

Addendum #1 – April 3, 2020
Contract WR20-002
2019 Water Utility Capital Works

- 1) **Clarification:** Metro Vancouver has added further specifications and notes in relation to the proposed watermain's crossing underneath the Metro Vancouver's 450mm Sanitary Trunk Sewer along North Bluff Road. Changes are reflected on attached drawings and supplemented by attached Metro Vancouver documents:

Replace:

- Tender Drawing Sheet 3 of 4 Revision A – Issued for Tender with attached Tender Drawing Sheet 3 of 4 Revision B – Issued for Addendum #1

Description:

- Added Metro Vancouver Notes:
 - Metro Vancouver Pipe Bedding, Backfill and Surface Restoration standards per Metro Vancouver (see attached GVWD&SDD Typical Trench and Pavement Restoration Details)
 - Exposed Metro Vancouver pipe support and shop drawing requirement
 - Field locate hydrovac requirement for centerline of Metro Vancouver sewer
 - Contact Information for Metro Vancouver representative.
- Added vertical deflection in watermain underneath 450mm sanitary trunk main to introduce 0.6m separation.

Addition:

- GVWD&SDD C-006A: CR-02-02-SD-CIV-00106 Section Typical Trench
- GVWD&SDD C-006B: CR-02-02-SD-CIV-00106 Section Pavement Restoration
- Proximal Work Requirements - Metro Vancouver Water and Liquid Waste System Facilities – Version 2.0

Additional Comments:

- The sewer sections should be supported with the number of Nylon or Polyester straps designed by the engineer (not less than 2 per exposed pipe section) with equidistant spacing. Straps to be structurally rated assuming pipes full of sewage, and synced with structural come-alongs with locking mechanism. For asbestos cement or vitrified clay sewers, the pipe joints are to be wrapped and reinforced with FRP in advance of accepting straps. For all other segmentally joined sewer pipes, the joints are to have bearing cushions installed in advance of accepting straps. Discrete pockets should be under-mined around the pipe (one by one) using hydro-vacuum or manual shovel, not greater than 300mm to 450mm in width, in order to FRP the joints or install bearing cushions before sliding straps underneath the pipe (one by one). The steel I-beam should span above the trench and bear on levelled shims well outside of any ground surface that can settle as a result of the construction work. The straps should be fully tensioned and each pipe section fully supported before the supporting soils / existing support are removed.
- No more than one joint of MV's sewer pipe may be exposed at any time.

- No joint of the sewer pipe may be left unsupported.
- Baseline and settlement monitoring to be conducted on a daily basis, promptly assessed by Geotechnical Engineer for any exceedance or near exceedance of tolerances, and promptly forwarded. **Settlement Monitoring will be by others for this project.**
- The bedding zone on the underside of the sewer pipe (3:00 – 9:00 o'clock position) should consist of lightweight cellular concrete (LCC). The sewer pipe is to be wrapped with polyethylene sheeting as a bond breaker. LCC by Gastaldo or approved equivalent (0.8 MPa max. at 28 days) should be used to backfill the trench up to the springline of MV's sewer and extend 1m either side of the crossing. LCC shall be placed on clean and undisturbed trench subgrade that is approved by a Geotechnical Engineer. Straps to remain in place until after the LCC supports the pipes. The LCC should be hard set before backfill materials are placed and compacted.

- 2) **Clarification:** City of White Rock has added further specification regarding excavation in a root zone.

Replace:

- Tender Drawing Sheet 3 of 4 Revision A – Issued for Tender with attached Tender Drawing Sheet 3 of 4 Revision B – Issued for Addendum #1

Description:

- Revised requirements when excavating in root zones to include excavation using Hydrovac and supervised by City arborist

- 3) **Clarification:** Regarding water source, the City has revised its procedure on how to draw water. Hydrant Use Permits will be issued by the City for this project and hydrant locations to draw water from will be discussed with the successful proponent during construction.

Replace:

- Section D2 – SUPPLEMENTARY SPECIFICATIONS (PROJECT), Page 6 of 8 with attached Section D2 – SUPPLEMENTARY SPECIFICATIONS (PROJECT) – ADD 1, Page 6 of 8

Description:

- Revised clause SSP 16 "Water Truck Fill Site" to procedures for drawing water.

- 4) **Question:** The Tender states that final paving till 3 to 6 months after. How will this that work with getting substantial completion? Does that mean the Contractor will have to carry the project for that time line? We also want to make sure that we will pave full depth of asphalt in our trench initially then come back in 3-6 months to complete the mill & relay.

Answer: The Contract will continue through the gap of time between temporary and final paving. Contractor to perform Temporary Pavement Restoration initially, then return in 3-6 months to Full Depth mill the trench and Surface Mill remainder of road to centerline, then final pave per notes and details on drawings.

- 5) **Question:** We would like clarification as to the type of Joint restraints to be used. Schedule of quantities, Item 33.08B refers to Uni-flange 1350 c/w thread rods, while Drawing 19-1006-W2 says under Joint restraint Notes, Uni-flange 1500 series "circle lock" type restraints. Which one is correct?

Answer: Drawing 19-1006-W2 is correct. Uni-flange 1500 series "circle lock" type restraints will be used.

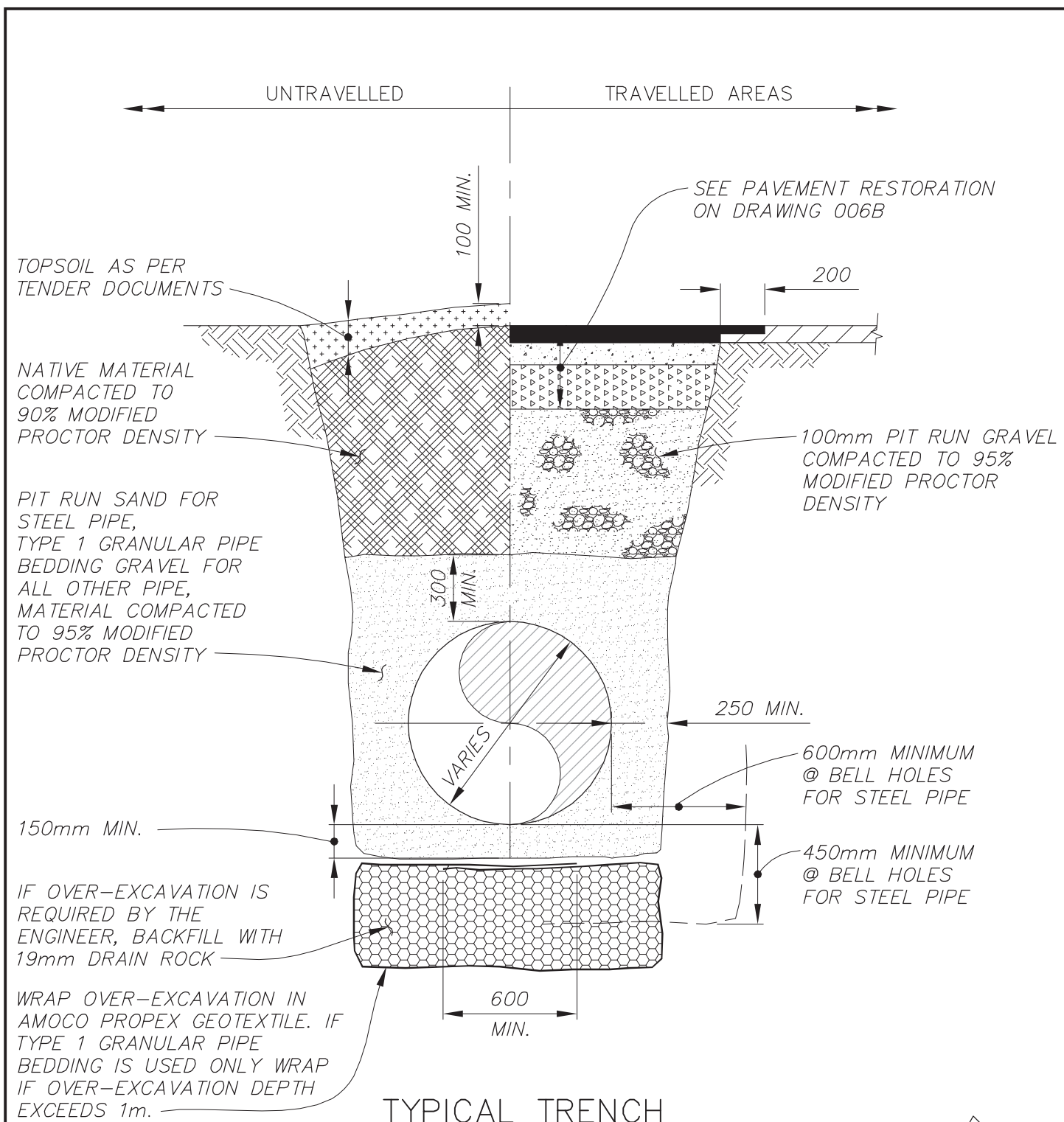
Replace:

- Section B2 – FORM OF TENDER, Page 8 of 15 with attached Section B2 – FORM OF TENDER – ADD 1, Page 8 of 15

Description:

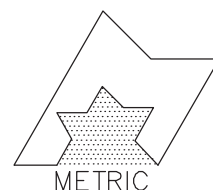
- Replaced item description for Item 33.08B from "Uni-Flange 1350 c/w thread rods" to "Uni-Flange Series 1500 "Circle Lock"".

END



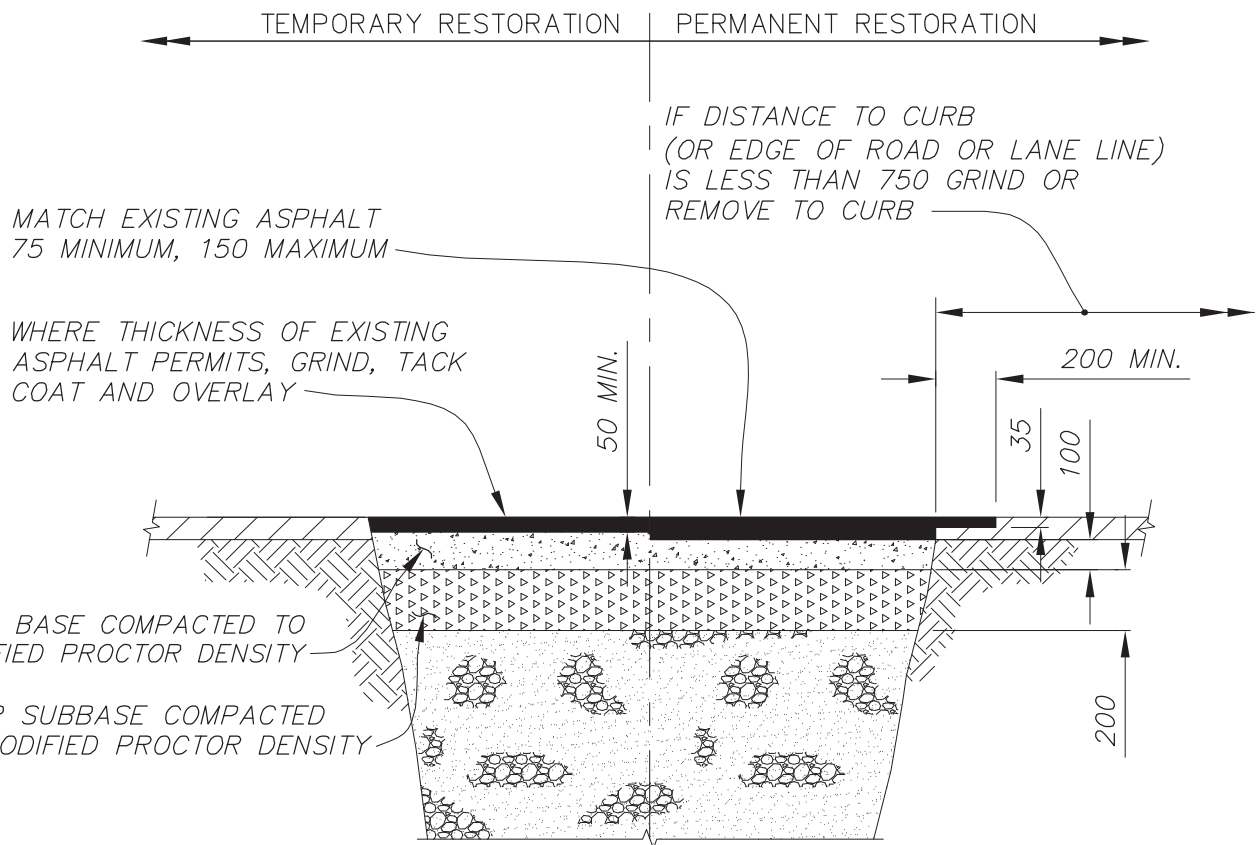
NOTE:
EXCAVATION MUST MEET WSBC REGULATIONS.

ORIGINAL SEALED BY: PAUL WILTING P.Eng.



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PAVEMENT RESTORATION

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Proximal Work Requirements

Metro Vancouver Water and
Liquid Waste System Facilities

Version 2.0

August 8, 2019
23650614



Version History

Version Number	Date	Description of Changes
2.0	August 8, 2019	Initial Version

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APPENDIX A: EMERGENCY RESPONSE - DAMAGE TO OR SPILL FROM A WATER MAIN* OR SANITARY SEWER*

APPENDIX B: TYPICAL SETTLEMENT GAUGE DETAILS

1 INTRODUCTION

Metro Vancouver (MV) provides drinking water and liquid waste water collection and treatment through its member municipalities for 2.5 million residents in the Lower Mainland. Water Services achieves this through managed watersheds, treatment facilities, and a network of transmission mains. Sewer services are achieved through collection and transmission of sewage through arterial sewers, major interceptors, and waste water treatment facilities. Protection of MV's water and sewer transmission mains is crucial to ensuring the continued and uninterrupted supply of drinking water and liquid waste water collection and treatment for the residents of Metro Vancouver.

Projects with works proximal to MV infrastructure have a role to play in protecting MV's regional water supply and liquid waste water collections systems by ensuring that their work meets MV's requirements. The nature of the transmission network means that any interruption to a water supply main or a sewer interceptor has the potential to cause a major disruption to the system. Any damage resulting in a leak or spill of drinking water or sewage has potential to cause adverse impacts to the surrounding natural environment. As such, a risk adverse approach to proximal works is necessary. It is critical that work around MV facilities is planned and executed carefully, meets MV's requirements, and is reviewed and approved by MV prior to the start of work.

Interruptions to MV's water and/or liquid waste infrastructure can cause major disruptions to the regional system

2 PURPOSE

This document is intended to help proponents and their agents (consultants, contractors, etc.) understand MV's minimum technical and submission requirements for works performed in proximity to MV water and liquid waste system facilities. MV proximal work requirements must be fully complied with and incorporated in the planning, design and construction stages of a proposed project working near MV infrastructure.

2.1 Projects Requiring Relocation

This document is not intended to detail all of MV's minimum requirements for projects that result in the relocation of MV infrastructure. In those cases, additional requirements for design submissions, design and construction review, construction, right-of-way impacts, costs and charges, payments, acceptance, etc., will be established on a case-by-case basis through a signed agreement between parties.

2.2 Disclaimer

This document is subject to ongoing review and is updated from time to time. Nothing in this document is to be interpreted or construed to constitute: any approval, acceptance, or support on the part of Metro Vancouver for any project or any drawings, specification, reports, work methodology or work plans with respect thereto; or any promise or commitment by or impose any obligation on Metro Vancouver related to or in connection with any project including and without limitation, any Metro Vancouver infrastructure which may require relocation or protection.

This document is not intended to conflict with any act, regulation, bylaw, contract, or agreement. In all cases where a conflict arises, the act, regulation, bylaw, contract or agreement supersedes this document.

3 PROJECT PLANNING

3.1 Getting Information on MV Infrastructure

General information on MV mains is available on MV's web-based GIS mapping application. Record drawings can be requested through the MV website - metrovancover.org - under the heading "Doing Business - Underground Infrastructure Drawings."

Metro Vancouver is not currently part of the BC One Call Program

Always obtain and review MV's record drawings to determine the locations of MV infrastructure in relation to the proposed works. Do not rely solely on drawings provided by others, which may or may not include MV infrastructure. MV infrastructure can be easily misinterpreted as municipal infrastructure. Also, note that MV is not currently part of the BC One Call Program.

3.2 Locates

Not all system features may be fully captured in record drawings

MV record drawings are made available for general information only. Certain features of the system such as thrust blocks and concrete cradles may not be fully captured in the drawings. It is the proponent's responsibility to verify the depth, location, and extents of MV infrastructure prior to construction. Field confirmation of MV facility location is recommended and may be required at MV's discretion.

Completing locates and, if required, daylighting of the infrastructure should be done as early as possible and preferably during the design stage.

3.3 Identifying Proximal Work

Generally, works within 30m of MV facilities are considered proximal works

Works that have the potential to impact MV infrastructure are considered proximal work. Generally, these are works that take place within 30m of MV infrastructure. Examples of proximal work include excavation and backfilling for pipe and equipment crossings, relocations, preloading, stockpiling, directional drilling, and any other sources of additional live or dead loads within 30m of MV infrastructure.

In some cases, works greater than 30m from MV infrastructure have the potential to impact MV infrastructure and are considered proximal work. If you are unsure if your work constitutes proximal work, contact MV to discuss.

3.4 Engaging with MV

If a proposed project is, or is likely to include work proximal to MV infrastructure, please initiate discussion with MV by submitting available project information (i.e., conceptual drawings and project details) to constructreview@metrovancouver.org. MV's Water Services and Liquid Waste Services departments will review the details submitted and contact the project proponent to discuss next steps.

Early engagement with MV, ideally during the project planning stage, is recommended. This helps proponents develop an understanding of MV's submission and review process, and any general and site specific requirements that may be applicable to their project. Early engagement with MV is also useful for the proponent's prospective contractors. It helps to identify specific MV groups and project teams that may have an interest in the proposed project, and to determine if there are scheduling or design conflicts with planned MV projects.

Early engagement with MV is essential for projects with potential conflicts with MV infrastructure

For projects where there are potential conflicts with MV infrastructure, early engagement with MV during the planning stages is essential. Any changes to the operation or configuration of MV infrastructure requires lengthy planning. The provision of conceptual designs and project milestones at the early stages of the project would be helpful in this regard. Alterations to the MV system must allow for the continuous operation of MV's facilities before, during, and following construction of the proximal work.

3.5 Permitting

For projects with works proximal to MV infrastructure, please include Metro Vancouver as a project stakeholder for any permitting requirements such as environmental assessments and project and environmental reviews.

3.6 Schedule Considerations

3.6.1 Construction Windows

No system isolation on MV water infrastructure is allowed during high demand periods

Construction that involves isolation of any existing water system, including tie-ins for relocations, is not allowed on MV water infrastructure during high demand periods. Some construction activities proximal to MV water infrastructure will not be permitted if MV considers them to be high risk. The high demand period varies from year to year based on weather conditions but generally includes the period between May 1 and October 15.

Proponents should be aware that consent for proximal works planned during the high demand period, especially during the peak demand period in July and August, may not be granted due to the elevated consequences of damage to a water main. Whenever possible, plan works outside of the high demand period.

Sewer relocation tie-ins must be conducted during periods of dry weather and low flows

Generally, sewer relocation tie-ins must be conducted during periods of dry weather and low flows. This may necessitate the need for seasonal work, night work and/or weekend work.

3.6.2 Submission Package Preparation and Review

Depending on the project scope, technical studies on impacts to MV infrastructure may be required. These studies take time to complete and to review. Plan accordingly and allow for sufficient time in the schedule to engage with MV by starting as early as possible.

The more complete the submission package, the shorter the overall timeline for review

As a general guideline, allow for a minimum of 15 business days for the review of **each** Notice of Work package submission, noting that more than one submission is often required to produce a package that fulfills all of the information requirements and addresses all concerns to MV's satisfaction.

4 PROPERTY REQUIREMENTS

4.1 Impairment of Legal Access

If in the course of constructing any works, the legal access rights which are currently available to MV are materially impaired, the proponent will need to obtain, at its cost, any statutory right-of-way required by MV to provide reasonable access to MV for the purpose of operating, maintaining, repairing and replacing its facilities and to obtain priority for such statutory right-of-way over any other registered charges. In such cases where MV access and infrastructure may be within lands owned by a railway or within a provincial highway, the proponent shall obtain, at its cost, a crossing permit from the railway, or a highway permit from the province that is acceptable to MV.

The proponent will not without MV's prior written consent do or permit to be done anything which in MV's opinion may impair the operating efficiency of any part of MV's facilities, obstruct access to or the use of any MV right-of-way area or facility, interfere with or adversely affect any rights granted by third parties to MV, or create or increase any hazard to any MV facility.

4.2 Construction within MV Tenure

Proposed proximal works to be constructed within MV tenure (i.e., statutory right-of-way) must receive a consent letter from MV Properties prior to the commencement of the proposed works.

5 DESIGN REQUIREMENTS

The following are MV's minimum design requirements for proximal works. These minimum requirements are provided as guidance only and are not meant to be all inclusive and may be subject to change upon review of the submission package due to variations in actual field conditions. Each project will be reviewed on an individual basis and additional requirements may be added.

5.1 Utility Crossings

5.1.1 Clearances

The minimum utility crossing clearance requirements are detailed in Table 1.

TABLE 1: MINIMUM UTILITY CLEARANCES

Parameter	Minimum Clearance	Facility	Notes
Horizontal Clearance	1.0m	to water	Clear space between the proposed pipe and parallel MV pipe, manhole, or chamber
	1.2m	to sewer	
Vertical Clearance	0.6m for oil and gas, transmission, and large diameter crossings	to water and/or sewer	Clear space between crossing pipe. If concrete encasement is proposed, the clear space will be measured from the outside face of the concrete
	0.3m for municipal utility crossings		
Trenchless Crossings	1.0m	to water	Visual confirmation on the design vertical clearance is required and will be requested during the design review
	1.2m	to sewer	

Note: Table 1 does not apply to shoring anchors. Clearances between MV facilities and shoring anchors are assessed on an individual basis.

5.1.2 Open Cut Crossings under MV Infrastructure

For under crossings, any exposed joints on an MV main must not be left unsupported

For an open cut crossing under any existing MV sewer or water main, if upon excavation a pipe joint is encountered, the pipe joint must be appropriately supported based on an engineered design or a new location must be selected. A pipe joint must not be left unsupported.

For all crossings under sewer pipes and as required for water mains, engineered details of temporary pipe supports and installation procedures must be submitted to MV for review. As a minimum, monitoring of the exposed MV sewer main is required on each side of the excavation and in the center of the exposed pipe to confirm that the settlement is within acceptable tolerances.

5.1.3 Sanitary Crossing MV Water Main

Precautions on sanitary crossings minimize the risk of sanitary leaks contaminating the water main

When a proposed sanitary sewer main crosses an MV water main:

- the crossing sewer pipe must be pressure rated
- all joints of the proposed sewer within 3m of the crossing must be wrapped
- a casing pipe may be used; the ends of the casing pipe must extend 3m beyond the existing water main

5.1.4 Utility Crossing under MV Sewer Main

When a proposed utility crosses under an MV sewer main the following requirements must be met:

- If the MV sewer is asbestos cement, vitrified tile or fiber reinforced, all exposed joints must be encased with an approved repair clamp or fiber-wrapped and be fully supported
- For all MV sewer main types unless authorized otherwise:
 - o no more than 1 joint on the sewer can be exposed at any time
 - o no more than 1 utility can be constructed across the sewer in a single excavation

5.2 Equipment Crossings over MV Infrastructure

Notify MV of ALL equipment crossings over MV facilities

MV must be advised of any proposed crossings of MV sewer and water facilities by construction equipment. The contractor is to ensure that appropriate measures are taken to protect the MV sewer and water facilities being crossed.

5.3 Access Requirements

5.3.1 Vehicle Access

MV requires safe access to facilities at all times

MV operates major water and sewer facilities throughout the region. Safe access to these facilities by MV Operations and Maintenance crews in a variety of vehicles, from light duty vehicles to heavy tandem trucks, is required at all times. Road access must be designed to appropriate highway live loading design standards and specifications. Other aspects to consider in providing safe access include driveways, overhead clearance, letdowns, turnarounds, turning radii and acceleration/deceleration lanes.

5.3.2 Access to Appurtenances

Include consideration of MV's access requirements during the project design phase

Project design should consider and accommodate continued access (with maintenance vehicles wherever possible) to MV appurtenances such as manholes, chambers, valve boxes, control kiosks, and air vents. Manholes and chambers may have to be re-built if the proposed or future loads exceed the manhole or chamber's original design capacity.

5.3.3 Access for Pipe Repairs

Project design must consider access for future pipe repairs

Project design must consider access for future pipe repairs. For both MV water and sewer main repairs, it is typical that the circumference of the pipe be exposed within a trench which is shored or sloped. Access from surface is required to move personnel, equipment and materials to the repair area. All utilities must be constructed with a set distance (see minimum utility clearances in Section 5.1.1) from MV facilities to allow MV to safely expose and work on the MV utility in future.

5.4 Infrastructure and Appurtenance Redesign

For any sewer and water main, manhole or chamber that is required to be relocated, re-constructed, reinforced or protected due to conflicts or excessive loads, the relocation, re-construction, reinforcement or protection must be designed and sealed by a qualified Professional Engineer registered in the Province of British Columbia and submitted to MV for review.

5.5 Landscaping

Landscaping may interfere with the MV facility and can hinder emergency repair access

The design of landscaping over MV facilities must consider access for future pipe repairs and interference with the facilities. No large diameter/deep rooting trees are to be planted over MV infrastructure. Ornamental or structural landscaping such as fountains, water retaining structures, retaining walls, structural foundations, gazebos, or playground apparatus are also not acceptable over MV infrastructure.

Include landscaping plans in the submission package supplied to MV for review and consent. Protection measures and limitations on MV's obligations to restore landscaping following repairs may be required.

5.6 Dead Loads including Stockpiles and Equipment Storage

Additional dead loads near MV facilities require geotechnical review to ensure that there is no settlement of the facility. Unless otherwise specified through a geotechnical assessment or as otherwise directed by MV, the minimum separation distance from an MV facility and new dead loads is 20m. MV may request additional study or specify greater distances following a review of the proposed work and site conditions.

Dead loads located within 20m of MV facilities require geotechnical review

6 SUBMISSION PROCESS AND REQUIREMENTS

For any proposed work in proximity to MV facilities, the contractor must notify and obtain consent from MV prior to the commencement of work. As part of the notification, the contractor must prepare a Notice of Work submission package.

6.1 Notice of Work Submission Process

MV staff will review the proponents' submission package to determine if the requirements detailed in this document and any site specific requirements are adequately addressed.

If the submission package does not adequately address the requirements, MV will advise the proponent of any elements that fail to meet the requirement and will review the proponent's subsequent amended submission packages.

A number of submissions may be required to produce a complete package

6.2 Submission Package

Any proposed construction in proximity to MV facilities requires submission of a package containing the following, as described in detail in Section 7, at a minimum.

- Application letter
- General site plan
- Issued for Review drawings
- Work plan
- Project schedule
- Equipment list
- Emergency Response Plan
- Technical studies, where required

6.3 Consent Notification

Consent will not be provided until all submission requirements are provided and considered satisfactory

If the proposed approach to working around MV facilities is to MV's satisfaction, MV will issue a written consent notification with conditions (if any) to the proponent. The proposed work must not commence until this notification is received. Consent will not be provided until all requirements are submitted and considered satisfactory by MV.

6.4 Submission Review Timelines

Allow sufficient time for the review process and to gather any information MV will require during the course of the review. The overall timeline for the review is therefore highly dependent on the completeness of the application and the quality of the information provided.

In general, allow for a minimum of 15 business days for MV's review of the notice of work submission package plus an additional 15 business days for the review of each subsequent amended submission package provided.

Overall review timelines are dependent on the quality and completeness of the submission package

To minimize submission iterations and long review timelines, clearly show how each MV requirement is clearly met in the submission package. Supply only the necessary information.

7 NOTICE OF WORK SUBMISSION PACKAGE REQUIREMENTS

The following are the minimum Notice of Work submission package requirements. These minimum requirements are provided as guidance only and are not meant to be an exhaustive list. Each project will be reviewed on an individual basis and additional requirements or conditions may be added.

7.1 Application Letter

The application letter must include the following:

- Applicant and applicant representative (contractor or consultant) contact information
- Purpose of the project
- Location of the proposed work
- Description of the proposed work
- Tentative construction start date and duration

7.2 General Site Plan

The general site plan must clearly show the following:

- project extents/site limits including north arrow, reference street names or landmarks
- location and placement of the proposed work
- existing and, if known, future MV facilities
- all other known existing utilities adjacent to MV facilities
- marked proximal work areas
- offset distances to MV facilities
- locations of live loads including site access routes and turnarounds
- locations of dead loads including equipment storage areas, staging or landing areas and stockpiles
- property information including MV statutory rights-of-way, easements or covenant areas, public or private road allowances and property boundaries

Both permanent and temporary loadings have the potential to result in displacement of MV infrastructure

7.3 Design Drawings

Issued for Review design drawings must be dated with a title block and include plans, profiles, sections and details that clearly indicate the following:

- type, construction material, specifications, and dimensions of the proposed works
- vertical and horizontal location of the proposed works
- location and depth of MV facilities
- vertical and horizontal clearances between the proposed works and existing MV facilities
- excavation design, where required
- engineered temporary support of MV facilities

Field confirmation of MV facility location is recommended and may be required at MV's discretion

7.4 Work Plan

Provide a work plan that outlines:

- the scope of the proposed works
- method of construction including clearances of construction equipment and their proximity to MV facilities

7.5 Project Schedule

Provide a project schedule (and subsequent updates) that indicate the anticipated start dates and duration of the design (if applicable) and construction of proximal works.

7.6 Equipment List and Specifications

Provide a list and specifications for all equipment proposed for construction of the proposed works. For equipment with payloads, provide:

- gross vehicle weights
- expected loaded weights
- specifications including weight distribution

If equipment is to be assembled on-site and may be operated in proximity to MV facilities, provide:

- axle loadings
- axle configuration diagram

Axle loadings and configurations help determine if existing and proposed protective measures are suitable

7.7 Emergency Response Plan

Damage to water utility infrastructure has the potential to cause the release of chlorinated drinking water into the environment. Damage to sewer utility infrastructure has the potential to cause release of sewage into the environment. The emergency response to such damage may be complex and require coordination amongst the utility, agencies, and governments in order to maintain the utilities continued provision of essential operations, ensure public safety, and mitigate any effects on the receiving environment.

For the proposed work, provide an Emergency Response Plan that includes:

- detailed procedures for avoiding damage to utilities (risk avoidance measures)
- actions to be taken in the event of damage to an MV facility
- an emergency contact list
- notification procedures should damage occur

The “Emergency Preparedness and Response - Damage to or Spill from a Water Main or Sanitary Sewer” document is provided in Appendix A to assist with the development of an Emergency Response Plan.

Submission of project level Emergency Response Plans may be insufficient if they do not specifically address accidental damage to MV infrastructure

8 TECHNICAL STUDY REQUIREMENTS

*Removal or addition of soil fill
including preload requires
geotechnical and structural studies*

If the proposed construction involves removal or addition of soil or implementation of ground improvement techniques such as preloading with soil fill or soil densification over or in close proximity to existing MV facilities, MV requires that geotechnical and structural assessments be completed and a report produced that is shared with MV. The report(s) must:

- address the potential impact to MV facilities due to the proposed work
- provide recommendations to alleviate or mitigate the impact
- be completed by a qualified Professional Engineer(s) registered in the Province of British Columbia

8.1 Geotechnical Assessment

The geotechnical assessment report must clearly state:

- soil analysis (including the properties of soil) and borehole logs
- the work and loads assessed
- for ground improvements, the extent of proposed work and zone of influence for the technique proposed
- where applicable, the maximum height of fill, type of fill materials, maximum excavation depth, and stabilization technique proposed
- any impacts expected **specifically** to MV facilities from the activities and method of construction (including excavation, preloading, ground densification, de-watering, drilling, construction equipment and vehicle loading) and recommended measures to be taken to mitigate impacts
- the predicted settlement and/or vibration expected (quantitative, not qualitative) and the method used to determine values
- a statement indicating if the values meet MV's geotechnical tolerance guidelines shown in Table 2 and Table 3, unless otherwise advised by MV
- mitigation and monitoring requirements

*Simply stating "no impacts" is
insufficient; studies must
indicate the predicted settlement
and/or vibration expected*

TABLE 2: METRO VANCOUVER GEOTECHNICAL SETTLEMENT TOLERANCES

Application	Parameter	Tolerance
Water or sewer – Welded steel main	Horizontal and vertical differential displacement	1 in 1000
Sewer – Reinforced concrete pipe	Horizontal and vertical joint displacement	1 in 1500
Sewer – HDPE/PVC pipe	Horizontal and vertical joint displacement	1 in 1200
Sewer – general	Sag or uplift in pipe profile over affected length	10mm

TABLE 3: METRO VANCOUVER GEOTECHNICAL VIBRATION TOLERANCES

Application	Tolerance (mm/sec)	Notes
Water – Welded steel main	50	Measured at pipe surface
Sewer	25	Frequencies between 25 and 100 Hz Measured at pipe surface
	19	Frequencies between 3 and 10 Hz Measured at pipe surface

Allowable tolerances for MV water mains that are not welded steel pipe will be assessed on a case-by-case basis. Allowable tolerances for MV sewer mains will be based on the current condition of the pipe and the pipe material and will also be evaluated on a case-by-case basis. Unless otherwise advised by MV, the tolerances in Table 2 and Table 3 will apply for all MV sewer mains.

8.2 Structural Assessment

In conjunction with the geotechnical assessment, an assessment of the structural impacts to existing MV facilities is required. This structural assessment will consider the impact that live load, dead load, internal pressure, soil characteristics and settlement have on MV facilities.

If it is determined that the proposed work will cause unacceptable stress to existing MV facilities, an alternative design must be proposed to eliminate this concern. Alternative measures may include reduced fill height, use of lightweight fill or bridging.

8.3 Monitoring Program

Monitoring programs must include ongoing review and reporting from a Geotechnical Engineer

The Geotechnical Engineer must oversee and make recommendations for a settlement and/or vibration monitoring program. MV requires that a vibration monitoring plan be in place for any major excavation, ground improvement, piling, or dynamic loading work completed in proximity to existing MV facilities. Recording of settlement, vibration and, in some cases, use of inclinometers may be required.

The monitoring program must include:

- a plan drawing indicating the number and locations of monitoring gauges
- the frequency of measurements
- reporting frequency and method
- the interpretation of results
- triggering points and proposed actions if the prescribed limits are exceeded

9 CONSTRUCTION REQUIREMENTS

Once MV provides a Notice to Proceed, the contractor will have to arrange for inspection by an MV representative. After an MV representative has been scheduled for inspection, construction of works as described in the Notice of Work is permitted to begin. Contractors are to follow WorkSafe BC Occupational Health and Safety Regulations applying to worker training, procedures and safety requirements. Parties working proximal to MV facilities are responsible for all damage to MV facilities and the environment as a result of the work.

9.1 Locates and Daylighting

Early locates are recommended as design changes following locates will likely require resubmission of a Notice of Work package

The proponent is responsible for identifying the depth and location of the MV infrastructure prior to construction. Field confirmation of MV facility locations is recommended and may be required at MV's discretion. A Notice of Work must be provided to MV and an MV representative must be present when this work is carried out.

9.2 Inspection

A representative of MV must be on site at the start of the works and for as long and as often as deemed necessary by MV. Please contact MV to arrange for a representative to be present during the works after MV consent is provided and at least 10 business days prior to the start of the proximal work.

The MV representative does not provide direction or supervision to site construction crews

The MV representative monitors work around MV infrastructure, identifies areas of concern, and confirms that MV requirements are being met. The MV representative is not to be seen as a technical resource or to be asked to provide directions. It is the proponent's responsibility to develop the construction methodology, provide direction to site crews, and ensure that MV's requirements are being met.

The proponent's qualified Professional Engineer is responsible for the quality control of the work and must keep MV's project engineer informed through regular correspondence, quality control inspections and reports.

9.3 Proximal Excavations

Only hand tools and/or hydro-vacuum excavation tools are to be used within 450mm horizontally and vertically of MV infrastructure.

9.4 Existing Infrastructure

All existing infrastructure must be protected from damage. If the existing MV water or sewer main is exposed, the contractor is responsible for restoring pipe bedding and backfill to MV standards.

9.5 Vibration and Settlement Monitoring

9.5.1 Monitoring Points

The pipe settlement monitoring points shall be installed on the MV sewer or water main as per MV standard detail (see Appendix B) unless MV directs otherwise. An MV representative must be present when this work is carried out (see Section 9.2).

Baseline surveys must be completed prior to the start of proximal work

Initial baseline survey monitoring must be conducted before the work starts and the results must be forwarded to MV project engineer within 1 business day. The submission must include a scaled site plan for the locations and reference numbers of the monitoring points.

9.5.2 Submission of Readings

Submit raw monitoring data promptly followed by monitoring reports

Raw monitoring data (e.g., survey elevations or vibration readings) must be shared with MV within 1 business day of collection followed by regular analysis and reporting of the monitoring results as outlined in the Monitoring Program (see Section 8.3).

Settlement monitoring data should be collected to a tolerance of +/-1 mm.

9.5.3 Exceedances

If the settlement or vibration exceeds the specifications detailed in Tables 2 and 3 (or as otherwise required by MV) during construction, the work must cease and the MV project engineer must be notified. Any fill placed must be removed immediately and an alternative design and/or method proposed.

9.6 Notification of Changes

Any changes to the schedule, design details, work methods, or equipment related to work proximal to MV infrastructure must be immediately identified to the MV representative. Revised drawing submissions indicating the proposed changes must be forwarded to MV project engineer for review.

If the alteration affects a portion of the project that was subject to a geotechnical or structural study, a review of the alteration, summarized in a letter report prepared by a Professional Engineer must be provided to MV for review. MV's standard review timelines (Section 6.4) apply to design changes.

MV's review timelines apply to review of design changes

9.7 Emergency Response

It is expected that personnel on-site are trained on how to respond to damage to MV infrastructure or a spill to the environment (as defined in applicable provincial or federal legislation) (see Appendix A) and have easy access to the supplies necessary to mitigate/minimize spill impacts to water and sewer operations and to the receiving environment.

Site staff must be trained on how to respond to damage to MV infrastructure

9.8 Decommissioning

Where the proposed work includes the permanent removal of MV infrastructure from service, the infrastructure must be removed at the proponent's cost and in accordance with MV's decommissioning practice. An application and approval process separate from the Notice of Work process is required. Decommissioning must not commence until proper authorization is obtained.

Decommissioning of MV infrastructure requires separate application and approvals

10 POST-CONSTRUCTION REQUIREMENTS

10.1 Monitoring Points

Unless otherwise indicated by MV, all monitoring points must be decommissioned following the completion of the proximal work.

10.2 Notification of Completion

Upon completion of the work described in the Notice of Work submission, the proponent must notify MV in writing within 10 days of the completion.

10.3 Record Drawings

Record drawings of all proximal works should be submitted to MV for record keeping. For works that involve modification to MV facilities such as relocations of MV infrastructure, MV requires record drawings to be:

- Completed on MV title blocks
- Completed to MV drafting standards
- Numbered using MV's convention – MV will provide drawing numbers
- Sent to MV for technical and drafting review and approval
- Once finalized, provided as two sealed full-size copies and digital copies of the scanned PDF and CAD file

Relocation record drawings are to be submitted ready for inclusion into MV's engineering drawing collection without the need for further edits by MV

Appendix A

Emergency Preparedness and Response
Damage to or Spill from a Water Main* or Sanitary Sewer*

Emergency Preparedness and Response

Damage to or Spill from a Water Main* or Sanitary Sewer*

INTRODUCTION

Drinking water and sewer main breaks have the potential to cause many adverse impacts including damage to persons or property, harm to surrounding environments and in the case of water mains, contamination of the drinking water supply. The emergency response to such damage may be complex and require coordination amongst the utility, agencies, and governments in order to maintain the utilities continued provision of essential operations, ensure public safety, and mitigate any effects on the receiving environment. If you think you have caused a drinking water or sewage spill, rapid response is a priority. The project/contractors are to follow WorkSafe BC Occupational Health and Safety Regulations for training, procedures and safety requirements during all emergency response activities.

If you think you have caused a drinking water or sewage spill, rapid response is a priority

*A project/contractor's bypass pumping system, its equipment or infrastructure are not considered to be a Metro Vancouver "water main or sanitary/combined sewer" within the meaning of Appendix A. The project/contractor is responsible for all emergency preparedness and response in relation to a bypass pumping system. For clarity, where a bypass pumping system sustains damage and causes a spill, the project/contractor is responsible for all emergency response actions including but not limited to:

- as soon as possible, stopping the spill and containing and mitigating its effects,
- reporting the spill to regulators, and
- upon becoming aware of the spill, informing Metro Vancouver using the emergency hotline: **604-451-6610**.

SITE INSPECTION AND PREPARATION

It is the project/contractors responsibility to be familiar with all environmental regulations^{1,2} as well as the site specific environmental considerations associated with a potential drinking water or sewage spill from the work area. It is essential that the project/contractor:

- Ensure locations of existing mains have been accurately determined before excavating.
- Identify nearby environmentally sensitive habitats, such as fish and non-fish bearing waterbodies, wetlands and ephemeral (seasonal) streams and their proximity to the work area.

Note that catch basins may lead to these habitats.

- Determine flow paths from potential break sites to the sensitive habitats. Plan and prepare for constructing temporary berms to direct water away from these areas in the event of a spill.
- Discuss work with Metro Vancouver and the municipality so a coordinated repair procedure can be planned should an incident occur.
- Ensure necessary supplies and equipment are readily available and staff have been trained in their use.
- Secure the work area to prevent unauthorized personnel from entering.

TABLE A1: RECOMMENDED SUPPLIES

Task	Description
De-chlorination	Minimum of 40lbs of sodium sulfite pucks in mesh deployment bags, SDS & PPE for product
Containment/Diversion	Sandbags for construction of temporary berms

¹ Environmental Management Act, SBC 2003, c 53 http://www.bclaws.ca/civix/document/id/complete/statreg/03053_04

² Fisheries Act, RSC 1985, c F-14 <https://laws-lois.justice.gc.ca/eng/acts/f-14/>

EMERGENCY RESPONSE STEPS

Ensure the area is safe to access before initiating spill response actions.

TABLE A2: EMERGENCY RESPONSE STEPS

Drinking Water	Sewage
1. Contact your Supervisor and cease adjacent construction activities.	
2. Call Metro Vancouver's water & sewerage emergency hotline (monitored 24-hours) immediately at 604-451-6610	
3. Place dechlorination product (10-15 sodium sulphite tablets per mesh bag) within all flow paths of the drinking water spill, as close to the leak source as possible. Bags should achieve 100% surface contact with leaking water prior to it entering a catch basin and/or any nearby watercourse or drain.	3. Make every reasonable effort to contain the spill onsite.
4. Use any means possible to prevent water or sewage from exiting the site or entering an environmentally sensitive habitat (waterbody, wetland, etc.) including setting up containment, using bypass pumping, and/or vacuum trucks.	
5. Maintain control measures in place and wait for further direction from Metro Vancouver Operations.	

For all other types of environmental spills or incidents, the project/contractor will follow the project-specific emergency response and reporting plan.

Metro Vancouver will be responsible for all verbal and written reporting to regulators that is associated with drinking water and sewage spills.

Project/contractor will not provide information to the media without Metro Vancouver authorization.

POST-INCIDENT INVESTIGATION

Metro Vancouver will require assistance from project/contractor staff who were onsite when the incident began, or involved in incident response in order to complete the post incident investigation.

To aid this process project/contractor staff will:

1. Record and share the details of how the incident occurred including start time and sequence of events.
2. Record and share actions taken for initial response as and when they are completed. Gather photos and video of the incident.
3. Participate in post-incident investigation under the guidance of Metro Vancouver staff after the emergency is under control.
4. Provide Metro Vancouver all pertinent environmental information gathered on the site prior to, or following the incident.

Accurate and detailed record keeping during an incident is essential for post-incident investigations

COSTS

The project/contractor will be responsible to reimburse Metro Vancouver for all costs, expenses or third party liabilities sustained by Metro Vancouver arising directly or indirectly from the damage or spill incident, incident response, repair, investigation and/or reporting.

Appendix B

Typical Settlement Gauge Details

 METRO VANCOUVER	METRO VANCOUVER ENGINEERING STANDARDS	Standard No.: CR-02-02-DS-SAI-00106 Published on: Aug 21, 2009
		Printed on: 8/18/2009 Page 1 of 1
	TYPICAL SETTLEMENT GAUGE DETAILS	

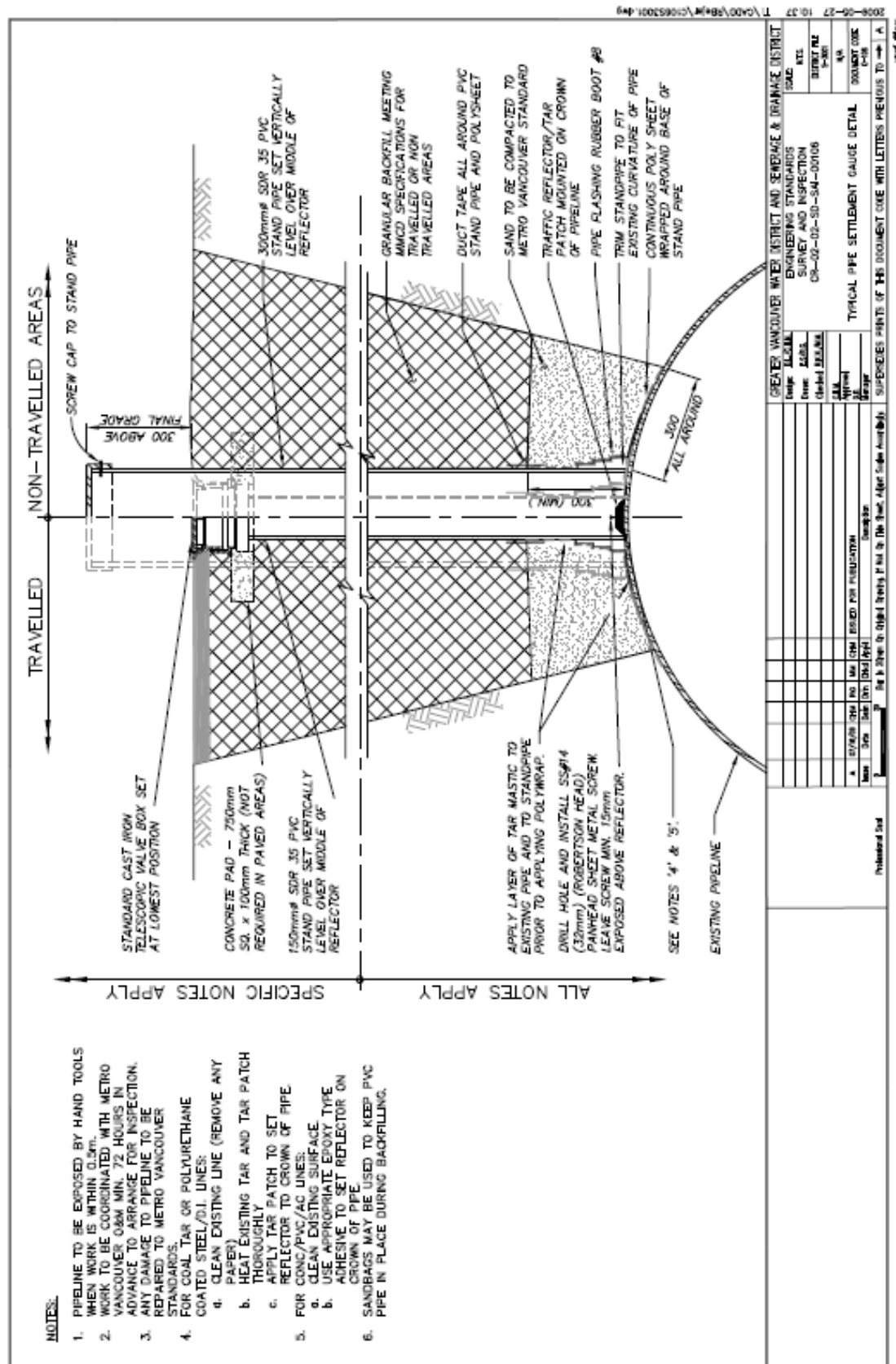
1.0 SCOPE:

1.1 This Standard is intended for use by Metro Vancouver staff or consulting engineers working on Metro Vancouver projects, subject to site specific requirements, suitability of the usage of products, materials and methods referred to, as well as the conditions and assumptions noted. The engineer who signed and sealed this Standard is responsible only for the detail/document as presented and the appropriate use of the Standard is the user's responsibility. When used by a consulting engineer, he/she shall review the material and take full responsibility for the content of the Standard while incorporating it in their design or applying it in construction. If any alteration or deviation is made from the Standard, the appropriate Metro Vancouver discipline supervisor shall be notified.

2.0 DRAWING:

2.1 This document covers the following drawing:

<i>DRAWING ISSUE</i>	<i>DATE</i>	<i>DESCRIPTION</i>
C-106	July 16, 2009	Typical Pipe Settlement Gauge Detail



SCHEDULE OF QUANTITIES AND PRICES – 2019 Water Utility Capital Works
Table A: Brearley Street (Blackburn Ave – North Bluff Rd)

ITEM NO.	MMCD SECTION	SPECIFICATION TITLE	UNIT	EST. QTY	UNIT PRICE	AMOUNT
DIVISION 01 – GENERAL REQUIREMENTS						
	01 55 00	Traffic Control, Vehicle Access and Parking				
01.01B	1.5.1	Traffic Control, Vehicle Access and Parking Brearley Street (Blackburn Ave – North Bluff Rd)	Lump Sum	1	\$	\$
DIVISION 26 – ELECTRICAL						
	26 42 13	Cathodic Protection				
26.01B	1.8.1	Cathodic Protection Brearley Street (Blackburn Ave – North Bluff Rd)	Lump Sum	1	\$	\$
DIVISION 32 – ROADS AND SITE IMPROVEMENTS						
	32 01 16.7	Cold Milling				
32.01B	1.5.1 SSP 13	Surface Milling Average 40mm Thick, Offsite Disposal	Square Meter	263	\$	\$
	32 12 13.1	Asphalt Tack Coat				
32.02B	1.5.1 SSP 13	Asphalt Tack Coat Emulsified Asphalt	Square Meter	263	\$	\$
	32 12 16	Hot-Mix Asphalt Concrete Paving				
32.03B	1.5.1 SSP 13	Asphalt Pavement – Upper Course #1 To MMCD G5	Tonne	36	\$	\$
DIVISION 33 – UTILITIES						
	33 11 01	Waterworks				
33.01B	1.8.2	Watermain PVC C900, DR18, 100mm Dia., All Depth, Imported Backfill	Lineal Meter	2	\$	\$
33.02B	1.8.2	Watermain PVC C900, DR18, 150mm Dia., All Depth, Imported Backfill	Lineal Meter	63	\$	\$
33.03B	1.8.3	Gate Valve 150mm Mechanical Joint	Each	2	\$	\$
33.04B	1.8.3	Bend 45 Degree, 150mm	Each	2	\$	\$
33.05B	1.8.3	Robar Repair Coupler 100mm	Each	1	\$	\$
33.06B	1.8.3	Robar Repair Coupler 150mm	Each	1	\$	\$
33.07B	1.8.3	Reducer 150mm x 100mm	Each	1	\$	\$
33.08B	1.8.3 SSP 14	Mechanical Joint Restraints Brearley Street (Blackburn Ave – North Bluff Rd) Uni-Flange <i>Series 1500 "Circle Lock"</i>	Lump Sum	1	\$	\$
33.09B	1.8.5	Test Point Including Cap and Blow Off Assembly	Each	2	\$	\$

Permanent pavement restoration per the detail shown on Drawing No. 19-1006-WD2 shall be completed between 3-6 months after the completion of temporary restoration, in consultation with the *Owner* and *Contract Administrator*.

Temporary pavement patches shall be completed per the detail shown on Drawing No. 19-1006-WD2 immediately after watermain works and shall use hot-mix concrete asphalt. No payment will be made for temporary hot-mix pavement patches, as this work is incidental to watermain installation.

The intent of the Contract is to install the watermain from March through May 2020, and at least 3 months after the completion of watermain installation, complete the permanent pavement restoration.

SSP 14. MECHANICAL JOINT RESTRAINTS

Contractor to provide a Lump Sum price to cover all costs associated with the supply and install of mechanical joint restraints for the watermain along Brearley Street. Mechanical joint restraints to be as per the Contract Drawings.

SSP 15. HYDRANT INSTALLATION

Add to MMCD 33 11 01 - 1.8:

.14 Payment for hydrant installation shall include the hydrant body, lateral connection from the mainline tee, isolation valve on the hydrant lead with adjustable valve box, fittings, and all other incidental work as shown on the contract drawings.

SSP 16. WATER TRUCK FILL SITE

During construction, the City of White Rock will issue Hydrant Use Permits, which the Contractor can apply for to draw water for use during construction. Hydrant locations to be discussed with successful proponent.

SSP 17. INCIDENTAL ITEMS

Payment for all of work performed under the following MMCD Sections shall be incidental to payment for work described in other MMCD Sections:

MMCD Section	Item Description
01 33 01	Project Record Documents
01 51 01	Temporary Utilities and Lighting
01 52 01	Temporary Structures
01 53 01	Temporary Facilities
01 57 01	Environmental Protection
SSP 10	Materials Testing