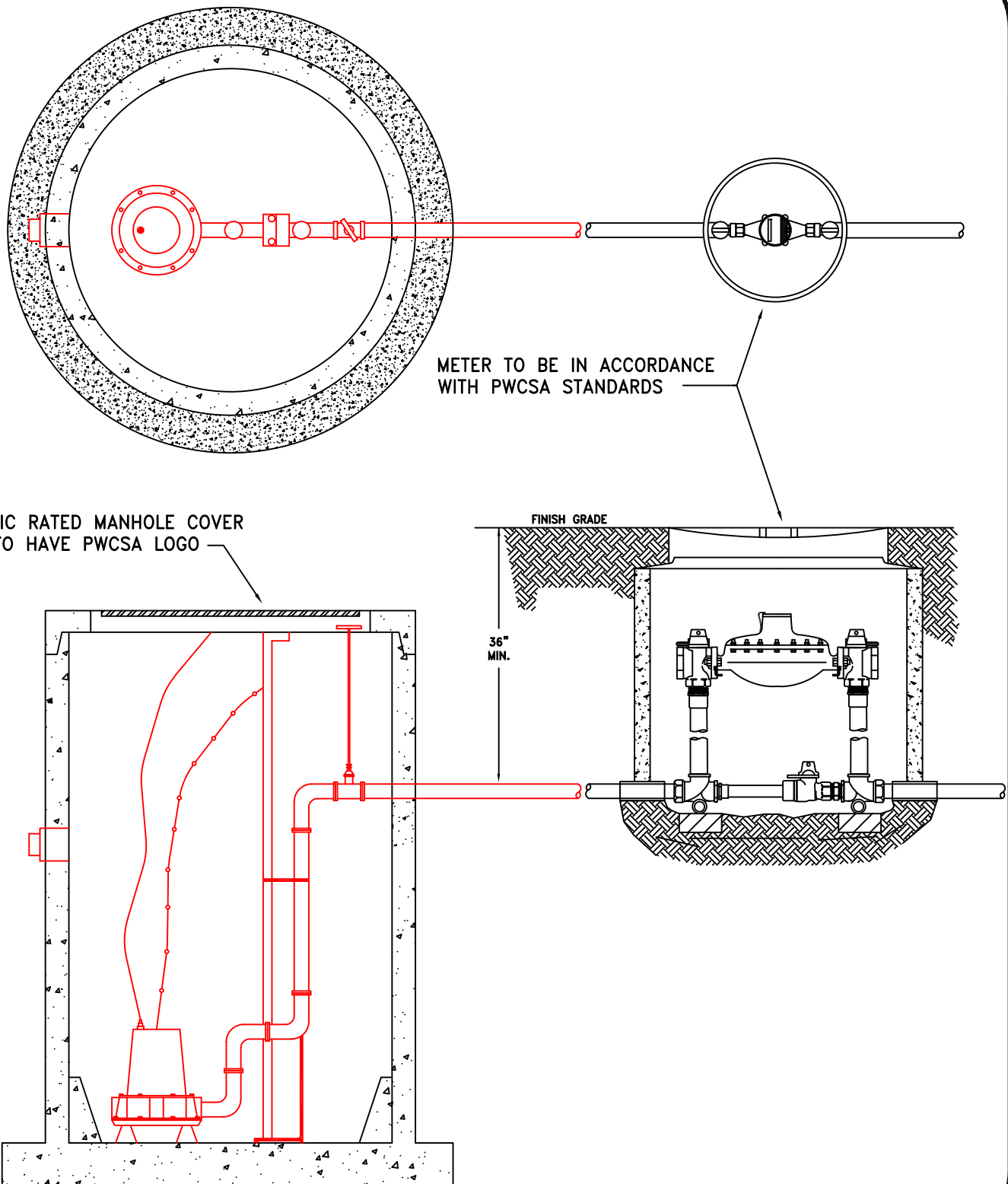
-
- Diagram illustrating the cross-section of a manhole assembly. Key components and dimensions are labeled:
- STANDARD MANHOLE FRAME AND COVER
 - PRECAST CONCRETE MANHOLE FLAT TOP
 - STEPS TO BE SET IN-LINE
 - TRUE UNION BALL VALVE
 - L.P.F.M. (Low Pressure Flow Meter)
 - RING LINE WITH 21A STONE
 - Dimensions: 2" MIN., 12", 4" MIN.
 - CONCRETE BLOCKS AT 90° POINTS

4 SOLID CONCRETE BLOCKS AT 90° POINTS



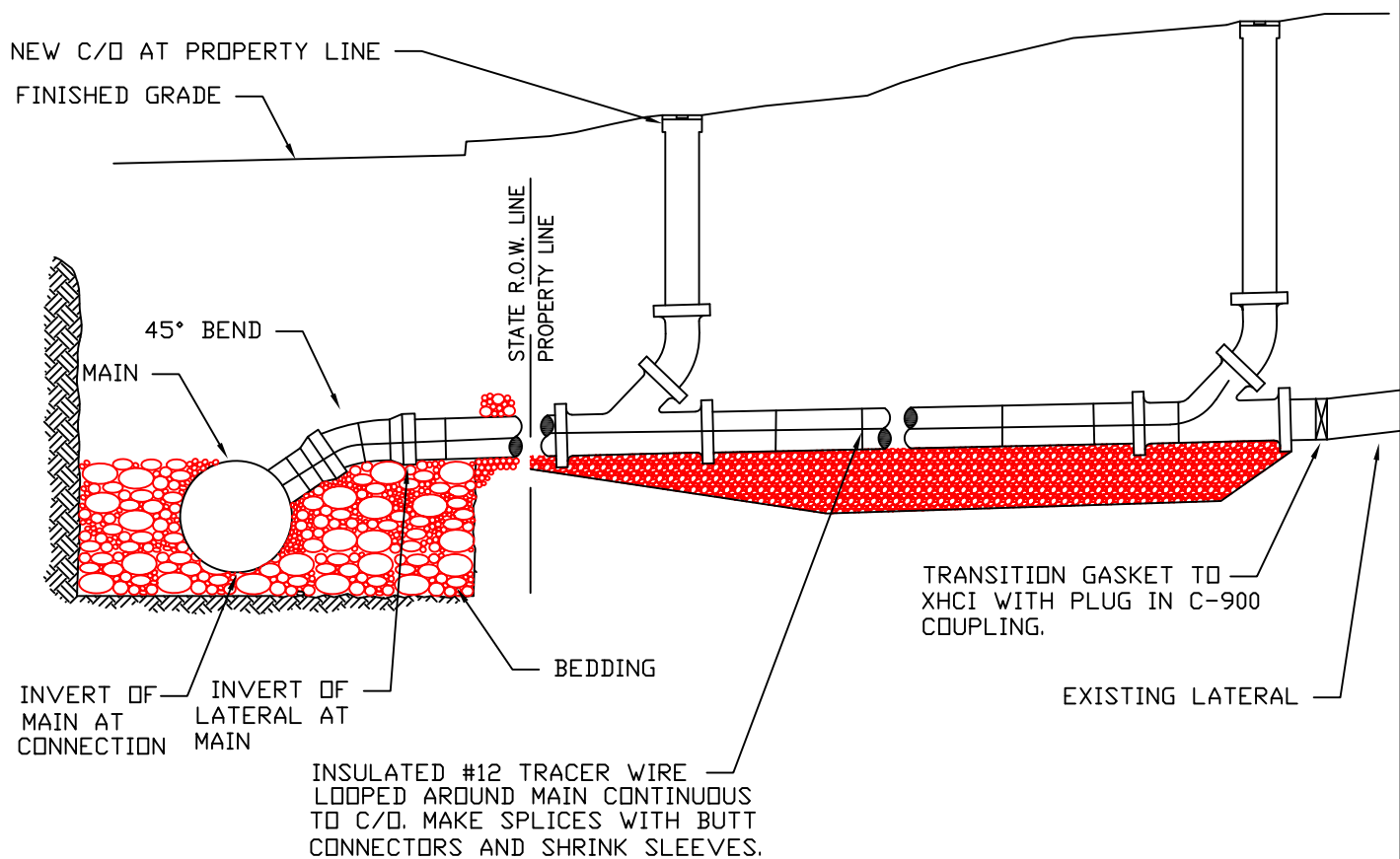
N.T.S.

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REV-2018



SEWER ONLY METER
FOR PROCESS WATER
N.T.S.

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REV-2018



NOTES:

1. STAINLESS STEEL SHEAR PROOF COUPLING / TRANSITION GASKET TO BE MINIMUM 5' FROM LAST PIPE JOINT.
2. REFER TO APPROVED PRODUCTS LIST FOR ADDITIONAL REQUIREMENTS.

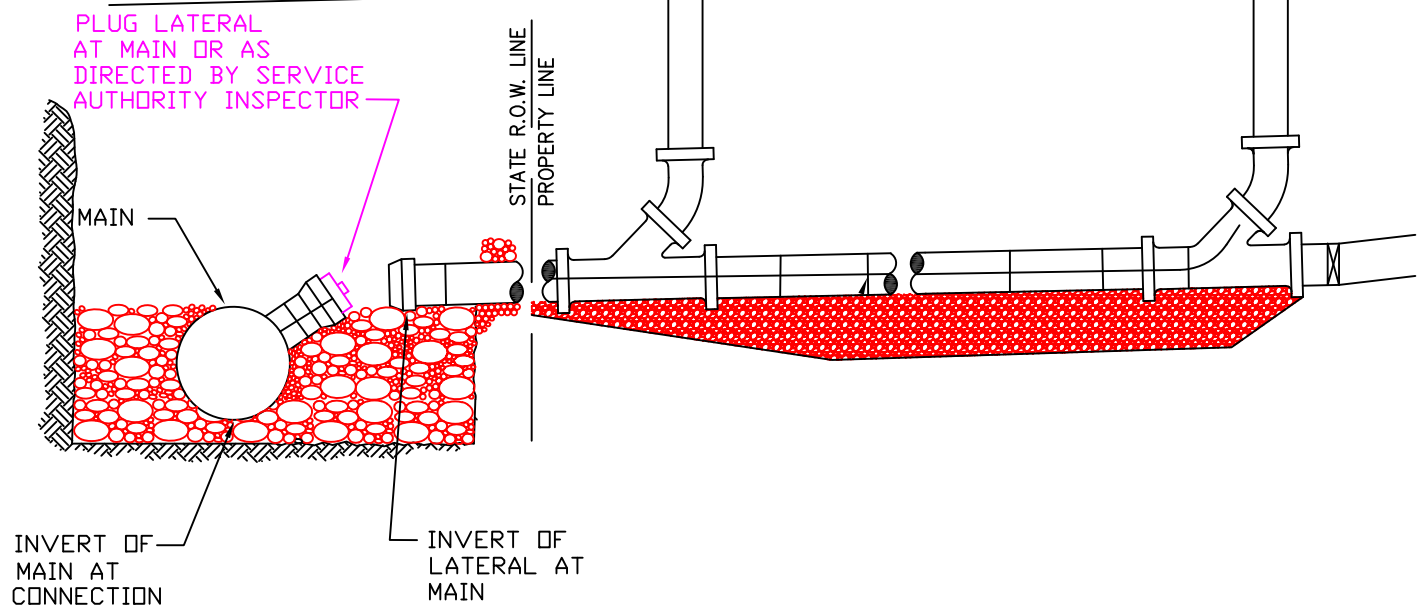


SANITARY SEWER LATERAL REPLACEMENT

N.T.S.

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REV-2018

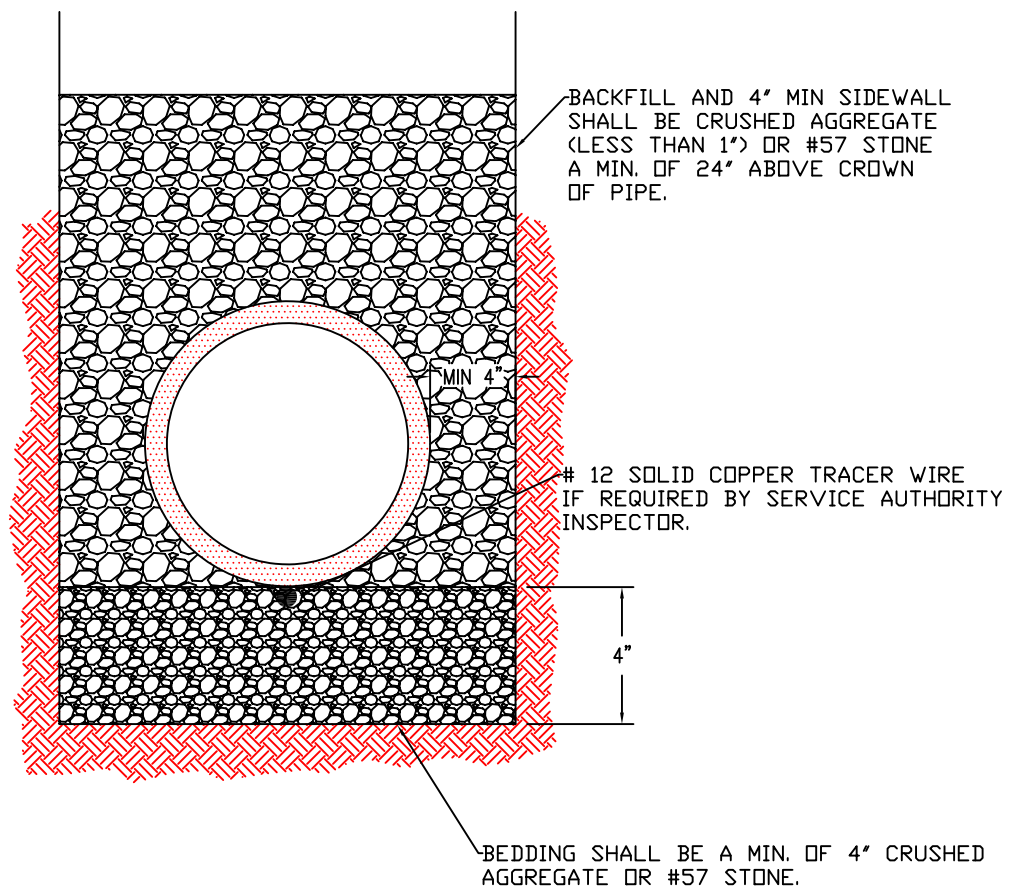
OPTION "A" FOR DIP/PVC



TERMINATION OF
SANITARY SEWER LATERAL
N.T.S.

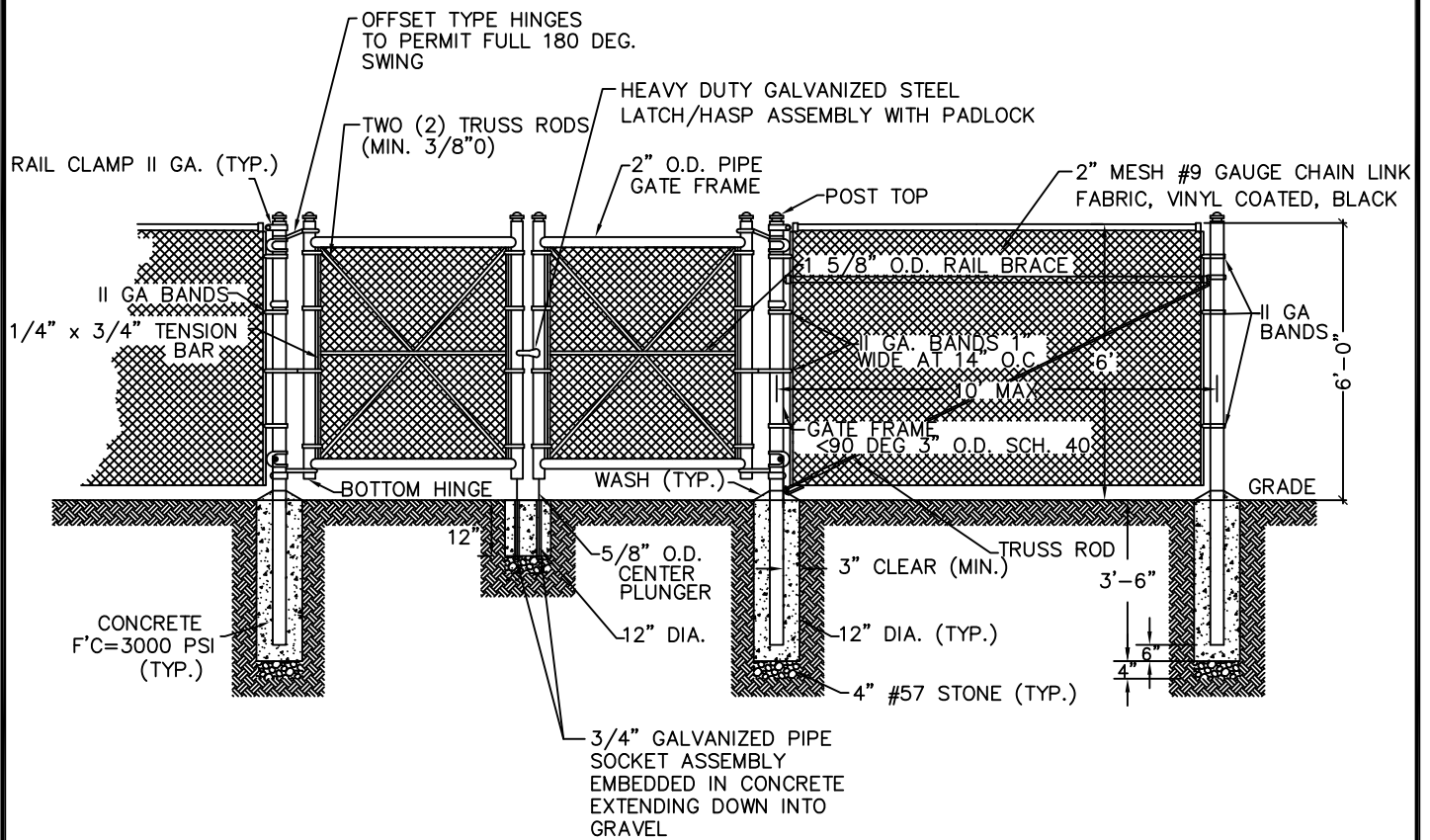
S-35
REV-2018

BEDDING AND BACKFILL FOR C-900, C-905 AND POLY-WRAPPED DIP



SANITARY SEWER LINE
BEDDING AND BACKFILL
N.T.S.

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REV-2018



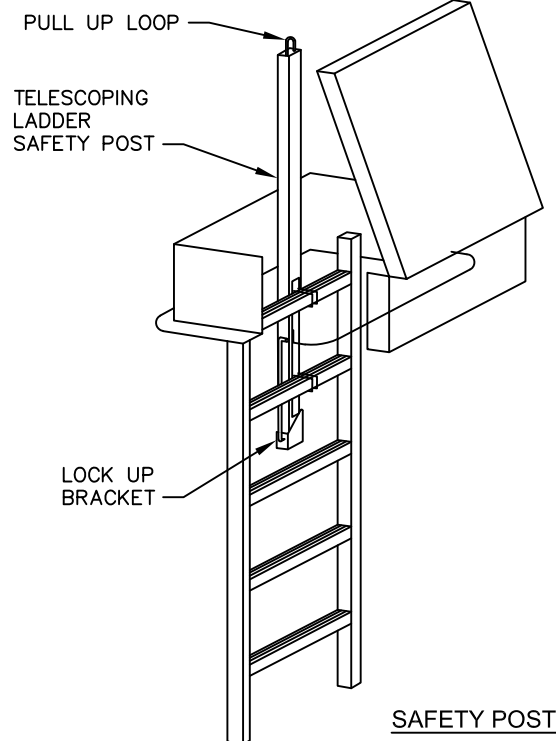
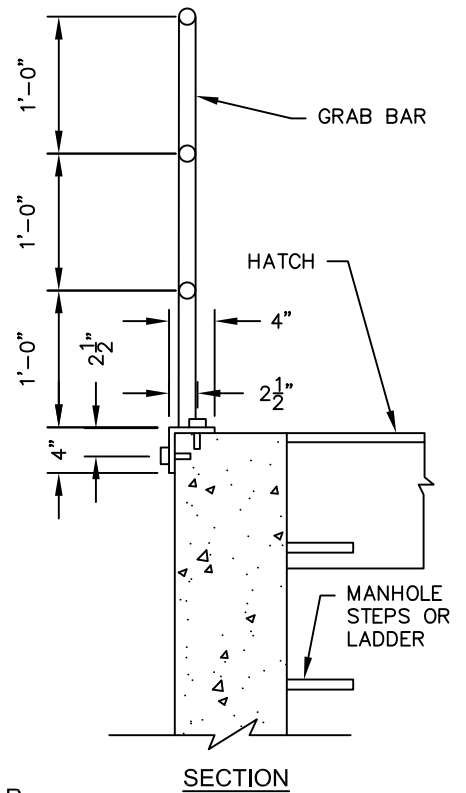
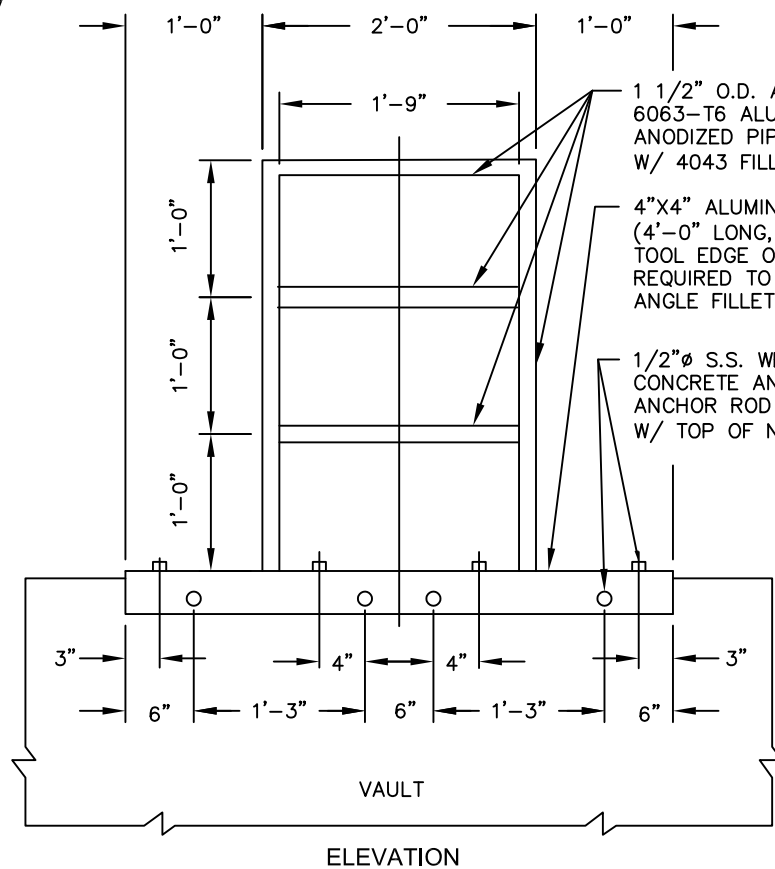
NOTE:

1. CONTRACTOR SHALL FIELD MEASURE TO CONFIRM AREA TO BE FENCED AND LOCATIONS OF GATES AND SUBMIT SHOP DRAWINGS PRIOR TO INSTALLATION



CHAIN LINK FENCE AND GATE DETAIL N.T.S.

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REV-2018



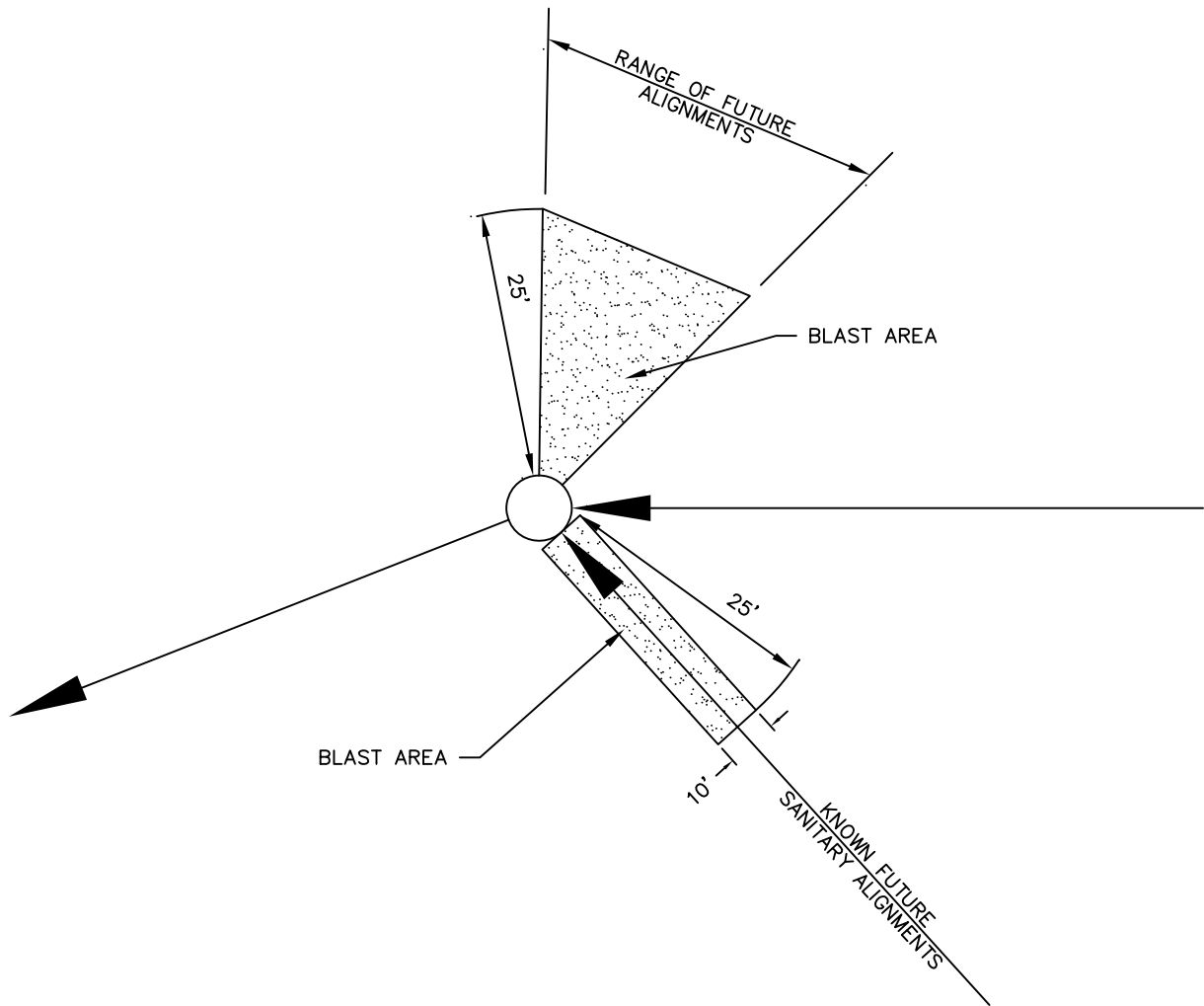
NOTES:

1. HATCH TO OPEN AWAY FROM GRAB BAR OR SAFETY POST.
2. CENTER GRAB BAR OR SAFETY POST ON CENTER OF LADDER. SAFETY POST MAY BE OFFSET WHEN USED WITH MILLER VI-GO™ SYSTEM.



HATCH SAFETY FEATURES N.T.S.

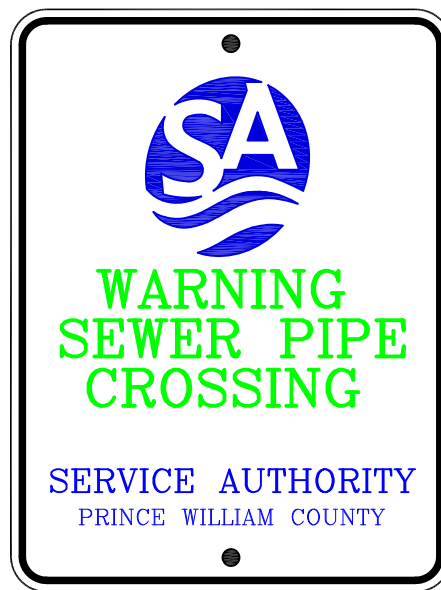
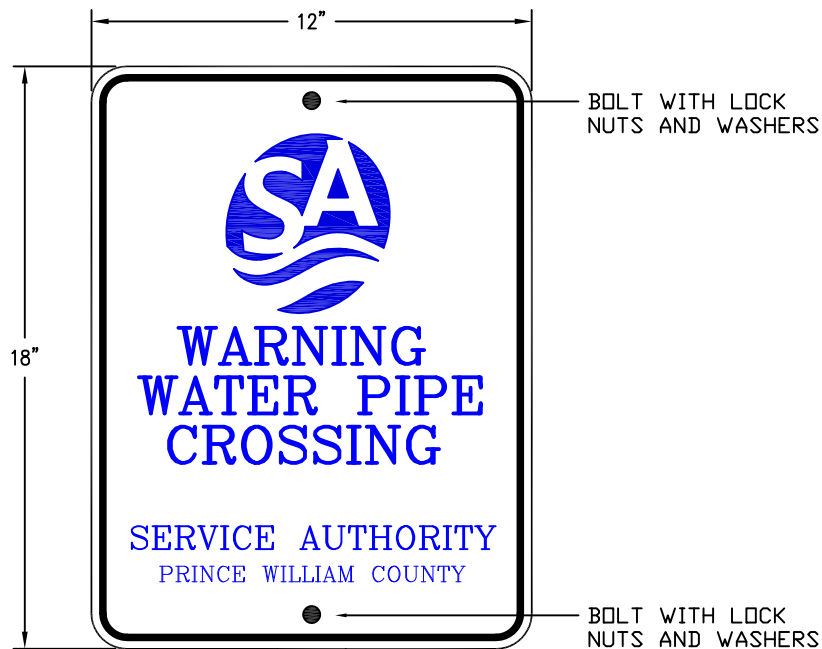
S-38
REV-2018



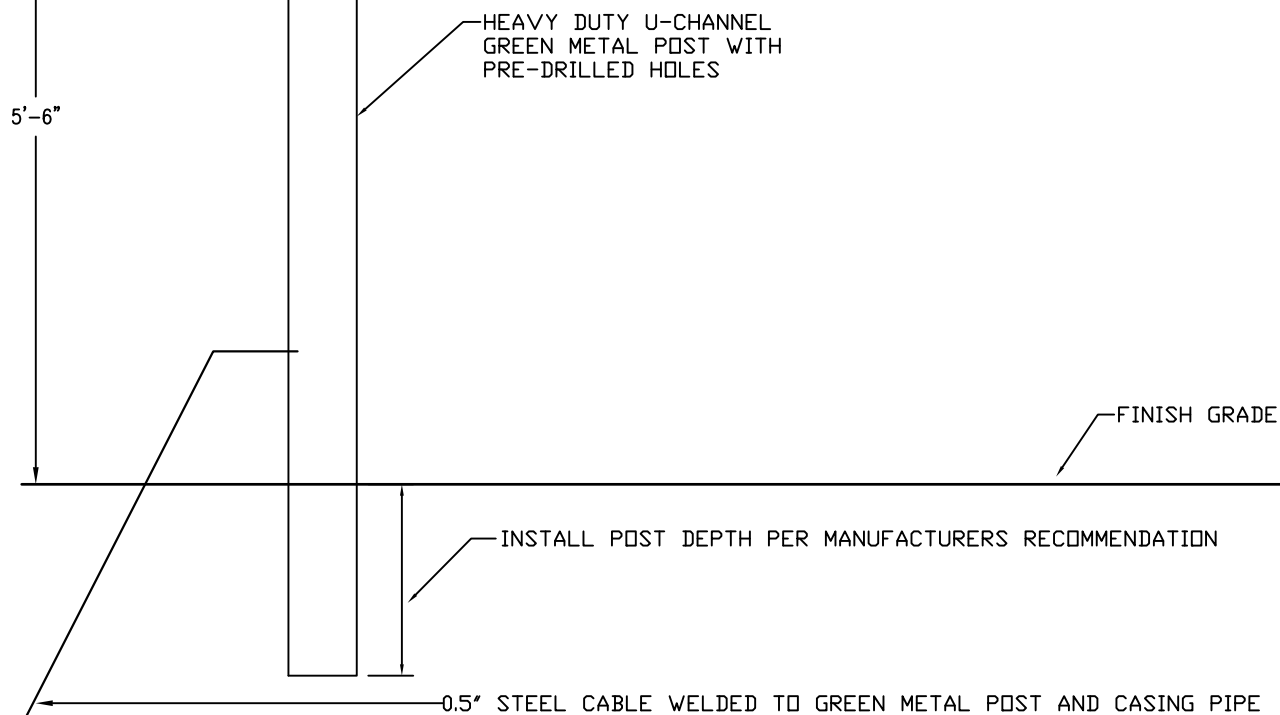
ADVANCE BLASTING

N.T.S.

S-39
REV-2018



SEE NOTES ON DETAIL
S26.07.01 FOR LOCATION
OF SIGN INSTALLATION



WARNING WATER/SEWER PIPE
CROSSING

N.T.S.

S40
REV-2019

Appendix C: USM Approved Products List

Refer to the Service Authority's USM Approved Products List
by using Control + Click to follow the link

[Products List](#)

Category	Manufacturer	Product
Gate Valves	American Flow Control	DI Resilient Wedge Valve Series 2500 with or w/o ALPHA ends
	TEAM Industries	TEAM Insert Valve
	Clow Valve Co	Resilient Seat Gate Valve 2639/2640
	Kennedy Valve	Resilient Seat Gate Valve RSGV-304SS
	M&H Valve Co	Resilient Seat Gate Valve - 4067
	Mueller Company	Resilient Wedge Gate Valve A-2361 and Tapping Valve T-2361
	US Pipe and Foundry Co	Metroseal 250 Resilient Seat Gate Valve
Butterfly Valves	Henry Pratt Co	HP250II
	M&H Valve Co	#4500 and #1450 CL. 250
	Mueller Company	Lineseal XP or XPII 250 psi rated
Check Valves	American Flow Control	Series 2100 Resilient Check Valve
Control Valves	CLA-VAL Co	Air Release, Vacuum, and Combination
	Singer Valve	Automatic Control Valves
Fire Hydrants	Clow Valve Co	Medallion
	Kennedy Valve	Guardian
	Mueller Company	Centurian
Meter Crocks, Frames and Covers	Bingham & Taylor	18" Meter Box Frame and Cover B&TA - 32PW
	Bingham & Taylor	Molded Meter Pit MMP182230
	Capitol Foundry of VA., Inc.	18"-36" MBX-PWCSA Meter Box Frame & Cover
	DFW Plastics	Plastic Meter Crock - this site has loads of crocks. Not sure which one..
	Hancor	PVC Meter Crock
	Old Castle Infrastructure	Heavy Wall PVC Meter Crock
	Mueller Company	B2423 Ball Valve Fabricated Meter Setter for 1.5inch & 2inch
	Vestal Manufacturing Company	18" Locking Ring and Cover (RMRC-18L)
	Vestal Manufacturing Company	20" Locking Cover w/RTR
	Vestal Manufacturing Company	20" Monitor Ring
	Vestal Manufacturing Company	ER-2024 Expanda Ring 26 ½" Adapts 20" Cover to 20" Tile
	Vestal Manufacturing Company	ER-2036 Expanda Ring 36" Adapts 36" Cover to 36" Tile
	Vestal Manufacturing Company	Waterworks Castings
	Vestal Manufacturing Company	18" Meter Box Frame and Cover
Tapping Sleeves and Water Service Saddles	Cascade Waterworks Manufacturing	Water Service Saddle
	Romac Ind, Inc.	Water Service Saddle
	Mueller Company	Water Service Saddles
	Romac Ind., Inc.	Steel Tapping Sleeve FTS425
	Romac Ind., Inc.	SST Stainless Steel Tapping Sleeve with DI Flange
	Mueller Company	SS Tapping Sleeve H-304
Waterline, Fittings and Appurtenances	Star Pipe Products, Inc.	AWWA Water Line Fittings
	SIGMA Corp.	AWWA Water Line Fittings
	Assured Flow Sales, Inc.	Fire Hydrant Gradelok
	Romac Industries, Inc.	Grip Ring Pipe Restraint (12" and smaller)
	Romac Industries, Inc.	Repair Clamp CL1
	Romac Industries, Inc.	Alpha Couplings and Fittings
	SIGMA Corp.	ONE-LOC Thurst Restraint
	EBAA Iron	Mega-Lugs Restraint
	One-Bolt	One-Bolt Fittings
	Mueller Company	Aquagrip Fittings
	Ford Meter Box Company	Uni-Flange Series 1400 Restraining Gland
	Cla-Val Co.	Air Release Valve - Water Service
	Mueller Company	Repair Clamp - this has been pending status since 1998. Do we use these?
	Star Pipe Products, Inc.	Stargrip MJ Restraint

	Tyler Union Romac Industries, Inc. Romac Industries, Inc. U.S. Pipe and Foundry Vestal Manufacturing Company Vestal Manufacturing Company Capital Industries, Inc. Rehau Multi-Fittings Diamond Plastics SW Services	TUF Grip Restraint Roma Grip Restraining Gland Roma Grip Restraint for DI Pipe PermaFuse Epoxy Coated D.I. Fittings 5 1/4" Valve Box Cover 1", 1.5", 2", 3", 4" and 6" Valve Box Riser Ring EZ-Lok Restraining Gland Municipex Waterline (PEX A) up to 200 psi Multi-Fittings C907 Tapped Coupling (LTD Approval) Diamond Lok C900 restrained Pipe (LTD Approval) Debriscap DC-455 and LD-4 Locking Device (Valves on 16 inch and larger mains)
Waterworks Brass	A.Y. McDonald Manufacturing Co Mueller Company A.Y. McDonald Manufacturing Co	Waterworks Brass 1.5" and 2" Copper Meter Setter 1.5" and 2" Copper Meter Setter

Sewage Collection

Manholes	Virginia Precast Winchester Bldg. Supply Co., Inc. Press Seal Gasket Corporation NPC American Step Co., Inc. Press Seal Gasket Corporation Press Seal Gasket Corporation Press Seal Gasket Corporation East Jordan Iron Work Canusa International Precast Supply Chesapeake Foundries Chesapeake Foundries Norfolk Casting Corporation Cretex Ladtech Predl	Forsheda Joint for Precast Manole Precast Concrete Manhole Press Boot Manhole Connector Internal Seal Manhole Steps 10-TDS-SSR PSX Positive Seal Manhole Connector PSX Series Six Manhole Connector 4G and 4F Profile Manhole Gaskets Manhole Frames and Covers Wrapid Seal Flexible Manhole Connector Watertight Manhole Frame and Cover Manhole Frame and Cover Manhole Frames and Covers Pro-Ring Manhole Adjustment Rings HDPE Adjusting Rings Cast in place manhole base liner

Sewage Pump Station Equipment	ARI Dezurik <i>See Appendix "D"</i>	Combination Sewage Air Valves D-020, D-023 and D-025 Plug Valves

Sewer Service Saddles	Fowler Manufacturing Co. DFW Plastics, Inc.	Inserta tee, Service Connection Flexible Sewer Saddle

Miscellaneous Products

Appendix D: Approved Equipment Manufacturers

Refer to the Service Authority's Approved Equipment Manufacturers
by using Control + Click to follow the link

[Equipment Manufacturers](#)

Appendix D: Approved Equipment Manufacturers

Part	Manufacturer		
	1	2	3
Sewage Pumping Stations			
Pumps ≤ 125 gpm	ABS Submersible	Gorman Rupp	-
Pumps > 125 gpm	Flygt	ABS Dry Pit Application	-
Flow Meters	ABB	Rosemont	-
Soft starts	Cutler Hammer	Benshaw	-
Check valves	GA	APCO	-
Channel grinders	JWC	Franklin Miller	-
Surge relief valves/pressure relief valves	Cla-Val	Golden Anderson	-
Booster Stations			
Pumps	Flow Serve	Aurora	-
Flowmeters	ABB	Rosemont	-
Soft starts	Cutler Hammer (Type S611)	Benshaw	Schneider
Check valves	Cla-Val	BERMAD	-
Surge relief valves/pressure relief valves	Cla-Val	Singer	-
Miscellaneous			
Generators	Cummins	Caterpillar	-
Automatic transfer switches	Onan	Russel Electric	ASCO
Exhaust fans	Greenheck	Loran Cook	-
Air relief valves	ARI	H-Tec	-
Tank level transmitters	Rosemont	GE Druck	-
Variable-frequency drives	Allen Bradley	Benshaw	-
Electrical/MCC	Square D	Eaton	

Appendix E: Partial/Full Beneficial Use Developer Request Template

Refer to the Service Authority's Partial/Full Beneficial Use Developer Request Template
by using Control + Click to follow the link

[Full and Partial Beneficial Use Request and Certification Form](#)

(Your Company Letter Head)
SAMPLE LETTER

Date

Mr. (Site inspector's name)
Prince William County Service Authority
P.O. Box 2266
Woodbridge, VA 22193-0266

Re: Project Name
PWC Plan #

Dear Mr. (Site inspector's name):

We have substantially completed the water and sewer infrastructure for the above referenced project, as of this date, and are now requesting that the Authority to place it in:

(Please check appropriate box)

- ☐ "Full Beneficial Use" status. (All Lots)
- ☐ "Partial Beneficial Use" status
- (Please list the Address of Lot you want in the Partial Beneficial Use)
 - (Attach the fire protection certification sealed by a Professional Engineer for lots to be placed in Partial Beneficial Use and Prince William County Approval)
 - Attach an exhibit highlighting those facilities proposed to be placed in Partial Beneficial Use Status

Please take the necessary steps to begin the process as soon as possible. I understand, and am in agreement, that the **"Beneficial Use"** status is solely for the purpose of using the facilities while the project is under construction. I am also aware that I must follow the established guideline for final bond release upon the completion of my project.

If you have any questions, please contact me at (123) 456-7890.

Yours truly,

Your name
Title

XXX/xxx

cc:
P:\DEVEL\INSP\FORMS_TEMPLATES\PreConst_Benefical Use\BeneficialUseRequestLetter_Rev_01.doc

(Letterhead)

(SEAL)

(Date)

Ms. Samantha Kearney, P.E.
Development Manager
Prince William County Service Authority
4 County Complex court
Woodbridge, VA 22192

Re: (Plan Name)
(Plan Number)
(Lots Numbers or Building Identifiers to be placed in Partial Beneficial Use)

Dear Ms. Kearney:

I, (Name), a duly licensed professional engineer in the commonwealth of Virginia, do hereby certify the available fire flow in accordance with Sec. 302.13 of the DCSM (Water Systems and Fire Flow Requirements) and fire protection/hydrant coverage in accordance with Sec. 302.08.B of the DCSM (Fire Hydrants in Relation to Buildings, reference to Table 3-2) for the above referenced lots/buildings. The information certified below is made by knowing the limited portion of the water system that is installed and to be put into operation with the occupancy of the referenced lots/buildings.



The required DCSM fire flow and hydrant coverage for the project is available. The water system constructed with the above referenced lots is able to deliver a minimum fire flow of _____ gpm at 20 psi.

- ☐ Estimated available fire flow has been determined by adjusting the hydraulic model previously accepted by Service Authority to match the installed water system that is to be placed in operation with the occupancy of the above referenced lots/buildings. The adjusted water model meets all Service Authority requirements referenced in the effective Prince William County Design and Construction Standards Manual and the Service Authority Utility Standards Manual.
- ☐ Estimated available fire flow has been determined by an on-site fire flow test from hydrants that provide coverage to the referenced lots/building. Test results have been extrapolated to all points of the installed water system that is to be placed in operation and adjusted for the low hydraulic grade line of the system, friction loss in the pipe, and elevation of the hydrant



The required DCSM fire flow is not available. The water system constructed with the above referenced lots is able to deliver a minimum fire flow of _____ gpm at 20 psi.

- ☐ Estimated available fire flow has been determined by adjusting the hydraulic model previously accepted by Service Authority to match the installed water system that is to be placed in operation with the occupancy of the above referenced lots/buildings. The adjusted water model meets all Service Authority requirements referenced in the effective Prince William County Design and Construction Standards Manual and the Service Authority Utility Standards Manual.
- ☐ Estimated available fire flow has been determined by an on-site fire flow test from hydrants that provide coverage to the referenced lots/building. Test results have been extrapolated to all points of the installed water system that is to be placed in operation and adjusted for the low hydraulic grade line of the system, friction loss in the pipe, and elevation of the hydrant

Disclaimer:

cc: Prince William County Service Authority

Appendix F: USM Waiver Form

Refer to the Service Authority's USM Waiver Form
by using Control + Click to follow the link

[Waiver Form](#)



Prince William County Service Authority

Utility Standards Manual Waiver

This form is for requesting waivers of the technical requirements of the Utility Standards Manual (USM). These requests are submitted to the Engineering & Planning Division.

I. General Information

Date:

Project Name:

Applicant:

Plan No.

Email:

Case No.

Phone:

II. Specifics of Waiver Request

Section(s) of USM to be waived:

Justification(s) for Request:

-----To be completed by Service Authority-----

III. Engineering & Planning Development Department

Cost Impact to the Service Authority:

☐ No

☐ Yes

Recommendation: ☐ Approve

☐ Approve with
Conditions

☐ Deny

Reason for Recommendation:

If Yes, the estimated value is
\$

SA Project Engineer Signature:

Date:

SA Development Manager Signature:

Date:

IV. Internal Stakeholder Concurrence:

☐

O&M

☐

Finance

☐

Not Applicable

Recommendation:

☐

Approve

☐

Approve w/
Conditions

☐

Deny

Reason for Recommendation:

Director or Designee Signature:

Date:

V. Engineering & Planning Department Director

☐

Waiver is approved as submitted

☐

Waiver is approved with conditions

☐

Waiver is denied as submitted

Waiver Conditions or Reason for Denial:

Director of Engineering & Planning Signature:

Date:

CC: File
CMMS Case

Appendix G: Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities

Refer to the Service Authority's Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities
by using Control + Click to follow the link

[Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Customers](#)

	Water and Sewer Service Policies	<i>EFFECTIVE DATE:</i> January 23, 2018
	<i>POLICY TITLE:</i> Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities	<i>STARTING SECTION:</i> 47000
		<i>OWNER:</i> DIRECTOR OF ENGINEERING & PLANNING

Division IV

Chapter 7

Article 1. Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities

Sections.

- 47100. Purpose.
- 47105. Reserved.
- 47110. Definitions.
- 47115. Decision-making Authority.
- 47120. Service Authority Priorities.
- 47125. Requirements for Projects Creating Impacts to Existing Communities.

§47100. Purpose.

It is essential to the Service Authority that its customers and the residents of Prince William County (“community”) are notified of construction projects that may create disruptions, inconvenience and impacts to their quality of life. This policy is intended to guide Service Authority employees in their decision-making process during plan review of developer projects and Service Authority Capital Improvement Program projects to assess potential community impacts. Service Authority employees, acting in their authorized roles and responsibilities, may be required to escalate decisions pertaining to community impacts created by potential construction projects to their Director, Deputy General Manager, or General Manager for further evaluation and mitigation. The Service Authority Priorities below represent the Service Authority’s shared values and are intended to guide employees as they make decisions and evaluate projects for potential impacts to surrounding communities.

§47105. Reserved.

§47110. Definitions.

Community – any Service Authority customer (commercial, residential, industrial, institutional, etc.), or resident of Prince William County adjacent to proposed construction activities initiated by a Developer or the Service Authority.

Developer – Property owner or designated agent responsible for developing property.

	Water and Sewer Service Policies	<i>EFFECTIVE DATE:</i> January 23, 2018
	<i>POLICY TITLE:</i> Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities	<i>STARTING SECTION:</i> 47000
		<i>OWNER:</i> DIRECTOR OF ENGINEERING & PLANNING

Development Projects – Projects initiated by the Development Industry that require off-site improvements to water and/or sewer infrastructure.

Service Authority - The Prince William County Service Authority and its Board of Directors.

Service Authority Projects – Projects initiated through the Capital Improvements Program.

Authorized Employee(s) – An employee of the Service Authority, acting in their regular or assigned role, who is authorized by policy, written or verbal instructions, to act in a specified capacity and make decisions.

§47115. Decision-making Authority.

- A. The Service Authority’s Authorized Employee is designated by one or more of the following:
1. By the Service Authority’s regular chain of command;
 2. By direction of the Service Authority’s General Manager.

§47120. Service Authority Priorities.

- A. The Service Authority Priorities are divided into two categories: absolute priorities and balancing priorities.
1. The Service Authority’s absolute priority is the preservation of the life, safety, health and quality of life of its customers, the general public and Service Authority employees.
- B. Balancing priorities are:
1. Minimizing disruptions, interruptions, and impacts to a community’s quality of life: noise, traffic interruptions, service interruptions, etc.
 2. Protection of the environment immediately adjacent to construction areas;
 3. Continuity of service to customers where construction activities will cause a loss of service;
 4. Continuity of service to communities where construction activities will not cause a loss of service, but may cause inconvenience, disruptions or interruptions to normal daily activities; and
 5. Compliance with regulatory or other legal requirements.

	Water and Sewer Service Policies	<i>EFFECTIVE DATE:</i> January 23, 2018
	<i>POLICY TITLE:</i> Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities	<i>STARTING SECTION:</i> 47000
		<i>OWNER:</i> DIRECTOR OF ENGINEERING & PLANNING

Authorized Employees shall evaluate each Developer and Service Authority project for potential community impacts and disruptions, negative impact to the Service Authority's public reputation and the overall mission and vision of the Board of Directors.

Authorized Employees should apply the balancing priorities above to arrive at the best overall recommendation as to whether or not impacts to existing communities will result from proposed construction activities. There may be unusual circumstances where an Authorized Employee is unsure of the potential impacts to surrounding communities. In such cases, the Authorized Employee shall consult with their Director, the Deputy General Manager or the General Manager prior to making a recommendation. For those projects creating a disruption, inconvenience, or impact to a surrounding community, the Authorized Employee shall follow the requirements listed in section 47125 below.

§47125. Requirements for Projects Creating Impacts to Existing Communities.

Projects creating community impacts are divided into two categories: Development Projects and Service Authority Projects.

1. Development Projects that result in offsite improvements which create impacts, disruptions or an inconvenience within existing communities will be subject to the following requirements upon concurrence of the General Manager:
 - a. The Developer submits a written Request to the County Planning Office for a Public Facilities Review (PFR) determination.
 - b. If a determination by Prince William County indicates a PFR is required, then the Developer will implement a community engagement and outreach effort, prior to the Planning Commission Public Hearing, to review the project with the impacted community and explain the time line, extent of disruptions and inconvenience and the Developer's mitigation plan. The Developer coordinates the community outreach program to include the impacted community, the offices of the Magisterial District Supervisor's Office and the Service Authority.
 - c. If a determination by Prince William County indicates a PFR is not required, then the Service Authority will require, prior to plan approval, a community engagement and outreach effort by the Developer to review the project with the impacted community and explain the time line, extent of disruptions and inconvenience and the Developer's mitigation plan. The Developer coordinates the community outreach program to include the impacted community, the offices of the Magisterial District Supervisor's Office and the Service Authority.

	Water and Sewer Service Policies	<i>EFFECTIVE DATE:</i> January 23, 2018
	<i>POLICY TITLE:</i> Community Notification & Outreach for Development and Service Authority Projects Creating Impacts to Existing Communities	<i>STARTING SECTION:</i> 47000
		<i>OWNER:</i> DIRECTOR OF ENGINEERING & PLANNING

2. Service Authority Projects that create impacts, disruptions or an inconvenience within existing communities will be subject to the following requirements upon concurrence of the General Manager:
 - a. Projects that require a County PFR determination will follow the Service Authority public notification and outreach process, which includes scheduling Town Hall meetings prior to the Planning Commission Public Hearing.
 - b. Projects that do not require a County PFR determination, a recommendation will be presented to the Board of Directors to follow the Service Authority public notification and outreach process that includes scheduling Town Hall meetings

ADOPTED: February 8, 2018

RESOLUTION: 18-02-12

REVISED: December 14, 2018

APPROVED BY GENERAL MANAGER

Appendix H: Service Authority Customer Handbook/ Developer Fees

Refer to the *Service Authority Customer Handbook Rates and Fees for New Connections (Developer Fees)*

by using Control + Click to follow the link

[Customer Handbook](#)

[Developer Fees](#)

DEVELOPER RATES & FEES

— Updated Feb. 2020 —



Developer Rates & Fees



Rates shall be charged in accordance with the rate schedules in effect at the time of billing.

Customers seeking or receiving service are subject to all Rates, Rules and Regulations which are subject to change. Please visit our website at www.pwcsa.org for the most current information. Customers should contact the Service Authority's Engineering & Planning Division at 703-335-7930 for assistance.

Detailed rate descriptions are included in the following pages.

New Developer Connection Rates and Fees (Effective 1/1/2015)	
A. Plan Review Fees	
Per Linear Foot (LF) - Water	\$0.65
Per Linear Foot - Sewer	\$0.65
Base Charge - New Plan	\$500.00
Base Charge - Plan Revision	\$150.00
B. Utility Permit Fees	
Inspection Fees Per LF - Water ⁽¹⁾	\$3.50
Inspection Fees Per LF - Sewer ⁽¹⁾	\$5.45
⁽¹⁾ Minimum charge of 100 LF per service.	
CCTV Inspection per LF	\$2.40
CCTV Return Trip	\$600.00
As-Built Fee per LF - Water	\$1.20
As-Built Fee per LF - Sewer	\$1.80
As-Built Minimum Charge per Project	\$1,000.00
C. Certification Fees	
Application Fee	\$35.00
Final Inspection (per Service)	\$50.00
Availability, Meter and Meter Installation Fees (see page 2)	
Local Facility Charges (per ERU)	
Powells Creek - Sewer ⁽²⁾	\$505.00
Little Bull Run - Sewer	\$880.00
Cabin Run - Sewer ⁽³⁾	\$3,500.00
⁽²⁾ Powells Creek Sewer Fees are subject to annual adjustment based on the Consumer Price Index and were revised on Jan. 1, 2020.	
⁽³⁾ Cabin Run Fee ends on June 1, 2020.	
D. Other Fees	
Other Review Fee	\$50.00
Other Inspection Fee	\$50.00
Stabilization Waiver Fee	\$490.00
Re-Inspection/Return Trip	\$100.00
Second Re-Inspection/Return Trip	\$200.00
Third and Any Subsequent Re-Inspection/Return Trip	\$300.00

Developer Rates & Fees

Availability Fees (Effective 1/1/2013) ⁽¹⁾⁽²⁾					
Meter	ERUs ⁽³⁾			Water	Sewer
5/8 x 3/4"	1			\$4,600.00	\$10,800.00
1"	4			\$18,400.00	\$43,200.00
1 1/2"	7			\$32,200.00	\$75,600.00
2" and Greater	Varies	Availability Fees for meter sizes 2" and greater shall be calculated on an individual basis based on the specific customer's peak monthly usage (but shall not be less than 12 Equivalent Residential Units (ERUs). ⁽¹⁾ 2" and Greater Fees effective 1/1/2019.			

⁽²⁾ Availability Fees are paid when applying for Certification to cover the cost of the customer's pro-rata share of water and/or wastewater treatment capacity as well as water transmission mains, sewer interceptors, storage tanks, pumping stations, reservoirs, infiltration and inflow and Engineering Administration.

⁽³⁾ An Equivalent Residential Unit (ERU) is a unit of allocated capacity based on 10,000 gallons maximum monthly water usage. A commercial customer's Availability Fees/ERUs are based on their estimated maximum monthly usage divided by 10,000 gallons times the Availability Fee for one ERU, currently \$4,600 for water and \$10,800 for sewer.

Meter and Meter Installation Fees (Effective 1/1/2015)			
Meter Size	Sub-Meter Service Fee	Meter Fee	Meter Installation Fee
5/8 x 3/4"	\$460.00	\$275.00	\$50.00
1"	\$1,840.00	\$350.00	\$100.00
1 1/2"	\$3,220.00	\$675.00	\$150.00
2"	\$5,520.00	\$675.00	\$150.00
3" and Greater	Meter and Installation Fees vary based on size of meter.		

The following fee descriptions are in accordance with the New Connection (Developer) Rates and Fees tables.

A. Plan Review Fees

Plan Review Fees cover all submittals that may be necessary to address review comments and are due prior to the issuance of a Utility Permit. There is a base fee and per linear foot charge based upon the amount of water and sewer main submitted.

Property Owners/Developers seeking water and/or sewer service for a location where no prior service has been established and for which new construction is planned shall submit a development or public improvement plan to Prince William County which will be routed to the Service Authority for review and approval. Plans for properties located in the Town of Haymarket, Town of Occoquan and Dumfries must be submitted directly to the Service Authority. The water and sewer facilities will be reviewed in accordance with and for compliance with the Service Authority's Utility Standards Manual (USM). Property Owners/Developers seeking to add water and/or sewer service to an existing building or home shall work with the Service Authority's Engineering & Planning Division to sketch the desired service.

Developer Rates & Fees

B. Utility Permit Fees

A Utility Permit may be requested from the Service Authority once the project plan has been approved by Prince William County or applicable jurisdiction. The Utility Permit authorizes ground work for utility installation to begin and initiates the Service Authority's inspection process. The Utility Permit includes a letter from the Service Authority to the Virginia Department of Transportation (VDOT) which states that the Service Authority will take over and maintain Service Authority approved infrastructure in that portion of the VDOT right of way identified in the project plans. All Plan Review and Utility Permit Fees must be paid prior to the issuance of a Utility Permit.

1. Inspection Fees

Inspection Fees are charged per linear foot and cover the cost of the water and sewer main inspections from the start of construction through beneficial use and bond release. There is a minimum charge equal to the cost for 100 linear feet per service.

A separate request for a bond release inspection must be made to the Engineering & Planning Division once final pavement is installed. The Service Authority will not recommend final bond release of a project until all charges and fees have been paid.

2. CCTV Inspection Fees

Closed Circuit TV Inspection (CCTV) Fees cover the cost to inspect the main sewer line by CCTV camera. This fee includes one CCTV inspection. Additional CCTV inspections are subject to additional fees.

3. As-Built Fees

As-Built Fees cover the cost of preparing As-Built drawings for the Service Authority's records after the utility installation is complete. The As-Built Fee is calculated based on the linear footage of water and/or sewer main installed. There is a minimum charge per project.

C. Certification Fees

Certification is the written authorization executed by the Service Authority's Engineering & Planning Division to establish service and physically connect a new location to the Service Authority's water and/or sewer system. All Plan Review and Utility Permit Fees must be paid prior to applying for Certification. Certification Fees shall be paid in full and in accordance with the fee schedule in effect at the time of payment. No connection to the Service Authority's system will be made without proof of Certification. Certification is required prior to the issuance of a Service Authority Water Meter.

1. Application Fee

All new accounts are charged an Application Fee at the time the account is opened. The Application Fee covers the administrative costs associated with establishing a new account.

2. Availability Fees

(a). Water and Sewer Availability Fees are charged when applying for Certification to cover the cost of the customer's pro-rata share of water and/or wastewater treatment capacity as well as water transmission mains, sewer interceptors, storage tanks, reservoirs, pumping stations, infiltration and inflow and Engineering Administration. Availability Fees shall not be used to pay for operations, maintenance, repairs or capital improvements to benefit existing customers.

Developer Rates & Fees

(b). Availability Fees are sold in Equivalent Residential Units (ERU) at the time of certification. ERUs are determined for each customer class as follows:

(i). Residential: One ERU shall be assigned to each single family home or townhouse.

(ii). Multi-family Residential: ERUs for apartments, condominiums, or like use, shall be based on 80% of 1 ERU, per dwelling unit.

(iii). Student Housing: ERUs shall be based on the specific estimated peak monthly usage.

(iv). Commercial: ERUs for meter sizes $\frac{3}{4}$ " through 1 $\frac{1}{2}$ " shall be based on a fixed schedule as indicated in the Service Authority's adopted schedule of Rates and Fees. Commercial ERUs for meter sizes 2" and greater shall be calculated on an individual basis based on the specific customer's peak monthly usage, at a minimum of 12 ERUs.

(c). Connection to the Service Authority's system requires payment of an Availability Fee. The Service Authority shall not waive Availability Fees.

(d). Availability Fees are non-refundable and non-transferable. Certifications are fixed to the property certified and cannot be transferred to other properties. Should that capacity cease to be needed at the connection initially served, the capacity can be applied in support of any other connection that is located on the same parcel of land. Where a parcel of land with assigned capacity is to be subdivided, or its boundaries adjusted, capacity may be applied to support service on the resultant property or properties.

(e). The payment of an Availability Fee allocates an amount of capacity in the Service Authority's system.

(i). One ERU of water is allocated 10,000 gallons maximum usage per month based on the following:

Water	Peaking Factor	Gallons per Day	Gallons per Month
Annual Average Daily Use ⁽¹⁾	1	250	7,500
Maximum Monthly Use ⁽²⁾	1.3	-	10,000
Maximum Daily Use ⁽³⁾	1.6	400	-
⁽¹⁾ Annual Average Daily use per residential unit of 250 gallons per day (GPD) is based on accepted industry standard. The average gallons per month are calculated by multiplying 250 gallons per day times 30 days.			
⁽²⁾ The Maximum Monthly use per residential unit is calculated by multiplying the annual average monthly use of 7,500 gallons times a 1.3 maximum monthly peaking factor, which is based on the Service Authority's historical peaking experience. This is rounded to 10,000 gallons per month.			
⁽³⁾ The Maximum Daily use per residential unit of 400 gallons is calculated by multiplying the annual average daily use of 250 gallons times a 1.6 maximum daily peaking factor, which is based on the Service Authority's historical peaking experience.			

(ii). Although the Service Authority is subject to water capacity limits from its wholesale water providers based on maximum day, Availability Fees are based on maximum monthly demands as the Service Authority measures a customer's water usage on a monthly basis.

(iii). The estimated maximum daily usage for each additional unit of sewer capacity is 330 gallons based on the Service Authority's historical peaking experience.

(f). The required meter size is approved during the Plan Review process and is based on the customer's maximum instantaneous flow rate as supported by the customer's submitted plans. Should actual consumption exceed the meter's rated capacity, the Property Owner/Developer shall be required to upgrade the meter to the appropriate meter type and size and pay any associated meter charges and

Developer Rates & Fees

Supplemental Availability Fees. The Service Authority shall review a customer's estimated instantaneous flow based upon fixture unit computations to verify the rated capacity of the requested meter size is adequate. In certain circumstances, such as establishing the ERU basis for 2" and larger commercial meters, the Service Authority may also consider (1) typical consumption for like facilities or customers; (2) comparable consumption data for like facilities or customers; (3) type of use, principal use, or timing of use; (4) other engineering or hydraulic information when instantaneous demands cannot be predicted by the fixture units, such as water used in processing or manufacturing applications; or 5) other factors applicable to the specific customer when trying to establish appropriate meter size or ERUs.

- (g). Commercial customers shall pay High Demand Charges for water consumption above their allotted ERUs as defined by the Service Authority's adopted User Rates.
- (h). Additional capacity may be requested by the customer or required by the Service Authority. Supplemental Availability Fees are calculated in ERUs and are based on either the change in meter size or the amount of capacity to be added (ERUs used during the peak month, less ERUs previously purchased) based on the current rates in effect at the date of the bill. Customers identified as exceeding the applicable usage limits and who consistently place high demands or a capacity burden on the Service Authority's system may be required to pay Supplemental Availability Fees. At any time, the Service Authority reserves the right to seek Supplemental Availability Fees when water or sewer demand exceeds the amount of capacity purchased, regardless of a change in ownership.
- (i). Availability Fees do not include Service Connections and System Extensions/Upgrades. See Section II. E., for more information.

3. Local Facilities Charge

In some cases, new service locations are subject to additional fees established by the Service Authority's Board of Directors called Local Facilities Charges (LFC). LFCs are designed to recoup the proportionate cost of designated infrastructure projects from new service locations within a specific service area that benefits from the project. If a property is subject to the LFC, the fees must be paid in accordance with the terms stated in the resolution adopted by the Board of Directors. Financial responsibility is incurred at the time of issuance of a Utility Permit or Certification.

4. Meter and Meter Installation Fees

Customers connecting to the system are subject to the appropriate Meter Fee and Meter Installation Fee based on the size of the meter and associated labor for installation. The required meter size is approved during the Plan Review process. Water meters are procured and installed by the Service Authority. The Service Authority will install the meter in the meter crock or vault that is provided by the customer. The Service Authority may at its own discretion at any time remove any meter for routine testing, repairs, or replacement.

Water meters are the property of the Service Authority and may be right sized at the discretion of the Service Authority to meet the customer's use. Customers shall be charged the differential cost for a larger meter size and are subject to applicable Supplemental Availability Fees.

Meter installations can be scheduled by the Utility Services Department at 703-335-7930.

5. Sub-Meter Service Fee

This fee covers the costs necessary for plan review, field service, and customer service administration. The Sub-Meter Service Fee is based on the size of the sub-meter required for the project. See Section III. D., Specialty Accounts, for additional information.

Appendix I: Service Connection Policy

Refer to the Service Authority's Service Connection Policy

by using Control + Click to follow the link

[Service Connection Policy](#)

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		<i>OWNER: Director of Finance</i>

Division IV

Chapter 1

Chapter 1. DEVELOPMENT; CONSTRUCTION; CONNECTION TO THE SERVICE AUTHORITY'S SYSTEM.

Article 5. SERVICE CONNECTION POLICY.

APPROVED BY BOARD OF DIRECTORS

MAY 10, 2007 RESOLUTION # 07-05-19 ADOPT SERVICE CONNECTION POLICY

JULY 12, 2007 RESOLUTION # 07-07-30 AMEND SERVICE CONNECTION POLICY

SEPTEMBER 11, 2014 RESOLUTION #14-09-34 REVISED SERVICE CONNECTION POLICY

JUNE 9, 2016 RESOLUTION #16-06-30 AMENDED SERVICE CONNECTION POLICY

Sections.

41500.	Purpose.
41505.	Definitions.
41510.	General Policy Statements.
41515.	Funds.
41520.	Rate Setting.
41525.	New Connection Overview.
41530.	Availability Fees.
41535.	Facility Charges.
41540.	Local Facilities Charges (LFC's).
41545.	Requests for Service Outside the Area Currently Served by the Authority.
41550.	System Acquisition Requests.
41555.	Master Plan Utility Adjustments (MPUA's).

§ 41500. Purpose.

The Service Connection Policy establishes guidelines for providing new water and sewer service in an equitable and uniform manner. This policy may require interpretation by the General Manager of the Authority and may be amended as necessary by the Board of Directors. The General Manager shall implement any procedures necessary to enforce this policy.

§ 41505. Definitions.

"The Act" The Virginia Water and Waste Authorities Act, Va. Code ann. §15.2-5100 et seq.

"Area Served" Area served by Authority facilities within the Authorized Service Area.

"Authorized Service Area" is the geographical limits of Prince William County.

"Availability Fee" The fee paid when applying for Certification to cover the cost of the customer's pro-rata share of water and/or wastewater treatment capacity, water transmission mains, sewer interceptors, storage tanks, pumping stations, reservoirs, infiltration and inflow and Engineering Administration.

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“Capacity” Any amount of water or sewage that can be treated, moved or held in a treatment plant or system infrastructure, over a certain period of time.

“Certification” The written authorization executed by the Authority's Engineering & Planning Division to establish service and physically connect a new location to the Authority's water and/or sewer system upon payment of the Availability Fee.

“Connection Facilities” All facilities constructed by the Property Owner and conveyed to the Authority. Connection Facilities may include collection and/or distribution mains, water service lines, sewer laterals, taps, fire hydrants and all other facilities from the Authority's existing water or sewer main up to and including the meter box or flush station, or, in the case of gravity sewer laterals, up to the VDOT right-of-way line. These costs are the responsibility of the Property Owner and are not covered in the Availability Fee. Connection Facilities are typically within a public easement or VDOT right-of-way. Property Owner responsibilities regarding maintenance of gravity sewer mains, sewer service lines and laterals, grinder pumps, sump pumps, and water service lines are further defined in Administrative Code sections 45101-45105 Water Service Responsibilities and 45201-45215 Sewer Service Responsibilities.

“Convey” To contribute the ownership of real property or an asset to the Authority.

“Customer Facilities” All facilities that are constructed, owned and maintained by the Property Owner. Customer Facilities include the portion of the water service line or sewer lateral from the house or building to the meter box, or flush station, or in the case of gravity sewer laterals, up to the VDOT right-of-way line. All gravity sewer laterals not in a VDOT right-of-way are Customer Facilities. Customer Facilities are typically on private property.

“Developer Charges” Any Administrative Fees such as Plan Review Fees, Inspection Fees, As-built Fees, Meter and Meter Installation Fees, charged by the Authority to facilitate connecting a new location to the Authority's water and/or sewer system.

“Entity” A water and/or sewer service provider of an existing water and/or sewer system.

“Local Facilities Charge” (“LFC”) A charge designed to recoup the proportionate cost of designated infrastructure projects from new service locations within the specific service area that benefits from the project.

“Property Owner” The owner(s) or party(ies) with an ownership interest in a specific property, such as developers, builders, individual property owners, government entities or any other owner(s).

“Sewer Interceptor” A pipeline integral to the movement of wastewater from a large service area to a sewer lift station or treatment facility as identified by the Authority.

“Supplemental Availability Fees” Availability Fees paid by an existing customer when additional capacity is requested by a customer or required by the Authority.

“Water Transmission Main” A pipeline integral to the movement of water from a pump station or source of supply to a water storage tank or a large service area as identified by the Authority.

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§ 41510. General Policy Statements.

- (a) Policy Coverage: These principles shall govern all activities related to extending new service and replacing or upgrading existing service.
- (b) Comprehensive Plan Compliance: The Authority shall comply with the Prince William County Comprehensive Plan in effect at the time of request for new service. The Comprehensive Plan (SEW-POLICY 1 and WA-POLICY 1) reflects a “growth pays for growth” philosophy meaning that to the maximum extent possible the cost of water and sewer system expansions and increases in the water and sewer system are to be borne by new development and new customers connecting to the water and/or sewer system.
- (c) Bond Covenants: The Authority shall charge and collect rates, fees and charges so fixed or revised, in accordance with the provisions of the Act and to meet all obligations and covenants associated with Authority debt, in order to at all times sufficiently (a) pay the cost of maintaining, repairing and operating the water and sewer utility system, and facilities incident thereto, on account of which bonds are issued, including reserves for such purposes and for replacement and depreciation and necessary extensions, (b) pay the principal of and the interest on the revenue bonds when due and reserves therefore, and (c) provide a margin of safety for making such payments.
- (d) No Free Service/Financial Assistance: The Authority shall not provide free or discounted service. Water and/or sewer service is provided only at the published charges in the Authority's adopted rate schedule. The Prince William County Department of Fire and Rescue is exempt from usage charges. The Authority does not offer payment plans, loans or funding of Availability Fees or construction costs for water and sewer infrastructure for Property Owners.
- (e) Fairness and Equity: The Authority shall treat all present and future customers fairly and equitably.
- (f) Cost Responsibilities: Existing ratepayers shall not subsidize new customers. To the maximum extent practicable, new customers shall pay for new development (growth shall pay for growth). The Authority shall not waive Availability Fees.
- (g) User Rates and Availability Fees: User rates shall pay the costs to service existing customers and Availability Fees shall pay for expansion costs associated with new customers.

§ 41515. Funds.

- (a) Four Funds for Revenue and Expenses: The Authority shall segregate all revenues and expenses into four funds. These funds and their uses are defined as follows:
- (b) Operating Fund: The Operating Fund (Fund 1) is funded by user rates (monthly bill payments) and used to pay for daily operations.
- (c) Expansion Fund: The Expansion Fund (Fund 2) is funded by Availability Fees and other Developer Charges, such as Inspection Fees, and is used to pay for development administration and capital projects that increase capacity.
- (d) Commitment Fund: The Commitment Fund (Fund 3) is funded by Availability Fees and is used to pay debt service associated with water and wastewater capacity agreements.

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- (e) Replacement Fund: The Replacement Fund (Fund 4) is funded annually by a balance transfer from the Operating Fund and is used to pay for capital replacement expenditures.

§ 41520. Rate Setting.

- (a) Rates, Fees and Charges: All rates, fees and charges imposed as provided hereunder shall conform to the provisions of the Act and all applicable requirements and covenants associated with Authority debt.
- (b) Approval of User Rates: The Authority shall set user rates to cover the projected costs of operating and maintaining the water and sewer system, as well as debt service, and capital costs, for repair and replacements of the existing water and sewer system that benefit existing customers. User rates are set to recover the costs budgeted in the Operating Fund and Replacement Fund. The Authority's Board of Directors shall approve user rates.
- (c) Availability Fees: The Authority shall set Availability Fees to cover expansion costs and debt service associated with new capacity. The Authority's Board of Directors shall approve Availability Fees.
- (d) Administrative Fees: The General Manager shall set Administrative Fees to cover administrative costs such as labor and materials associated with a specific task. The General Manager shall have the authority to adjust Administrative Fees as necessary.

§ 41525. New Connection Overview.

- (a) Zoning: A property must be zoned and planned by Prince William County with a land use designation that permits public water and sanitary sewer.
- (b) Utility Standards Manual (USM): All service connections or infrastructure that will be part of the Authority's water and sewer system must comply with the Authority's USM. The USM represents the policies and standards required to design and construct extensions to water mains, sanitary sewers and minor sewage pumping stations to be owned and operated by the Authority. The current USM and details can be found on the Authority's website. Property Owners may also obtain a copy through the Engineering & Planning Division.
- (c) Developer Charges and Availability Fees: Property Owners shall pay all applicable Developer Charges and Availability Fees as defined by the Authority's adopted rate schedules and policies. Developer Charges and Availability Fees shall, to the maximum extent possible, practicable, and feasible cover the cost of service.
- (d) Application and Availability: The Authority allocates water and sewer capacity on a first-come, first-served basis as long as capacity is available and such requests are in accordance with the Prince William County Comprehensive Plan. All customers connecting a new location to the Authority's water and/or sewer system are required to apply for connection through the Authority's Engineering & Planning Division. The Authority's Engineering & Planning Division shall make an initial determination of whether a connection is feasible (i.e., is capacity available, are there legal restrictions to the proposed connection, etc.).

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- (e) Plan Review: Property Owners seeking water and/or sewer service for a location in which no prior service has been established and for which new construction is planned shall submit a development or public improvement plan to Prince William County which will be routed to the Authority for review and approval. Plans for properties located in the Town of Haymarket, Town of Occoquan and Dumfries must be submitted directly to the Authority. The water and sewer facilities will be reviewed in accordance with and for compliance with the Authority's USM. Property Owners of a single lot or parcel seeking water and/or sewer service for a location which has an existing service and/or an existing building or home shall work with the Authority's Engineering & Planning Division to sketch the desired service. Property Owners shall pay all applicable Plan Review Fees.
- (f) Utility Permit: Property Owners may request a Utility Permit from the Authority once the project plan has been approved by Prince William County or applicable jurisdiction. The Utility Permit authorizes ground work for utility installation to begin and initiates the Authority's inspection process. The Utility Permit includes a letter from the Authority to the Virginia Department of Transportation (VDOT) which states that the Authority will take over and maintain Authority approved infrastructure in that portion of the VDOT right of way identified in the project plans. Property Owners applying for a Utility Permit shall pay all applicable charges, such as Inspection Fees, As-Built Fees, and applicable Closed Circuit Television Inspection (CCTV) Fees prior to the issuance of the Utility Permit.
- (g) Certification: Certification is the written authorization executed by the Authority's Engineering & Planning Division to establish service and physically connect a new location to the Authority's water and/or sewer system. Property Owners may apply for Certification once all Utility Permit Fees have been paid. Property Owners applying for Certification shall pay all applicable charges such as Application Fees, Availability Fees, Local Facility Charges, Meter and Meter Installation Charges, and Final Inspection Fees. No connection to the Authority's water and/or sewer system may be made without proof of Certification.
- (h) Meter Set: Property Owners must pay all Certification Fees and have received written authorization for beneficial use by the Authority's Engineering Division prior to requesting a meter set to initiate service.
- (i) Prince William County: Prince William County requires an Approved Final Inspection Report from the Authority prior to issuing an Occupancy Permit. Prince William County also requires the Authority to approve the Property Owner's request for bond release.

§ 41530. Availability Fees.

- (a) Availability Fees: Availability Fees charged by the Authority shall cover the cost of the customer's pro-rata share of water and/or wastewater treatment capacity as well as water transmission mains, sewer interceptors, storage tanks, reservoirs, pumping stations, infiltration and inflow and Engineering Administration. Availability Fees do not cover extensions of infrastructure as further defined in Section 41535 Facility Charges. Availability Fees shall not be used to pay for operations, maintenance, repairs or capital improvements to benefit existing customers.
- (b) No Availability Fee Waivers: Property Owners connecting to the Authority's water and/or sewer system shall pay an Availability Fee. The Authority shall not waive Availability Fees.
- (c) Nonrefundable and Nontransferable: Availability Fees are sold in Equivalent Residential Units (ERU) at the time of Certification and are non-refundable. Certifications are fixed to the property certified

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and cannot be transferred to other properties. Should that capacity cease to be needed at the connection initially served, the capacity can be applied in support of any other connection that is located on the same parcel of land. Where a parcel of land with assigned capacity is to be subdivided, or its boundaries adjusted, capacity may be applied to support service on the resultant property or properties.

(d) Capacity Allocation: The payment of an Availability Fee allocates an amount of capacity in the Authority's water and/or sewer system.

- a. One Equivalent Residential Unit of water is allocated 10,000 gallons maximum usage per month based on the following:

Water	Peaking Factor	Gallons per Day	Gallons per Month
Annual Average Use¹	1	250	7,500
Maximum Monthly²	1.3	-	10,000
Maximum Daily³	1.6	400	-
1 - Annual Average Daily use per residential unit of 250 gallons per day (GPD) is based on accepted industry standard. The average gallons per month is calculated by multiplying 250 gallons per day times 30 days.			
2 - The Maximum Monthly use per residential is calculated by multiplying the annual average monthly use of 7,500 gallons times a 1.3 maximum month peaking factor, which is based on the Authority's historical peaking experience. This is rounded to 10,000 gallons per month.			
3- The Maximum Daily use per residential unit of 400 gallons is calculated by multiplying the annual average daily use of 250 gallons times a 1.6 maximum daily peaking factor, which is based on the Authority's historical peaking experience.			

Although the Authority is subject to water capacity limits from its wholesale water providers based on maximum day, Availability Fees are based on maximum monthly demand as the Authority measures a customer's water usage on a monthly basis.

- b. The estimated maximum daily usage for each additional unit of sewer capacity is 330 gallons based on the Authority's historical peaking experience.

(e) Equivalent Residential Units (ERU's): ERU's are determined for each customer class as follows.

- Residential: One ERU shall be assigned to each single family home or townhouse.
- Multi-family Residential: ERU's for apartments, condominiums, or like use, shall be based on 80% of 1 ERU, per dwelling unit.
- Student Housing: ERU's shall be based on the specific estimated peak monthly usage.
- Commercial: ERU's for meter sizes $\frac{3}{4}$ " through 2" shall be based on a fixed schedule as indicated in the Authority's adopted schedule of Rates and Fees. Commercial ERU's for meter

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sizes 3" and greater shall be calculated on an individual basis based on the specific customer's peak monthly usage.

The Authority's Engineering and Planning Division shall review a customer's estimated instantaneous flow based upon fixture unit computations to verify the rated capacity of the requested meter size is adequate. In certain circumstances, such as establishing the ERU basis for 3" and larger commercial meters, the Authority's Engineering and Planning Division may also consider (1) typical consumption for like facilities or customers; (2) comparable consumption data for like facilities or customers; (3) type of use, principal use, or timing of use; (4) other engineering or hydraulic information when instantaneous demands cannot be predicted by the fixture units such as water used in processing or manufacturing applications; or 5) other factors applicable to the specific customer when trying to establish appropriate meter size or ERU's.

- (f) **High Demand:** Commercial customers shall pay High Demand Charges for water consumption above their allotted ERU's as defined by the Authority's adopted User Rates.
- (g) **Meter Size:** The required meter size is approved during the Plan Review process and is based on the customer's maximum instantaneous flow rate as supported by the customer's submitted plans. Should actual consumption exceed the meter's rated capacity, the Property Owner shall be required to upgrade the meter to the appropriate meter type and size and pay any associated meter charges and Supplemental Availability Fees.
- (h) **Supplemental Availability Fees:** Additional capacity may be requested by the customer or required by the Authority. Supplemental Availability Fees are calculated in ERU's and are based on either the change in meter size or the amount of capacity to be added (ERU's used during the peak month, less ERU's previously purchased) based on the current rates in effect at the date of the bill. Customers identified as exceeding the applicable usage limits and who consistently place high demands or a capacity burden on the Authority's water and sewer system may be required to pay Supplemental Availability Fees. At any time, the Authority reserves the right to seek Supplemental Availability Fees when water or sewer demand exceeds the amount of capacity purchased, regardless of a change in ownership.
- (i) **Deferrals:** In unusual circumstances, the General Manager may allow a deferral of Availability Fees of up to twelve months for government agencies. Such a request must be made in writing to the General Manager's office. In the case of an approved government deferral, the Authority shall waive the requirement of the government agency to show proof of Certification to Prince William County.

§ 41535. Facility Charges.

- (a) It is the responsibility of the Property Owner to make all improvements, both on-site and off-site, to the water and sanitary sewer systems necessary to develop a property. Property Owners shall be responsible to construct and pay for all Connection and Customer Facilities. The Property Owner shall also be responsible for obtaining any right of entry, such as easements or private property agreements that may be required to connect service.
- (b) The Authority does not construct or fund local lines (water or sewer) for the purpose of serving existing neighborhoods, lots or undeveloped areas. The Authority only constructs Water Transmission Mains and Sewer Interceptors to support water and sewer system operations. The extension of service is the responsibility of the Property Owner.

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- (c) All extensions and upgrades to the Authority's water and sewer system must be made in accordance with the Authority's USM. The Authority's Engineering & Planning Division shall inspect that new connections are in compliance with the Authority's USM.
- (d) Connection Facilities are all facilities constructed by the Property Owner and conveyed to the Authority. Connection Facilities may include collection and/or distribution mains, water service lines, sewer laterals, taps, and all other facilities from the Authority's existing water or sewer main up to and including the meter box or flush station, or, in the case of gravity sewer laterals, up to the VDOT right-of-way line. These costs are the responsibility of the Property Owner and are not covered in the Availability Fee. Connection Facilities are typically within a public easement or VDOT right-of-way. Property Owner responsibilities regarding maintenance of gravity sewer mains, sewer service lines and laterals, grinder pumps, sump pumps, and water service lines are further defined in Administrative Code sections 45101-45105 Water Service Responsibilities and 45201-45215 Sewer Service Responsibilities.
- (e) Customer Facilities are all facilities that are constructed, owned and maintained by the Property Owner. Customer Facilities include the portion of the water service line or sewer lateral from the house or building to the meter box, or flush station, or, in the case of gravity sewer laterals, up to the VDOT right-of-way line. All gravity sewer laterals not in VDOT right-of-way are Customer Facilities. Customer Facilities are typically on private property.
- (f) The Authority may elect to increase the size, re-route, or extend facilities in conjunction with the service connection request. In these cases, the requesting Property Owner is only responsible for the cost of Connection and Customer Facility Costs required to deliver service to the location. See Section 41560 Master Plan Utility Adjustments (MPUA's).

§ 41540. Local Facilities Charges (LFC's).

- (a) New service locations may be subject to an additional fee established by the Authority's Board of Directors called a Local Facilities Charge (LFC). LFC's are designed to recoup the proportionate cost of designated infrastructure projects from new service locations within the specific service area that benefits from the project. Such projects are paid for by the Service Authority or a third party and are not included in the Availability Fee.
- (b) An LFC shall be established on a pro-rata basis (per lot, ERU, or acre). If a property is subject to an LFC, the fee must be paid in accordance with the terms stated in the resolution adopted by the Board of Directors. Financial responsibility is incurred at issuance of a Utility Permit or Certification.

§ 41545. Requests for Service Outside of the Area Currently Served by the Authority.

- (a) Authority as Service Provider: The Authority is not the only water and sewer service provider within the Authorized Service Area. The Authority shall only review requests for service within the Area Served.
- (b) Other Service Provider Options: If the Authority does not provide service to a particular area within the Area Served, and a Property Owner is able to obtain service through another service provider, the Authority may agree to allow the Property Owner to connect to the other service provider's water and/or sewer system while remaining as a customer of the Authority. A separate agreement

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concerning this connection will be required between the Authority, the Property Owner and the service provider.

§ 41550. System Acquisition Requests.

- (a) The Authority shall in good faith consider any request from another Entity to acquire all or a portion of the other Entity's existing water and/or sewer system located in the Authorized Service Area.
- (b) A formal written request shall be sent to the Authority's General Manager from the Entity's governing body.
- (c) The Authority's General Manager shall take the request to the Authority's Board of Directors for approval to take such matters into consideration.
- (d) The Authority's Board of Directors may direct the General Manager to take the request to the Prince William Board of County Supervisors for consideration.
- (e) The General Manager shall appoint a Service Connection Committee (SCC) to perform and/or coordinate an acquisition analysis. The SCC may request an independent third party to perform or assist in performing the analysis. The analysis shall, at a minimum, determine: economic feasibility, operational feasibility, detailed condition of the water and/or sewer system, legal issues, regulatory issues, future costs, and other necessary analysis. The SCC shall recommend any cost sharing between the Authority and the requesting entity, for the costs of such analysis.
- (f) The SCC shall review the assessment and provide a detailed report to the General Manager to include, but not be limited to, a summary of the findings, available options, recommendations, and suggested terms and conditions.
- (g) The General Manager shall report findings and recommend a course of action to the Board of Directors for approval. Due to the nature of negotiations, the Board may elect to give the General Manager guidance in closed session.
- (h) The General Manager shall negotiate an agreement based on guidance provided by the Board of Directors. The Board of Directors must approve the final agreement.
- (i) A water and/or sewer system acquisition shall transfer all rights of ownership and operation of water and/or sewer services to the Authority.

§ 41555. Master Plan Utility Adjustments (MPUA's).

- (a) In all cases, Property Owners will be required to construct water and sewer lines sized in accordance with the requirements of the USM. Adequate line sizes for any development project will be determined based upon engineering calculations prepared and sealed by a Professional Engineer licensed in Virginia. However, the Authority may require certain lines within a Property Owner's project to be increased in size or length in order to serve other properties within a larger service area. The physical size difference in pipeline size and/or length between what is adequate for a given development based on the engineering calculations, and what the Authority requires, will constitute the differential for cost reimbursement. In such instances where increased pipeline size or length is required by the Authority, the Property Owner may request reimbursement for the cost differential, which will be approved on a case-by-case basis. All engineering computations for

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reimbursement will be reviewed and approved by the Authority prior to acceptance of any reimbursement requests.

- (b) The Property Owner requesting payment for differential costs must prepare and submit a detailed cost estimate to the Authority's Engineering & Planning Division. The cost estimate must contain an appropriately detailed listing of all pipe materials, quantities, and supplier prices for both the adequate and required pipe sizes and lengths. All cost estimates must be signed by a representative of the Property Owner and must include the name, address and phone number of a contact person with the Property Owner or the Property Owner's consulting engineer. For small increases in pipe sizes, the Authority will only reimburse the Property Owner for the difference in material costs. The only exception to this rule may be when there is such a large disparity between adequate and required line sizes that construction costs are increased. For increased pipeline length, the Authority will reimburse the Property Owner for 100% of the agreed upon, reasonable construction costs. The Authority will not reimburse the Property Owner for any administrative, processing, overhead, delay costs or pay for any profit. Reasonable expenses for additional engineering costs may be considered.
- (c) The Authority's Engineering staff will review the cost estimate and direct the Property Owner to make any necessary changes. The request for reimbursement will be submitted to the General Manager for administrative approval, or scheduled for presentation to the Authority's Board of Directors, based on the amount of the requested reimbursement, when the Engineering staff is satisfied with the estimate. All reimbursement requests must be submitted to and approved in advance by the Authority. It is not the purpose or the intention of the reimbursement approval to create a joint venture, partnership, or other relationship whereby either party shall be liable for the omissions, commissions, or performance of the other party, and shall not be so construed.
- (d) Once the payment of differential costs has been approved, the Property Owner will be eligible to collect these monies after the water or sanitary sewer main is installed and in service. Water mains will be considered to be in service when testing and disinfection are completed and the Authority issues a Letter of Beneficial Use for the main. Sanitary sewer lines will be considered to be in service when testing is complete and the Authority issues a Letter of Beneficial Use for the sewer. To receive payment, the Property Owner shall submit an appropriate certification to the Authority's Engineering & Planning Division that the work has been properly completed, and include the request for payment of the approved reimbursement amount.
- (e) The Property Owner may submit a request for reimbursement with cost estimates at any time during the final plan review process. However, once the Property Owner has paid the Authority Inspection Fees and the Authority has issued a Utility Permit for water and/or sewer construction for a given project, the Authority will not thereafter accept any requests for reimbursement for that given project/improvement plan. If a Property Owner who has submitted a proper MPUA reimbursement request chooses to proceed with utility installation prior to receiving formal approval of the request for reimbursement, he is proceeding at his own risk with no guarantee of receiving payments from the Authority for same. Once the Authority has formally approved a request for differential payment, the Authority will not accept changes to the request without subsequent processing and formal approval of a modified request for reimbursement.

Appendix J: Low Pressure Force Main and Grinder Pump Policy

Refer to the Service Authority's Low Pressure Force Main Policy

by using Control + Click to follow the link

[Low Pressure Force Main](#)

	WATER AND SEWER SERVICE POLICIES	<i>EFFECTIVE DATE:</i> January 30, 2015
	<i>POLICY TITLE:</i> LOW PRESSURE FORCE MAIN AND GRINDER PUMP	<i>STARTING SECTION:</i> 41565
		<i>OWNER: Director of Operations & Maintenance</i>

Division IV

Chapter 1

§ 41565 Low Pressure Force Main

The following policy outlines the Low Pressure Force Main and Grinder Pump Policy of Prince William County Service Authority (the Authority). This policy is intended to establish guidelines for the approval of the installation of low pressure force mains that are to be maintained by the Authority for existing properties and new development areas; as well as guidelines for the responsibilities associated with private grinder pump installations. This policy may require interpretation by the General Manager of the Authority and may be amended as necessary by the General Manager. The General Manager shall implement any procedures necessary to enforce the policy.

A. Definitions

- a) "Connection facilities" ("service connections") includes the line, tap, and other facilities that must be constructed on public property, road right of way, or Authority owned easements from the sewer main up to and including the flush station (See Detail 1). The funding and construction of connection facilities are not covered by the availability fee, and are the responsibility of the Property Owner.
- b) "Existing properties" are the properties with existing structures which have not previously been connected to the Authority sewer system.
- c) "Grinder Pump System" is the grinder pump assembly and all piping including piping on the property owner's property from the building to the grinder pump and from the grinder pump to the flush station; including all electrical connections, and appurtenances.
- d) "Low Pressure Force Main" - the pressure main (in the right of way or easement dedicated to the Authority) and the pressure service pipe to the property up to and including the flush station.
- e) "Lateral" - the piping between the building and the grinder pump assembly.
- f) "Maintenance" - any required preventative or corrective service, repair, or replacement necessary to maintain the grinder pump system to optimal operating condition.
- g) "Property Owner"- the owner of a specific property, such as Developers, Builders, individual property owners, corporations, partnerships, government entities or any other owner.

B. Low Pressure Force Main Applicability

Low Pressure Force Mains shall only be used where connection to the Authority's sewer system is required and the use of a gravity system is not possible or reasonably feasible, as determined by the Authority's Engineering & Planning Division and approved by the Engineering & Planning Director. In the case of new subdivisions, written concurrence from the Authority's Director of Operations & Maintenance Division is also required. The decision to allow the use of a low pressure force main instead of a gravity system shall be at the sole discretion of the Authority. The design and construction of low pressure force main systems

	WATER AND SEWER SERVICE POLICIES	<i>EFFECTIVE DATE:</i> January 30, 2015
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		<i>OWNER: Director of Operations & Maintenance</i>

shall be in compliance with and meet the requirements of the Authority's Utility Standards Manual (USM). Factors the Authority may consider in determining if a gravity system is not possible or reasonably feasible include, but are not limited to:

- a) Likelihood of future extension of the sewer system in the vicinity under consideration
- b) Environmental impacts
- c) The number of properties to be served
- d) Conflicts with existing infrastructure such as roads or utilities

C. Grinder Pump Applicability

Property owners may elect to connect to the Authority's sewer system via grinder pump subject to the Property Owner Responsibilities below.

D. Property Owner Responsibilities (Existing Properties and New Development)

a) Service Connection Only

Property owners requesting to install a grinder pump in order to connect to an existing Service Authority sewer main (whether a gravity main, force main, or a low pressure force main) must apply for a service connection (see Service Connection Policy). The property owner shall be responsible to install the Grinder Pump System and Connection Facilities, and pay all related installation costs. The property owner shall have the installation performed by a contractor of his choosing. The Connection Facilities shall be dedicated to and accepted by the Authority for ownership and maintenance. The property owner must obtain and satisfy the requirements of any required permits from the appropriate Building Official (i.e. Prince William County, Town of Dumfries, etc.) or permitting agency.

b) Service Connection with Low Pressure Force Main Extension

Property owners requesting to construct a low pressure force main and associated grinder pump(s) must apply for a service connection (see Service Connection Policy). Property owners shall not install a grinder pump and low pressure force main without approval by the Authority. The property owner shall be responsible to install the Grinder Pump System, Connection Facilities, and Low Pressure Force Main and pay all related installation costs. The property owner shall have the installation performed by a contractor of his choosing, subject to all USM requirements. The Low Pressure Force Main and Connection Facilities shall be dedicated to and accepted by the Authority for ownership and maintenance. The property owner must obtain and satisfy the requirements of any required permits from the appropriate Building Official (i.e. Prince William County, Town of Dumfries, etc.) or permitting agency.

- c) Any property with sewer service that is served by a private well must have a water meter, issued by the Authority, installed on the well prior to connection to the Service Authority's System. The property owner shall purchase the water meter from the Authority, at the same time as paying

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the availability fee. The property owner shall provide and install a meter yoke, meter crock, and meter crock cover and the Authority shall install the well meter. Installation must meet all Authority specifications provided by the Service Authority at the time of approval. After the property owner has installed the meter crock and yoke, the Authority shall install the appropriately sized meter. The well meter shall be installed at a location approved by the Authority in accordance with the Authority's water meter standards. The Authority shall use the well meter reading when billing for sewer use. The property owner agrees to grant access to the water meter for reading and routine maintenance during regular business hours. Failure to grant access shall result in disconnection of service.

- d) Ownership, maintenance, repair, and replacement of the Grinder Pump System shall be the sole responsibility of the property owner. The Grinder Pump System must be located on the property to be served.

E. Service Authority Responsibilities for Low Pressure Force Mains

All maintenance of the Low Pressure Force Mains and Connection Facilities in the Right of Way or easement dedicated to the Service Authority shall be the responsibility of the Service Authority.

F. Service Authority Responsibilities (In cases where a grinder pump is provided for the benefit of the Service Authority).

- a) The Authority's Director of Engineering and the Director of Operations and Maintenance may determine that it is necessary and in the best interest of the Authority's system to install grinder pumps at properties which are already served by gravity laterals. (e.g. Nokesville Pumpover and Wellington Road Interceptor, where needed to prevent sewage backup into home). In these cases, the Authority shall provide and install the Grinder Pump System from the property owner's existing lateral connection to the Authority's sewer system. This shall include design, inspection, electrical connection from the alarm panel to the grinder pump, grinder pump and tank, and associated pipe and appurtenances. In these circumstances, the Authority shall provide on-going maintenance of the Grinder Pump System at no cost to the property owner.
- b) Properties that meet the circumstances described in (F.a), above, and are served by a private well must have a water meter, issued by the Authority, installed on the well. The Authority shall install the well meter, meter yoke, meter crock, and meter crock cover. Installation must meet all Authority specifications as shown in the USM at the time of approval. The well meter shall be installed at a location approved by the Authority in accordance with the Authority's water meter standards. The Authority shall use the well meter reading when billing for sewer use. The property owner agrees to grant access to the water meter for reading and routine maintenance during regular business hours. Failure to grant access shall result in disconnection of service.

G. Continuing Service and Fees.

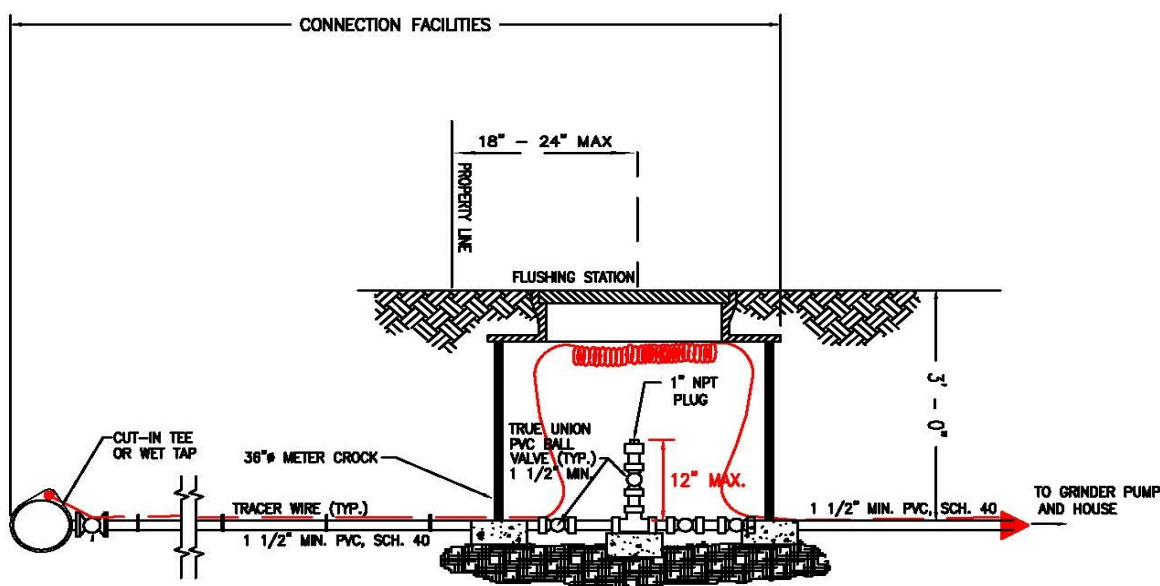
- a) The Authority shall continue to provide maintenance to residential properties in which the Authority previously accepted responsibility to maintain the Grinder Pump System for a maintenance fee. The Authority does not offer maintenance services to commercial customers. The Authority shall not offer new maintenance service to any new customers.

	WATER AND SEWER SERVICE POLICIES	EFFECTIVE DATE: January 30, 2015
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- b) Grinder pump maintenance fees shall cover the estimated cost of maintenance and replacement. Grinder pump fees shall be adjusted as necessary by the General Manager. Grinder pump fees shall be assessed monthly.

H. Account Default and Failure to Grant Access

The property owner is responsible for paying all usage and service fees. The Authority's responsibilities for maintenance services under this Policy shall cease if an account is in default. Default for an account held by a property owner shall be defined as an account which has been closed for non-payment. Default for an account held by a tenant shall be defined as an unpaid account thirty (30) days after notice to the property owner that such account has not been paid or thirty (30) days from filing a lien for such payment. If disruption of a maintenance service occurs, future service shall be at the sole discretion of the Authority. Additionally, failure to grant access to the Grinder Pump System for maintenance shall relieve the Service Authority of any and all responsibilities for maintenance, and such responsibilities shall revert to the property owner.



Detail 1. Illustration of Connection Facilities

Appendix K: Pump Station Startup Procedure Checklist

Refer to the Service Authority's Pump Station Startup Procedure Checklist
by using Control + Click to follow the link

[Pump Station Startup Procedure Checklist](#)



WASTEWATER LIFT STATION START-UP PROCEDURES **PRINCE WILLIAM COUNTY SERVICE AUTHORITY**

PUMP STATION: _____

DATE: _____ **TIME:** _____

ATTENDEES: _____

A. INFLUENT SEWERS

		INITIAL	INITIAL
EXISTING SEWERS PLUGGED	YES		NO
NEW SEWERS FLOWING CORRECTLY	ACCEPTABLE YES		NO

B. COMMUNUTOR CHAMBER

		INITIAL	INITIAL
COMMUNUTOR DRUMS OPERATING IN PROPER DIRECTIONS	ACCEPTABLE YES		NO

COMMUNUTOR CONTROLLER INDICATOR LIGHTS FUNCTIONING

		INITIAL	INITIAL
POWER ON LIGHT	ACCEPTABLE YES		NO
RUN LIGHT	ACCEPTABLE YES		NO
GRINDER OVERLOAD LIGHT	ACCEPTABLE YES		NO
MOTOR OVERLOAD LIGHT	ACCEPTABLE YES		NO
OIL OVER TEMP LIGHT	ACCEPTABLE YES		NO
LOW OIL LEVEL LIGHT	ACCEPTABLE YES		NO

COMMUNUTOR CONTROLLER SWITCH

		INITIAL	INITIAL
HAND POSITION: MOTOR STARTS	ACCEPTABLE YES		NO
OFF/RESET POSITION: MOTOR WILL NOT RUN	ACCEPTABLE YES		NO
AUTO POSITION: GRINDER STARTS/STOPS BY REMOTE	ACCEPTABLE YES		NO
EMERGENCY STOP SWITCH FUNCTIONS PROPERLY	ACCEPTABLE YES		NO

COMMUNUTOR OBSTRUCTION TEST

		INITIAL	INITIAL
GRINDER STOPS & REVERSES	ACCEPTABLE YES		NO
GRINDER RESTARTS AFTER OBSTRUCTION IS CLEARED	ACCEPTABLE YES		NO
GRINDER REVERSES 8 TIMES WITH CONTINUOUS OBSTRUCTION AND THEN SHUTS DOWN WITH WARNING	ACCEPTABLE YES		NO

COMMUNUTOR CHAMBER

		INITIAL	INITIAL
LIGHTS FUNCTIONING	ACCEPTABLE YES		NO

EXHAUST FAN FUNCTIONING & VERIFIED EXPLOSION PROOF	ACCEPTABLE	YES		NO	
EQUIPMENT HOIST FUNCTIONS	ACCEPTABLE	YES		NO	
VERIFY THAT ALL FASTENING DEVICES ARE STAINLESS STEEL	ACCEPTABLE	YES		NO	
SLUICE GATES FUNCTIONING PROPERLY	ACCEPTABLE	YES		NO	

C. PUMP STATION / PUMP CONTROLS

PUMP OPERATIONS

PUMP 1	TDH	ST. HD		
	FLOW, GPM	FT.	FT.	COMMENTS
DESIGN				
ACTUAL				
DRAWDOWN TEST - FLOW DATA :		GPM	ACCEPTABLE	YES NO
PUMP 2	TDH	ST. HD		
	FLOW, GPM	FT.	FT.	COMMENTS
DESIGN				
ACTUAL				
DRAWDOWN TEST - FLOW DATA :		GPM	ACCEPTABLE	YES NO
PUMP 3	TDH	ST. HD		
	FLOW, GPM	FT.	FT.	COMMENTS
DESIGN				
ACTUAL				
DRAWDOWN TEST - FLOW DATA :		GPM	ACCEPTABLE	YES NO
PUMP 4	TDH	ST. HD		
	FLOW, GPM	FT.	FT.	COMMENTS
DESIGN				
ACTUAL				
DRAWDOWN TEST - FLOW DATA :		GPM	ACCEPTABLE	YES NO
ALL PUMP DATA PLATE INFORMATION RECORDED			YES	NO
VERIFY PRIMARY AND SECONDARY LEVEL TRANSDUCER 4-20 mA MATCHES WITH SCADA AND ACTUAL WET WELL LEVEL.		ACCEPTABLE	YES	NO
VERIFY PRIMARY AND SECONDARY LEVEL TRANSDUCER ARE WITH IN NORMAL DEVIATION RANGE.		ACCEPTABLE	YES	NO
SIMULATE LAST RESORT PUMP RUN ON THE MAIN PLC CONTROLLER USING HI-HI FLOAT		ACCEPTABLE	YES	NO
VERIFY PUMPS ALTERNATION WITH PUMPS OUT OF SERVICE.		ACCEPTABLE	YES	NO
HIGH WET WELL LEVEL TRANSDUCER ALARMS, LOCAL/REMOTE SCADA		ACCEPTABLE	YES	NO
HIGH WET WELL FLOAT ALARM, LOCAL/REMOTE SCADA		ACCEPTABLE	YES	NO

HOA SWITCH OPERATIONAL	ACCEPTABLE	YES		NO	
HOA OFF POSITION/OUT OF SERVICE ALARM, LOCAL/REMOTE SCADA	ACCEPTABLE	YES		NO	

	DESIGN SET POINT	ACTUAL SET POINT
LEAD PUMP ON ELEVATION		
LEAD PUMP OFF ELEVATION		
LAG PUMP ON ELEV.		
LAG PUMP OFF ELEV.		
PUMP #3 ON ELEV.		
PUMP #3 OFF ELEV.		
PUMP #4 ON ELEV.		
PUMP #4 OFF ELEV.		
HIGH WET WELL FLOAT ALARM ELEV.		
HIGH WET WELL LEVEL TRANSDUCER ALARM ELEV.		

			INITIAL		INITIAL
PUMP #1 RUN (GREEN)	ACCEPTABLE	YES		NO	
PUMP #1 CHECK VALVE FAIL TO OPERATE/CLOSE (RED)	ACCEPTABLE	YES		NO	
PUMP #1 OVER TEMP LIGHT (RED)	ACCEPTABLE	YES		NO	
PUMP #1 SEAL LIGHT (AMBER)	ACCEPTABLE	YES		NO	
VERIFY PUMP FAIL AND LOCAL/SCADA ALARM SOUNDS	ACCEPTABLE	YES		NO	
VFD PROGRAM (CHECK ALL THE APPLICABLE PERAMETER)	ACCEPTABLE	YES		NO	
SIMULATING NO FLOW	ACCEPTABLE	YES		NO	

			INITIAL		INITIAL
PUMP #2 RUN (GREEN)	ACCEPTABLE	YES		NO	
PUMP #2 CHECK VALVE FAIL TO OPERATE/CLOSE (RED)	ACCEPTABLE	YES		NO	
PUMP #2 OVER TEMP LIGHT (RED)	ACCEPTABLE	YES		NO	
PUMP #2 SEAL LIGHT (AMBER)	ACCEPTABLE	YES		NO	
VERIFY PUMP FAIL AND LOCAL/SCADA ALARM SOUNDS	ACCEPTABLE	YES		NO	
VFD PROGRAM (CHECK ALL THE APPLICABLE PERAMETER)	ACCEPTABLE	YES		NO	
SIMULATING NO FLOW	ACCEPTABLE	YES		NO	

PUMP #3 RUN (GREEN)	ACCEPTABLE	YES		NO	
PUMP #3 CHECK VALVE FAIL TO OPERATE/CLOSE (RED)	ACCEPTABLE	YES		NO	
PUMP #3 OVER TEMP LIGHT (RED)	ACCEPTABLE	YES		NO	
PUMP #3 SEAL LIGHT (AMBER)	ACCEPTABLE	YES		NO	
VERIFY PUMP FAIL AND LOCAL/SCADA ALARM SOUNDS	ACCEPTABLE	YES		NO	
VFD PROGRAM (CHECK ALL THE APPLICABLE PERAMETER)	ACCEPTABLE	YES		NO	
SIMULATING NO FLOW	ACCEPTABLE	YES		NO	

PUMP #4 RUN (GREEN)	ACCEPTABLE	YES		NO	
PUMP #4 CHECK VALVE FAIL TO OPERATE/CLOSE (RED)	ACCEPTABLE	YES		NO	
PUMP #4 OVER TEMP LIGHT (RED)	ACCEPTABLE	YES		NO	
PUMP #4 SEAL LIGHT (AMBER)	ACCEPTABLE	YES		NO	

VERIFY PUMP FAIL AND LOCAL/SCADA ALARM SOUNDS	ACCEPTABLE	YES		NO	
VFD PROGRAM (CHECK ALL THE APPLICABLE PARAMETER)	ACCEPTABLE	YES		NO	
SIMULATING NO FLOW	ACCEPTABLE	YES		NO	

SCADA

D. OIT DISPLAY

			INITIAL		INITIAL
PUMP RUN STATUS -ON/OFF DISPLAYED	ACCEPTABLE	YES		NO	
PUMP RUN TIMES	ACCEPTABLE	YES		NO	
VFD STATUS-% OF SPEED	ACCEPTABLE	YES		NO	
PUMP FLOW	ACCEPTABLE	YES		NO	
TOTALIZER FOR FLOW	ACCEPTABLE	YES		NO	
MANUAL OPERATION OF PUMPS	ACCEPTABLE	YES		NO	
MANUAL OPERATION OF STATION	ACCEPTABLE	YES		NO	
WET WELL LEVEL CONTROL/GRAPHIC PAGE	ACCEPTABLE	YES		NO	
WETWELL LEVEL TREND ON OIT	ACCEPTABLE	YES		NO	
CHANNEL GRINDER RUN STATUS	ACCEPTABLE	YES		NO	
GENERATOR RUN STATUS	ACCEPTABLE	YES		NO	
GENERATOR FUEL LEVEL	ACCEPTABLE	YES		NO	
POWER MONITORING	ACCEPTABLE	YES		NO	
ROOM TEMPERTURE	ACCEPTABLE	YES		NO	
SUCTION AND DISCHARE PRESSURES	ACCEPTABLE	YES		NO	
CHECK COMMUNICATION STATUS	ACCEPTABLE	YES		NO	
CHECK FAIL OVER ON THE PRIMARY DC POWER SUPPLY	ACCEPTABLE	YES		NO	
VERIFY REMOTE SCADA AND LOCAL OIT ALARM ARE THE SAME	ACCEPTABLE	YES		NO	
CHECK FAIL OVER ON THE PRIMARY LEVEL TRANSDUCER	ACCEPTABLE	YES		NO	
SIMULATE LAST RESORT PUMP RUN ON THE PRIMARY PLC CONTROLLER USING HI-HI FLOAT	ACCEPTABLE	YES		NO	

E. BACKUP CONTROLS

			INITIAL		INITIAL
MAIN PLC FAILURE-DOES BACK UP PLC TAKE CONTROL	ACCEPTABLE	YES		NO	
BACK UP CONTROLLER LEVEL TRANSDUCER WORKING PROPERLY	ACCEPTABLE	YES		NO	
VERIFY PUMPS OPERATION ON BACK-UP CONTROLLER	ACCEPTABLE	YES		NO	
SIMULATE LAST RESORT PUMP RUN ON THE BACK-UP CONTROLLER USING HI-HI FLOAT	ACCEPTABLE	YES		NO	

F. ALARMS AT OIT AND REMOTE CLEAR SCADA

			INITIAL		INITIAL
PUMP FAIL FOR ALL PUMPS	ACCEPTABLE	YES		NO	
POWER FAIL	ACCEPTABLE	YES		NO	
GENERATOR FAIL	ACCEPTABLE	YES		NO	
GENERATOR LOW FUEL	ACCEPTABLE	YES		NO	
ATS STATUS/ NORMAL TO EMERGENCY ALARM	ACCEPTABLE	YES		NO	
CHANNEL GRINDER FAIL	ACCEPTABLE	YES		NO	
HIGH BAR LEVEL ALARM	ACCEPTABLE	YES		NO	
HIGH PUMP ROOM ALARM	ACCEPTABLE	YES		NO	
INTRUSION ALARM	ACCEPTABLE	YES		NO	

INTRUSION HORN WORKING	ACCEPTABLE	YES		NO	
REQUEST TO EXIT CLEAR ALARM	ACCEPTABLE	YES		NO	
PLC FAILURE ALARM	ACCEPTABLE	YES		NO	
UPS FAILURE ALARM	ACCEPTABLE	YES		NO	
LEVEL TRANSDUCER FAIL ALARM	ACCEPTABLE	YES		NO	
WETWELL LEVEL- DEVIATION ALARM	ACCEPTABLE	YES		NO	
HIGH WETWELL FLOAT LEVEL ALARM	ACCEPTABLE	YES		NO	
COMMUNICATION FAILURE ALARM	ACCEPTABLE	YES		NO	

G. SCADA GENERAL

			INITIAL		INITIAL
PUMP ALTERNATION SEQUENCE AUTO ROTATE AND RUN TIME	ACCEPTABLE	YES		NO	
CHLORINE ANALYZER ACCURATE	ACCEPTABLE	YES		NO	
CAMERA WORKING/ DISPLAYING ON CLEARSCADA	ACCEPTABLE	YES		NO	
UPS WORKED PROPERLY DURING POWER OUTAGE	ACCEPTABLE	YES		NO	
ANY FAILURES DURING POWER INTERRUPTION	ACCEPTABLE	YES		NO	
SUCTION AND DISCHARGE PRESSURES ACCURATE	ACCEPTABLE	YES		NO	
VERIFY SMOKE DETECTOR WORKS	ACCEPTABLE	YES		NO	

H. VALVE VAULT

VALVE OPERATIONS					
PUMP 1					
ISOLATION VALVE	ACCEPTABLE	YES		NO	
CHECK VALVE	ACCEPTABLE	YES		NO	
CHECK VALVE LIMIT SWITCH	ACCEPTABLE	YES		NO	
PUMP 2					
ISOLATION VALVE	ACCEPTABLE	YES		NO	
CHECK VALVE	ACCEPTABLE	YES		NO	
CHECK VALVE LIMIT SWITCH	ACCEPTABLE	YES		NO	
PUMP 3					
ISOLATION VALVE	ACCEPTABLE	YES		NO	
CHECK VALVE	ACCEPTABLE	YES		NO	
CHECK VALVE LIMIT SWITCH	ACCEPTABLE	YES		NO	
PUMP 4					
ISOLATION VALVE	ACCEPTABLE	YES		NO	
CHECK VALVE	ACCEPTABLE	YES		NO	
CHECK VALVE LIMIT SWITCH	ACCEPTABLE	YES		NO	
SURGE VALVE FUNCTIONING PROPERLY	ACCEPTABLE	YES		NO	
FLOW METER OPERATIONAL	ACCEPTABLE	YES		NO	
FLOW RANGE: _____					
DRAW DOWN TEST VERIFIED AGAINST FLOW READINGS	ACCEPTABLE	YES		NO	
FLOW RECORDER FUNCTIONAL	ACCEPTABLE	YES		NO	

EMERGENCY BY-PASS VALVE OPERATIONAL	ACCEPTABLE	YES		NO	
VAULT LIGHTS FUNCTIONS	ACCEPTABLE	YES		NO	
VAULT SUMP PUMP FUNCTIONS	ACCEPTABLE	YES		NO	
VAULT EXHAUST FAN FUNCTIONS	ACCEPTABLE	YES		NO	
EXHAUST FAN VERIFIED EXPLOSION PROOF	ACCEPTABLE	YES		NO	
EQUIPMENT HOIST FUNCTIONS	ACCEPTABLE	YES		NO	

I. GENERATOR / ATS

			INITIAL		INITIAL
PROGRAM ATS PHASE ROTATION SENSOR	ACCEPTABLE	YES		NO	
PROGRAM ATS LOSS OF SINGLE PHASE SENSOR	ACCEPTABLE	YES		NO	
PROGRAM ATS UNDER AND OVER VOLTAGE SENSOR	ACCEPTABLE	YES		NO	
GENERATOR WEEKLY EXERCISER FUNCTIONING PROPERLY	ACCEPTABLE	YES			
AUTOMATIC TRANSFER SWITCH ENGAGES WITH MAIN POWER OUTAGE.	ACCEPTABLE	YES		NO	
SCADA GENERATOR RUN ALARM	ACCEPTABLE	YES			
SCADA GENERATOR OUT OF SERVICE ALARM	ACCEPTABLE	YES			

J. GENERATOR FIELD TEST

CRANKCASE HEATER FUNCTIONING PROPERLY	ACCEPTABLE	YES		NO	

AT NORMAL OPERATING LEVELS WITH PUMPS, GRINDER AND LIGHTS ON

TIME MAIN POWER DISCONTINUED	_____	AM	_____	PM
CRANKING TIME	_____			
OPERATING SPEED TIME	_____			
TIME TO AUTOMATIC TRANSFER	_____			
VOLTAGE LEVEL	_____			
FREQUENCY LEVEL	_____			
FULL LOAD CURR. (OUT. AMPS)	_____			
OIL PRESSURE	_____			
AMBIENT AIR TEMP.	_____			
COOLANT TEMP	_____			
KILOWATTS	_____			
POWER FACTOR	_____			
BATTERY CHARGING RATE				
@ 5 MINUTES	_____			
@ 30 MINUTES	_____			
@ 60 MINUTES	_____			
@ 2 HOURS	_____			

FULL RATED LOAD OPERATION	ACCEPTABLE	YES		NO	

FUEL TANK FULL AFTER ALL TESTING COMPLETED	ACCEPTABLE	YES		NO	

K. ELECTRICAL SYSTEMS

INITIAL INITIAL

BUILDING LIGHTING FUNCTIONING	ACCEPTABLE	YES		NO	
EXHAUST FANS FUNCTIONING	ACCEPTABLE	YES		NO	
ELECTRIC HEATERS FUNCTIONING	ACCEPTABLE	YES		NO	
EXTERIOR LIGHTING FUNCTIONING	ACCEPTABLE	YES		NO	
BUILDING AND EQUIPMENT BONDED PER CODE	ACCEPTABLE	YES		NO	

L. WELL

			INITIAL		INITIAL
WELL OPERATING PROPERLY	ACCEPTABLE	YES		NO	
BACKFLOW PREVENTERS INSTALLED AND TEST PERFORMED	ACCEPTABLE	YES		NO	
YARD HYDRANTS AND SPIGOTS FUNCTIONAL AND VERIFIED FROST PROOF	ACCEPTABLE	YES		NO	

M. PUMP STATION GENERAL

			INITIAL		INITIAL
SPARE PARTS SUPPLIED AS INDICATED IN SPECIFICATIONS	ACCEPTABLE	YES		NO	
SPECIAL TOOLS SUPPLIED AS INDICATED IN SPECIFICATIONS	ACCEPTABLE	YES		NO	
FINAL GRADING, SEEDING, PLANTING, AND PAVING COMPLETE	ACCEPTABLE	YES		NO	
FENCING COMPLETED	ACCEPTABLE	YES		NO	
THREE (3) COPIES OF EQUIPMENT MANUALS RECEIVED	ACCEPTABLE	YES		NO	
THREE (3) COPIES OF FACILITY OPERATIONS MANUALS RECEIVED	ACCEPTABLE	YES		NO	
CERTIFICATE TO OPERATE RECEIVED	ACCEPTABLE	YES		NO	
FINAL COUNTY INSPECTION/CERTIFICATE OF OCCUPANCY RECEIVED	ACCEPTABLE	YES		NO	
ALL SPECIFIED EQUIPMENT TRAINING RECEIVED AS REQUIRED	ACCEPTABLE	YES		NO	

COMMENTS

Appendix L: Deed of Easement Template

Refer to the Service Authority's Omnibus Deed of Easement Template
by using Control + Click to follow the link

[Easement Template](#)

GUIDELINES FOR
PRINCE WILLIAM COUNTY SERVICE AUTHORITY
OMNIBUS DEED OF EASEMENT
August 28, 2018

All parties intending to convey easements and interests in real property (“Applicant”) to the Prince William County Service Authority (“PWCSA”) should review and abide by the following guidelines:

1. The Applicant is responsible for preparing the deed, submitting it to PWCSA for review and approval, and recording the deed in the Prince William County land records.
2. The "omnibus" document is intended for use by an attorney, licensed to practice in the Commonwealth of Virginia, as a basic guide for the preparation of proposed deeds related to water and sewer infrastructure in Prince William County.
3. The format or style of the deed is not exclusive to the omnibus document.
4. Notwithstanding Guideline 3, the specific terms and conditions are standardized, as set forth in the omnibus document. Therefore, the terms and conditions for required interests should be set forth verbatim. Minor deviations may be considered in certain cases where justification in writing is provided to PWCSA by the Applicant. However, PWCSA does not guarantee all or any such requests will be granted.
5. The Applicant must submit a clean and redline copy of the proposed deed to PWCSA for review. The redline copy should show all proposed changes to the omnibus document.

Document prepared by and
when recorded return to:

GPIN Nos: _____

THIS DEED IS EXEMPT FROM RECORDATION TAX PURSUANT TO
SECTION 58.1-811(A)(3) OF THE CODE OF VIRGINIA, 1950, AS AMENDED

DEED OF QUITCLAIM AND EASEMENTS

[TITLE OF THIS DEED SHOULD BE UPDATED TO REFLECT ITS CONTENTS]

THIS DEED OF QUITCLAIM AND EASEMENTS (this "Deed") is made this ____
day of _____, _____, by and between _____, a
_____**[PROVIDE ENTITY TYPE AND STATE OF FORMATION, IF**
APPLICABLE], as grantor (the "Owner"); _____, Trustee(s), as grantor (the
"Trustee(s)"); _____, a _____, as grantor (the
"Lender"); and the **PRINCE WILLIAM COUNTY SERVICE AUTHORITY**, a public body
politic and corporate, as grantee (the "Authority").

RECITALS

R-1. By virtue of a deed recorded among the land records of Prince William County, Virginia (the "Land Records") as _____ **[INSERT INSTRUMENT NO. OR DEED BOOK AND PAGE]**, Owner is the owner of that certain parcel of real property located and situate in Prince William County, Virginia identified as _____ **[INSERT PROPERTY'S LEGAL DESCRIPTION OR METES AND BOUNDS DESCRIPTION]** (the "Property"), which is more particularly shown and described on the plat attached hereto and made a part hereof entitled "_____" dated _____ and prepared by _____ (the "Plat").

R-2. [The Property is encumbered by the lien of that certain Deed of Trust made by Owner to Trustee(s) and securing Lender, dated _____ and recorded among the Land Records as _____ (the "Deed of Trust").]

OR

[The Property is not subject to the lien of any deed of trust or similar lien instrument.]

R-3. Currently there exist on, across, through, and underneath the Property certain facilities for the collection and conveyance of sanitary sewage and/or for the transmission and distribution of water (the "Existing Facilities"). **[THIS RECITAL SHOULD ONLY BE USED IF THE OWNER IS QUITCLAIMING EXISTING FACILITIES TO THE AUTHORITY THAT ARE NOT CURRENTLY WITHIN AN EASEMENT BENEFITTING THE AUTHORITY.]**

R-4. It is now the Owner's desire and intention, with the consent and approval of the Trustee(s) and Lender, as evidenced by their signatures affixed hereto, to quitclaim, release, and convey to the Authority any and all of Owner's rights, title, and interest in and to the Existing Facilities. **[THIS RECITAL SHOULD ONLY BE USED IF THE OWNER IS QUITCLAIMING EXISTING FACILITIES TO THE AUTHORITY THAT ARE NOT CURRENTLY WITHIN AN EASEMENT BENEFITTING THE AUTHORITY.]**

R-5. It is now also the Owner's desire and intention, with the consent and approval of the Trustee(s) and Lender, as evidenced by their signatures affixed hereto, to create, grant, and convey to the Authority those permanent easements and rights-of-way, in the areas and dimensions as shown on the Plat for the purposes set forth herein.

R-6. It is now further the Owner's desire and intention, with the consent and approval of the Trustee(s) and Lender, as evidenced by their signatures affixed hereto, to create, grant, and convey to the Authority temporary construction easements through, upon, under, and across the Property in the locations and dimensions shown on the Plat for the purposes set forth herein. **[THIS RECITAL SHOULD ONLY BE USED IF THE OWNER IS CONVEYING TEMPORARY CONSTRUCTION EASEMENTS TO THE AUTHORITY.]**

R-7. The Authority is the beneficiary of an easement encumbering the Property for _____ purposes (the "Existing Authority Easement") pursuant to that certain deed recorded among the Land Records as _____ **[INSERT INSTRUMENT NO. OR DEED BOOK AND PAGE]**. It is now the Authority's desire and intention to vacate, surrender, and quitclaim to Owner all of the Authority's right, title, and interest in and to those portions of the Existing Authority Easement as more particularly set forth on the Plat. **[THIS RECITAL SHOULD ONLY BE USED IF THE AUTHORITY IS QUITCLAIMING EASEMENT RIGHTS TO THE OWNER.]**

WITNESSETH:

QUITCLAIM OF EXISTING FACILITIES
[THIS SECTION SHOULD ONLY BE USED IF THE OWNER IS QUITCLAIMING EXISTING FACILITIES TO THE AUTHORITY THAT ARE NOT CURRENTLY WITHIN AN EASEMENT BENEFITTING THE AUTHORITY.]

NOW, THEREFORE, in consideration of the sum of ten dollars and NO/100 (\$10.00), cash in hand paid, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Owner hereby forever remises, quitclaims, releases, and conveys to the Authority, its successors and assigns, any and all of Owner's rights, title, and interest in and to the Existing Facilities.

SANITARY SEWER EASEMENT

THIS DEED FURTHER WITNESSETH, that for and in consideration of the sum of One and 00/100 Dollars (\$1.00), cash in hand paid, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Owner does hereby create, grant, and convey unto the Authority, its successors and assigns, with General Warranty of title, a

permanent easement and right-of-way over, under, across, and through the Property, in the locations and dimensions as shown on the Plat (the "Sanitary Sewer Easement Area"), and described on the Plat as "_____" (the "Sanitary Sewer Easement") for the purposes of installing, constructing, operating, maintaining, inspecting, repairing, replacing, adding to or altering, changing the size of, and removing one or more present or future sanitary sewage utility lines and mains, including, without limitation, inlet structures, meters, manholes, forcemains, and other appurtenant facilities for the collection of sewage and its transmission through, upon, under, and across the Property (collectively, the "Sanitary Sewer Facilities"). The Sanitary Sewer Easement is subject to the following terms and conditions:

1. All Sanitary Sewer Facilities which are installed in the Sanitary Sewer Easement Area shall be and remain the property of the Authority, its successors and assigns.

2. The Authority, and its agents, employees, contractors, and authorized permittees shall have full and free use of the Sanitary Sewer Easement and right-of-way for the purposes named, and shall have all rights and privileges reasonably necessary to the enjoyment and exercise of the Sanitary Sewer Easement and right-of-way including the right of reasonable access to and from the Sanitary Sewer Easement Area and right to use adjoining land where necessary; provided, however, that this right to use adjoining land shall be exercised only during periods of actual surveying, construction, reconstruction or maintenance, and further, this right shall not be construed to allow the Authority to erect any building or structure of a permanent nature on such adjoining land.

3. The Authority shall have the right to trim, cut and remove trees, shrubbery, fences, structures, or other obstructions in or near the Sanitary Sewer Easement Area, including those existing at the time of execution of this Deed, deemed by the Authority to interfere with the proper and efficient construction, operation and maintenance of the Sanitary Sewer Facilities; provided, however, that the Authority at its own expense shall restore, as nearly as practicable, to their original condition all land or premises included within or adjoining the Sanitary Sewer Easement Area which are disturbed in any manner by the construction, operation and maintenance of the Sanitary Sewer Facilities. Such restoration shall include (i) the backfilling of trenches, (ii) repaving, (iii) replacement of fences pre-approved by the Authority or existing at the time of execution of this Deed (the "Permitted Fences"), (iv) the reseeding or resodding of lawns or pasture areas, and (v) the replacement of trees, flowers, shrubbery, vegetable plants, structures and other obstructions located outside the Sanitary Sewer Easement Area, but shall not include the replacement of trees, flowers, shrubbery, vegetable plants, structures, except Permitted Fences, or other obstructions located within the Sanitary Sewer Easement Area.

4. The Owner reserves the right to make any use of the Sanitary Sewer Easement Area which may not be inconsistent with the rights herein conveyed, or interfere with the use of the Sanitary Sewer Easement by the Authority for the purposes named; provided, however, that the Owner shall not erect any building or other structure, including a fence, in the Sanitary Sewer Easement Area, without obtaining the prior written approval of the Authority. In the event a use of the Property by Owner is approved by the Authority, but requires the relocation of any of the Sanitary Sewer Facilities or the adjustment of the depth of any of the Sanitary Sewer Facilities, all costs required to accomplish such relocation or adjustment shall be paid by Owner. Owner

agrees that no vegetation other than (i) grass, (ii) shrubbery, and (iii) flowers and vegetable plants with root systems that extend no more than 12 inches below the surface at maturity, may be planted in the Sanitary Sewer Easement Area; provided, however, that such flowers, shrubbery and vegetable plants are planted at Owner's risk and the Authority shall have no obligation to replant such flowers, shrubbery and vegetable plants nor to compensate Owner for such vegetation in the event such vegetation is damaged or destroyed during the exercise of the Authority's rights under this Deed.

WATERLINE EASEMENT

THIS DEED FURTHER WITNESSETH, that for and in consideration of the sum of One and 00/100 Dollars (\$1.00), cash in hand paid, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Owner does hereby create, grant, and convey unto the Authority, its successors and assigns, with General Warranty of title, a permanent easement and right-of-way over, under, across, and through the Property, in the locations and dimensions as shown on the Plat (the "Waterline Easement Area"), and described on the Plat as "_____ " (the "Waterline Easement") for the purposes of installing, inspecting, constructing, operating, maintaining, repairing, adding to, altering or replacing one or more present or future water lines or mains, including, without limitation, fire hydrants, valves, vaults, meters, building service connections and other appurtenant facilities for the transmission and distribution of water, through, upon, under, and across the Property (collectively, the "Waterline Facilities"). The Waterline Easement shall be subject to the following terms and conditions:

1. All Waterline Facilities which are installed in the Waterline Easement Area shall be and remain the property of the Authority, its successors and assigns.

2. The Authority, and its agents, employees, contractors, and authorized permittees shall have full and free use of the Waterline Easement and right-of-way for the purposes named, and shall have all rights and privileges reasonably necessary to the enjoyment and exercise of the Waterline Easement and right-of-way including the right of reasonable access to and from the Waterline Easement Area and right to use adjoining land where necessary; provided, however, that this right to use adjoining land shall be exercised only during periods of actual surveying, construction, reconstruction or maintenance, and further, this right shall not be construed to allow the Authority to erect any building or structure of a permanent nature on such adjoining land.

3. The Authority shall have the right to trim, cut and remove trees, shrubbery, fences, structures, or other obstructions in or near the Waterline Easement Area, including those existing at the time of execution of this Deed, deemed by the Authority to interfere with the proper and efficient construction, operation and maintenance of the Waterline Facilities; provided, however, that the Authority at its own expense shall restore, as nearly as practicable, to their original condition all land or premises included within or adjoining the Waterline Easement Area which are disturbed in any manner by the construction, operation and maintenance of the Waterline Facilities. Such restoration shall include (i) the backfilling of trenches, (ii) repaving, (iii) replacement of fences pre-approved by the Authority or existing at the time of execution of

this Deed (the "Permitted Fences"), (iv) the reseeding or resodding of lawns or pasture areas, and (v) the replacement of trees, flowers, shrubbery, vegetable plants, structures and other obstructions located outside the Waterline Easement Area, but shall not include the replacement of trees, flowers, shrubbery, vegetable plants, structures, except Permitted Fences, or other obstructions located within the Waterline Easement Area.

4. The Owner reserves the right to make any use of the Waterline Easement Area which may not be inconsistent with the rights herein conveyed, or interfere with the use of the Waterline Easement by the Authority for the purposes named; provided, however, that the Owner shall not erect any building or other structure, including a fence, in the Waterline Easement Area, without obtaining the prior written approval of the Authority. In the event a use of the Property by Owner is approved by the Authority, but requires the relocation of any of the Waterline Facilities or the adjustment of the depth of any of the Waterline Facilities, all costs required to accomplish such relocation or adjustment shall be paid by Owner. Owner agrees that no vegetation other than (i) grass, (ii) shrubbery, and (iii) flowers and vegetable plants with root systems that extend no more than 12 inches below the surface at maturity, may be planted in the Waterline Easement Area; provided, however, that such flowers, shrubbery and vegetable plants are planted at Owner's risk and the Authority shall have no obligation to replant such flowers, shrubbery and vegetable plants nor to compensate Owner for such vegetation in the event such vegetation is damaged or destroyed during the exercise of the Authority's rights under this Deed.

TEMPORARY CONSTRUCTION EASEMENT
[THIS SECTION SHOULD ONLY BE USED IF THE OWNER IS CONVEYING
TEMPORARY CONSTRUCTION EASEMENTS TO THE AUTHORITY.]

THIS DEED FURTHER WITNESSETH, that for and in consideration of the sum of One and 00/100 dollars (\$1.00), cash in hand paid, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Owner does hereby create, grant, and convey unto the Authority, its agents, successors and assigns, a temporary construction easement (the "Temporary Construction Easement") over, under, across, and through the Property, in the areas and dimensions as shown on the Plat (the "Temporary Construction Easement Area") and described on the Plat as "_____ " for the purpose of performing construction work and activities relating to the Sanitary Sewer Easement and/or Waterline Easement, on, under, through and across the Property. The Temporary Construction Easement shall be subject to the following terms and conditions:

1. The Authority, and its agents, employees, contractors, and authorized permittees shall have full and free use of the said Temporary Construction Easement for the purposes named, and shall have all rights and privileges reasonably necessary to the enjoyment and exercise of the Temporary Construction Easement including the right of reasonable access to and from the Temporary Construction Easement Area and right to use adjoining land where necessary; provided, however, that this right to use adjoining land shall be exercised only during periods of actual surveying, construction, reconstruction or maintenance, and further, this right shall not be construed to allow the Authority to erect any building or structure of a permanent nature on such adjoining land.

2. The Authority shall have the right to trim, cut and remove trees, shrubbery, fences, structures or other obstructions or facilities in or near the Temporary Construction Easement being conveyed, deemed by it to interfere with the proper and efficient construction, grading or maintenance of the property; provided, however, that the Authority at its own expense shall restore, as nearly as possible, the premises to their original condition, such restoration to include the backfilling of trenches, the replacement of shrubbery and the seeding or sodding of lawns or pasture areas, but not the restoration of the original grade or topography or the replacement of structures, trees or other obstructions.

3. The Owner reserves the right to make any use of the Property which may not be inconsistent with the rights herein conveyed, or interfere with the use of the Temporary Construction Easement by the Authority for the purposes named; provided, however, that the Owner shall not erect any building or structure, including a fence, on the Temporary Construction Easement Area without the prior written approval of the Authority.

4. The Temporary Construction Easement shall expire and become null and void at such time as construction of the improvements for which the Temporary Construction Easement are required is completed.

RELEASE AND SUBORDINATION
[THIS SECTION SHOULD BE UPDATED TO
REFLECT THE CONTENTS OF THIS DEED]

THIS DEED FURTHER WITNESSETH, that for and in consideration of the sum of One and 00/100 Dollars (\$1.00), cash in hand paid, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Trustee(s), with the consent and approval of the Lender, [as shown by Lender's signature affixed hereto,] [as authorized to act without the joinder of the Lender] **[CHOOSE ONE]** does hereby release and discharge the Existing Facilities from the lien of the Deed of Trust, and, further, does hereby subordinate the said lien to the easements herein conveyed.

TO HAVE AND TO HOLD SAID Existing Facilities unto the Authority, its successors and assigns, fully released and discharged from the liens and operations of the Deed of Trust.

It is expressly understood that the release of the Existing Facilities from the lien of the Deed of Trust shall not affect in any way the lien of the Deed of Trust upon any other property, real or personal, conveyed thereby and not released hereby, and the Deed of Trust shall remain in full force and effect as to any such property, real or personal, conveyed thereby and not released hereby, subject, however, to the easements herein conveyed.

VACATION OF THE EXISTING AUTHORITY EASEMENT
[THIS SECTION SHOULD ONLY BE USED IF THE AUTHORITY IS QUITCLAIMING
EASEMENT RIGHTS TO THE OWNER.]

THIS DEED FURTHER WITNESSETH: that for an in consideration of the sum of One and No/100 Dollars (\$1.00), cash in hand paid, and other good and valuable consideration, the

receipt and sufficiency of which are hereby acknowledged, the Authority does hereby forever vacate, surrender, and quitclaim to Owner, its successors and assigns, any and all of the Authority's right, title, and interest in and to those portions of the Existing Authority Easement that are shown and described on the Plat as "_____".

MISCELLANEOUS

1. This Deed is made with the free consent and in accordance with the desires of the Owner.

2. Owner covenants that it is seized of and has the right to convey the easements set forth in this Deed, that the Authority shall have quiet and peaceable possession, use and enjoyment of the said easements, and that the Owner shall execute such further assurances thereof as may be required.

3. In the event the Authority notifies Owner, or Owner's successors or assigns, of a violation of the terms of this Deed and Owner does not cure such violation within thirty (30) days of such notice, or such other time as Owner and the Authority may agree upon in writing, the Authority may take such action as necessary to cure such violation, including ingress and egress over any portion of Owner's Property deemed necessary by the Authority to access the easement area and to enforce the Authority's rights hereunder. All costs and expenses incurred by the Authority in exercising or enforcing its rights hereunder shall be paid or, at the Authority's election, reimbursed, by Owner, within thirty (30) days from the date Owner receives a bill or invoice from the Authority for such costs and expenses. If such costs and expenses are not paid within the thirty (30) day period referenced in the preceding sentence, all such costs and expenses shall immediately commence bearing interest at the rate of twelve percent (12%) per annum. The Authority shall have the right to enforce the terms of this Deed by any remedy available at law or in equity.

4. If the Authority is adjudicated the prevailing party in any judicial proceeding between the parties regarding enforcement of this Deed, the Authority shall be awarded its reasonable costs and expenses, including reasonable attorneys' fees.

5. The parties agree that the terms, conditions, and covenants stated in this Deed shall be construed as covenants running with the land and shall be binding upon and shall inure to the benefit of the Owner, the Authority, and their respective heirs, successors, and assigns.

6. The parties agree that this Deed describes the entire agreement and understanding between the Owner and the Authority with respect to the subject matter hereof and that no written or verbal statement or representations have been made by or to the Authority which either modify, add to, or change this Deed.

7. If any term or provision of this Deed shall be invalid or unenforceable to any extent, the remainder of this Deed shall not be affected thereby, and each remaining term and provision of this Deed shall be valid and enforceable to the fullest extent permitted by law.

8. This Deed shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia.

9. This Deed may be executed in counterparts, each of which shall be deemed an original, but which together shall constitute one and the same instrument. Owner shall be responsible, at its sole cost and expense, for causing this Deed to be recorded among the Land Records.

10. The Recitals are hereby incorporated into this Deed.

[SIGNATURES APPEAR ON THE FOLLOWING PAGES]
[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

WITNESS the following signatures and seals:

OWNER:

By: _____ (SEAL)
Name:
Title:

STATE/Commonwealth of _____
CITY/COUNTY OF _____, to wit:

I, the undersigned Notary Public of and for the jurisdiction aforesaid, do hereby certify that _____, as _____ of _____, whose name is signed to the foregoing Deed, has this date appeared before me, and acknowledged the same.

Given under my hand this _____ day of _____, _____.

Notary Public

My Commission Expires: _____

[SIGNATURES CONTINUE ON THE FOLLOWING PAGE]
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TRUSTEE(S):

By: _____ (SEAL)
Name:
Title:

STATE/Commonwealth of _____
CITY/COUNTY OF _____, to wit:

I, the undersigned Notary Public of and for the jurisdiction aforesaid, do hereby certify that _____, as _____ of _____, whose name is signed to the foregoing Deed, has this date appeared before me, and acknowledged the same.

Given under my hand this _____ day of _____, _____.

Notary Public

My Commission Expires: _____

[SIGNATURES CONTINUE ON THE FOLLOWING PAGE]
[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

LENDER:

By: _____ (SEAL)
Name:
Title:

STATE/Commonwealth of _____
CITY/COUNTY OF _____, to wit:

I, the undersigned Notary Public of and for the jurisdiction aforesaid, do hereby certify that _____, as _____ of _____, whose name is signed to the foregoing Deed, has this date appeared before me, and acknowledged the same.

Given under my hand this _____ day of _____, _____.

Notary Public

My Commission Expires: _____

[SIGNATURES CONTINUE ON THE FOLLOWING PAGE]
[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

THE AUTHORITY:

PRINCE WILLIAM COUNTY SERVICE AUTHORITY

By: _____(SEAL)
Name:
Title:

COMMONWEALTH of VIRGINIA
COUNTY OF PRINCE WILLIAM, to wit:

I, the undersigned Notary Public of and for the jurisdiction aforesaid, do hereby certify that _____, as _____ of the Prince William County Service Authority, its authorized agent, whose name is signed to the foregoing Deed, has this date appeared before me, and acknowledged the same.

Given under my hand this _____ day of _____, _____.

Notary Public

My Commission Expires: _____

Appendix M: Off-Site Easement Acquisition Policy

Refer to the Service Authority's Off-Site Easement Acquisition Policy

by using Control + Click to follow the link

[Off-Site Easement Acquisition](#)

	WATER AND SEWER SERVICE POLICIES	<i>EFFECTIVE DATE:</i> 3/14/2002
	<i>POLICY TITLE:</i> OFF-SITE EASEMENT ACQUISITION POLICY	<i>STARTING SECTION:</i> 41405
		<i>OWNER: Director of Engineering & Planning</i>

Article 4. EASEMENTS.

Sections.

41405. Off-site Easement Acquisition Policy.

§ 41405. Off-Site Easement Acquisition Policy.

- (a) It is the Service Authority's policy that off-site easement acquisition shall be the responsibility of the Applicant for Service ("Applicant"). All contact by the Applicant with property owners shall be conducted in good faith, with an emphasis upon fairness to the private property owner (the "Easement Grantor") who is being asked to grant the easement. The Applicant shall report to and advise Service Authority staff if difficulties are encountered in the easement acquisition process, so that the Service Authority may monitor the process to assure fairness to all involved. If voluntary easement acquisition is unsuccessful, the Service Authority Board of Directors ("Board"), upon the staff's recommendation, may determine to employ its powers of eminent domain to acquire the necessary easements.
- (b) The Applicant is responsible to propose a sanitary sewer or water main design of proper alignment and which is technically adequate and acceptable to the Service Authority. The proposed sewer or water main must be a part of a subdivision plan or site plan submitted to the appropriate Prince William County reviewing agencies.
- (c) The Applicant is responsible to eliminate any unresolved design or plan issues which could affect or change the sanitary sewer or water design and/or off-site easement requirements.
- (d) The Applicant is responsible to participate in a bona fide effort to acquire the easement and will provide the Easement Grantor with:
 - 1) Engineering plans of the proposed utility improvements related to their property,
 - 2) Appropriate easement plat, and
 - 3) Easement agreement form approved by the Service Authority.
- (e) The Applicant will obtain a title report, to identify all parties having an ownership interest in the property, and a comprehensive appraisal report prepared by a professional real estate appraiser, approved by the Service Authority, to establish current values of the affected property.
- (f) The appraisal must address the current value of permanent and temporary easement areas, damaged trees/forest and damages or enhancements to the residual property.
- (g) The offer of compensation to the Easement Grantor for the requested easement rights will be based on no less than the appraisal report.
- (h) The probable timing of construction of the utilities, impact on the property, restoration of the disturbed site, and availability of the utilities to serve the property must be explained.
- (i) The Easement Grantor must be given a reasonable time period to evaluate the Applicant's offer and to receive answers to any questions or concerns, which may raise.

	WATER AND SEWER SERVICE POLICIES	<i>EFFECTIVE DATE:</i> 3/14/2002
	<i>POLICY TITLE:</i> OFF-SITE EASEMENT ACQUISITION POLICY	<i>STARTING SECTION:</i> 41405
		<i>OWNER: Director of Engineering & Planning</i>

- (j) The Applicant must document efforts and unsuccessful attempts to negotiate with the affected Easement Grantor to acquire the necessary easement rights. This process must include:
 - 1) a legitimate determination of the value of the easement rights being sought;
 - 2) multiple contacts with the Easement Grantor to discuss the need for the easement and to explain the impact on their properties;
 - 3) a good faith effort to address and accommodate the concerns of the Easement Grantor;
 - 4) a bona fide written offer to purchase the easement rights for a price not less than the appraised value of the easement rights.
- (k) The Applicant must satisfy Service Authority staff that no other reasonable alternative to the proposed alignment exists and must provide documentation that confirms the Applicant's opinion that further negotiation efforts by the Applicant, no matter how equitable the proposed settlement offer, would likely continue to be unsuccessful.
- (l) At any time, prior to requesting the Board to authorize condemnation procedures, the Service Authority staff may involve themselves directly in negotiations with the Easement Grantor and staff may determine to engage the services of an independent, objective, real estate negotiator and acquisition specialist (to be paid for by the Applicant) to assure that all reasonable efforts to acquire the easement voluntarily have been made.
- (m) If the guidelines in this section have been met, then the Applicant must supply documentation, as listed in this section, along with a written request for the Service Authority's assistance. If the Service Authority's staff is satisfied that all conditions have been met and that further negotiations by the Applicant would likely be unsuccessful, the staff will advise the Easement Grantor that unless the matter is resolved within a reasonable time period and stated deadline, the staff will be requesting that the Board consider authorizing utilization of its powers of eminent domain to acquire the easement.
- (n) If the matter is not resolved by the deadline, the request will be scheduled for presentation to the Board for consideration during a regularly scheduled meeting. The Easement Grantor or its legal representative, and the Applicant, shall be provided notice of the time and place at which the Board will consider the matter. The Board, at its discretion, may direct staff to negotiate – or continue negotiations – with the Easement Grantor to acquire the easement and/or to utilize the Service Authority's powers of eminent domain as provided by Va. Code Ann. § 15.2-5114, if necessary. The Board may decline to authorize further involvement in the easement acquisition process. Negotiations between Applicant and Easement Grantor are **STRONGLY** encouraged and the exercise of filing a Certificate of Take by the Service Authority will only be made for a public purpose and where the easement is to become part of the Service Authority's public system after construction and acceptance.
- (o) All such Applicant requests will be considered on a case-by-case basis, judged on the circumstances, merits of the case, and the rights of the individual property owners to be compensated fairly for any use of their property.
- (p) If off-site easement acquisition assistance is authorized, the Applicant will pay all direct and indirect costs and expenses associated with the acquisitions within thirty (30) days of invoice by the Service Authority. Filing a Certificate of Taking (Quick Take) involves legal costs and posting of a deposit representing the estimated value of the easement rights. Filing and trying a condemnation suit involves, but is not limited to, court and

	WATER AND SEWER SERVICE POLICIES		<i>EFFECTIVE DATE:</i> 3/14/2002
	<i>POLICY TITLE:</i> OFF-SITE EASEMENT ACQUISITION POLICY		<i>STARTING SECTION:</i> 41405
			<i>OWNER: Director of Engineering & Planning</i>

legal costs, services of a real estate appraiser, responsibility for the compensation awarded by the court, and Service Authority administrative costs.

ADOPTED: NOVEMBER 9, 1995

REVISED: MARCH 14, 2002

APPROVED BY GENERAL MANAGER

Appendix N: Pre-Construction Packet

Refer to the Service Authority's Pre-Construction Packet
by using Control + Click to follow the link

[Pre-Construction Packet](#)



PRE-CONSTRUCTION MEETING

Project:

PWC Plan #

PWCSA Utility Inspector:

Phone:

Email:

Construction:

All water and sanitary sewer construction will be done in strict accordance with the Service Authority's Utility Standards Manual, Dated: April 10, 2017 along with the Project Plans and Specifications. The contractor is responsible for knowing and following the requirements.

Permits:

The contractor is responsible for having all of the permits and approvals necessary to construct this project. This may include, but not limited to Prince William County (PWC) Land Disturbance Permit, Plumbing Permit, and Erosion and Sediment Control Permit, Corps of Engineers Wetlands Permit, and Virginia Department of Health's Certificate to Construct.

PWCSA Utility Permit Issued. If not, work cannot begin. Contact Karla Coker with the Engineering Department @ (703) 335-7930 to obtain current permit fees.

- ☐ Yes
- ☐ No

Does Contractor/Developer have copy of USM? If not, then must obtain one prior to beginning construction. Copy can be obtained from Contact Karla Coker with the Engineering Department @ (703) 335-7930.

- ☐ Yes
- ☐ No

Safety:

It is the Contractor/Developer's responsibility to comply with all VOSHA requirements pertaining to his project. If an unsafe condition is identified on the job site, The Service Authority's utility inspector will advise the highest-ranking member of the contractor's staff at the project of the violation. Under no circumstances will the Service Authority's utility inspector provide directions of any kind on how to correct the problem, other than declaring an unsafe condition exist. Inspection services will not be rendered until such time as the problem has been corrected. Failure to correct an unsafe condition or repeated conditions will result in notification to the Virginia Occupational Safety and Hazard Association.

Over-Time Requests for the convenience of the Contractor:

Requests for inspection services outside of regular hours *(7:30am to 3:30pm Monday through Friday)* are to be made thru the Project Inspector along with a signed Service Authority Overtime Request Sheet no later than 3 days prior to the scheduled work. If contractor chooses to work outside these business hours (All) work is to be left open for inspection as the Inspectors schedule allows. All costs for inspection services provided outside of regular working hours for the convenience of the contractor will be reimbursed to the Service Authority. The Utility Inspections Supervisor shall compute all overtime costs. The overtime rate will include hourly wages, including overtime, holiday pay, and equipment costs. The contractor will be invoiced for the costs of the inspection services on a monthly basis, or at the discretion of the Utility Inspections Supervisor, upon conclusion of the work. *All Service Authority overtime must be paid in full prior to Service Authority Bond Release acceptance.*

The Service Authority reserves the right to refuse request for overtime services at any time.

Field Changes:

Service Authority Utility Inspectors are empowered to request and obtain minor field changes to the approved plans. This usually consists of additional valves, changes in grade, or other adjustments, which will not affect easements, reduce hydraulic capacity or change the alignment. For such minor changes, the utility inspector will simply note the change on the Field Drawings.

In most cases however, the Developer or their Engineer initiates field changes. In such situations, and where substantive changes to approved construction drawings are necessary, a formal field change will be required to be submitted to the Service Authority's Engineering Department for review and approval prior to installation.

Materials:

It is the intent of the Service Authority specifications to describe definitely and fully the character of materials and to require new materials in all particulars.

No reuse of materials without the prior approval of the Service Authority. The Authority also reserves the right to salvage any and all existing materials.

A materials list will be required at the start of the job. This will need to contain the manufacturers name, sizes, etc. This will be required for all fire hydrants, tees, valves,

Fittings, pipe, manholes and any other materials used for the installation of water and sewer. The Service Authority Inspector will need to check this list with the materials onsite, prior to starting the work.

Special Conditions:

Interruption of Water Service – The Authority's goal is not to interrupt service unless it is absolutely necessary. All other options shall be taken into account when considering a service interruption, however, should it be necessary, then the following requirements must be followed:

- 1) Hold a pre-interruption meeting with Developer/Contractor to discuss overall plans for making tie-in. Attendees are as follows:
 - Representatives from the Developer/Contractor developing site, Authority's Utility Inspections Supervisor and the Project Inspector, Representative from the Authority's Operations & Maintenance Division, and others as required. (VDOT Inspector, etc.)

Agenda:

- a.) Discuss responsibilities for operating existing facilities. (O&M Department)
 - b.) **ONLY PWCSA employees are allowed to operate PWCSA valves and fire hydrants.**
 - c.) Discuss responsibilities for Notification of Interruption to existing customers.
 - d.) Discuss in depth the procedure for the proposed work. This will include time of day when tie-in can be made, type of materials that will be used, equipment that will be on-site and the necessary manpower needed to perform the work. We will also discuss the need for additional manpower should the work extend into the late hours of the night, as well as the estimated maximum time needed to complete the work. We will also discuss which home owners/business, if any, which will require continuous service.
 - e.) All work will be done in strict accordance with the USM.
 - f.) Advise the contractor/developer that they are responsible for paying all overtime costs accrued by Service Authority employees.
 - g.) Advise the contractor/developer that the interruption will be canceled if the field inspector is not satisfied that all of the requirements have been adequately met.
- 2) The developer/contractor must submit in writing fifteen (15) days in advance of any construction, a detailed schedule outlining the procedures, techniques, personnel, materials and equipment they are planning to use to perform this tie-in.
 - 3) The developer/contractor must notify the Authority's Project Inspector seven (7) working days prior to making the actual tie-in so that the **Interruption Notice** can be prepared and hand delivered three (3) days in advance of the actual interruption. Depending on the

Number of notices that have to be delivered, the contractor/developer may be required to assist the inspector in delivering the notices.

- 4) A meeting will be scheduled with the developer/contractor and a representative from the Authority's Operations & Maintenance department on the day prior to the actual tie-in. The purpose of the meeting is to finalize the procedures and verify that all of the required equipment and materials are on hand as outlined in the Required Materials List and Procedure Plan. *(Remember that the developer/contractor is responsible for having on-site, all of the necessary equipment and materials as well as any backup equipment and materials needed to perform the scheduled work. If at any time the inspector determines that the contractor/developer is not ready and does not have the adequate equipment and materials on site to perform this work, he may cancel the interruption.)*

Special Provisions:

- There will be a maximum allowable time to complete the work as agreed upon in the **Approved Procedure Plan**.
- If it is determined by the Service Authority's Field Inspector that the work will not be completed within the agreed upon time allotment, the Service Authority reserves the right to remove the contractor and complete the work with its own forces or contractor. In the event this occurs, the contractor/developer will be billed for all costs incurred as a result of this action.
- The Service Authority reserves the right to require the contractor/developer to maintain service to facilities that have special needs at all times such as restaurants, health care facilities, residents that have special needs, etc. This may require installation of temporary lines.
- It is the practice of the Service Authority (SA) that assets in Partial Beneficial Use, Beneficial Use, or accepted by the SA **SHALL NOT** be accessed, used, operated, or adjusted by non-SA personnel.
- In the event that an Applicant for or holder/assignee of ("Holder") a Utility Permit commits an Unauthorized Use of or obtains Unauthorized Access to Service Authority facilities or assets, the Applicant and/or Holder, shall be liable for all of the following costs and fees: (i) all of the Service Authority's costs in responding to incidents arising from an Unauthorized Use or Unauthorized Access; (ii) any fees imposed by any federal, state, or local regulatory agency as a result of Applicant and/or Holder's Unauthorized Access or Unauthorized Use; and (iii) the costs to Service Authority customers arising from the loss of service caused by an Unauthorized Use or Unauthorized Access.

- “Unauthorized Use” means any use of Service Authority facilities or assets not authorized by a Utility Permit. “Unauthorized Access” means any obtaining access to Service Authority facilities or assets in a manner that is not authorized by a Utility Permit or other permission of the Service Authority (including, but not limited to, any easements, rights of entry, license, or similar privilege).
- Service shall not be authorized until water and/or sewer lines are installed, inspected and have received written Beneficial Use Status in accordance with Service Authority and County specifications.
- It is the responsibility of the Owner/Developer to make all improvements, both on-site and off-site, to the water and sanitary sewer systems necessary to service the property.
- The Builder/Developer shall be responsible for temporary construction meter accounts. This includes replacement costs for damaged, lost or stolen meters. The Builder/Developer shall be responsible for payment of water and sewer bills associated with temporary construction meter accounts.
- The act of diverting or wasting public water, tampering with a metering device, damaging or intentionally destroying water facilities is illegal (Virginia Code Section 18.2-162, 163). Any person opening a fire hydrant without a metering device, excluding Service Authority and fire-fighting personnel, will be subject to an Unauthorized Use Charge.

Sewer Re-routing and/or Pump around – The Authority’s purpose is to minimize the impact a pump around has on both the development and the surrounding community.

- 1) Hold a meeting with Developer/Contractor to discuss overall plans for re-routing sewer and pump around requirements. Developer/Contractor responsible for submitting by-pass pumping design to the Authority for approval prior to start of work. Design will reflect actual existing sewer flows through manhole as measured by the contractor including projected flows for peak flow conditions and an allowance for inflow and infiltration during a rain event. Design will also take into account the required storage needed to operate the recommended pumps during their operation. If it is determined by the Develop/Contractor That additional storage is needed to accommodate the pump around, then it will be their responsibility to provide the storage via a means acceptable to the Authority.

Attendees are as follows:

- Representatives from the Developer/Contractor developing site, Authority’s Utility Inspections Supervisor and the Project Inspector, Representative from the Authority’s Operations & Maintenance Division, and others as required. (VDOT Inspector, etc.)

Agenda:

- a. Discuss responsibilities for operating existing facilities. (O&M Department)
 - b. Discuss in depth the procedure for the proposed work. This will include time of day when main can be interrupted and pump around started, type of pump (silent vs. standard) and back-up pump requirements, 24 hour run test and back-up pump run test, monitoring procedure for pump run time to include manually monitoring pumps on a 2 hour interval vs. auto dialing system and required emergency contact numbers, pre-inspection of piping and coupling system for leaks, and emergency spill plan.
 - c. All work will be done in strict accordance with the USM.
 - d. Advise the contractor/developer that they are responsible for paying all overtime costs accrued by Service Authority employees.
 - e. Advise the contractor/developer that the interruption and pump around procedure will be canceled if the field inspector is not satisfied that all of the requirements have been adequately met.
- 2) The developer/contractor must submit in writing fifteen (15) days in advance of any construction, a detailed schedule outlining the procedures, techniques, personnel, materials and equipment they are planning to use to perform this task.

Full Beneficial Use

The term "**Full Beneficial Use**" is used to describe the situation during the construction of development or VDOT projects whenever a pipeline or pumping facility is used to support one or more Service Authority customers and the project has not received bond release for final acceptance. This is predominantly the case in subdivisions when homes in a residential section are sold and occupied before the subdivision is complete. The inspection process for "**Full Beneficial Use**" is triggered by the request from the owner/contractor/developer by filling out the "**Full Beneficial Use**" request letter attached to this paperwork prior to the setting of any water meters in the subdivision or project site.

It is possible for pipelines and pumping facilities to be in "**Full Beneficial Use**" for years prior to performance bond releases.

While in Beneficial Use all problems will be corrected by the site contractor. In the absence of a timely response by the site contractor/developer, Operations and Maintenance (O&M) will repair problems affecting water and sanitary sewer services to the customer. If this occurs, the Authority will bill the owner/developer/contractor for all costs associated with the repairs.

PROCEDURE

Once the contractor/developer has installed and tested all of the water and sewer mains and their appurtenances in accordance with the approved plans and specification, the following steps must be taken by the owner/contractor/developer in order to place the project in a "**Full Beneficial Use**" status:

- Step 1** The owner/contractor/developer will request in writing to the Beneficial Use (BU) Inspector/Project Inspector, that the project be placed in a "**Full Beneficial Use**" status. A sample copy of the letter is attached to this paperwork.
- Step 2** If necessary, the BU Inspector will review the request with the Project Inspector to make sure that the utilities are in fact installed, tested, and ready for use as requested and that the drawing provided by the contractor/developer has all of the necessary information in order to track the process. The BU Inspector/Project Inspector has 30 days upon request to generate a "**Full Beneficial Use**" punch list for the owner/contractor/developer. Corrections to the "**Full Beneficial Use**" punch list are to be completed by the owner/contractor/developer prior to meter requests or installations.
- Step 3** Upon notification from the site owner/contractor/developer that all of the deficiencies identified during the initial inspection have been corrected, the BU inspector will:
- a.) Notify the site owner/contractor/developer via an approved letter advising them that they can now begin requesting construction meters.
 - b.) Notify the following internal offices via copy of the approval letter that the project has been placed in "**Full Beneficial Use**" status and is now ready for water meters.
 - Utility Services
 - Plan Review
 - O&M
 - Mapping

Partial Beneficial Use

The term "**Partial Beneficial Use**" is used to describe the situation of a "**Full Beneficial Use**" but for only a portion of or certain lots of the site. In this case, the owner/builder/contractor will follow the same steps for a "**Full Beneficial Use**" with the following differences.

- When filling out the attached paperwork instead of marking the sheet for **“Full Beneficial Use”** you will mark it as **“Partial Beneficial Use”** and add the lot numbers, street names and /or the section you would like to be inspected.
- Fill out the attached DCSM fire flow and hydrant coverage sheet with an engineer approved stamp and signature attached.
- Fill out the attached CCTV Additional Inspection Request form.

All **“Partial Beneficial Use”** requests will require a \$600.00 fee with the exception of the final **“Partial Beneficial Use”** which will then put the entire site into **“Full Beneficial Use”**. \$600.00 fee must be paid to Utility Services prior to any inspections. You can contact Utility Services at 703-335-7930.

SPECIAL NOTE:

“Full/Partial Beneficial Use” status does not in any way constitute final acceptance of the system, but only allows the developer/contractor to place the water and sewer mains in use while the development is under construction. The developer/contractor is still responsible for all maintenance and repair of the system until it has been bond released and turned over to the Authority for ownership and operation.

Sanitary Sewer Mains – Per the USM:

Construction:

- Cut sheets will be submitted to the utility inspector for review and approval prior to construction.
- All materials will be inspected to assure that they meet Service Authority standards.
- Handling of materials in the field by the contractor will be done as recommended by the manufacturer.
- Chock haunches of pipe. *(No bellies accepted)* this includes both mains and laterals.
- 5-foot diameter manholes are required when using inside drop connection.
- Do not parge joints, boots, and castings inside manhole with mortar.
- All DIP pipe for sewer will be poly wrapped and bolts and DIP fittings with bare metal showing will be coated with Roscote R-28 coating.

Laterals:

- Increase grade on laterals when possible *(i.e. vertical jump)* refer to the USM.

Backfill:

- Backfill in areas subject to vehicular traffic will be compacted to 95% dry density; areas not subject to vehicular loads will be compacted to 90%.

- The first 2-foot lift over the pipe will be of stone pieces no larger than 1-inch in any dimension. Backfill will be placed in 8-inch lifts compacted as specified in the USM.
- Rocks larger than 10-inches in any dimension will not be used in the backfill of any sewers or structures.
- Backfill in existing right-of-ways controlled by VDOT are subject to their standards.

Testing:

- All mains, laterals, manholes will be tested in accordance with the USM prior to acceptance.

Water Mains - Per the USM:

Construction:

- Cut sheets will be submitted to the utility inspector for review and approval prior to construction.
- No ***"USED"*** materials (*i.e. fire hydrants, pipe, fittings, etc.*).
- All materials will be inspected to assure that they meet Service Authority standards.
- Handling of materials in the field by the contractor will be done as recommended by the manufacturer.
- Service Authority staff will operate all existing valves.
- Open end of pipe to be covered in trench and plugged overnight.
- Concrete thrust blocks may be required along with mega-lugs at the utility inspector's request.
- Restraint schedule will be shown on plans and/or cut sheet.
- All DIP pipe water line pipe will be poly wrapped, bolts, and DIP fittings with bare metal showing will be coated with Roscote R-28 coating.
- All water main fittings and service lines will be inspected prior to placing backfill.

Water Services:

- No water meters will be released to project until all testing and flushing of both water and sanitary sewer mains have been completed and the Service Authority **"Full/Partial Beneficial Use"** process has been completed.
- Curb & Gutter must be in place prior to installing water services.
- Property line must be marked for installation of water meter setting.
- Stone dust suitable for backfill for water services (*if no suitable dirt available*).
- No bluestone is allowed in or under meter box.

Backfill:

- Backfill in areas subject to vehicular traffic will be compacted to 95% dry density; areas not subject to vehicular loads will be compacted to 90%.
- The first 2-foot lift over the pipe will be of stone pieces no larger than 1-inch in dimension. Backfill will be placed in 8-inch lifts compacted as specified in the USM.
- Where excavation is made in rock, boulders, or other unsuitable materials, the sub-grade will be made by backfilling with minimum 4-inches of gravel or clean selected soil, which shall be thoroughly compacted.
- Backfill in existing right-of-ways controlled by VDOT are subject to their standards.

Testing:

- Proper test equipment (gauges, meter, clean barrel or tank) required.
- All testing must be satisfactorily completed (this includes bacteria) before water services can be installed.

Resolution of Problems:

The contractor will make effort to resolve any problems encountered in the field with the utility inspector. If a problem cannot be resolved, the utility inspector will bring it to the attention of the Assistant Utility Inspection Supervisor.

Contacts: Conrad Holtslag, Utility Inspection's Area Manager at 703-335-7937 or 703-898-3433.

The conditions' listed above have been explained to me and I understand my responsibility as the contractor/developer.

Signature (Contractor/Developer)

Date

Signature (PWCSA)

(Your Company Letter Head)
SAMPLE LETTER

Date

Mr. (Site inspector's name)
Prince William County Service Authority
P.O. Box 2266
Woodbridge, VA 22193-0266

Re: Project Name
PWC Plan #

Dear Mr. (Site inspector's name):

We have substantially completed the water and sewer infrastructure for the above referenced project, as of this date, and are now requesting that the Authority to place it in:

(Please check appropriate box)

- ☐ "Full Beneficial Use" status. (All Lots)
- ☐ "Partial Beneficial Use" status
- (Please list the Address of Lot you want in the Partial Beneficial Use)
 - (Attach the fire protection certification sealed by a Professional Engineer for lots to be placed in Partial Beneficial Use and Prince William County Approval)
 - Attach an exhibit highlighting those facilities proposed to be placed in Partial Beneficial Use Status

Please take the necessary steps to begin the process as soon as possible. I understand, and am in agreement, that the ***"Full/Partial Beneficial Use"*** status is solely for the purpose of using the facilities while the project is under construction. I am also aware that I must follow the established guideline for final bond release upon the completion of my project.

If you have any questions, please contact me at (123) 456-7890.

Yours truly,

Your name
Title

(Letterhead)

(SEAL)

(Date)

Ms. Samantha Kearney, P.E.
Development Manager
Prince William County Service Authority
4 County Complex court
Woodbridge, VA 22192

Re: (Plan Name)
(Plan Number)
(Lots Numbers or Building Identifiers to be placed in Partial Beneficial Use)

Dear Ms. Kearney:

I, (Name), a duly licensed professional engineer in the commonwealth of Virginia, do hereby certify the available fire flow in accordance with the DCSM (Water Systems and Fire Flow Requirements) and fire protection/hydrant coverage in accordance with the DCSM (Fire Hydrants in Relation to Buildings, reference to Table 3-2) for the above referenced lots/buildings. The information certified below is made by knowing the limited portion of the water system that is installed and to be put into operation with the occupancy of the referenced lots/buildings.

☐ The required DCSM fire flow and hydrant coverage for the project is available. The water system constructed with the above referenced lots is able to deliver a minimum fire flow of _____ gpm at 20 psi.

- ☐ Estimated available fire flow has been determined by adjusting the hydraulic model previously accepted by Service Authority to match the installed water system that is to be placed in operation with the occupancy of the above referenced lots/buildings. The adjusted water model meets all Service Authority requirements referenced in the effective Prince William County Design and Construction Standards Manual and the Service Authority Utility Standards Manual.
- ☐ Estimated available fire flow has been determined by an on-site fire flow test from hydrants that provide coverage to the referenced lots/building. Test results have been extrapolated to all points of the installed water system that is to be placed in operation and adjusted for the low hydraulic grade line of the system, friction loss in the pipe, and elevation of the hydrant locations.

☐ The required DCSM fire flow is not available. The water system constructed with the above referenced lots is able to deliver a minimum fire flow of _____ gpm at 20 psi.

- ☐ Estimated available fire flow has been determined by adjusting the hydraulic model previously accepted by Service Authority to match the installed water system that is to be placed in operation with the occupancy of the above referenced lots/buildings. The adjusted water model meets all Service Authority requirements referenced in the effective Prince William County Design and Construction Standards Manual and the Service Authority Utility Standards Manual.
- ☐ Estimated available fire flow has been determined by an on-site fire flow test from hydrants that provide coverage to the referenced lots/building. Test results have been extrapolated to all points of the installed water system that is to be placed in operation and adjusted for the low hydraulic grade line of the system, friction loss in the pipe, and elevation of the hydrant.



NOTICE TO ALL BUILDERS, DEVELOPERS, CONTRACTORS & HOMEOWNERS

Effective July 1, 2016, the Service Authority will change its policy concerning new construction water meters as follows:

CONSTRUCTION METER CHANGES:

- The Service Authority will no longer permit the use of jumpers in meter pits as a part of its process, but, upon request and approval, will permit the use of a construction meter.
- Prior to the Service Authority installing a construction meter, the builder/developer will be required to call (703) 335-8980, fax to (703) 335-8933 or e-mail to (utilityservices@pwcsa.org) to schedule an appointment with the Service Authority's designated representative to make sure the infrastructure is at a point that it can be placed in service. The Service Authority refers to this as "Beneficial Use Status". Once the inspector has assigned this status to the development and has issued a Beneficial Use Certificate, the builder/developer may start requesting construction meters.
- Construction meters will be installed by the Service Authority upon the request of the builder/developer, providing the meter box meets the minimum requirements in the Utility Standards Manual (USM).
- The builder/developer is responsible for any and all damages to the meter, meter cock and assembly until the final meter inspection is approved.
- Water used for the purpose of building construction, testing, irrigation, or washing exterior of homes, garage floors, driveways and sidewalks (power washing) must be from a metered connection (i.e. construction meter) with no exceptions. Use of a jumper for the purposes stated above is not permitted. Violation of this policy will result in an unauthorized usage charge and possible delays in setting of construction meters and/or final meter inspections.
- Model homes must have final inspection and meter set prior to use.
- Once installed, a construction meter must remain in its original location as it will ultimately become that location's final meter. Removal of the meter by anyone other than a Service Authority employee will result in an unauthorized usage charge and potential delays in future inspections.
- All consumption registering through a construction meter will be subject to the Service Authority's rates, fees, and charges billed on a monthly basis.



Service Authority

Prince William County

New Construction Meter & Final Inspection Policy

- Delinquent payments will be subject to the Service Authority's existing policies and may include removal of the construction meter.

CONSTRUCTION METER REQUEST:

- Construction meter installation requests may be made by either faxing the request to (703) 335-8933, calling the request line at (703) 335-8980 or e-mailing at (utilityservices@pwcsa.org). The Service Authority's goal is to set the construction meter within one (1) business day of the request; however, extenuating circumstances, such as inclement weather, scheduled holidays or high volume workloads may cause delays. There is a limit of 15 installs a day. Requests received will be honored on a first come, first serve basis. Calls received after 2:00 p.m. will be scheduled for the second business day.

GUIDELINES FOR CONSTRUCTION METER INSPECTION/INSTALLATION:

- A 10-foot radius around the meter crotch must be graded so that it is within two-inches of the top of the meter lid and is not a safety hazard.
- The crotch must be free of dirt, water, and debris.
- All materials must be in accordance with the water meter details shown in the USM. This includes the meter box, lid and all internal parts.
- All equipment must be serviceable.
- Orange construction fence or silt fence will be placed around the crotch during the construction phase to protect it from construction traffic. The fence must be maintained throughout the construction phase of the lot until the final inspection is made.
- The meter box must be in its proper location (within one-foot of the property line) or as shown on the approved plans.
- There must be no visible leaks within the crotch at the time of installation of the construction meter.
- Lot numbers or house numbers must be posted and visible from the street. (Spray painting lot numbers or house numbers on silt fence or house will not be accepted).
- The Service Authority reserves the rights to not install a construction meter if any of the aforementioned items are not met. Reinspection fees will be assessed after the first attempt of setting the construction meter and at each subsequent attempt thereafter.
- Once installed, the meter must remain in its original location. Removal of the meter by anyone other than a Service Authority employee will result in an unauthorized usage charge and likely delays in future inspections.

Disclaimer:



NOTICE TO ALL BUILDERS, DEVELOPERS & CONTRACTORS

Effective July 1, 2011 the Service Authority will institute a CCTV return trip fee. The Service Authority performs a CCTV inspection on all gravity sewer mains prior to acceptance by the Service Authority. The builder is responsible for ensuring that the gravity mains are free of debris and gravel to allow the CCTV camera to pass through the mains to complete the inspection.

Occasionally, a CCTV inspection is requested by the builder, but the inspection cannot be performed due to debris and/or gravel in the mains. To recover the Service Authority's remobilization costs, effective July 1, 2011, builders will be charged a CCTV return trip fee if they request a CCTV inspection, but the CCTV crew finds debris and/or gravel in the main that prevents completion of the inspection. The CCTV return trip fee will only be assessed in cases where the sewer mains are not cleaned to allow the CCTV camera to pass through.

The fee shall be as follows:

CCTV Return Trip Fee* - \$600

* All fees are subject to change with associated costs and are posted online at www.pwcsa.org.

Please be advised if the builder is assessed a CCTV return trip fee, the fee must be paid prior to requesting additional CCTV inspections.

Please contact me with any questions you might have.

Sincerely,
Karla Coker,
Utility Services Manager

POLYETHYLENE ENCASEMENT INSTALLATION GUIDE

*Effective, Economical
Protection for
Ductile Iron Pipe
In Corrosive Environments*

**DIPRA
DIPRA
DIPRA
DIPRA®**

For a pocket-size version of this Guide, please contact your local DIPRA Regional Engineer, or visit the DIPRA web site at <http://www.dipra.org> to order your copy.

A STEP-BY-STEP GUIDE FOR INSTALLING POLYETHYLENE ENCASEMENT ON DUCTILE IRON PIPE

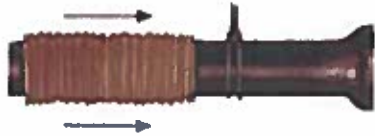
THIS POLYETHYLENE SLEEVE (polywrap) is placed on Ductile Iron pipe to prevent corrosion. It does not have to be sealed watertight, but it should be installed so that no dirt or bedding material comes in contact with the pipe. All lumps of clay, mud, cinders, etc., on the pipe surface should be removed before the pipe is covered with polyethylene. If the polyethylene is damaged, it must be repaired before the trench is backfilled.

Small holes or tears can be repaired with a piece of tape placed over the hole. Large holes or tears should be repaired by taping another piece of polyethylene over the hole.

Overlaps, ends, and repairs can be held in place with tape or plastic tie straps until the trench is backfilled.

Other general tips for proper installation include: • When lifting polywrapped pipe with a backhoe, use a fabric type "sling" or padded cable to protect the polyethylene. • When installing polywrap below the water table or in areas subject to tidal action, seal as thoroughly as possible both ends of each polyethylene tube with adhesive tape or plastic tie straps at the joint overlap. Also, place tape or plastic tie straps around the pipe at two (2) foot intervals. • Quality of installation is more important than the actual sequence followed.

FOLLOW THESE STEPS FOR EASY INSTALLATION



STEP 1

Clean all dirt, cinders, etc., from the surface of the pipe. Cut polyethylene two (2) feet longer than the pipe. Slip polyethylene over spigot end and bunch as shown above.



STEP 2

Dig bell holes at joint locations, lower pipe into trench and make up joint.



STEP 3

Move cable hoist to bell end of pipe and lift enough to slip polyethylene along pipe as shown above.



STEP 4

Pull polyethylene forward from previous joint over the bell and secure in place as shown.

2



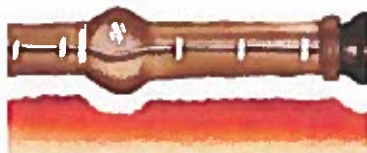
STEP 5

Pull polyethylene from new pipe over this same bell, providing a double layer of polyethylene and secure in place as shown.



STEP 6

Take up slack in the tube along the pipe barrel, making a snug but not tight fit. Fold over on top of pipe and secure in place about every three (3) feet as shown.



STEP 7

Make sure any tears in the polyethylene are repaired with tape or another piece of polyethylene secured over the damaged area.

3



STEP 8

Backfill the trench according to specifications, being careful not to damage the polyethylene while tamping around pipe. Backfill should not contain material that might damage the polyethylene.

Wet Trench Installation



STEP 1

Cut the polyethylene tube two (2) feet longer than pipe and slip over pipe as shown above.



STEP 2

Spread the polyethylene tube as shown so that enough is left to provide a one (1) foot overlap at each end of pipe.



STEP 3

Take up slack in the tube to make a snug but not tight fit and secure every two (2) feet with tape or plastic tie straps completely around the pipe.

4



STEP 4

Lower pipe into trench, being sure that the polywrap is not damaged, and make up joint. Make overlap at joints as shown before. Be sure to secure the ends of the polyethylene with tape or plastic tie straps.

Tapping Polywrapped Pipe

When tapping polywrapped Ductile Iron pipe, the following procedure is recommended.



STEP 1

Wrap two or three layers of tape completely around the pipe where the tapping machine will be placed.



STEP 2

Mount the tapping machine on the taped area and make the tap directly through the tape and polywrap. Install corporation stop.

5



STEP 3

Inspect the entire area for damage and repair if necessary.



STEP 4

Wrap any connected copper service line within three (3) feet of the pipe with polyethylene.

STEP 5

Backfill trench as described before.

Remember: If you have any problems or questions about installing polyethylene encasement, contact DIPRA or one of its member companies.

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DIPRA MEMBER COMPANIES

American Cast Iron Pipe Company
P.O. Box 2727
Birmingham, Alabama 35202-2727

Atlantic States Cast Iron Pipe Company
183 Signatures Street
Phillipsburg, New Jersey 08865-3000

Canada Pipe Company, Ltd.
1757 Burlington Street East
Hamilton, Ontario L8N 3R5 Canada

Clow Water Systems Company
P.O. Box 6001
Coshocton, Ohio 43812-6001

McWane Cast Iron Pipe Company
1201 Vanderbilt Road
Birmingham, Alabama 35234

Pacific States Cast Iron Pipe Company
P.O. Box 1219
Provo, Utah 84603-1219

United States Pipe and Foundry Company
P.O. Box 10406
Birmingham, Alabama 35202-0406

DUCTILE IRON PIPE RESEARCH ASSOCIATION

An association of quality producers dedicated to highest pipe standards through a program of continuing research.
245 Riverchase Parkway East, Suite O
Birmingham, Alabama 35244-1856
Telephone 205 402-8700 FAX 205 402-8730
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Published 12/95
Rev. 2/99



Division of Engineering & Planning
Samer S. Beidas, P.E., CCM, *Director*

NOTICE TO DEVELOPERS

PWCSA STABILIZATION WAIVER

EFFECTIVE NOVEMBER 15, 2014 THE SERVICE AUTHORITY WILL BEGIN A VOLUNTARY PROGRAM AUTHORIZING THE ISSUANCE OF THE "FINAL INSPECTION FOR OCCUPANCY" WITHOUT THE PERMANENT LOT STABILIZATION REQUIREMENT, BASED ON THE FOLLOWING:

- **THE COMMERCIAL AND/OR RESIDENTIAL LOT HAS MET THE SERVICE AUTHORITY'S INSPECTION REQUIREMENTS FOR THE "FINAL INSPECTION FOR OCCUPANCY" WITH THE EXCEPTION OF PERMANENT LOT STABILIZATION (SOD OR GERMINATED GRASS SEED).**
- **THE LOT MUST BE FULLY SEEDED AND STRAWED. IN CASES OF INCLEMENT WEATHER WHERE IT IS NOT FEASIBLE TO ACHIEVE FINAL GRADE, THE SERVICE AUTHORITY STABILIZATION WAIVER WILL ALLOW FOR FINAL OCCUPANCY WITH TEMPORARY STABILIZATION AND ROUGH GRADE.**
- **A NON-REFUNDABLE FEE OF \$490.00 IS PAID TO THE SERVICE AUTHORITY PRIOR TO THE ISSUANCE OF THE "FINAL INSPECTION FOR OCCUPANCY."**

THE STABILIZATION WAIVER PROGRAM IS AVAILABLE YEAR-ROUND AND IS VOLUNTARY.

****PLEASE NOTE: LOTS WITH PERMANENT LOT STABILIZATION AND WHICH HAVE MET ALL THE REQUIREMENTS FOR THE ISSUANCE OF A "FINAL INSPECTION FOR OCCUPANCY" BY RECEIVING APPROVAL FROM A SERVICE AUTHORITY INSPECTOR DO NOT NEED A STABILIZATION WAIVER.**

FOR MORE INFORMATION PLEASE CALL 703-335-7930

Appendix O: New Construction Meter & Final Inspection Guidelines

Refer to the Service Authority's New Construction Meter and Final Inspection Guidelines

by using Control + Click to follow the link

[New Construction Meter & Final Inspection Guidelines](#)

NOTICE TO ALL BUILDERS, DEVELOPERS, CONTRACTORS & HOMEOWNERS

Effective July 1, 2016, the Service Authority will change its policy concerning new construction water meters as follows:

CONSTRUCTION METER CHANGES:

- The Service Authority will no longer permit the use of jumpers in meter pits as a part of its process, but, upon request and approval, will permit the use of a construction meter.
- Prior to the Service Authority installing a construction meter, the builder/developer will be required to call (703) 335-8980, fax to (703) 335-8933 or e-mail to (utilityservices@pwcsa.org) to schedule an appointment with the Service Authority's designated representative to make sure the infrastructure is at a point that it can be placed in service. The Service Authority refers to this as "Beneficial Use Status". Once the inspector has assigned this status to the development and has issued a Beneficial Use Certificate, the builder/developer may start requesting construction meters.
- Construction meters will be installed by the Service Authority upon the request of the builder/developer, providing the meter box meets the minimum requirements in the Utility Standards Manual (USM).
- The builder/developer is responsible for any and all damages to the meter, meter crock and assembly until the final meter inspection is approved.
- Water used for the purpose of building construction, testing, irrigation, or washing exterior of homes, garage floors, driveways and sidewalks (power washing) must be from a metered connection (i.e. construction meter) with no exceptions. Use of a jumper for the purposes stated above is not permitted. Violation of this policy will result in an unauthorized usage charge and possible delays in setting of construction meters and/or final meter inspections.
- Model homes must have final inspection and meter set prior to use.
- Once installed, a construction meter must remain in its original location as it will ultimately become that location's final meter. Removal of the meter by anyone other than a Service Authority employee will result in an unauthorized usage charge and potential delays in future inspections.
- All consumption registering through a construction meter will be subject to the Service Authority's rates, fees, and charges billed on a monthly basis.

- Delinquent payments will be subject to the Service Authority's existing policies and may include removal of the construction meter.

CONSTRUCTION METER REQUEST:

- Construction meter installation requests may be made by either faxing the request to (703) 335-8933, calling the request line at (703) 335-8980 or e-mailing at (utilityservices@pwcsa.org). The Service Authority's goal is to set the construction meter within one (1) business day of the request; however, extenuating circumstances, such as inclement weather, scheduled holidays or high volume workloads may cause delays. There is a limit of 15 installs a day. Requests received will be honored on a first come, first serve basis. Calls received after 2:00 p.m. will be scheduled for the second business day.

GUIDELINES FOR CONSTRUCTION METER INSPECTION/INSTALLATION:

- A 10-foot radius around the meter crock must be graded so that it is within two-inches of the top of the meter lid and is not a safety hazard.
- The crock must be free of dirt, water, and debris.
- All materials must be in accordance with the water meter details shown in the USM. This includes the meter box, lid and all internal parts.
- All equipment must be serviceable.
- Orange construction fence or silt fence will be placed around the crock during the construction phase to protect it from construction traffic. The fence must be maintained throughout the construction phase of the lot until the final inspection is made.
- The meter box must be in its proper location (within one-foot of the property line) or as shown on the approved plans.
- There must be no visible leaks within the crock at the time of installation of the construction meter.
- Lot numbers or house numbers must be posted and visible from the street. (Spray painting lot numbers or house numbers on silt fence or house will not be accepted).
- The Service Authority reserves the rights to not install a construction meter if any of the aforementioned items are not met. Reinspection fees will be assessed after the first attempt of setting the construction meter and at each subsequent attempt thereafter.
- Once installed, the meter must remain in its original location. Removal of the meter by anyone other than a Service Authority employee will result in an unauthorized usage charge and likely delays in future inspections.

FINAL METER INSPECTION:

The Service Authority strongly recommends that the builder/developer plan ahead to avoid delays in this process.

- Final inspection requests may be made by telephone, fax or e-mail to the Engineering Division as previously stated in the construction meter request section. We recommend that the builder/developer call in the inspection request a **minimum** of five (5) working days prior to settlement. This will allow time to correct any deficiencies found during the final inspection.
- The Service Authority will make every effort to perform the final inspection within three (3) working days of the initial call.
- If a construction meter set was not performed prior to the final meter inspection, the inspector will install the meter providing the facilities pass all inspections.
- Once the final inspection is approved, the Service Authority will release the inspection report directly to the builder/developer.
- A failed inspection will be made if the builder/developer is not available when the Inspector shows up to do the inspection. Inspectors will **NOT** make phone calls prior to showing up on site for the inspection. Inspections will be made between the hours of 7:30am and 2:30pm
- There will be a mandatory 48-hour waiting period for reinspections.
- Reinspection fees will be assessed after the first inspection and at each subsequent attempt thereafter. Reinspection fees must be paid prior to the next inspection.

GUIDELINES FOR FINAL INSPECTION FOR OCCUPANCY:***Site Requirements***

1. The yard must be at final grade, completely sodded or seeded providing a stabilization waiver has been paid (Please see stabilization waiver form on page 6). Site must be completely ready for occupancy.

Winter waivers issued by Prince William County are not recognized by the Service Authority.

1. The permanent address number must be posted on the structure (i.e. house or building).

Water Service Requirements

The meter box and assembly must be in accordance with the water meter details shown in the USM. This includes all materials and depth/spacing requirements. The following is an abbreviated list of items checked by the field inspector prior to granting final approval:

- a) The meter box frame and cover is set flush with grade and at the proper elevation. It must be an approved assembly; manufactures tabs on bottom of frame must sit inside the box as designed with frame sitting tightly on box.
- b) Alterations to the meter box are not permitted (i.e. cuts to permit pipe entry or changes to height of box).
- c) The meter box must be clear of water, debris, dirt and gravel (sand or stone dust is permitted but only in the bottom of the box). Under no circumstances is gravel permitted in or under the box.
- d) The meter box must be located within one-foot of the property line or as shown on the approved plans.
- e) The meter yoke and assembly must be centered and level in the box and set to the proper depth.
- f) The meter must be in the yoke assembly at the time of inspection to verify that angle valves are working properly and that there are no visible leaks.

Sanitary Sewer Lateral Requirements

The sanitary sewer lateral is inspected at the same time as the water service. It must be installed in accordance with the details shown in the USM. This includes all materials and grade requirements. The following is an abbreviated list of items checked by the field inspector prior to granting final approval:

- a) Flow through the lateral must be free from obstruction and standing water during the Closed Circuit Television (CCTV) inspection.
- b) Clean-outs, if required to meet Building Officials & Code Administrators National Plumbing (BOCA) requirements, will be cut off to grade so that a lawn mower can easily pass over it without causing damage to the cap.
- c) Adapters located in the yard must be glued to the stack and have a brass cap.
- d) Clean-outs subject to vehicle traffic must be protected as shown in the USM. Clean-out stack height must be adjusted to provide a minimum of one-inch clearance between the top of the clean out cap and the bottom of the 12-inch protector cover.
- e) #12 solid copper, green coated tracer wire must be accessible and complete at the house/building clean-out.
- f) For units served by grinder pumps, the following standards apply:
 - i. Low-pressure force main flushing stations must be set to grade within one-foot of the property line and in accordance with the USM.
 - ii. #12 solid copper green coated tracer wire must be accessible and complete.
 - iii. Flushing stations must be free of water and debris. All valves including the check valve will be in accordance with the USM.

- iv. Service contract agreement information must be clearly displayed on the face of the grinder pump alarm box.

PENALTIES: Violation of the above guidelines and procedures will result in unauthorized usage charges in accordance with prevailing rates but, more importantly, will likely result in delays to the developer/builder for the installation of the construction meter and/or final inspection.

P:\DEVEL\INSP\Tom Robinson\MTRPOLICY2007_070406.doc

4 County Complex Court
P.O. Box 2266
Woodbridge, VA 22195-2266

Phone (703) 335-7930
Fax (703) 335-8933
www.pwcsa.org

Division of Engineering & Planning
Samer S. Beidas, P.E., CCM, *Director*



NOTICE TO DEVELOPERS

PWCSA STABILIZATION WAIVER

EFFECTIVE NOVEMBER 15, 2014 THE SERVICE AUTHORITY WILL BEGIN A **VOLUNTARY** PROGRAM AUTHORIZING THE ISSUANCE OF THE "FINAL INSPECTION FOR OCCUPANCY" WITHOUT THE PERMANENT LOT STABILIZATION REQUIREMENT, BASED ON THE FOLLOWING:

- THE COMMERCIAL AND/OR RESIDENTIAL LOT HAS MET THE SERVICE AUTHORITY'S INSPECTION REQUIREMENTS FOR THE "FINAL INSPECTION FOR OCCUPANCY" WITH THE EXCEPTION OF PERMANENT LOT STABILIZATION (SOD OR GERMINATED GRASS SEED).
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- A NON-REFUNDABLE FEE OF \$490.00 IS PAID TO THE SERVICE AUTHORITY PRIOR TO THE ISSUANCE OF THE "FINAL INSPECTION FOR OCCUPANCY."

THE STABILIZATION WAIVER PROGRAM IS AVAILABLE YEAR-ROUND AND IS VOLUNTARY.

****PLEASE NOTE:** LOTS WITH PERMANENT LOT STABILIZATION AND WHICH HAVE MET ALL THE REQUIREMENTS FOR THE ISSUANCE OF A "FINAL INSPECTION FOR OCCUPANCY" BY RECEIVING APPROVAL FROM A SERVICE AUTHORITY INSPECTOR DO NOT NEED A STABILIZATION WAIVER.

FOR MORE INFORMATION PLEASE CALL 703-335-7930

Appendix P: Sub-Meter Policy

Refer to the Service Authority's Sub-Meter Policy
by using Control + Click to follow the link

[Sub-Meter Policy](#)

	WATER AND SEWER SERVICE POLICIES	<i>EFFECTIVE DATE:</i> 4/04/2017
	<i>POLICY TITLE:</i> SUB-METER POLICY STATEMENT	<i>STARTING SECTION:</i> 411405
		<i>OWNER:</i> Samer Beidas

Article 14. SUB-METER POLICY STATEMENT.

Sections

411405.	Sub-Meter Purpose.
411410.	Sub-Meter Design Criteria.
411415.	Sub-Meter Application Process.
411420.	Superseded.
411425.	Sub-Meter Permits.
411430.	Sub-Meter Installation.
411435.	Sub-Meter Inspection.
411440.	Removed
411445.	Sub-Meter Maintenance.

§ 411405. Sub-Meter Purpose.

The Service Authority will permit the installation of water sub-meters. A water sub-meter is a permanently installed meter that may be used for the purpose of eliminating sewer charges on water consumption that does not enter the sewer system. The submeter separately records the amount of water consumed that does not return to the sanitary sewer system for processing; then the consumption on the water sub-meter is subtracted from consumption on the main water meter to determine the total billable sewer consumption. A water sub-meter is permitted for any customer using large amounts of water for the following reasons:

- (a) Lawn irrigation systems.
- (b) Pools
- (c) Cooling towers.
- (d) Wash racks.
- (e) Car washes.
- (f) Other large water uses not identified above where it can be demonstrated that the water used does not enter the sanitary sewer system.

REVISED APRIL 22, 2009

APPROVED BY THE GENERAL MANAGER

§ 411410. Sub-Meter Design Criteria.

The following minimum criteria must be adhered to when planning for and designing the location of a water sub-meter:

- (a) No cross connections can exist between the water sub-meter and the domestic water system. A cross connection is an illegal connection and requires immediate action be taken by the property owner to rectify. Identification of a cross connection shall result in immediate termination of service to include service disconnect or removal of the meter.

	WATER AND SEWER SERVICE POLICIES		EFFECTIVE DATE: 4/04/2017
	POLICY TITLE: SUB-METER POLICY STATEMENT		STARTING SECTION: 411405
			OWNER: Samer Beidas

- (b) Sub-meter settings will conform to the Service Authority's Utility Standards Manual (USM). All piping and appurtenances with the exception of the meter and meter yoke will conform to the current BOCA National Plumbing Code in effect at the time of installation.
- (c) The requested size of the water sub-meter must be appropriate for the anticipated flow. The Service Authority reserves the right to require the customer to right size the meter, should usage or flow exceed the recommended limits for the existing meter. Right sizing may require replacement of the existing meter with a larger meter and payment of the difference in applicable Developer Charges.
- (d) In order to ensure reliable metering and accurate billing for both the Customer and the Service Authority internal sub-meters will not be permitted regardless of circumstances.
- (e) All sub-meters must be located outside of the building and within 10 feet of the main meter in accordance with current Utility Standards Manual (USM) requirements
- (f) The Service Authority may consider an exception to the distance requirement from the main meter if the proposed plan(s) meets all other Service Authority requirements. The final exterior location of all sub-meters must be approved by the Engineering Division of the Service Authority prior to installation
- (g) Sub-meters must be readily accessible to Service Authority staff during regular business hours.

REVISED APRIL 22, 2009

APPROVED BY THE GENERAL MANAGER

§ 411415. Sub-Meter Application Process.

Applicants must submit a plan for review by the Service Authority's Engineering Division. The following information is required:

- (a) New construction/ development. Sub-meters included in plans submitted through the standard plan review process for new construction or development shall be reviewed as part of the overall plan review process. The following information must be included in the applicants development plan:
 - 1) The location of the proposed sub-meter(s).
 - 2) The purpose of the sub-meter.
 - 3) Calculations confirming the size of the sub-meter
 - 4) If plans are approved, a copy of the approved plans shall be sent from the Service Authority's Engineering Division to the Prince William County Plumbing Department.
- (b) Existing development/accounts. The following information must be submitted to the Service Authority's Engineering Division for plan review if a sub-meter is requested or if information is not included in development plans received through Prince William County.
 - 1) A letter of intent explaining the request for the sub-meter.

	WATER AND SEWER SERVICE POLICIES	<i>EFFECTIVE DATE:</i> 4/04/2017
	<i>POLICY TITLE:</i> SUB-METER POLICY STATEMENT	<i>STARTING SECTION:</i> 411405
		<i>OWNER:</i> Samer Beidas

- 2) Design calculations to justify the size of the sub-meter to include the impact on the main meter.
- 3) One paper copy and one electronic copy of the plan that will identify the existing water system and the location of the proposed sub-meter.
- 4) Failure to meet the design criteria stated above will result in rejected plans.
- 5) Approved plans will be stamped with approval, signed by authorized Service Authority personnel, and returned to the applicant. A copy of the approved plans shall be sent from the Service Authority's Engineering Division to the Prince William County Plumbing Department.

REVISED APRIL 22, 2009

APPROVED BY THE GENERAL MANAGER

§ 411420. Superseded.

§ 411425. Sub-Meter Permits.

The property owner or its agent is responsible for obtaining a Service Authority sub-meter certification, a Prince William County plumbing permit, and any other applicable permits or inspections.

(a) Service Authority sub-meter certification:

- 1) If the plan review is approved, the customer must contact the Service Authority's Utility Services Department to pay all fees associated with a sub-meter (certification) and coordinate meter installation and inspection

(b) Other applicable permits or inspections:

- 1) A Prince William County plumbing permit for the meter installation and back-flow preventer is the responsibility of the property owner.
- 2) Other permits or inspections are the responsibility of the property owner.

REVISED APRIL 22, 2009

APPROVED BY THE GENERAL MANAGER

§ 411430. Sub-Meter Installation and Inspections

1. Sub-meter installation(s) shall not occur prior to the plan review approval, certification, and/or payment of all fees incurred to-date.
2. An approved inspection of all sub-meters is required by the Service Authority to ensure that the sub-meter is properly installed and billing is initiated.
3. Installation and inspection of all sub-meters must be requested through the Utility Services Department. Utility Services shall coordinate sub-meter installations as follows:

	WATER AND SEWER SERVICE POLICIES	<i>EFFECTIVE DATE:</i> 4/04/2017
	<i>POLICY TITLE:</i> SUB-METER POLICY STATEMENT	<i>STARTING SECTION:</i> 411405
		<i>OWNER:</i> Samer Beidas

- a. Provided standard setup, 3/4 x 5/8–inch and 1-inch sub-meters will be delivered, installed, and inspected by the Service Authority's Inspections Department during the same visit.
 - b. 1-1/2-inch and larger sub-meters, as well as non-standard setup for 3/4 x 5/8–inch and 1-inch sub-meters will be installed by the Service Authority's Field Services Department. After successful installation the property owner's is responsible for contacting the Service Authority's Utility Services Department who will then schedule the final inspection.
4. The Utility Services Department shall notify the Billing section of all approved sub-meter inspections to initiate the billing process.

REVISED APRIL 22, 2009

APPROVED BY THE GENERAL MANAGER

§ 411440. Disclaimer for Sub-Meters Located Inside Buildings.

Section Removed.

REVISED APRIL 22, 2009

APPROVED BY THE GENERAL MANAGER

§ 411445. Sub-Meter Maintenance.

All sub-meters are supplied by the Service Authority and are the property of the Service Authority. Maintenance procedures for sub-meters are as follows:

- (a) The property owner is responsible to provide property access as noted in the Owner Responsibilities section of the Customer Handbook. Access to sub-meters is required during normal business hours to perform routine maintenance and confirm readings.
- (b) The Service Authority reserves the right to periodically test sub-meters for accuracy. The Service Authority may at any time remove the meter for testing, repair, and replacement.
- (c) The Service Authority is not responsible for any of the piping; to include the piping between the primary meter and sub-meters or appurtenances associated with the sub-meter. Repairs for all associated problems will be the responsibility of the property owner.
- (d) Sub-meters will be maintained and/or replaced as necessary by the Service Authority. Replacement costs will apply if it is determined by the Service Authority that damage is due to customer negligence or failure to properly maintain piping or appurtenances connected to the sub-meter
- (e) In order for the customer to takes full advantage of reduced sewer charges through the meter reading and billing process, it is the customers responsibility to review sub-meter consumption data on a timely basis and request any inspections, repairs or maintenance as necessary. On an appointment basis, the Service Authority will investigate and/or repair damaged meters. Replacement and repair costs will apply if it is

	WATER AND SEWER SERVICE POLICIES	<i>EFFECTIVE DATE:</i> 4/04/2017
	<i>POLICY TITLE:</i> SUB-METER POLICY STATEMENT	<i>STARTING SECTION:</i> 411405
		<i>OWNER:</i> Samer Beidas

determined by the Service Authority that damage is due to customer negligence or failure to properly maintain piping or appurtenances connected to the sub-meter.

- (f) In the event that the meter reading transmitter is found to be malfunctioning and recording less usage than the meter to which it is connected, there will be no adjustment made to bills already rendered to the customer. The Service Authority will not use submeter readings while the meter is not functioning properly or if access to the meter is denied. The Service Authority will obtain manual readings if possible, but will not estimate consumption on sub-meters. If readings are not able to be obtained, the customer will be responsible to pay full sewer charges.

REVISED APRIL 22, 2009

APPROVED BY THE GENERAL MANAGER

Appendix Q: Facilities Access Agreement

Refer to the Service Authority's Facility Access Agreement

by using Control + Click to follow the link

[Facilities Access Agreement](#)



FACILITIES ACCESS AGREEMENT

THIS FACILITIES ACCESS AGREEMENT (this “Agreement”) is made and entered into as of the date set forth below in Section 1.1.B, by and between the Applicant (as defined in Section 1.1.A) and the Prince William County Service Authority.

Section 1.0. Purpose of this Agreement.

- A. The Applicant has requested access to the following utilities and/or other infrastructure owned and operated by the Authority (the “Facilities”):

Description of affected Facilities	
Address and GPIN of property where affected Facilities are located (the “Property”)	
Describe documents creating Authority interest in the Property, including deed book, plat book, and page numbers	

- B. The access requested under this Agreement is associated with the following plans (“Plans”):

Prince William County Service Authority Plan No.	As revised by: Date approved:
Prince William County Plan No.	As revised by: Date approved:_____

- C. In consideration of the Authority granting a license to the Applicant and its agents and contractors to access the Facilities on the Property, the Applicant agrees to be bound by all terms and conditions provided in this Agreement, including any exhibits attached to this Agreement (“Exhibits”). All Exhibits are in addition to and supplementary to this Agreement and shall be deemed to be operative terms of this Agreement, as if fully set forth herein.

Section 1.1. Applicant; Term; Agency.

- A. The Applicant is as follows, and shall include any of its Agent(s) or contractors:

Company Name:	Point of Contact: Name: Phone Number: Email: Fax:
Address:	Emergency Contact Information: Name: Phone Number: Email: Fax:

- B. The term of this Agreement (the “Term”) shall commence on _____, 20__ (“Commencement Date”). The Term of this Agreement shall expire at midnight, _____ months from the Commencement Date (“Expiration Date”). On the Expiration Date, the license granted to the Applicant hereunder shall automatically expire and be of no further force or effect; provided, however, that such expiration will not affect the Applicant’s obligations pursuant to Sections 2.0.B or 2.0.C.ii of this Agreement.
- C. If the Applicant is represented by an agent in making this Agreement (“Agent”), the Agent is as follows (include additional sheets if there is more than one Agent), and the Power of Attorney Form, as set forth in Exhibit A, shall be completed by the Applicant and returned to the Authority before entering into this Agreement:

Company Name:	Point of Contact: Name: Phone Number: Email: Fax:
Address:	Emergency Contact Information: Name: Phone Number: Email: Fax:

Section 2.0. Standard Terms and Conditions of this Agreement.

A. By signing and delivering this Agreement to the Authority, the Applicant acknowledges it has read this Agreement and agrees to be bound by all terms and conditions set forth herein, including in any Exhibits.

B. General Conditions

- i. The Applicant shall perform any construction activities (including any construction activities affecting the Facilities) (the “Work”) in substantial conformance with the Plans and in accordance with the requirements of the Authority’s Utility Standards Manual. All Work shall be performed in a safe and workmanlike manner and in conformance with general standards for commercial construction activity in Northern Virginia. The Applicant shall perform the Work at no cost to the Authority, and the Applicant shall be responsible for obtaining all necessary federal, state, and/or local permits required to perform the Work.
- ii. The Applicant may access the Facilities between the hours of ____ A.M and ____ P.M., **Monday through Sunday**; provided, however, that throughout the Work, the Applicant shall provide and the Authority shall retain the ability to access the Facilities at all times for purposes of inspection, maintenance, repairs, and other similar purposes.
- iii. The Applicant will provide the Authority with notice of its intent to access the Facilities at least 48 hours in advance.
- iv. The Applicant shall be liable, at its sole cost and expense, for any bodily injury, death, personal injury, and property damage (including damage to the Property, the Facilities, or other Authority property, real or personal) to the Authority and/or any third party arising from or in any way relating to the Work and attributable to the Applicant’s negligence, gross negligence, or willful misconduct. This Section 2.0.B.v is subject to the indemnity provision of Section 2.0.C.ii of this Agreement.
- v. Throughout the Work, the Applicant shall maintain the integrity, safety, and security of the Facilities and the Property. The Applicant shall install or maintain fencing or such other security measures as the parties agree to in writing.
- vi. Any damage to or degradation of the Facilities arising from or relating to the Work shall be immediately reported to the Authority, but not more than 24 hours after such damage or degradation occurs. If, at the Authority’s sole determination, such damage or degradation threatens the integrity, safety, working condition, or security of the Facilities, the Applicant will immediately cease the Work and the Authority will have immediate access to the Facilities to make necessary repairs or restoration of the Facilities. The Applicant shall be liable to the Authority for the cost and expense of such repairs or restoration where they

are attributable to the Applicant's negligence, gross negligence, or willful misconduct.

- vii. The Applicant shall, at its sole cost and expense and upon completion of the Work, restore, as nearly as practicable, to their original condition the Property and any land or premises included within or adjoining the Property which are disturbed in any manner during the Work. Such restoration shall include, but shall not necessarily be limited to, (i) the backfilling of trenches, (ii) repaving, (iii) replacement of fences or other security measures for the Facilities, (iv) the reseedling or resodding of lawns or pasture areas, and (v) the replacement of trees, flowers, shrubbery, vegetable plants, structures and other similar features. The Applicant shall be responsible for any settlement of all backfill or repaving for a period of two (2) years after the Expiration Date.

C. Insurance and Indemnity

- i. Prior to commencing the Work, the Applicant shall secure, and shall maintain throughout the Term of this Agreement, commercial general liability insurance coverage (including bodily injury, death, personal injury, and property damage) in an amount not less than One Million and 00/100 Dollars (\$1,000,000.00) per occurrence and One Million and 00/100 Dollars (\$1,000,000.00) in the aggregate. The Authority shall be named as an additional insured in all such insurance policies and such insurance shall provide coverage for the Applicant's liabilities under this Agreement. The Applicant shall provide the Authority with proof of insurance within five (5) business days of obtaining the same, and shall provide proof of insurance to the Authority annually thereafter by the second Monday in January.
- ii. Except to the extent of the Authority's negligence, and to the extent permitted by Virginia law, Applicant hereby agrees to release, indemnify, defend, and hold harmless the Authority from and against all debts, obligations, losses, costs, promises, covenants, agreements, contracts, endorsements, bonds, controversies, suits, actions, causes of action, rights, obligations, liabilities, judgments, damages, expenses, claims, counterclaims, cross-claims, or demands, in law or equity, and liabilities of every kind whatsoever, including, without limitation, reasonable attorney's fees and costs, whether sounding in tort, contract, statute, or otherwise, arising from or in any way relating to the Work.

D. Miscellaneous

- i. It is not the purpose or the intention of this Agreement to create a joint venture, partnership, or other relationship whereby either party shall be liable for the commissions, omissions, or performance of the other party, and it shall not be so construed.

- ii. The Applicant may not assign its obligations under this Agreement to any third party who is not an Agent or contractor of the Applicant (“Assignee”) without the prior written consent of the Authority. As part of any request to assign this Agreement to any Assignee, the Applicant shall obtain and deliver to the Authority the Assignee’s written consent to and agreement to be bound by all terms and conditions of this Agreement (“Assignee Consent”). The Authority shall not be obligated to consider any request by the Applicant to assign this Agreement until the Authority receives the Assignee Consent and proof of insurance as required by this Agreement.
- iii. Notwithstanding anything in Section 1.1.B to the contrary, the license granted to the Applicant under this Agreement shall automatically expire upon any of the following events occurring; provided, however, that such expiration will not affect the Applicant’s obligations pursuant to Sections 2.0.B or 2.0.C.ii of this Agreement:
 - a. The Applicant does not commence the Work within _____ months of the Commencement Date;
 - b. The Applicant fails to secure or maintain the insurance required by Section 2.0.C.i of this Agreement;
 - c. The Applicant fails to cure a violation of this Agreement within ten (10) business days of receiving written notice from the Authority of such violation;
 - d. The Applicant assigns this Agreement without complying with Section 2.0.D.ii of this Agreement; or
 - e. The Applicant completes the Work and fulfills all terms and conditions of this Agreement prior to Expiration Date.
- iv. Each provision of this Agreement shall be considered separate, and if for any reason any provision or provisions herein is/are determined to be invalid under any existing or future law, such invalidity shall not impair the operation of or affect those portions of this Agreement which are valid.
- v. The venue for any suit involving this Agreement shall be in the Circuit Court for the County of Prince William or (if appropriate) in the Federal District Court for the Eastern District of Virginia. Each party hereby irrevocably submits to personal jurisdiction of such court.
- vi. This Agreement constitutes the entire agreement among the parties hereto with respect to the subject matter hereof, and it supersedes all prior oral or written agreements, commitments or understandings with respect to the matters provided for herein. This Agreement may be executed in counterparts, each of which shall

be deemed an original, but all of which shall constitute one and the same instrument. This Agreement shall be construed and enforced in accordance with the laws of the Commonwealth of Virginia.

Section 2.1. Additional Terms and Conditions of this Agreement.

Check one of the following options as applicable:

- A. _____. The parties agree additional terms and conditions are required in order to provide the access requested by the Applicant under this Agreement and in furtherance of the Plans. In addition to the terms and conditions set forth in Section 2.0 of this Agreement, the Applicant agrees to be bound by all terms and conditions set forth in Exhibit B.

- B. _____. The parties agree additional terms and conditions are not required in order to provide the access requested by the Applicant under this Agreement and in furtherance of the Plans.

SIGNATURES APPEAR BELOW:

_____, a _____ By: _____ Name: _____ Title: _____ Date: _____	PRINCE WILLIAM COUNTY SERVICE AUTHORITY, a body politic and corporate By: _____ Name: _____ Title: _____ Date: _____

EXHIBIT A
POWER OF ATTORNEY FORM

This _____ day of _____, _____,

I _____, the _____ of

_____, a _____ do hereby make, constitute, and

appoint _____, my true and lawful attorney-in-fact, and in my name,

place and stead giving unto said attorney-in-fact full power and authority to do and perform all

acts and make all representations necessary, without any limitation whatsoever, to enter into that

certain Facilities Access Agreement by and between myself, as Applicant, and the Prince

William County Service Authority. The authority granted herein may only be revoked by a

written statement delivered to the Prince William County Service Authority.

WITNESS the following signatures and seals

_____, a _____
By: _____(SEAL)

Name:

Title:

STATE/Commonwealth of _____

CITY/COUNTY OF _____, to wit:

I, the undersigned Notary Public of and for the jurisdiction aforesaid, do hereby certify that _____, as _____ of _____, whose name is signed to the foregoing Power of Attorney Form, has this date appeared before me, and acknowledged the same.

Given under my hand this _____ day of _____, 2017.

Notary Public

My Commission Expires: _____

EXHIBIT B
ADDITIONAL TERMS AND CONDITIONS
PURSUANT TO SECTION 2.1 OF THIS AGREEMENT

Appendix R: Development Review Process and System Improvement Policy

Refer to the Service Authority's Development Review Process and System Improvement Policy
by using Control + Click to follow the link

[Development Review Process and System Improvement Policy](#)

	Water and Sewer Service Policies	<i>EFFECTIVE DATE:</i> April 13, 2017
	<i>POLICY TITLE:</i> Development Review Process and System Improvement Policy	<i>STARTING SECTION:</i> 41100
		<i>OWNER:</i> Director of Engineering & Planning

Division IV Chapter 1

Article 15. Development Review Process and System Improvement Policy.

Sections.

- 411500. Purpose.
- 411505. Definitions.
- 411510. General Policy Statements.
- 411515. By-Right Development Plan Review.
- 411520. Land Use Entitlement Application Review.
- 411525. Administration.

§ 411500. Purpose.

The following policy outlines the Development Review Process and System Improvement Policy of the Prince William County Service Authority (the “Service Authority”). This policy establishes an applicant’s responsibilities for water and sewer infrastructure associated with a proposed development.

§ 411505. Definitions.

Applicant	Property Owner or designated agent.
Board of Directors	The Board of Directors of the Service Authority.
Board of Supervisors	The Board of County Supervisors of Prince William County, Virginia.
By-Right Development	A development project where a property is developed in accordance with its current zoning designation within PWC or a Town.
CIP	Service Authority’s Capital Improvements Program.
Conditional By-Right Development	A development project where a property is developed in accordance with a change in its zoning designation within PWC or a Town.

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DCSM	Prince William County Design and Construction Standards Manual.
Development Department	A Department in the Division of Engineering and Planning within the Service Authority responsible for the review and approval of Project Plans.
Development Manager	The Development Department Manager of the Service Authority.
Development Policy	This Development Review Process and System Improvement Policy of the Service Authority.
Director	The Director of Engineering and Planning of the Service Authority.
General Manager	General Manager of the Service Authority.
Land Use Entitlement	Requests submitted to the PWC Planning & Zoning Office or the appropriate Town Agency by applicants to change, modify or amend current zoning designations or development requirements for parcel(s) of land for the specific purpose of developing those parcels.
Performance Standards	The minimum design criteria determined by the Service Authority during review of Project Plans which include Utility Standards Manual design requirements, water quality (.5 m/l minimum chlorine residual, looping and minimizing dead-ends), water pressure (30 psi or greater at the main) and water quantity (maximum day demand and fire flow) while maximizing system effectiveness, efficiency, maintainability and customer satisfaction.
Plan Review Process	The review and approval of proposed water and sewer infrastructure that are included in Project Plans by the Development Department of the Service Authority.

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Planning Department

A Department in the Division of Engineering and Planning within the Service Authority responsible for the review of Land Use Entitlement Applications.

Planning Manager

The Planning Department Manager of the Service Authority.

Project Plans

The site plan, subdivision plan, or public improvement plan containing the design and specifications for water and sewer systems.

PWC (or County)

Prince William County.

SA (or Service Authority)

Prince William County Service Authority.

Service Authority System

The Service Authority utility system including water and/or wastewater treatment facilities, water transmission mains, sewer interceptors, collection and distribution mains, storage tanks, reservoirs, and pumping stations.

System Improvements

Service connection improvements determined by the Service Authority in addition to minimum Performance Standards required for Project Plans in order to increase the hydraulic characteristics of the water or sewer system to serve future anticipated customers, strengthen the utility system, improve reliability and redundancy, and provide better overall customer service. These improvements include but are not limited to: pipeline oversizing, loop closures, multiple feeds, pumping stations, easement dedications for future tanks, control vaults and pipeline extensions. Improvement projects have generally been previously identified in the County's Comprehensive Plan, Town Comprehensive Plan, the Service Authority's Capital Improvement Program, Preliminary Engineering Reports or Studies, or operational observations and recommendations.

USM

Prince William County Service Authority Utility Standards Manual.

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§ 411510. General Policy Statements.

The Service Authority was created by a resolution of the Board of County Supervisors (BOCS) on January 11, 1983. The Service Authority is chartered by the State Corporation Commission and is an independent public body responsible for providing a comprehensive county-wide water and sewer system. The Board of Directors of the Service Authority is appointed by the Board of County Supervisors. The Board of Directors appoints the General Manager, who is responsible for the daily management of the Service Authority.

The Board of Directors has delegated the authority to administer the Service Authority System to the General Manager or his/her designated staff. This Development Policy, along with the Customer Service Handbook, the USM, the Service Connection Policy, the Master Plan Utility Adjustment Policy, the Low Pressure Force Main and Grinder Pump Policy, Board of Directors-adopted Rate Policy and other related Policies and Procedures, constitutes the policies and procedures to be used by individuals, companies and developers to plan for and connect to the SA Utility System.

The authority to administer the Development Review Process and regulations is delegated by the General Manager of the Service Authority to the Director of Engineering and Planning. This Development Review Process and System Improvement Policy complement the USM and shall be used to interpret the intent of the Service Authority and applied consistently to all applicants.

As all connections to the SA Utility System impact the operations of the system, the review of all development applications and Project Plans is based on meeting the Service Authority's Water and Wastewater Performance Standards and any planned System Improvements, and not solely the local Performance Standards needed for the Project Plans. Service Authority comments and requirements related to development applications and Project Plans will serve to strengthen and enhance the overall utility system.

In order to approve Project Plans, the Service Authority shall establish Applicant contributions and/or improvements needed to meet Performance Standards and System Improvements necessary for the proposed development to offset its impact and become an integral part of the existing and future Service Authority System.

§ 411515. By-Right Development Plan Review.

- A. A By-Right Development project is developed in accordance with the property's current zoning designation. By-Right Development Project Plans are submitted directly to the County's Land Development Office or appropriate Town Agency without prior review and approval from the County Planning & Zoning Office, Planning Commission, Board

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of Supervisors, or the respective Town process.

- B. The review of an Applicant's By-Right Project Plans by the Service Authority's Development Department focuses on the proposed configuration of water and sewer mains and connections to the existing Service Authority System to ensure that the design incorporates necessary Performance Standards and System Improvements and meets all DCSM and USM requirements, applicable regulatory requirements, applicable Service Authority Policies and Standards and local Performance Standards.
- C. Upon Project Plan referral from PWC or a Town, the Service Authority's Development Department shall review the current Service Authority CIP, Prince William County Comprehensive Plan or Town Comprehensive Plan, and internal files, and will consult with other departments and divisions as necessary to determine if a Service Authority System Improvement has been identified on or near the subject site.
- D. The Applicant shall provide all funding, land, easements, design, construction, equipment and material for the assets (both onsite and offsite) necessary to serve the proposed development, including provisions for adequate fire protection. The required System Improvements to be constructed by the Applicant shall be determined by the Director of Engineering and Planning or his/her designated representative, in accordance with System Performance Standards and requirements outlined in the USM and Service Authority Policies.
- E. In the case where the Service Authority has identified a future planned asset to be located on or through the subject parcel, the Applicant shall dedicate the easements and/or transfer of land ownership to the Service Authority.
- F. When improvements beyond those needed to support the proposed development are identified as being required by the Service Authority, the Service Authority and Applicant will enter into an agreement to reimburse the Applicant the incremental cost apportionment for the additional required facilities.

§ 411520. Land Use Entitlement Application Review.

- A. Land Use Entitlement applications are requests submitted to PWC's Planning & Zoning Office or the appropriate Town Agency by applicants to change, modify or amend current zoning designations or development requirements for parcel(s) of land for the specific purpose of developing those parcels. Applications are generally classified as rezoning, special use permits, special exceptions, proffer amendments or comprehensive plan

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amendments. These applications must be reviewed by various state and local agencies, including the Service Authority, for comments to identify applicant proffer requirements, or development conditions, as applicable, among others, with final approval by the Board of County Supervisors or Town Council prior to submission of a formal Project Plan.

- B. The Planning Department reviews Land Use Entitlement applications and identifies if System Improvements are to be constructed in conjunction with the proposed development (the Service Authority CIP or Master Plan, Prince William County Comprehensive Plan, Town Comprehensive Plan or other document). The Service Authority's comments on the Land Use Entitlement application will include a statement that the Applicant shall design the System Improvement and contribute a pro-rata share up to one hundred percent of the construction costs of the System Improvements which will be determined during the project plan review process.
- C. The Applicant's obligations and responsibilities during the project plan review process, as outlined in the USM and Customer Handbook, are separate from, and in addition to, those obligations and conditions identified in the land use entitlement process.
- D. In the case where the Service Authority has identified a future planned asset to be located on or through the subject parcel, the applicant shall dedicate the required easements and/or transfer of land ownership to the Service Authority at no charge.
- E. The Applicant shall provide all funding, land, easements, design, construction, equipment and material for the assets (both onsite and offsite) necessary to serve the proposed development, including provisions for adequate fire protection. The required System Improvements to be constructed by the Applicant shall be determined by the Director of Engineering and Planning or his/her designated representative, in accordance with System Performance Standards and requirements outlined in the USM, Service Authority policies and this Development Policy.
- F. When improvements beyond those needed to support the proposed development are identified as being required by the Service Authority, the Service Authority and Applicant will enter into an agreement to reimburse the Applicant the incremental cost apportionment for the additional required facilities.

§ 411525. Administration.

- A. The Service Authority Board of Directors may amend this policy in accordance with the following:

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1. After 30-day notice of changes posted on the Service Authority's web site.
2. Immediately if any portion of the policy is determined to conflict with the Code of Virginia or Prince William County ordinances.

- B. The Service Authority's Director of Engineering and Planning shall maintain the policy and be responsible for review and providing recommended updates through the General Manager to the Service Authority Board of Directors for approval.
- C. In order to maintain smooth day-to-day operations and avoid administrative delays, the General Manager shall implement any procedures necessary and make interpretations necessary to enforce the policy.

ADOPTED: April 13, 2017

RESOLUTION: 17-04-26

REVISED: December 14, 2018

APPROVED BY GENERAL MANAGER