



WATER METER
DESIGN GUIDELINES
AND
SUPPLEMENTARY SPECIFICATIONS

January 2023

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1. GENERAL INFORMATION

1.1 Introduction

This document outlines the *City's* requirements for the installation of water meters on municipal water services, pursuant to Waterworks Bylaw No. 3325.

1.2 Content and Intent

This document is divided into four separate parts:

Introduction – which outlines the purpose of this document, defines key terms, and outlines the responsibilities of each party.

Design Guidelines – which are intended to provide direction to the *Applicant* and *Applicant's Engineer* on the elements that need to be considered in the design of new water meter installations.

Supplementary Specifications – which are intended to provide direction to the *Applicant* and *Applicant's Engineer* regarding approved products, materials, and other specifications that must be incorporated into the design of the new water service and water meter.

Appendices – which provide reference material including a water meter sizing calculation sheet and standard water meter installation drawings.

1.3 Definitions

Applicant Refers to a property *Owner* or their authorized agent who makes an application for a water service connection.

Applicant's Engineer Refers to a professional engineer engaged by the *Applicant* to design the water service connection and water meter assembly.

ASTM Stands for the American Society for Testing and Materials.

AWWA Stands for the American Water Works Association.

City	Refers to the <i>City</i> of Burnaby.
CSA	Stands for the Canadian Standards Association.
FM	Stands for Factory Mutual.
NFPA	Stands for National Fire Protection Association.
Owner	Means the property <i>Owner</i> as defined in the <i>City</i> of Burnaby Waterworks Bylaw No. 3325.
ULC	Stands for Underwriters Laboratory of Canada.

1.4 Responsibilities

The *City* of Burnaby Bylaw No. 3325 outlines billing meter requirements for specific property types and land uses.

The *Applicant* or *Applicant's Engineer* is responsible for determination of the appropriate size and type of water billing meter as well as the design of the complete meter assembly, in accordance with City requirements. The water meter assembly designs must be submitted to the City, for approved, prior to initiation of any on-site works associated with the water service and meter installation.

Where required, water services will be installed by the *City*, at the *Applicant's* expense, to within one metre of the property line, or otherwise at the City's discretion. Specified water meters are supplied by the *City*, at the *Applicant's* expense.

An *Applicant* may apply for a separate water service for use during construction. Construction services shall be equipped with an approved water meter and double check valve (backflow prevention) device, installed in accordance with City of Burnaby Bylaw No. 6335. The *Applicant* shall apply for a *Plumbing Permit* associated with the *backflow device* and *meter assembly* installation.

Construction services may be billed "flat-rate" for installations 50mm and smaller. Larger services (75mm and up) may be equipped with approved backflow prevention and meter. Water for construction purposes shall not be obtained from a City fire hydrant.

1.5 Timing

Water services are installed by City forces in order of priority, based on the date of application and site readiness. Upon receipt of an application, the *City (meter shop)* will advise the *Applicant* of a tentative date for the water service installation and meter supply. The *Applicant* shall allow sufficient lead time (up to four months) for delivery from specific meter equipment manufacturers.

The *Applicant* shall ensure site readiness and maintain meter assembly locations clear and unobstructed for access by City forces at all times.

The water service shall not be activated until the private plumbing system has been approved by the City Plumbing Inspector and provisions for metering are in place and inspected.

1.6 Disclaimer (Reliance of Water Supply)

The *City* does not guarantee a stable pressure nor continuous supply of water, and cannot accept responsibility for fluctuations in pressures experienced at any connection point. The *City* reserves the right at any and all times, without notice, to disrupt water service for the purpose of making repairs, extensions, alterations, or improvements, or for any other reason, and to increase or reduce pressure to an area for design or operational reasons. Customers who depend upon a continuous, uninterrupted supply of water or having processes or equipment that require specific water needs shall provide such emergency storage, piping, pumps, tanks, filters, pressure regulators, additional service pipes or other means of their own for a continuous and adequate supply of water suitable for their specific requirements. Should a long term change of pressure occur within an area for design or operational reasons, the customer (*Applicant*) shall be responsible for and bear all costs associated with making any changes necessary to regulate supply pressure for their use.

The *Applicant* agrees to save harmless the *City* from any legal actions or claims of any kind and description of what-so-ever against it for or on account of any damage or injury to persons or property because of water service fluctuations, or water meter installations, etc.

The *Applicant* remains responsible for any damage to the meter, meter setter or assembly, including valves and fittings, throughout the life-time of the installation. Contact the *City* regarding changes or repairs to the meter assembly.

2. DESIGN GUIDELINES

2.1 Meter Sizing

Meters for domestic water use shall be sized in accordance with *AWWA Manual of Water Supply Practices M22 Sizing Water Service Lines and Meters* taking into account specific requirements outlined in the meter sizing calculation sheet included in **Appendix A**. Note; this sizing methodology is based on the *AWWA fixture value* method, and not the *fixture unit* method employed by the BC Building Code.

The meter size selection should not compromise the operating range or the long term life of the meter itself, nor adversely impact water pressures supplied to the property. In this same regard, the sizing analysis should be sufficiently thorough to avoid unnecessarily over-sizing the meter. In some instances, this may result in a smaller meter than the existing water service size. Note; newer meter technologies no longer derate maximum continuous flow to 50% but still incur a headloss.

For developments that are to be phased, the meter assembly shall be sized to accommodate the meter required for the ultimate build-out of the development. However, an initial meter installation may be sized to accurately capture the range of anticipated flows for a current phase of development.

Fire service meters shall be sized based on Fire Underwriters Survey requirements for on-site fire hydrants and NFPA standards for sprinkler systems.

2.2 Meter Selection

2.2.1. Industrial / Commercial / Institutional Services

Water meters that are approved for use in the *City* are listed in Section 3.1.1 of the Supplementary Specifications.

Unless otherwise approved by the *City*, typically, a single meter for water use is to be installed per property. No water can be sold or conveyed beyond the property served either below or above grade. If the *Owner* intends to subdivide the property

in the future, the private water system should be designed such that the internal plumbing between subdivisions can be isolated and supplied by separate water service connections and meters, at the discretion of the *City*.

2.2.2. Dedicated Fire Services

All dedicated fire services must be equipped with a FM approved / ULC listed double check detector valve assembly to detect unauthorized water use. The remote receptacle for a “tattle tale” meter must be mounted such that it is accessible for the meter reader and *City* staff, at all times. All double check detector valve assemblies shall be factory supplied and installed as a complete unit.

2.2.3. Combined Fire & Domestic Services

Unless otherwise approved, where the *Applicant* proposes a combined fire and domestic service, a FM approved / ULC listed water meter and backflow prevention device assembly shall be installed at the property line. Fire service meters currently approved for use are listed *Section 3.1 Water Meters*.

2.2.4. Private Fire Hydrants

A service to supply a fire hydrant located on private property must be equipped with a FM approved / ULC listed double check detector valve assembly in the case of a dedicated fire service, or a FM approved / ULC listed water meter and backflow prevention device assembly in the case of a combined fire and domestic service.

Where water usage other than fire fighting through an onsite private hydrant is anticipated (i.e., flushing, bulk supply) a full sized water meter must be used.

2.2.5 Mixed Use Developments

Comprehensive developments, including mixed use commercial and residential, shall have approved meter boxes, chambers or onsite mechanical rooms sized to accommodate metering of both the proposed commercial consumption and “monitoring” of domestic water usage within the property.

The *Applicant* shall prepare and submit a documented “*Metering Strategy*” that outlines how all metering of the development shall be achieved.

2.3 Meter Locations

2.3.1. Preferred Locations

Meter locations are subject to approval of *City* (meter shop) staff. Ideally, all meter layout shall be per BBY-WM1. Typically, larger meters shall be located just inside the property line while smaller meters may be located in the City boulevard.

With prior permission of City staff, meters may be located inside a building mechanical room, particularly where “zero lot line” development is anticipated. All inside installations shall be completely accessible by City personnel, at all times. The Applicant shall provide contact information to City (meter shop) staff regarding ongoing arrangements for access for purposes of conducting meter maintenance and service. Access agreements shall be filed with the City.

2.3.2. Inside Meters (Mechanical room)

The distance from the floor level to pipe centre of the water meter setting shall not exceed 1 metre.

The meter shall be located close to the wall through which the water service enters the building with no more than 2 metres of pipe between the entry point and the meter, unless otherwise approved by City (meter shop) staff. The complete meter assembly shall be restrained in accordance with good engineering practice.

A minimum working area of 1 metre x 1 metre horizontal immediately adjacent to the meter, as well as a 1 metre vertical clearance, shall remain free of obstruction to allow for convenient servicing or testing of the meter by City staff, at all times.

The meter should be located within a reasonable distance of a floor drain. The floor drain should be adequately sized to accept the flows associated with meter testing and servicing.

The Meter must not be installed within proximity to any sources of unreasonable heat, cold and any and all types of corrosive materials.

If a meter is to be installed in any location where it may be subjected to any source of unreasonable heat, cold and any corrosive materials it must have prior approval from the City forces and be adequately protect from such.

No electronic, electrical, mechanical, or other water-sensitive equipment should be placed or installed under the meter assembly, or in an area where splash or flow from the meter assembly could occur during onsite servicing or testing of the meter.

2.3.3. Outside Meters (Chambers or box)

Outside meter boxes and chambers to be bedded on 100mm of compacted crush granular (or road base) material. Set top of meter box or chamber flush with final lot grade, with surface area surrounding the installation to promote surface drainage away from meter chamber or box, access point. Depth down to top of meter register to be 450mm minimum, 600mm maximum, deeper where access into a chamber is provided.

An area of at least 1 metre horizontal surrounding the meter box or chamber should be free of major landscaping or obstructions to provide ongoing access for meter maintenance or testing. Meter boxes or chambers shall be installed in areas with little or no possibility of vehicular traffic, either moving or parked, at the time of installation or under future conditions. Where this is not possible, or unknown, meter chambers shall be designed to accommodate vehicle traffic (H-20) loading.

Where subject to freezing, equip meter box or chamber, on the under-side of the lid or hatch, with rigid insulation.

2.4 Meter Configuration

Minimum depth from top of meter box to top of register to be 450mm; maximum 600mm, unless otherwise approved. Meters shall be installed horizontally with register faces oriented (upwards) vertically for easy viewing.

Straight pipe lengths upstream and downstream of the meter (including the presence of bypass tees, isolation valves, reducers, and any other fittings) shall comply with manufacturer's recommendations for optimal meter accuracy. Typically, valves and fittings shall be spaced a minimum of three (3) pipe diameters up-stream of the meter.

Meters, strainers, valves, bypasses and associated piping or fittings shall be supported by appropriate pipe stands or anchors, to fully restrain against movement, or hydraulic thrust, even if the meter is removed for service. A restraint coupling must be provided on the downstream side of the meter to provide flexibility for meter removal or replacement.

2.4.1. Isolation Valves

Isolation valves must be provided upstream and downstream of the meter assembly to facilitate testing or removal of the water meter and strainer. Valves shall comply with the requirements stated in Section 3.7. The use of butterfly valves on positive displacement style meter installations are prohibited. If a butterfly valve is used it must be a flanged non wafer style.

Isolation valves are typically installed outside the meter box or chamber for 50mm or smaller. Larger installations may have both, outside and inside isolations, to WorkSafe requirements (double-block-and-bleed).

2.4.2. Reducers

Any reduction in the size of the incoming or outgoing water service connection must occur between the isolation valves and within the box, chamber or approved mechanical room installation. Reducers to be eccentric type, with deviation on the bottom. If a reduction in water service size is proposed, the isolation valve spacing must be sufficient to accommodate a meter that is the same size as the service connection. Typically, all piping, valves and fittings and meters shall remain full size.

2.4.3. Bypasses

Bypasses are required for all meters larger than 50mm.

For designated domestic services, the bypass shall be no less than half the size of the meter or service connection. For a combined fire and domestic service meter, a bypass equal to one size smaller is required. For a designated fire service, a full size bypass shall be provided.

All bypass valves must be equipped with a lock wing on both the operating nut and case. After testing the installation, the bypass valve shall be closed and sealed by the installer.

Pressure reducing valves (PRVs) must be located downstream of the meter assembly. PRVs are not to be installed on the bypass piping around the meter assembly.

For meters located inside building mechanical rooms, the bypass should be located above the meter, in clear sight for inspection. Bypasses offset horizontally from the meter shall be avoided.

For meters located outside, the bypass piping and valve must be within the same box or chamber as the meter.

2.4.4. Test Ports

Test ports must be provided for all meters larger than 50 mm. In the absence of a test port on the meter case, a test tee must be installed with a 50 mm threaded lateral and plug at a distance of three pipe diameters downstream of the meter. Consult with City (Meter shop) staff for further detail.

2.4.5. Setters

All 50mm meters or smaller, located in exterior meter boxes, shall be installed on a setter. Re-setters shall only be installed when approved by the City.

All setters, with meter installed, shall include a full port inlet ball valve and full port dual check valve outlet.

2.4.6. Strainers

Strainers are not typically required for full-port, ultrasonic meters. However, where required, strainers shall be installed immediately upstream of the meter using flanged connections. For meters not supplied inclusive of a strainer, the strainer shall be installed as per manufacturer's specifications. Sufficient area must be provided to drain, inspect, and clean the strainer.

2.4.7. Remote Receptacles

The meter setup shall include conduit and wiring, installed and fully labelled. Wall mounted remote receptacles must be located 1.2 metres to 1.8 metres above floor level and easily accessible for reading. The three wires from the meter to the receptacle must be installed in accordance with the manufacturer's instructions. The cable must run neatly in horizontal or vertical directions only, in an approved casing or duct. Any penetrations through the building wall to facilitate remote receptacle mounting shall be sealed with sealing compound. Where possible,

remote receptacles should be located with an unobstructed view of the sky to facilitate radio communications. Lanes and areas adjacent to large high rises will have to have prior approval from the City.

For outside meters installed at property line, remote receptacles must be mounted to the meter box or chamber lid according to the manufacturer's instructions. Receptacles must be provided with at least 1.8 metres of 22 gauge, three-colour (red, green, black) wire connected and sealed at the receptacle without terminal exposure. Remote wiring connections must be either factory or field sealed to ensure that the connection is waterproof.

Compound meters with two registers must have a separate remote receptacle mounted to the box or chamber lid or wall for each register. Services with multiple meter installations shall have receptacles mounted in such a manner to be in close proximity to each other and with sufficient room for associated radio units.

2.4.8. Chambers

The *Applicant* is responsible for selecting the appropriate meter box or chamber for a given application that satisfies the *City's* requirements, including specifications noted in Section 3.9, Meter Chambers.

Chamber lids / hatches shall be large enough to facilitate installation or replacement of the complete meter assembly including meter(s), strainer, and isolation valves. Manhole lids are not acceptable.

The minimum distance between the inside chamber walls and outside edges of pipe shall be 300 mm to provide sufficient space for maintenance. At least 600 mm separation shall be provided between the water service line and bypass. All internal piping shall be supported using appropriate and adjustable pipe supports.

All below ground chambers for meters 50 mm and larger shall be made water-tight and include a drain connected to the *City's* sanitary sewer or stormwater collection system (with de-chloronation). Where a gravity connection is not available, the *City* may accept a chamber with electric sump pump installed.

2.5 Applicant Submissions

An *Applicant's* submission to the *City* for a new water service / meter design shall include sufficient detail to support the proposed water meter assembly including:

- Anticipated flow rate and water service size;
- Meter size supported by water demand calculations, per Appendix A;
- Meter type, manufacturer, and model, accepted by the *City*;
- Meter location relevant to property line and building footprint indicated on a site plan (1:500 scale);
- Meter chamber or mechanical room layout indicated on a detail drawing (1:250 scale);
- Discharge location and details associated with chamber drain;
- Land use and approved zoning;
- Presence of on-site fire hydrants or fire sprinkler systems;
- Presence of irrigation systems;
- Future development phases for the property, with anticipated meter upgrades.
- Any other relevant information regarding the proposed meter installation.

- Water lines for irrigation shall come after the meter.

Submissions not conforming to the City of Burnaby - Water Meter Design Guidelines and Supplementary Specifications and/or BC Plumbing Code will be rejected by the *City*. The *Applicant* shall not proceed with the water meter assembly installation without the prior approval of the *City*. Should this happen, a water service shut-off may result until the installation is fully accepted.

2.6 Sample Water Meter Installation Drawings

Sample water meter installation drawings are provided in **Appendix B**. These drawings are provided as a guide to the *Applicant* and *Applicant's Engineer* and are intended to illustrate some of the common meter installation details that may be required for a specific installation. The *Applicant* and *Applicant's Engineer* are responsible for the complete water meter assembly design and acquiring approvals from the *City*, for a given application.

Consult with the City’s Meter Shop personnel for ‘interpretation’ of any of the meter requirements contained herein.

3. SUPPLEMENTARY SPECIFICATIONS

3.1 Water Meters

.1 The meters approved for use in the *City of Burnaby* and listed in Table 1.

Table 1 – Approved Water Meters

Manufacturer	Model	Type
<i>Neptune</i>	¾” through 2” Mach 10 Ultrasonic	Includes E-Coder, non integrated with select communications module.
<i>Neptune</i>	3” through 12” Mach 10 Ultrasonic	Includes E-Coder, non integrated with select communications module. UL listed, FM approved, solid state, with replaceable UME.
<i>Neptune</i>	HP Protectus III Stainless Steel (S)	Combined Fire Service and domestic meter, with select communications module.
<i>Badger</i>	3” through 8” E-Series Ultrasonic	E-Series G2 Ultrasonic Meter (Fire service)

Note - alternate meter selections may be accepted, only upon prior approval of City of Burnaby, Water Operations (Meter Shop) staff.

.2 Water meters shall meet the following *AWWA* standards:

- Positive displacement meters must conform to *AWWA C700*.
- Turbine meters must conform to *AWWA C701*.
- Compound meters must conform to *AWWA C702*.

- Fire service meters must conform to *AWWA C703*.
- .3 For all meters with base plates, the base plate shall be cast iron for outside installations and bronze for inside installations. Plastic base plates are not acceptable.
 - .4 All 38 mm and 50 mm diameter meters shall have oval two-bolt flanges.
 - .5 All meters must be new. Used or refurbished meters are not acceptable.

3.2 Registers

- .1 Registers shall be absolute encoder-type remote-registration conforming to *AWWA C707*. Registers utilizing generator pulses, low voltage conversions, or with internal battery power are subject to approval. Power necessary for data transmission must be supplied by an interrogation device. Registers must be compatible with Neptune 360 and hardware. The register must provide at least six-digit visual registration at the meter with the capability to simultaneously encode (in digital format) at least six-digits of the meter reading for transmission through the remotely located receptacle. Each reading encoded electronically must include the meter identification number and record the read to the nearest cubic metre (m³).
- .2 Registers must have visual display capabilities for leak detection by means of a full test sweep hand / dial or an electronic flow indicating display.
- .3 All registers must be programmed with a multiplier of 1.0 and shall record measurement units in cubic metres (m³). The unit of measurement, month and year of manufacture, and other identification information must be clearly printed on the face of the register. When multipliers are unavoidable, the information must be clearly marked on both the meter and the remote reading interface for testing and data verification with tax.
- .4 All registers must be factory sealed to prevent tampering and to provide protection for internal components suitable for operation in humid or submerged conditions. Registers must be removable from the meter without disassembling the meter body, and must permit field installation or removal without taking the meter out of service.

- .5 All registers must have data logging capabilities and able to store a minimum of 35 days of hourly data. Battery life must be guaranteed for a minimum of 10 years.
- .6 Registers must be new; used or refurbished registers are not acceptable. The life expectancy of a register shall exceed 10 or 15 years for meters >75mm and <50mm respectively.

3.3 Remote Receptacles

- .1 Remote receptacles shall be capable of interfacing with the City's select radio transmitter system (*or Neptune technology*) in the absence of a physical hard wired connection.
- .2 Remote receptacles must be either wall mount or pit mount style. Remote receptacles must not include a remote display or data storage.
- .3 The materials employed must be resistant to corrosion, ultraviolet degradation, rain, condensation, and suitable for rugged service for the duration of their expected life.
- .4 The unit must provide for mechanical and electrical connection between the receptacle and interrogation equipment. Interrogation must be achieved by inductive coupling without physical connection of the reading device.
- .5 Colour coded (red, green, black), 22 gauge, three-wire terminals must be provided. Excess wire must be looped and fastened to the building wall or chamber lid and be labeled for "Burnaby Water Meter".
- .6 All wiring shall conform to a Class 2 circuit and be in accordance with the City of Burnaby Electrical Bylaw No. 6494.
- .7 For wall mounted receptacles, the receptacle shall be sealed with the terminal screws concealed by the receptacle.

3.4 Pipe and Fittings

- .1 All water service connections 75 mm diameter or larger must be restrained to the *City* watermain.

- .2 All pipe material shall be ductile iron, Schedule 80 PVC, C900 PVC, polyethylene, or Type K copper. All products must be approved for potable water application.

3.5 Flange Adapters

- .1 Flange adapters for sizes 38 mm to 200 mm diameter shall conform to *AWWA C219*.

3.6 Bolts and Nuts

- .1 Bolts and nuts shall be stainless steel. Bolts shall conform to *ASTM F599* or *ASTM F731*. Heavy hex nuts shall conform to *ASTM F574* or *ASTM F836*. Threads, fit, and dimension must conform to *AWWA C111*.

3.7 Valves

- .1 For exterior meters 50 mm or smaller, isolation valves shall be brass or bronze curb stops, to City standard. Quarter turn plug valves are acceptable.
- .2 For interior meters 75 mm or larger, isolation valves shall be ductile iron, resilient seat, non-rising stem gate valves, with hand wheel activation, to City standards.
- .3 All bypass valves must be equipped with a lock wing on both the operating nut and case.
- .4 All valves on fire service lines must comply with NFPA, FM, and ULC requirements.

3.8 Strainers

- .1 Strainers must be straight type and of the same size as the meter.
- .2 Strainer mesh material shall be corrosion resistant (such as stainless steel).

3.9 Meter Chambers

- .1 Below-grade meter boxes and chambers shall be pre-cast concrete, or other approved material.

- .2 Lids and hatches must be capable of withstanding H-20 dynamic loading in travelled surfaces and H-20 static loading in all other areas. Lids shall be cast iron or approved equivalents.
- .3 For meter chambers exceeding 560mm x 860mm (internal dimensions) hatches shall be used, including aluminum or galvanized steel, spring assisted where requested, and lockable. Multiple hatches (two or more) may be required where dimensions exceed 900mm in any direction.
- .4 Lids must have two pre-drilled 45 mm diameter holes to facilitate mounting of a remote receptacle. These holes must remain plugged until the receptacle is installed.
- .5 Meter plates, frames, valve lids and boxes are a *City* standard. Consult with the Waterworks or Pumps & Controls staff for further details.
- .6 Access lids, latches, and ladders must comply with current WorkSafeBC requirements. Access ladders to be aluminum, fixed to the collar of the chamber opening.
- .7 All chambers must be damp-proofed by applying grout and an asphalt emulsion coating to all exterior surfaces. Construction joints must be made water-tight with an appropriate water-stop sealant. All pipe penetrations through the chamber must be sealed using grommets.

3.10 Meter Setters

- .1 For 19 mm and 25 mm services, meter setters shall be equipped with a full port inlet ball valve and dual check valve on the outlet. For 38 mm and 50 mm

- services, the setter shall be equipped with a full port inlet ball valve and full port outlet ball valve to facilitate in-situ testing of the meter.
- .2 For installations without meters (current residential standard) include a plastic idler bar and delete the dual check valve assembly as required. See dwg *BBY-WM2b*.
 - .3 Setters must meet NSF 61 Annex F/G requirements.
 - .4 Setters are only permitted for water meters 50 mm diameter or smaller, of same size as the incoming water service.

3.11 Meter Installation

- .1 During construction, the meter chamber area must be kept free and accessible at all times in order to facilitate the installation and ongoing maintenance of the meter by City Water Operations (Meter Shop) staff.
- .2 The *Applicant* is responsible for protection of the meter installation from damage throughout the duration of construction, until 'acceptance'. The Applicant is responsible for necessary repairs and making good any damage that occurs to the meter box or chamber, setter, meter, or lid, as identified through inspection.
- .3 The *Applicant* shall ensure that the meter box and lid are adjusted to final grade and remain unobstructed to facilitate access for City maintenance, reading, and testing.

APPENDIX A

Water Meter Sizing Calculation Sheet

Note; reference is made to AWWA M22, Sizing Water Service and Meters, 3rd edition.



Water Meter Sizing Calculation Sheet

For Non-Fire Service Meters

AWWA M22 Fixture Value Methodology

General Information

Customer Name: _____ PID # _____

Address: _____ Building Permit # _____

Occupancy Type: Industrial Commercial Institutional

Multi-Family Residential Agricultural Other

Is this a phased development? Yes No

Calculations pertain to: Buildout Phase Phase No. _____

Step 1: Calculate Total Domestic Fixture Value

Fixture	Fixture Value (GPM @ 60 psi)	No. of Fixtures	Fixture Value
Bathtub	8	x _____ =	_____
Bedpan Washers	10	x _____ =	_____
Bidet	2	x _____ =	_____
Dental Unit	2	x _____ =	_____
Dishwasher	2	x _____ =	_____
Drinking Fountain - Public	2	x _____ =	_____
Hose Bibs (c/w 50 ft wash down):			
- 1/2 inch	5	x _____ =	_____
- 5/8 inch	9	x _____ =	_____
- 3/4 inch	12	x _____ =	_____
Kitchen Sink	2.2	x _____ =	_____
Lavatory	1.5	x _____ =	_____
Showerhead (Shower Only)	2.5	x _____ =	_____
Service Sink	4	x _____ =	_____
Toilet:			
- Flush Valve	35	x _____ =	_____
- Tank Type	4	x _____ =	_____
Urinal:			
- Pedestal Flush Valve	35	x _____ =	_____
- Wall Flush Valve	16	x _____ =	_____
Wash Sink (Each Set of Faucets)	4	x _____ =	_____
Washing Machine	6	x _____ =	_____



Water Meter Sizing Calculation Sheet

Step 1 (cont.)

Fixture	Fixture Value (GPM @ 60 psi)	No. of Fixtures	Fixture Value
Other:			
_____	_____	x _____	= _____
_____	_____	x _____	= _____
_____	_____	x _____	= _____
Total Domestic Fixture Value			= _____ GPM (A)

Step 2: Calculate Probable Peak Domestic Demand

Refer to Figure 4-2 or 4-3

Probable Peak Domestic Demand = _____ **GPM (B)**

Step 3: Apply Pressure Adjustment Factor

City Water System Pressure = _____ psi

Pressure Factor from Table 4-1 = _____ (C)

Adjusted Peak Domestic Demand (B x C) = _____ **GPM (D)**

Step 4: Identify Irrigation Demand

Total Irrigation Demand = _____ **GPM (E)**

For irrigation demands greater than 50 GPM, a detailed irrigation plan shall be provided with appropriately designed zones.

Step 5: Calculate Total Peak Demand

Total Peak Demand (D + E) = _____ **GPM (F)**

Step 6: Recommend Water Meter Size *

Water Meter Size = _____ inches

Based on Water Meter Make / Model = _____

Water Service Connection Size = _____ inches

* Water meters are supplied and installed by the City.

Professional Certification



Seal

Name: _____

Company: _____

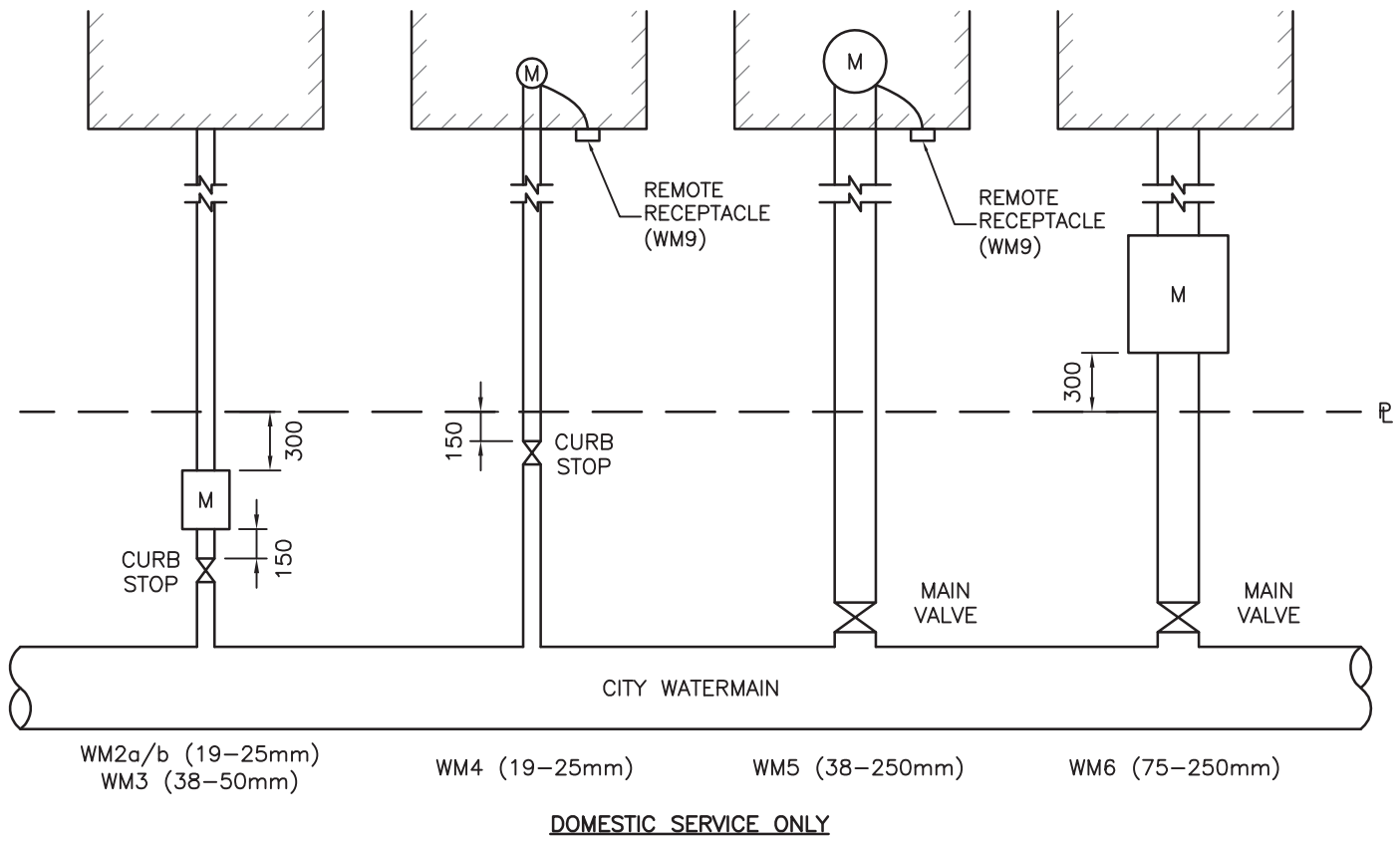
Date: _____

Comments: _____

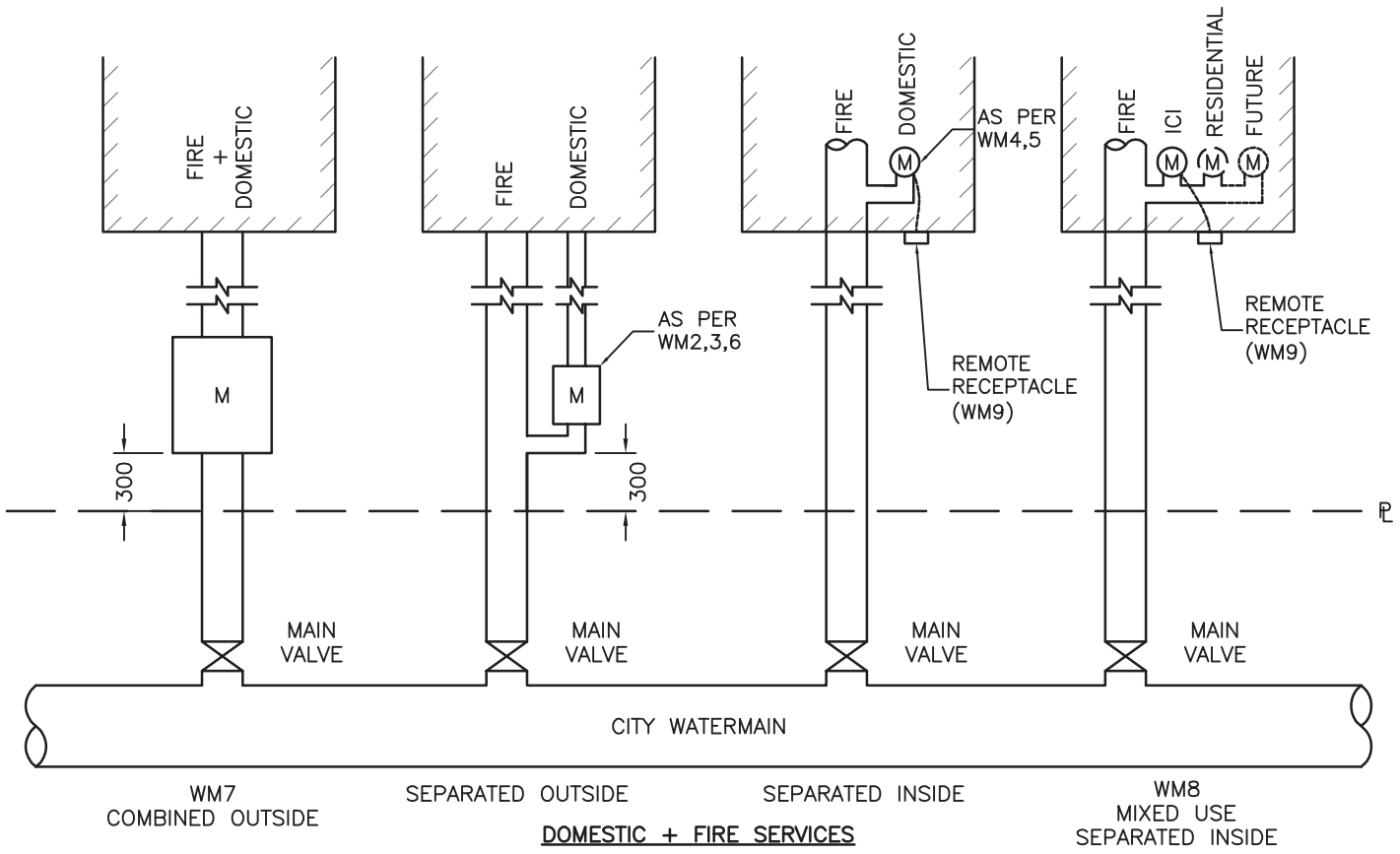
APPENDIX B

Sample Meter Installation Drawings

BBY-WM1, 2a and 2b, 3 and 4



WM2a/b (19-25mm)
WM3 (38-50mm) WM4 (19-25mm) WM5 (38-250mm) WM6 (75-250mm)



WM7 COMBINED OUTSIDE SEPARATED OUTSIDE SEPARATED INSIDE WM8 MIXED USE SEPARATED INSIDE

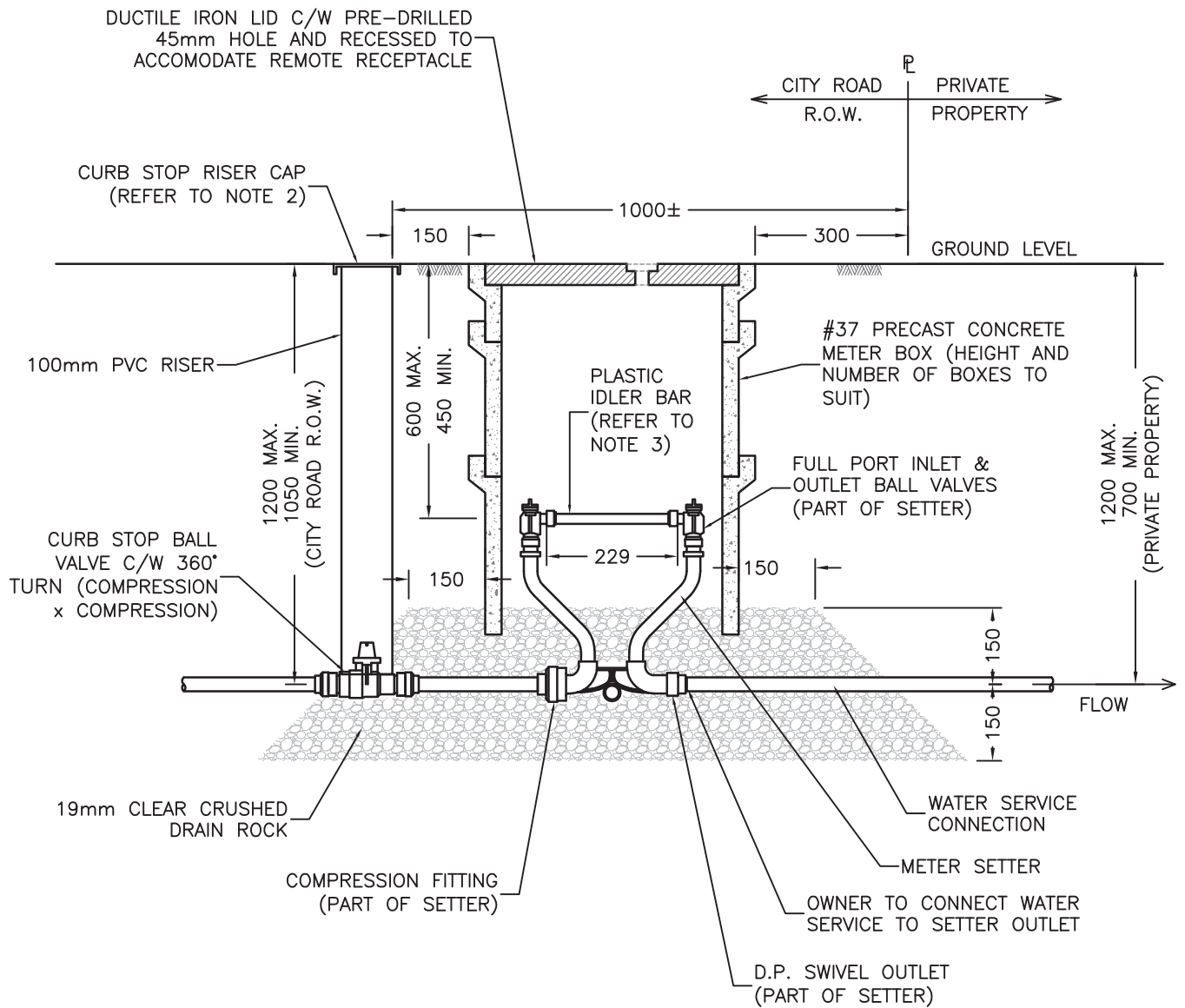
NO.	DATE	REVISION	APP'D	BY



**GENERAL LAYOUT
FOR TYPICAL WATER METER INSTALLATIONS**

DRAWN BY: URBAN SCALE: N.T.S.
APPRV'D BY: DATE: 2016-03-22

BBY- WM1



NOTES:

1. THIS DRAWING SHOULD BE REVIEWED IN CONJUNCTION WITH THE CITY OF BURNABY WATER METER DESIGN GUIDELINES AND SUPPLEMENTARY SPECIFICATIONS.
2. FOR CURB STOP RISERS, DUCTILE IRON LID TO BE PROVIDED IN LANDSCAPED AREAS. NELSON BOX TO BE INSTALLED IN DRIVEWAYS OR OTHER HARD SURFACES.
3. PLASTIC IDLER BAR TO BE INSTALLED IN PLACE OF WATER METER UNTIL FURTHER NOTICE FROM THE CITY OF BURNABY.
4. ALL DIMENSIONS ARE IN MILLIMETRES.

NO.	DATE	REVISION	APP'D	BY

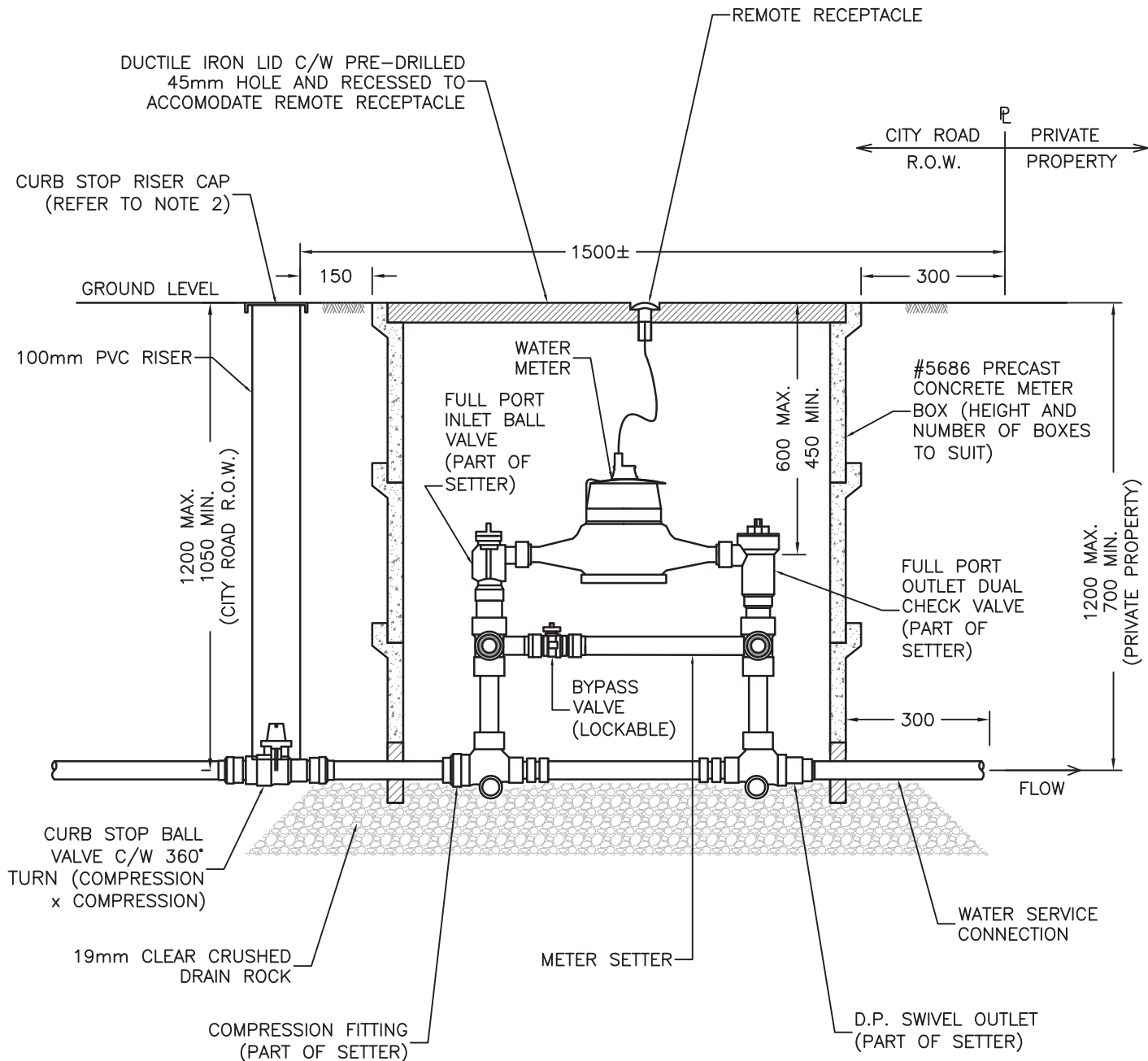


**OUTSIDE INSTALLATION
FOR 19mm AND 25mm METERS
(SETTER WITHOUT METER)**

DRAWN BY: URBAN
APPRV'D BY:

SCALE: N.T.S.
DATE: 2016-03-22

BBY- WM2b



NOTES:

1. THIS DRAWING SHOULD BE REVIEWED IN CONJUNCTION WITH THE CITY OF BURNABY WATER METER DESIGN GUIDELINES AND SUPPLEMENTARY SPECIFICATIONS.
2. FOR CURB STOP RISERS, DUCTILE IRON LID TO BE PROVIDED IN LANDSCAPED AREAS. NELSON BOX TO BE INSTALLED IN DRIVEWAYS OR OTHER HARD SURFACES.
3. ALL DIMENSIONS ARE IN MILLIMETRES.

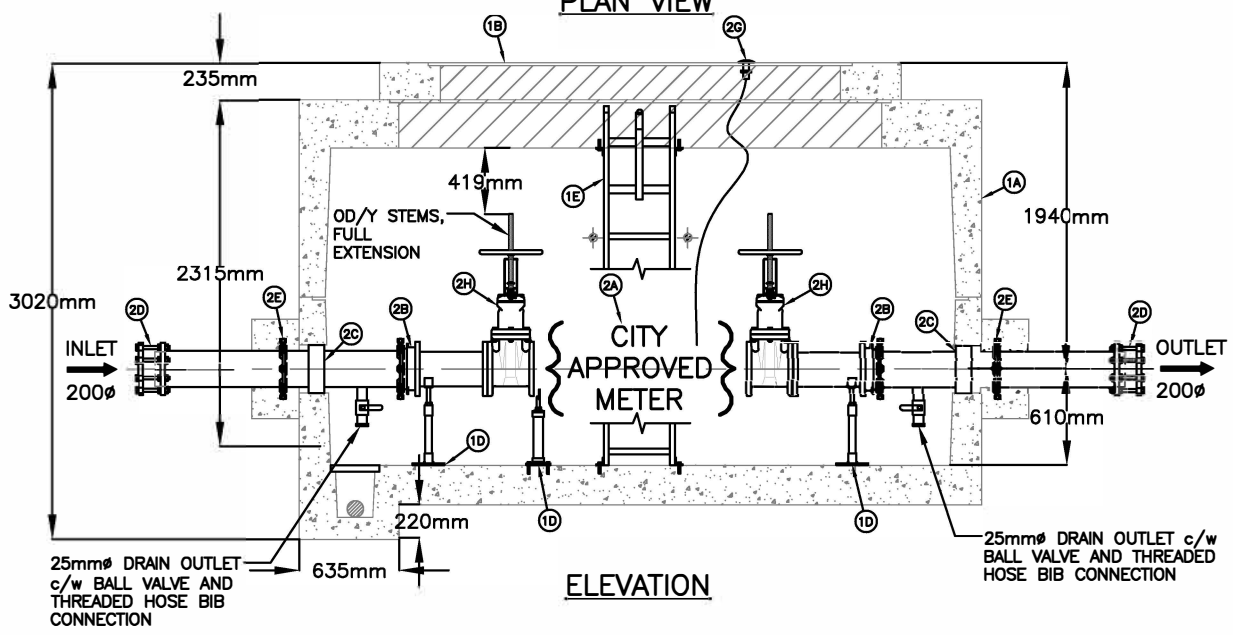
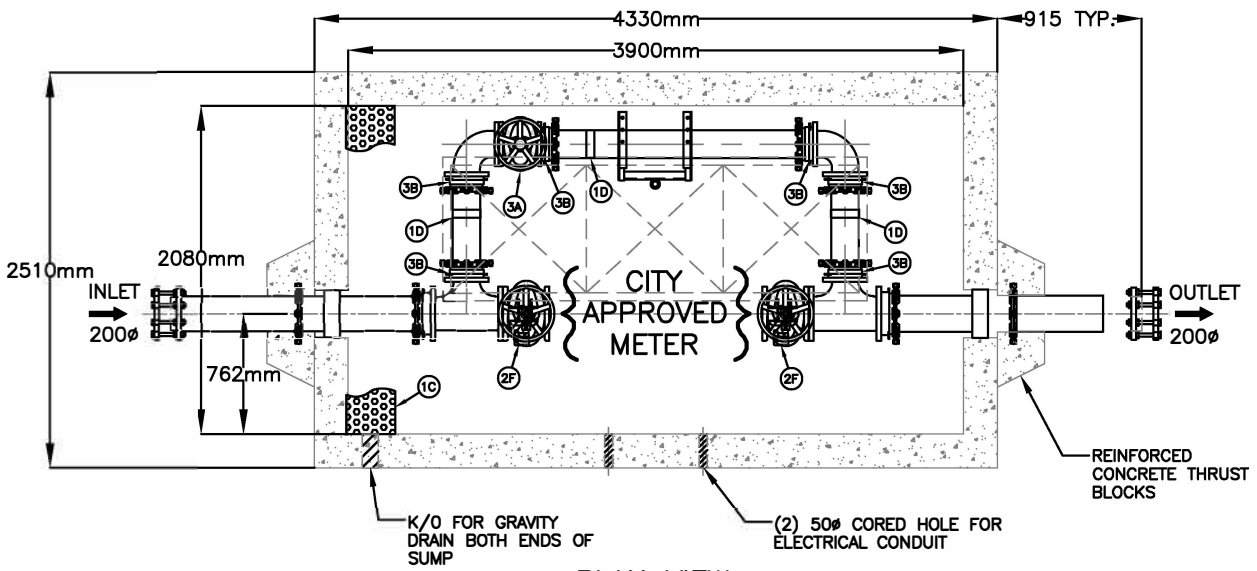
NO.	DATE	REVISION	APP'D	BY



OUTSIDE INSTALLATION
FOR 38mm AND 50mm METERS

DRAWN BY: URBAN SCALE: N.T.S.
 APPRV'D BY: DATE: 2016-03-22

BBY- **WM3**



BILL OF MATERIALS		
ITEM	QTY	DESCRIPTION
1A	1	PRECAST CONCRETE CHAMBER (LCG 4212, OR APPROVED EQUIVALENT) c/w WHITE PAINTED INTERIOR AND BLACK EXTERIOR SEALANT.
1B	1	1220 x 4440 ALUMINUM DOUBLE DOOR HATCH (CAST INTO ROOF SLAB), H20-44 CLASS B LOAD RATING, c/w RECESSED LOCK HASP AND LIFT SPRINGS.
1C	1	ALUMINUM SUMP DRAIN, FULL WIDTH
1D	6	ADJUSTABLE GALVANIZED PIPE SUPPORT
1E	1	ALUMINUM LADDER, c/w RETRACTABLE SAFETY POST
2A	1	CITY APPROVED SERVICE METER; 100mm - 250mm
2B	2	200mm RESTRAINED ADAPTER OR, VICTAULIC COUPLING
2C	2	200mm PIPE SEAL ASSEMBLY (LINK SEAL OR EQUIVALENT)
2D	2	200mm RESTRAINED TRANSITION COUPLING
2E	2	MID-SPAN RESTRAINER (OR WELDED THRUST RING)
2F	2	OS&Y SUPERVISORY SWITCH (WIRED TO REMOTE READ)
2G	1	HOUSING ASSEMBLY FOR REMOTE READ (COMPATIBLE WITH SMART METER SYS)
2H	2	200mm OS&Y RESILIENT SEATED NRS GATE VALVE c/w HAND WHEEL
3A	1	150mm RESILIENT SEATED NRS GATE VALVE
3B	6	150mm RESTRAINED ADAPTERS

- NOTES:**
- PIPE 100 ϕ AND UP, TO BE DUCTILE IRON (SC 50).
 - FITTINGS TO BE NON-CORROSIVE EPOXY COATED, WHERE AVAILABLE.
 - PIPE & FITTINGS 50 AND SMALLER TO BE SCH 40 BRASS.
 - FLANGES TO BE ANSI 125/150.
 - FASTENERS TO BE 18.8 STAINLESS STEEL.
 - SUMP TO DRAIN TO SANITARY, 100mm ϕ DRAIN PIPE.
 - CONCRETE THRUST BLOCKS TO BE REINFORCED.
 - METER BY-PASS - ONE DIAMETER SMALLER; MIN. 100mm.
 - ALTERNATIVE CONSTRUCTION, INCLUDING SCH 40 SS, WELDED PIPE AND FITTINGS, UPON APPROVAL.
 - INSTALLATION OF METER CHAMBER TO MEET ALL APPLICABLE REQUIREMENTS FOR 'DOUBLE-BLOCK-AND-BLEED'; INCLUDING ADDITIONAL ISOLATION VALVES AT CITY MAIN AND (ONSITE) SUPPLY LINE, AND 25mm DRAINS INSIDE CHAMBER.
 - A RADIO-READ TRANSMITTER IS TO BE PROVIDED.

NO.	DATE	REVISION	APP'D	BY



COMBINED FIRE & DOMESTIC SERVICE METER INSTALLATION (200mm SHOWN FOR CLARITY)

DRAWN BY: HLOUIE	SCALE: N.T.S.	BBY- WM4
APPR'V'D BY:	DATE: 2023-03-16	