

**Union Bay Improvement District
Bylaw #176 Subdivision Water Regulation
Consolidated (Bylaw #227) 2010**

A bylaw regulating the subdivision of land that is being proposed for connection to the Union Bay Improvement District's water system.

The trustees of the Union Bay Improvement District enact as follows:

INTREPRETATION

1 In this bylaw:

- (1) "Applicant" means the owner of property, or the authorized agent of the owner, who has submitted a completed application for the subdivision of land to which the District may supply water.
- (2) "District: means the Union Bay Improvement District.
- (3) "Subdivision" means a subdivision as defined in the *Land Title Act* or the *Strata Property Act*.
- (4) "Standards" means the District's water system Engineering Specifications and Design standards attached as Schedule B to this bylaw.
- (5) "District's system" means the water distribution system including all works owned and operated by the District.
- (6) "Trustees" mean the trustees for the District.
- (7) "Works" means any structure, including pipes, and all attachments, fittings, and facilities for the storage, supply, conveyance, treatment and distribution of water.

OTHER ENACTMENTS

2 Nothing contained in this bylaw shall relieve any person from responsibility for seeking out and complying with other enactments applicable to their undertaking.

GENERAL PROHIBITION

3 Land that is connected to the District's system, or is proposed for connection to the District's system, must not be subdivided contrary to this bylaw.

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APPLICATION

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- (1) An owner of land who proposes to subdivide land and wishes to connect one or more parcels to be created by the subdivision to the district's system must apply to the District by delivering to the District:
 - a) The form prescribed as Schedule A to this bylaw.
 - b) The plans and other information specified in Schedule A.
 - c) A subdivision application fee of \$500 for the first 3 lots and \$100 for each additional lot.

- (2) Every application for subdivision of land that will create a parcel to be connected to the District's system must include a calculation of peak hourly water demand and pressure requirement for the ultimate development of the parcels and sufficient information, plans and drawings for the District to determine whether the proposed works comply with this bylaw. These calculations and plans must be prepared by a registered professional engineer, licensed in the Province of British Columbia.

GENERAL PROVISION

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- (1) The trustees may refuse to approve the proposed subdivision where:
 - a) The proposed subdivision does not comply with the provisions of this and other applicable bylaws of the District;
 - b) One or more parcels to be created by the subdivision are to be connected to the District's system and the District has an insufficient water supply to provide such parcels with a supply of water.

- (2) For the purpose of (1) b), the demand that would be placed on the District's system as a result of the proposed subdivision will be calculated having reference to the peak hourly water demand and pressure requirements for the ultimate development of the parcels or provided under section 4 (2).

- (3) Despite subsection (1), an application may be approved where the owner of the land provides to the District a reasonable proposal to increase the supply capacity of the District's system so that it is capable of providing the parcels to be created by the subdivision with a sufficient supply of water.

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- (1) Subject to section 747.1(3) of the *Local Government Act*, an owner of land who proposes to subdivide the land must:
 - a) Provide, locate and construct a water distribution system within the subdivision;
and
 - b) Connect the water distribution system to the District's system in accordance with the Standards.

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- (2) The cost of providing, locating and constructing the water distribution system and connecting the water distribution system to the District's system must be paid completely by the owner of the land providing the Works.
- (3) The costs referred to in paragraph (2) include the cost of all permits, inspections, engineering costs and other costs related to the proposed subdivision.

CONSTRUCTION OF WORKS IN ADJACENT HIGHWAYS

- 7 In addition to the requirements of section 6, the Board of Trustees of the District may also, by resolution, require that an owner of land provide works and services in accordance with the Standards, on that portion of a highway immediately adjacent to the site being subdivided or developed up to the centre line of the highway, in accordance with section 747.1(4) of the *Local Government Act*.

CONSTRUCTION OF EXTENDED SERVICES

- 8 Where the Board of Trustees requires that an owner of land provide excess or extended services under section 747.2 of the *Local Government Act*, the District will determine the proportion of the cost of the extended or excess service which will be borne by the applicant in accordance with the *Local Government Act* and any policy regarding latecomer charges approved by the Board of Trustees.

EXTENSION OF WORKS AND SERVICES

- 9
- (1) All works required to be installed under section 6 must be installed along the full frontage of the land being subdivided or developed unless the lands beyond the land being subdivided or developed are incapable of further subdivision or development, as determined by the District.
 - (2) For the purpose of subsection (1) lands are not incapable of further subdivision or development by reason only that an amendment to an enactment of a local government or the District would be necessary to permit further subdivision or development.

TRANSFER OF WORKS TO DISTRICT

- 10
- (1) An owner of land who has installed works under this bylaw must:
 - a) Transfer the works to the District and,
 - b) Where any part of the works transferred to the District are located on lands owned by any person other than the District or within a highway, provide a statutory right of way agreement for the works in a form acceptable to the District, naming the District as transferee with priority over any financial encumbrances registered against the title to the land.

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- (2) An owner who transfers works to the District must:
- a) Remedy all defects in the Works for one year following the date of the transfer; and
 - b) Deposit with the District an irrevocable standby letter of credit valid for at least one year from the date of the transfer in an amount not less than the full of the cost of the Works plus 25% as security for the performance of the owner's obligations under a).

COPIES OF PERMITS

- 11 The owner required to install Works under this bylaw must provide to the District a copy of the construction permit for the Works, issued by the Ministry of Health.

CONNECTION CHARGES

- 12 No person may connect any parcel to the District's system without paying all applicable charges in accordance with the District's bylaws.

APPROVAL PERIOD

- 13
- (1) Subject to changes in an enactment, which may affect a subdivision, approval of a subdivision under this bylaw will be valid for a period of six months.
 - (2) An approval under this bylaw must not be interpreted as limiting the function or authority of the Approving Officer under section 87 of the *Land Title Act*.

VIOLATION

- 14 A person who does any act or suffers or permits any act to be done in contravention of this bylaw or who neglects to do or refrains from doing any act or thing which is required to be done by this bylaw, commits an offence.

PENALTY

- 15 A person who commits an offence under this bylaw is liable on summary conviction to a penalty in accordance with the *Offence Act*.

SEVERABILITY

- 16 If any section, subsection, sentence, clause, or phrase of this bylaw is for any reason held to be invalid by the decision of any court, such section, subsection, sentence, clause or phrase may be severed from the remaining portion of this bylaw with the remaining portions of the bylaw remaining valid and of full force and effect.

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INSPECTION AND RIGHT OF ACCESS

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- (1) The trustees, or an officer or employee of the District may enter at all reasonable times upon land subject to this bylaw, to ascertain whether the provisions of the bylaw are being obeyed, provided that:
 - a) Consent to inspect the land is obtained from the owner or occupier of the land, or;
 - b) Where such consent has been refused, written notice of the intent to inspect is given to the owner or occupier no less than 24 hours prior to the time of inspection.

- (2) No person shall obstruct or present a person referred to in paragraph (1) from carrying out any of the provisions of this bylaw.

REPEAL

18 Subdivision Water Regulation Bylaw No. 94 is repealed.

CITATION

19 This bylaw may be cited as the "Subdivision Water Regulation Bylaw No. 176".

INTRODUCED and given first reading by the Trustees on the 16th day of June, 2004

RECONSIDERED and finally passed by the Trustees on the 16th day of June, 2004.

Passed June 16, 2004 Registered July 26, 2004

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Schedule "A"

Application for Water Service to Proposed Subdivision

Property Address(es): _____

Legal Description of Property: _____

Address (Correspondence/calls to be directed to): _____

Phone: _____ Fax: _____ email: _____

The following must accompany this application:

- 1 Copy of Indefeasible Title(s), dated within 30days of the date of application.
- 2 A letter of authorization if the applicant is not the owner.
- 3 Plan of proposed subdivision with dimensions clearly illustrating lot layout, roads, etc. to a scale of not less than 1:2000. Four copies are required.
- 4 The layout sketch plan, in metric, must be prepared by a consulting engineer, planner, or land surveyor and show the following:
 - The full legal description of the parcel(s) to be subdivided;
 - The dimensions and area of all proposed lots;
 - The arrangement of parcels and streets which will be created by the subdivision, including the widths of the proposed streets and alteration of lot lines or subdivision of any existing parcels;
 - The location of all existing buildings and structures on the property;
 - Existing property lines and highways to be eliminated by the proposed subdivision;
 - The location of all natural features and watercourses;
 - The relationship of the development to neighbouring parcels and highways;
 - Intended use of each parcel to be created by the subdivision;
 - Topographic information where land affected by the application is steep, irregular, or otherwise difficult to appraise in respect to the proposed development;
 - A plan of the water system to service the subdivision designed in accordance with the District's Standards.
5. An application fee of \$_____.

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6. Evidence of approval or authorization from other agencies involved in the subdivision process.

Please note the following:

Personal information collected on this form is collected for the purpose of processing this application and for administration and enforcement of District bylaws related to subdivision. Personal information or business information submitted on this form is not considered to be supplied in confidence.

The District, or their duly appointed representative, are authorized to enter the property for inspection purposes.

Property owner(s) signature(s): _____

OR

Authorized agent's signature: _____

Date of Application: _____

Approved this _____ day of _____, 20 .

Authorized Signature

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Schedule "B"

UNION BAY IMPROVEMENT DISTRICT
ENGINEERING SPECIFICATIONS
AND
STANDARD DRAWINGS

MCSL File NO:
2211-46677-0

Revised August 2010

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UNION BAY IMPROVEMENT DISTRICT
SPECIFICATION A - 1

GENERAL INTRODUCTION

1.0 Scope

1.01 The attached specifications shall apply to the design and installation of services within the area served by the UNION BAY IMPROVEMENT DISTRICT. They apply to the design and installation of water mains, together with their respective connections and appurtenances and any other associated works such as pump houses, reservoirs, vaults, etc. which are required to be designed and/or installed.

1.02 These specifications are applicable unless superseded by a more recently issued specification.

1.03 The District's Standard Drawings shall form an integral part of these specifications and shall apply throughout.

1.04 In the event that these specifications and standard drawings do not adequately cover a specific item, the “master Municipal Construction Documents”, (MMCD) latest edition, shall apply. The MMCD specifications document shall be considered an adjunct to the District’s engineering specifications and standard drawings.

2.0 General

2.01 The following specifications and conditions shall apply to all or any of the respective services:

Specification A:	1 - General Introduction
	2 - The Union Bay Improvement District Water Main Connection/Extension Procedures and Policy
Specification B:	1 - Preparation of Design Drawings
	2 - Preparation of "As Constructed" Drawings
Specification W:	1 - Design of Water mains and Water Services
	2 - Installation of Water mains and Water Services
Specification T:	1 - Water Utility Excavation, Backfill and Clean Up

2.02 All services shall be designed and installed as detailed in the specifications and according to the procedures set out in this specification.

2.03 Where strict compliance with these specifications is impractical or unreasonable, the Union Bay Improvement District may permit a variance to the specifications provided prior approval is obtained. Approval of any variance must be issued by the Board of Directors of the Union Bay Improvement District. Once approved, a record of these changes shall be sent to the District.

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3.0 Definitions - The following Definitions shall apply to all Agreement Documents.

3.01 The Agreement

The Agreement means the Water Main Connection/Extension Agreement. Unless otherwise specified, the Agreement shall be governed by the law of British Columbia.

3.02 Water Connection/Extension Agreement

The Agreement Documents form the Water Main Connection/Extension Agreement. This Agreement is the undertaking by the parties to perform their respective duties, responsibilities and obligations as prescribed in the Agreement Documents and represents the entire agreement between the parties. The Agreement supersedes all prior negotiations, representations or agreements, either written or oral. The Agreement may be amended only as agreed upon between the parties.

3.03 Agreement Documents

The Agreement Documents consist of the executed Water Main Connection/Extension Agreement between the Union Bay Improvement District and the Owner, the Union Bay Improvement District's Definitions, Procedures and Policies, Engineering Specifications, Standard Drawings, Warranty Agreement and such other documents including amendments as agreed upon between the parties. **This shall include requirements and conditions as stipulated in UBID Bylaw No. 176, the Subdivision Water regulation.**

3.04 District

The term District means the Union Bay Improvement District or its authorized agent or representative as designated to the Owner in writing.

3.05 Owner

The Owner is the person, firm or corporation identified as such in the Water Main Connection/Extension Agreement and is referred to throughout the Agreement Documents as if singular in number and masculine in gender. The term Owner means the Owner or his authorized agent or representative as designated to the Union Bay Improvement District in writing but does not include the Consulting Engineer or Contractor.

3.06 Applicant

The Applicant is the person, firm or corporation identified as such in the Agreement Documents and is referred to as if singular in number and masculine in gender. The term Applicant means the Owner or his authorized agent or representative as designated to the Union Bay Improvement District in writing but does not include the Consulting Engineer or Contractor.

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3.07 Consulting Engineer

The Consulting Engineer is the person, firm or corporation identified as such in the Agreement Documents and is an Engineer licensed to practice in the Province of British Columbia, and is referred to throughout the Agreement Documents as if singular in number and masculine in gender.

3.08 Contractor

The Contractor is the person, firm or corporation identified as such in the Agreement Documents and is referred to as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative as designated to either the Owner or the Union Bay Improvement District in writing, which shall undertake the installation of the waterworks on behalf of either the Owner or the Union Bay Improvement District.

3.09 Engineer Client Agreement

The Engineer Client Agreement is the agreement entered into by the Owner and a Consulting Engineer wherein the Owner engages the professional services of the Consulting Engineer to provide the level of engineering service required by the Agreement Documents for the design and construction supervision of the waterworks.

3.10 Waterworks

The Waterworks means the total construction and related services required by the Agreement Documents.

3.11 Work

The Work means the total construction and related services required by the Agreement Documents.

3.12 Trustee to the Union Bay Improvement District

The Trustee to the Union Bay Improvement District is the official in charge of the Union Bay Improvement District or their appointed representative and is referred to throughout the Agreement Documents as if masculine in gender. The term Trustee to the Union Bay Improvement District means any employee, agent or representative authorized to act on his behalf.

3.13 Waterworks Inspector

The Waterworks Inspector is a person either employed or engaged by the Union Bay Improvement District and is referred to throughout the Agreement Documents as if masculine in gender. The term Waterworks Inspector means the District representative or Consulting Engineer approved by the Trustee to the Union Bay Improvement District who shall make such inspections and tests as he considers necessary, of any work being carried out under the Agreement Documents and shall coordinate works being carried out within the areas served by the District.

3.14 Authority Having Jurisdiction

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The Authority Having Jurisdiction means that public body with powers to enforce statutes, regulations, codes and by-laws, and to issue consents, approvals, licences and permits, in a given area, all as applicable and necessary to the design and construction of the works.

3.15 Prepayment of the Estimated Costs

Prepayment of the Estimated Costs means the deposit to be made by the Owner to the District in the form of cash, certified cheque and/or Irrevocable Letter of Credit equal to 120 percent of the estimated amount of the cost of installing and paying for the waterworks required by the Agreement Documents.

3.16 Design Drawings

The term Design Drawings means those drawings prepared in accordance with the Agreement Documents which are a detailed, illustrative description of the work to be constructed.

3.17 Preliminary Design Drawings

The term Preliminary Design Drawings means those Design Drawings which show the location and layout of the works and contain sufficient detail to enable the project to be reviewed by the Union Bay Improvement District and other authorities having jurisdiction.

3.18 Design Approval

The term Design Approval means those Design Drawings which have been given final approval by the Union Bay Improvement District.

3.19 "As Constructed" Drawings

The term "As Constructed" Drawings means those Design Drawings which have been revised to reflect any changes in design that were incorporated into the actual construction of the works.

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UNION BAY IMPROVEMENT DISTRICT
SPECIFICATION A - 2

WATER MAIN CONNECTION/EXTENSION PROCEDURES AND POLICY

1.0 Introduction

1.01 This section contains Water Main Connection/Extension Procedures and Policy that apply to the Union Bay Improvement District.

2.0 General Information and Policies

2.01 The extension and upgrading of water distribution systems in the Union Bay Improvement District to serve new customers or new development is the responsibility of the District, but the entire cost of works and services is at the Applicant's expense.

2.02 Topographical surveys, design and preparation of drawings for waterworks shall be carried out by Consulting Engineers engaged by the Applicant and in accordance with these specifications.

2.03 General Provisions

a) The estimated costs of waterworks extensions shall be based upon compliance with these specifications and the requirements of other regulatory authorities having jurisdiction.

b) The District may charge builders or subdividers in or of unserved areas the full cost, in advance, for extensions and the servicing of the unserved area, plus a reasonable portion of replacing or enlarging any existing works (including pipelines, pumping plants, reservoirs and control systems) which will serve the area, and if there are no pipelines to the subdivision, the subdivider shall pay for one large enough to supply the subdivision.

c) The District will only assume ownership and responsibility to operate and maintain water distribution works that comply with these specifications and are located along publicly gazetted roads, through right-of-ways or easements held in the District's name, or on property owned outright by the District.

2.04 Responsibility for Material

a) Responsibility for Material Furnished by Contractor

The Contractor shall be responsible for all material furnished by him and shall replace at his own expense all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include

the furnishing of all material and labour required for the replacement of installed materials.

All materials furnished by the Contractor shall be approved by the District before being incorporated into the works.

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b) Responsibility for Material Furnished by District

The Contractor's responsibility for material furnished by the District shall begin at the point of delivery thereof to said Contractor. Materials already on the site shall become the Contractor's responsibility on the day work commences. Who supplies the material for the works shall be the sole decision of the Union Bay Improvement District.

c) Responsibility for Safe Storage

The Contractor shall be responsible for the safe storage of material furnished by or to him, and accepted by him, and intended for the work, until it has been incorporated in the completed project. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.

3.0 Right-of-Way or Easement Documents

- 3.01 The Applicant shall have all right-of-way documents prepared for waterworks where the District will assume responsibility for maintenance. Where a single right-of-way is required, the minimum acceptable width is 4.5 m.
- 3.02 Rights-of-way shall be located within a single property adjacent and parallel to property boundaries and shall be clear of proposed building sites.
- 3.03 Rights-of-way shall be provided by the Applicant for the eventual extension of the water main as required by the Trustee to the Union Bay Improvement District.

4.0 Engineering Supervision

- 4.01 The Consulting Engineer shall be responsible for the layout, inspection and approval of all services which are the responsibility of the Applicant.
- 4.02 Engineering supervision on work carried out by the Contractor shall include sufficient inspection to ensure that the works and services are constructed in accordance with the approved design drawings and specifications.
- 4.03 In addition to the Consulting Engineer carrying out supervision, the District shall bring to the attention of the Contractor and the Consultant Engineer the use of unacceptable materials or practices. If remedial action is not taken to the satisfaction of the District, the waterworks will not be accepted.
- 4.04 If the Consulting Engineer wishes to make any changes in approved design either before or during the execution of the work, he shall first submit a marked print showing proposed revisions to the District's office. If approval is granted for revision, the original drawing shall be immediately revised, signed by the Trustee to the Union Bay Improvement District and new prints issued.

As all District employees have been instructed to enter only those excavations which meet the requirements of WCB regulations, no approval will be given to installations which cannot be inspected because of unsafe working conditions.

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5.0 Circulation and Approval of Design Drawings

- 5.01 The Consulting Engineer shall prepare Preliminary Design Drawings and upon completion, submit two copies of same to the District for review and comment.
- 5.02 After review by the District, a marked set of drawings showing comments will be returned to the Consulting Engineer for revisions to the design drawings.
- 5.03 When all items have been corrected the Consulting Engineer shall submit two copies of the revised Design Drawings to the District for final approval.
- 5.04 A letter of confirmation that an Engineer Client agreement is in force must be received prior to design approval. The Engineer Client Agreement must provide for the level of engineering service required in this specification. A copy of such a letter shall be supplied to the Trustee to the Union Bay Improvement District.
- 5.05 Any right-of-way outside of the proposed subdivision plan must be obtained and registered by the Applicant prior to Design Approval. See section 3.0 of this specification for right-of-way preparation procedure.
- 5.06 Where authorization, approval and/or permits are required from municipalities, senior governments and other authorities having jurisdiction, it is the Applicant's responsibility to obtain these. Developments adjacent to, affected by or affecting the following will require plans to be submitted to the appropriate municipal/non-municipal authority:
- Regional District
 - Municipality having jurisdiction.
 - Ministry of Transportation and Highways.
 - Fire District having jurisdiction.
 - Ministry of Health - Public Health Engineer.
 - B.C. Hydro, B.C. Telephone, Centra Gas, Railway, Right-of-Ways.
 - Main water courses, and water - course crossings.
 - Drain Outfalls.
 - Ministry of Environment.
- The above approvals are required prior to design approval.

6.0 Service Installation

- 6.01 The following steps shall be carried out prior to start of construction of the waterworks:
- a) Design drawings must have approval of the District.
 - b) The Consulting Engineer shall make arrangements to inspect the site of the work in the company of a District representative 24 hours prior to the start of construction.
- If work proceeds without approved inspections, the District will require the works to be exposed for an inspection prior to acceptance.
- c) All necessary permits and approvals must be obtained from the authority having jurisdiction before work proceeds.
- 6.02 A copy of the approved Design Drawing and the District Specifications and Standard Drawings shall be maintained by the Contractor at the construction site

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during the installation of all waterworks. A clean set of drawings shall be kept for marking all "As Constructed" details and shall be submitted to the District upon completion of the work.

- 6.03 Waterworks and services shall not be permitted to operate as part of the District's distribution system until the waterworks and services have been inspected, tested, disinfected and approved in writing by the District.

7.0 District Acceptance of Works and Services

- 7.01 Upon the authorization of the District and after the receipt of satisfactory as-constructed drawings, warranty security and the acceptance of the required works, any relevant deposits guaranteeing the satisfactory installation of the works shall be returned to the Applicant.

- 7.02 Warranty security shall be held by the District in the form of an Irrevocable Letter of Credit or cash deposit for the one (1) year period of warranty for all services. The security shall be in the amount of 10% of the Contract price or cost estimate, whichever is greater, and will not be less than five hundred dollars (\$500.00).

- 7.03 The District may release a portion of any deposit for work requiring an extended period of construction provided that:

- a) The Consulting Engineer certifies in writing the extent and value of work completed, as well as itemizing the outstanding work and cost of same (including outstanding engineering fees for the submission of "As Constructed" drawings if applicable), and that the completed works meet the specifications of the District.

- b) Verification is obtained from the District that the work to date is acceptable.

Monthly payments may be released according to the following schedule:

- c) If the total estimated value of construction is \$10,000.00 or less, no releases will be permitted until completion of the work.

- d) If the total estimated value of construction is greater than \$10,000.00, up to 75% of the value of the work performed may be released.

- 7.04 The District will not accept the works until "As Constructed" drawings have been provided and approved. The period of the Warranty will begin on the date the "As Constructed" drawings are approved by the District. The District will retain any remaining deposits until the Warranty begins.

8.0 Warranty of Works and Services

- 8.01 The Owner/Applicant shall be responsible for and at his own expense execute all work, repair, alteration, reconstruction or replacement required to remedy any defect, fault or deficiency in or developing in the completed work not only up to the receipt and approval of the Consulting Engineer's "As Constructed" drawing but also during the period of warranty of twelve (12) months after the date of approval of each "As Constructed" drawing.

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- 8.02 In the event repairs are required which necessitate the interruption of service to any customer and/or the draining of any main, the District reserves the right to perform the work and charge the costs to the Owner/Applicant.
- 8.03 All such works of rectification, repair and warranty shall be executed upon the written request of the District. Should the Applicant neglect or fail to commence the execution of such works within the time period given by the District, the District shall complete the remedial works according to the terms of the Warranty Agreement.
- 8.04 Final Acceptance by the District
- a) The District shall inspect the works prior to the expiration of the warranty period. Any deficiencies shall be corrected as noted above prior to release of the Warranty deposit.
 - b) If rectification or repair does not take place within the time allowed by the District, the District shall complete the remedial works according to the terms of the Warranty Agreement.
 - c) If no deficiencies have developed during the warranty period, the Warranty deposit shall be released.

9.0 Testing

- 9.01 The Contractor, under supervision and direction from the Consulting Engineer, shall disinfect newly installed water main after a satisfactory leakage test has been carried out by the Contractor.
- 9.02 The Consulting Engineer shall, at his discretion, arrange for periodic compaction testing within the trench where trenches are over one metre deep. Test results shall be submitted to the District.
- 9.03 The Contractor under supervision and direction from the Consulting Engineer, shall flush and then obtain samples from the newly installed water main, and have these samples subject to a coliform test by a qualified testing laboratory. Coliform test results are to meet or exceed Guidelines for Canadian Drinking Water Quality, and are to be approved and passed by the Consulting Engineer.

10.0 Payment

- 10.01 Payment of costs shall be as follows:
- a) Work that is to be carried out by District forces is subject to prepayment of the estimated costs. Six weeks must be allowed after payment for preparation of plans, work orders and scheduling of the work.
 - b) Where work is to be carried out by the Owner, and if materials are being supplied by the District, prepayment for the estimated costs of materials must be made to the District.
 - c) Whether the work is done by the Owner or District shall be the sole decision of the District. The District reserves the right to perform only a portion of the work.

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SPECIFICATION B - 1

PREPARATION OF DESIGN DRAWINGS

1.0 Scope

1.01 This specification shall govern the preparation of all engineering drawings for design of services within the District.

2.0 General

2.01 Any information received from the District on existing services shall be used as a guide only. Verification of locations and elevations must be checked by actual survey. The District takes no responsibility for the exactness of service information obtained from plates and drawings. Confirmation of the location of underground utilities shall be the sole responsibility of the Applicant.

2.02 All existing statutory rights-of-way or easements and their permitted uses must be checked through the Land Titles Office and be shown lightly shaded on the design drawing. Registration numbers shall be shown.

2.03 All proposed rights-of-way for new services are to be shown as a dashed line. These shall be tied to the iron pin in each lot, together with their width, permitted use, and the note "acquire" or "proposed". Right-of-way documents shall be prepared as detailed in these specifications.

2.04 A north arrow, existing and proposed street names shall be shown on the design drawing. The north shall be generally oriented towards the top of the sheet.

2.05 All services shall generally be shown on one plan using the symbol shown in brackets for the following:

(MC)	Mountable Curb	(G)	Gas
(NMC)	Non-mountable Curb	(W)	Water
(S/W)	Sidewalk	(U/G)	Underground wiring
(S)	Sewer	(H)	Hydro Pole
(D)	Drain	(T)	Telephone Pole

Other services shall be clearly designated on the drawing.

2.06 Existing water mains, sanitary sewer mains, storms drains (including all appurtenances), ditches, pavement, curbs, sidewalks, underground wiring, gas, poles, trees, service connections and other underground utilities shall be indicated in plan and profile where applicable.

2.07 All proposed utilities shall be fully dimensioned as specified herein.

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3.0 Drawing Information

3.01 Standard sheet size is A1 metric size 594 mm x 841 mm.

3.02 Use transparent plan/profile paper complete with standard District title block in the lower part of the sheet. Personalized Company plan/profile paper may be used provided it can meet the following requirements:

- 1) Plan view shall be in the lower half of the page with District title block added in the lowest 50 mm of the page.
- 2) Profile view shall be 1 x 5 lines to the centimetre and occupy the upper half of the page.

The use of the plan on one sheet and profile on a second sheet shall not be allowed.

3.03 Layout dimensions shall be given from an existing or proposed iron pin or lot line.

3.04 Proposed construction shall be shown as dashed lines and the existing shown as solid lines.

3.05 Lines and printing shall be in Leroy and be of uniform size using the following weights for : Lot lines #.25; Road lines #.5; Sewer, drain, water lines #.35. Construction notes shall be confined to a separate "note" column, wherever possible, with numbered references in plan or profile.

3.06 Road and/or water main chainage shall be tied to an iron pin from the start of construction.

4.0 Scales

Normally:	Horizontal 1:500	Vertical 1:100 or 1:50
Details: *	Horizontal 1:200	Vertical 1:20 or 1:50
Cross Sections:	Horizontal 1:100	Vertical 1:100
Structural Details	1:20	

* e.g.: a detail of piping.

5.0 Requirements for Subdivision Key Plan

5.01 A key plan, when required, shall be on the right side of the design drawing and shall include the following information:

- a) Plan of adjacent streets and existing lots with streets named and legal of adjacent lots given;
- b) Civic address with the property being subdivided shown shaded;
- c) North arrow;

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- d) The location of existing and proposed hydrants;
- e) Contours at 1, 2 or 5 m intervals; to geodetic datum;
- f) Title "Proposed Subdivision of (give the full legal)";
- g) If the subdivision is to be developed in stages, each proposed stage shall be clearly outlined and order of development indicated.

5.02 If a key plan is not required, the house number of existing houses shall be shown on the detailed design plan.

6.0 Requirements for Waterworks

6.01 Drawings shall indicate whether the water main passes over or under other underground utilities.

6.02 The following information shall be shown on the profile:

- a) The size, type and class of pipe, and class of bedding.
- b) For mains 200 mm and larger, profile grades to 2 decimal places.

6.03 The following information shall be shown on the plan:

- a) The offset of the main centreline from the property line.
- b) Where the short pipe lengths are required on curves, refer to District Specification W-1, section 3.11.
- c) Extent of work required in making the connection to the existing water main.

7.0 Requirements for Other Utilities

7.01 Complete details of other utilities shall be obtained from the appropriate utility company.

7.02 The following information shall be shown on the plan:

- a) Existing utilities.
- b) Utility offset from property line and/or iron pin.
- c) Lot connections and other appurtenances.
- d) Existing and proposed poles shall be dimensioned from the pole road face to property line and/or pin.

7.03 Underground utilities shall be shown schematically.

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UNION BAY IMPROVEMENT DISTRICT
SPECIFICATION B - 2

PREPARATION OF "AS CONSTRUCTED" DRAWINGS

1.0 Scope

1.01 This specification governs "As Constructed" drawings of the installed waterworks.

2.0 General

2.01 "As Constructed" drawings shall consist of one paper print of the approved design drawing with changes or corrections made as required in Section 2.02. This shall be followed after approval by a mylar of the original design drawing, revised as required to show services as constructed.

2.02 The "As Constructed" drawings shall clearly show the location of all services as installed using offsets from survey pins. The extent shall be shown by inking the constructed service in dark blue. The locations will be shown either by check-marking any original dimension on the drawing (if they are correct) or by showing the revised dimension beside the original dimension. In addition, the location to the end of underground pipe shall be shown.

2.03 Within two weeks of completion of the waterworks to be installed by the Applicant, the Consulting Engineer shall deliver ""As Constructed"" drawings to the District. These drawings shall include the following statement signed, sealed and dated by the Consulting Engineer:

"I certify that the following services " _____ " were inspected during construction and were installed in accordance with District Specifications and Standard Drawings and as shown on this drawing."

3.0 Tolerances

Layout Dimensions

- 3.1
 - a) Record all horizontal dimensions to the nearest 150 mm;
 - b) Record all vertical elevations to the nearest 5 mm except that ground elevations and service connection inverts at property line shall be to the nearest 30 mm;
 - c) Record road horizontal locations to the nearest 30 mm.
 - d) Record road vertical locations to the nearest 15 mm.

3.2 All other dimensions, i.e. structures, etc. shall be recorded to the tolerances shown on the drawings and appropriate specifications.

4.0 Additional Required Details

4.01 Water

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- a) Show domestic water services and reference to corner iron pin;
- b) Location of corporation stops.
- c) Location of rock cuts and maximum depth of rock excavation;
- d) Profile of main indicating numerically the invert at 15 m stations;
- e) Reference locations of fire hydrants to main valve and IP;
- f) Location of all valves and reference to iron pin.

4.02 Road, Curb and Sidewalk

- a) Location of end of curb, sidewalk and pavement.

4.03 Bridges, etc.

- a) Location of structure
- b) Elevation of deck

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SPECIFICATION W - 1

DESIGN OF WATER MAINS AND WATER SERVICES

1.0 Scope

1.01 This specification shall govern the design of all water pipe and waterworks appurtenances within the Union Bay Improvement District.

2.0 General

2.01 Water mains shall not be extended unless the residual pressure will be greater than 200 kPa (30 psi) at the meter box during average daily demand. If this is not adequate to serve the property, it shall be the responsibility of the property owner to provide a suitable booster pump.

2.02 Fire flows for single family residential areas shall not be less than 2000 l/m (400 gpm) for two hour duration in addition to domestic consumption at maximum daily rate. Residual pressure shall not be less than 140 kPa (20 psi).

3.0 Location

3.01 The water main shall be located within a road allowance as approved by the authority having jurisdiction.

3.02 The water service shall be located in the road allowance fronting the lot to be serviced. If required, traffic islands with planting areas shall be provided with a 19 mm water service.

3.03 The water main shall be installed along the full frontage of the property to be developed and extended to the most convenient existing water main that will provide an adequate supply of water. The water main shall extend at least 1.25 m beyond the pavement at the extreme end of a cul-de-sac.

3.04 The water main shall not be located within 1 m of any utility pole.

3.05 Where it is necessary for the water main to cross other underground services the crossing shall be made at an angle greater than 20 degrees and the vertical clearance between services at the crossing point shall be not less than 75 mm.

3.06 At any location there shall be a minimum linear horizontal clearance of 1 m between the water main and other existing or proposed underground services or open ditches, except sanitary sewers, unless an approved construction technique is employed. A minimum linear horizontal clearance of 3 m shall be maintained between the water main and a sanitary sewer with the exception that in rock or hardpan the water main may be located on a bench with continuous support and having a horizontal separation of 450 mm minimum and the invert of the water main a minimum of 450 mm above the crown of the sanitary sewer.

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- 3.07 At all intersections the pipe shall connect to existing mains.
- 3.08 Where the final road pattern prevents the looping of the water main network, a supplementary connection of a minimum of 150 mm diameter to an existing main may be required which may necessitate the provision of a right-of-way in favour of the District.
- 3.09 a) On a curve for ductile iron pipe the minimum permissible pipe line radius with a 5.5 m length of ductile pipe shall be 60 m. A shorter radius shall be allowed with shorter pipe lengths provided the radius is not less than the manufacturer's minimum.
- b) For PVC pipe in 6.1 m lengths the minimum radius of curvature shall be as follows:
- 150 mm pipe - 70 m
200 mm pipe - 91 m
- 3.10 At all dead ends, provision shall be made for flushing the completed main prior to filling and testing. Provision shall also be made for expelling air during filling by the installation of double acting air valves or main cocks where necessary.
- 3.11 All water mains shall be installed to a designed grade to provide a minimum depth of cover of 1.0 m (3 ft.) to the top of the pipe.

4.0 Pipe Size

- 4.01 Water mains shall be a minimum of 150 mm diameter.
- 4.02 Water services for single family residences shall be 19 mm. A duplex shall be considered as two single family residences and each shall have its own service. Where two service connections are served by a single service line, the service line shall be one pipe size larger than the largest meter supplied.

5.0 Materials

- 5.01 All pipe and fittings shall conform to AWWA, or CIIC specifications for a working pressure of 1030 kPa (150 psi). Where working pressure exceeds 1030 kPa (150 psi) pressure class of pipe and fittings shall be increased accordingly.
- 5.02 Ductile Iron pipe shall have a gasketed push-on joint and a cement mortar lining conforming to AWWA Standard C151. Pipe shall have cement mortar lining inside and asphaltic lining outside.
- 5.03 PVC pipe shall conform to AWWA C900-89 "Poly Vinyl Chloride" (PVC) Pressure Pipe 150 mm through 300 mm for water. The pipe is to be minimum class 150 [Dimensional ratio (DR) of 18 maximum] with Ductile Iron outside diameter and Integral Bell Gasketed Joint. The pipe shall be supplied in 6.0m nominal lengths.

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- 5.04 19 mm, 25 mm, 39 mm and 50 mm water service tubing shall be polyethylene tubing (AST B.88-80) or approved alternative.
- 5.05 Valve boxes shall be Victoria Foundries Ltd. type 30-72 square, or equal. The valve box shall be placed so that the arrow points downstream.
- 5.06 Main stops and service stops shall have compression type end fittings suitable for polyethylene pipe.
- 5.07 **For PVC pipe, single broad strap stainless steel service clamps and bronze bushings to match the pipe and connection sizes shall be provided for each proposed water service connection. For other pipe material, including Asbestos Cement pipe, double broad strap stainless steel service clamps shall be used for each proposed water service connection.**
- 5.08 Gate valves up to 300 mm shall be standard, 860 kPa (125 psi) iron body, bronze mounted solid wedge with N.R.S. turning counter clockwise to open with 50 mm square operating nut. Resilient seat valves shall be used for valves up to 300 mm in diameter. All valves shall meet AWWA C509-87.
- 5.09 A valve box shall be provided with each gate valve and as required for other appurtenances.
- 5.10 Fire hydrants shall be 150 mm, tested for a working pressure of 1030 kPa (150 psi) and having one 122 mm pumper port and two 65 mm hose ports. The ports are to be threaded to the BC Standard and provided with caps. The operating nut is to be pentagonal with 25 mm sides turning counter clockwise to open and the port caps shall have matching nuts. A drain valve shall be incorporated in the base of the hydrant (Terminal City C-71P).

6.0 Fire Hydrants

- 6.01 Hydrants shall be located in the boulevard and should preferably be located at or near a street intersection; otherwise they may be located on the projection of the property line dividing two lots. The local Fire Department shall determine the location where hydrants must be installed.
- 6.02 Generally a hydrant shall not be located within 3 m of a utility pole or light standard, within 1 m of underground service pipes or open ditches, or within 2.2 m of the curb line.
- 6.03 There shall be a gate valve on each fire hydrant.
- 6.04 All hydrants shall be set to finished grade in accordance with the Standard Drawing. All hydrants shall have a minimum depth of bury of 1.2 m (4 ft.).
- 6.05 Hydrants shall be located so that no lot is greater than 150 m from a hydrant.
- 6.06 Hydrants shall be Terminal City C-71P – Red with white caps.

7.0 Valves

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- 7.01 Line valves shall be not more than 300 m apart. For convenience of operations, line valves should be located adjacent to a hydrant if there are no connecting mains within 120 m.
- 7.02 Line valves or hydrant valves shall not be located within 600 mm of a curb line, in a ditch, or above another service.
- 7.03 A line valve of the same diameter as the pipe, where deemed necessary by the District, shall be placed on each downstream branch of all "tee" and "cross" fittings.
- 7.04 Double acting air valves, if deemed necessary by the District, shall be installed at all high points on water mains.
- 7.05 On service connections greater than 25 mm, a valve and box shall be placed on the connection adjacent to the main.

8.0 Fittings

- 8.01 All fittings and appurtenances shall generally have standard hub ends (Tyton or approved equal) except where valves are attached to the fitting, in which case flanges shall be used.
- 8.02 Flush valves shall be installed at all dead ends.
- 8.03 Approved restrainers shall be used where deemed appropriate and necessary.

9.0 Thrust Blocks

- 9.01 Thrust blocks shall be constructed in accordance with the Standard Drawing.

10.0 Pressure Reducing Stations

- 10.1 A pressure reducing station shall be required where the pressure in the proposed distribution system will exceed 860 kPa. In general the pressure reducing station shall be located at the elevation where the station pressure initially exceeds 860 kPa.
- 10.2 General requirements for pressure reducing stations shall be as follows:
 - a) A valved bypass shall be provided.
 - b) A downstream surge relief valve shall be provided to release pressure in the event of a failure of the pressure reducing valve(s). The surge relief valve may be incorporated into the pressure reducing station or may be located at some other suitable location within the distribution system. The surge relief valve shall drain to an adequate storm drainage facility, as approved by the District. Upstream surge relief valves shall be provided as required.
 - c) Pressure reducing valves shall be sized to provide adequate pressure control through all ranges of design flows. If necessary, two or more pressure reducing valves of varying sizes shall be provided in the one station.

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- d) Each pressure reducing and surge relief valve shall be provided with isolating valves and shall be installed so that individual components may be easily removed for repair or replacement.
- e) The pressure reducing station equipment shall be enclosed in a watertight reinforced concrete vault designed to CS600 loading with a standard manhole cover or other opening large enough to remove the largest single piece of equipment in the station. Station floors shall be sloped at 2.0% towards a floor drain assembly.
- f) Pressure gauges complete with snubbers and isolating valves shall be installed to register both upstream and downstream pressure. Gauges shall be mounted so they may be read from the manhole access lid without entering the chamber.
- g) Adequate strainers shall be supplied on the water used for controlling the regulating valves and on the main intake.
- h) Pressure reducing stations shall be located outside of the travelled portion of any street and must be vented to promoted air circulation.
- i) Inside walls, floors and ceilings of stations to be painted with a white water soluble cement base paint manufactured for the purpose of sealing concrete.
- j) Exterior walls below grade shall be tar coated to prevent leakage.

11.0 Storage Tanks

- 11.1 Where storage tanks are required within the Union Bay system, the Applicant and Consulting Engineer shall meet with the District to determine requirements. All tanks shall be judged on a criteria that may include minimal long term maintenance of the tank and structure. The District will determine what materials, configuration and location is appropriate in each situation.
- 11.2 Each tank installed within the District shall include an appropriate control mechanism, approved by the District.
- 11.3 Every tank shall meet the appropriate AWWA specifications.
- 11.4 Each tank shall be tested for leakage upon completion. The leakage shall be within the allowances specified on the approved design drawings.

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SPECIFICATION W - 2

INSTALLATION OF WATER MAIN AND WATER SERVICES

1.0 Scope

1.01 This specification shall govern the installation of all water pipe and waterworks appurtenances within the Union Bay Improvement District.

1.02 **Water services originate at the main and terminate at the meter box and shall include the saddle, the corporation stop, the polyethylene service line, the meter box and meter setter (with dual check valve), but excludes the meter. The meter will be installed by the District when service is required.**

2.0 General

2.01 The installation, including jointing, shall be in accordance with the current AWWA Standards.

2.02 Ductile iron pipe shall be installed without joint conductance unless specifically required for corrosion protection.

2.03 When the water main is under construction in a trench, water and debris shall be prevented from entering openings in the water main by keeping the excavation sufficiently dewatered and also by capping or plugging such openings with watertight fittings. Pipe and fittings shall be protected from contamination during construction. At the end of each working day pipes shall be securely capped.

2.04 The 19 and 25 mm water service tubing shall be of one continuous piece between the main stop and curb service.

2.05 Existing valves shall not be opened or closed by unauthorized persons.

2.06 For existing 100 mm diameter pipe; 19 mm and 25 mm services shall be tapped a minimum 600 mm apart, (and 600 mm from a collar) and rotated a minimum of 100 mm on the circumference of the pipe. Larger services into pipes greater than 100 mm diameter shall be a minimum of 1.25 m apart. Service saddles shall be installed in all cases.

2.07 Where installation of other services cross under Asbestos Cement (AC) water mains, a section of the AC main shall be replaced with Ductile Iron pipe such that the full trench width is bridged by Ductile Iron.

2.08 Blocking shall be installed as required. Concrete used for precast or cast in place blocks shall have a minimum 20 MPa compressive strength at 28 days.

2.09 The pipe shall not be backfilled until it has been inspected, approved, and the horizontal and vertical alignment recorded by the Consultant Engineer.

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- 2.10 Connection of a new pipe line to an existing water main shall be done by the Contractor under the direction of the District. The Contractor is to notify the District 72 hours in advance of his intention to make a connection of a new pipe line to an existing water main.
- 2.11 Closure of any portion of the District water system cannot be made without the express prior consent of the District. The Contractor is to notify the District 72 hours in advance of his intention to close any or part of the District water system.
- 2.12 Where valve boxes are to be located in the gravel shoulder of a paved highway, the top of the valve box shall be installed to the grade of the gravel shoulder. A square area 2 metres x 2 metres within which the valve box is centred, shall be excavated to a depth of 50mm and cold mix shall be placed and compacted to a final depth of 50mm. The cold mix shall extend to the edge of the existing road paved surface.
- 2.13 Where a water main crosses over or under a sanitary sewer or sanitary sewer service connection with less than one (1) meter clear vertical distance between the water main and the sewer line, sufficient protection shall be provided to enable repairs of either pipe line without damage or rupture of both mains. This protection shall be provided by:
- (i) using ductile iron water main at the crossing for a distance of three (3) meters both sides of the crossing or,
 - (ii) by sleeving the sewer main in ductile iron pipe at the crossing for a distance of three meters both sides of the crossing or,
 - (iii) providing a suitable pipe bridge between the mains or,
 - (iv) by other means satisfactory to and approved in advance of construction by the District.

3.0 Location of Mains

- 3.01 The main and appurtenances shall be located to within 60 mm horizontally of the position shown on the approved plan.
- 3.02 All pipe shall be laid to designed alignment and grade with the following tolerances:
- a) Horizontal tolerance shall not be greater than 60 mm from designed location. The rate of deviation from the required alignment shall not exceed 30 mm in 7.5 m.
 - b) Vertical tolerances shall not be greater than 10 mm from designed grades on 200 mm and larger water mains.
- 3.03 When the water main is within the road allowance, it shall have a minimum of 1.0 m cover.

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4.0 Location of Services

- 4.01 The curb stop is to be located within the property frontage, 1 metre into the road SRW from the property frontage.
- 4.02 The location of the curb stop at the end property line shall be marked with a 50mm x 100mm wooden post painted blue and staked into the ground with minimum 0.5m projecting above grade. A 2mm blue wire is to be wrapped and tied to the ends of the water service and post.
- 4.03 Water services shall be installed from the water main to the property line, using the shortest practical route.
- 4.04 The ditch excavation shall be deep enough to allow a minimum of 0.9 m of cover material to be placed over the water service except the curb stop which shall have 250 mm cover.

5.0 Bedding

- 5.01 Bedding for all water pipe shall be as detailed on the Standard Drawing.

6.0 Testing the System

- 6.01 All water service connections shall be installed prior to pressure testing of the water mains.
- 6.02 Pressure Test - After the pipe has been laid and back filled or partially backfilled, all newly laid pipe and hydrants shall be subjected to a hydrostatic pressure equal to the design pressure of the pipe being used for a 2 hour duration. Pressure tests shall be conducted in conformity with AWWA Standard C600 - 87, Section 4 or latest revision thereof.

Before applying the specified test pressure, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, the Contractor shall install main stops at such points as to allow air to expel as the line is filled. After the air is expelled, the main stops shall be closed and the test pressure applied using a pump connected to the pipe. The test pressure shall be corrected based on the elevation of the lowest point of the section under test and the elevation of the test gauge. The pump, pipe connection including any necessary taps, and all necessary apparatus, shall be furnished by the Contractor.

- 6.03 A leakage test shall be conducted after the pressure test has been satisfactorily completed. Tests shall be done by the Contractor at his own expense, and shall be conducted under the direct supervision of the Consulting Engineer. The Contractor shall furnish all the necessary apparatus and furnish the necessary assistance to conduct the test. A pressure equal to the design pressure of the pipe being used shall be maintained during the test at the lowest elevation of the system being tested.

Pressure piping will not be accepted until the leakage is less than the maximum allowable leakage determined from the following formula:

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$$L = \frac{ND\sqrt{P}}{130,000}$$

where L = the allowable leakage in litres per hour
N = the number of joints in the test section
D = the nominal diameter of the pipe in millimetres
P = the average test pressure during the leakage test in kilopascals

A coupling collar shall count as 2 joints.

The Contractor shall, at his own expense, locate and repair defective joints until the leakage is within the specified limits.

- 6.04 Upon completion of the backfilling and satisfactory test results the water system shall be flushed clean of any debris in accordance with AWWA standards.
- 6.05 The leakage test may be conducted concurrently with the pressure test.

7.0 Disinfection

- 7.01 Disinfection shall be performed by the Contractor under direct supervision by the Consulting Engineer and shall be repeated until Regional Health Specifications are achieved.
- 7.02 The Owner shall arrange and pay for the required bacteriological testing. Test results shall be submitted to the District.
- 7.03 Disinfection shall be done in accordance with AWWA C651.

8.0 Pressure Reducing Stations

- 8.1 Valves
- a) Pressure reducing valves shall be hydraulically operated, pilot controlled diaphragm-type globe or angle valves.
 - b) The main valve shall have a resilient disc and a removable seat ring.
 - c) The main valve trim shall be brass.
 - d) The valve stem on 50mm and larger valves shall be guided at both ends.
 - e) All repairs shall be possible without moving valve from main line.
 - f) All wetted surfaces on main valve shall be coated with an epoxy protective coating.
 - g) All PR valves shall have a position indicator.

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- h) All PR valves shall have Y strainers or basket strainers installed upstream of the main valve and upstream of the control pilot.
- i) All PR valves shall have speed controls between pilot and main valve body.

8.2 Gauges, pressure snubbers, isolation valves for gauges

- a) All pressure gauges shall have a 90 mm minimum dial size with a 6.5 mm NPT bottom connection.
- b) All gauges shall be installed with piston-type snubber.
- c) All gauges shall be installed with a brass gate valve for isolation.
- d) All gauges in pressure reducing chambers shall be mounted so the can be read from the manhole lid access.
- e) Small diameter piping up to 60 mm shall be copper, or brass.
- f) Piping over 75mm shall be flanged steel pipe.

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UNION BAY IMPROVEMENT DISTRICT
SPECIFICATION T - 1

WATER UTILITY EXCAVATION, BACKFILL AND CLEAN UP

1.0 Scope

1.01 This specification shall govern the excavation, backfilling and clean up for water utility trenches within the District. This relates to backfill above the pipe zone and below the finished surface.

2.0 Excavation

2.01 The trench shall be excavated to the required alignment, width, depth and grade as shown on Union Bay Improvement District Standard Drawings.

2.02 Excavated material shall not be stockpiled on the roadway.

2.03 Where the maximum trench width shown on the Union Bay Improvement District Standard Drawings is exceeded, reference must be made to the Consulting Engineer who shall obtain the approval of the District before further construction may continue.

2.04 If the bottom of the trench is organic or other unsuitable material, the trench shall be over excavated to firm ground and backfilled with suitable compacted material for pipe support.

2.05 Trench water must be removed.

2.06 All solid rock boulders and large stones shall be removed to provide a minimum clearance of 150 mm around the pipe.

2.07 Where an existing structure or underground installation may be affected by the works, it is the responsibility of the Consulting Engineer to inform the owner of such utility sufficiently in advance to enable the owner to specify what protective measures must be taken.

3.0 Backfill

3.01 Where a pipe or conduit is installed beneath an existing or foreseeable future pavement, sidewalk, driveway or gravel shoulder, the backfill shall be pitrun gravel or equal, compacted to a minimum 95% Standard Procter Density, except for the top 300 mm which shall be 100%.

3.02 Suitable native materials may be used as backfill where the pipe or conduit is installed in non-travelled areas. Backfill in these cases shall be free of stones over 150 mm size, frozen material, organic, or other perishable or objectionable material that would prevent proper consolidation or which might cause subsequent settlement.

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3.03 Controlled density backfill, where required, shall be used in lieu of compacted gravel backfill. Controlled density or unshrinkable fill shall be manufactured and placed in accordance with Canadian Portland Cement Association publication CP004.01P.

3.04 Where it is required to replace topsoil it shall occupy the upper 300 mm of the trench and shall be mounded on top to allow for settlement. If the installation is under a developed lawn, the soil shall be fine raked during the appropriate season and sown with a top quality grass seed at the rate of 50 grams of seed per square metre and rolled.

4.0 Cleanup

4.01 Gravel filled trenches shall be maintained to within 25 mm of the original surface prior to final paving.

4.02 Patching cuts in existing pavement.

- a) Cuts shall be hot mix paved within 3 days of backfilling and to the same thickness as the adjacent pavement.
- b) If weather conditions do not permit hot-mix asphalt, cuts shall be paved within 3 days of backfilling using cold-mix asphalt and replaced as weather permits.
- c) Where the excavation is on the shoulder or under the travelled portion of the street, the surface material shall be cut in neat straight lines at the edges of the trench by means of an asphalt cutting wheel, milling machine or pneumatic pavement breaker. Where the edges of any area requiring repaving extend outside the straight lines cut, further cuts shall be made so that the final patch will have a neat appearance.
- d) Any area of pavement adjacent to the excavation which has become undermined or deformed due to excavation practices or blasting shall be removed and repaved as above.
- e) The pavement of cuts which have settled shall be removed, the trench shall be recompacted and repaved.

5.0 Testing

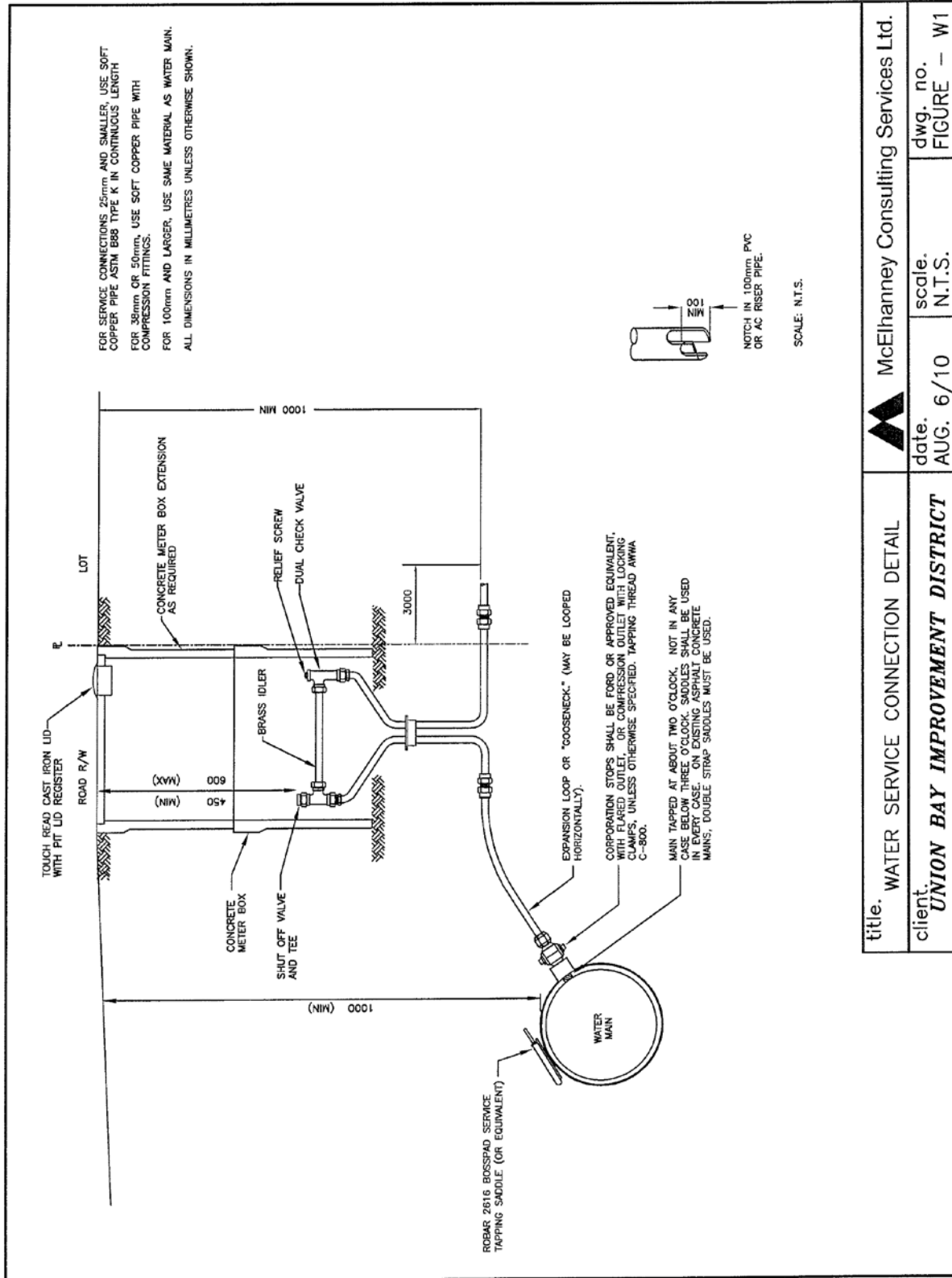
5.01 The Consulting Engineer shall, at his discretion, arrange for periodic compaction testing within the trench where trenches are over 1.0 m deep. Test results shall be submitted to the District.

6.0 Final Approval

6.01 Upon completion of the work the Consulting Engineer shall notify the District and will schedule a final inspection with the District.

Any Deficiencies found in the work during the final inspection shall be remedied by the Contractor at his own cost until such time that the District finds that the Work has been satisfactorily completed.

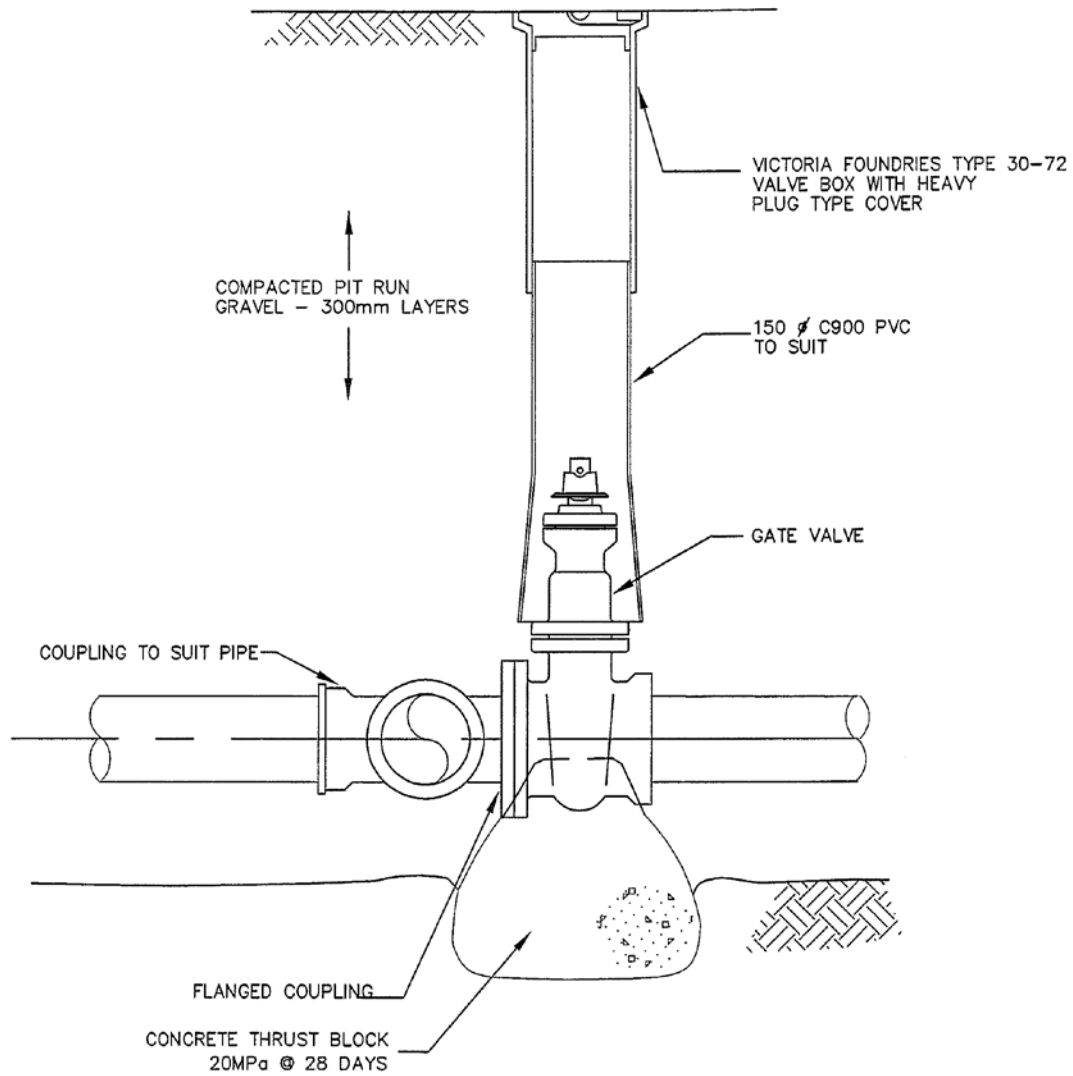
UNION BAY IMPROVEMENT DISTRICT BYLAW NO. 176 Subdivision Water Regulation



title. WATER SERVICE CONNECTION DETAIL	McElhannay Consulting Services Ltd.
client. UNION BAY IMPROVEMENT DISTRICT	dwg. no. FIGURE - W1
	scale. N.T.S.
	date. AUG. 6/10

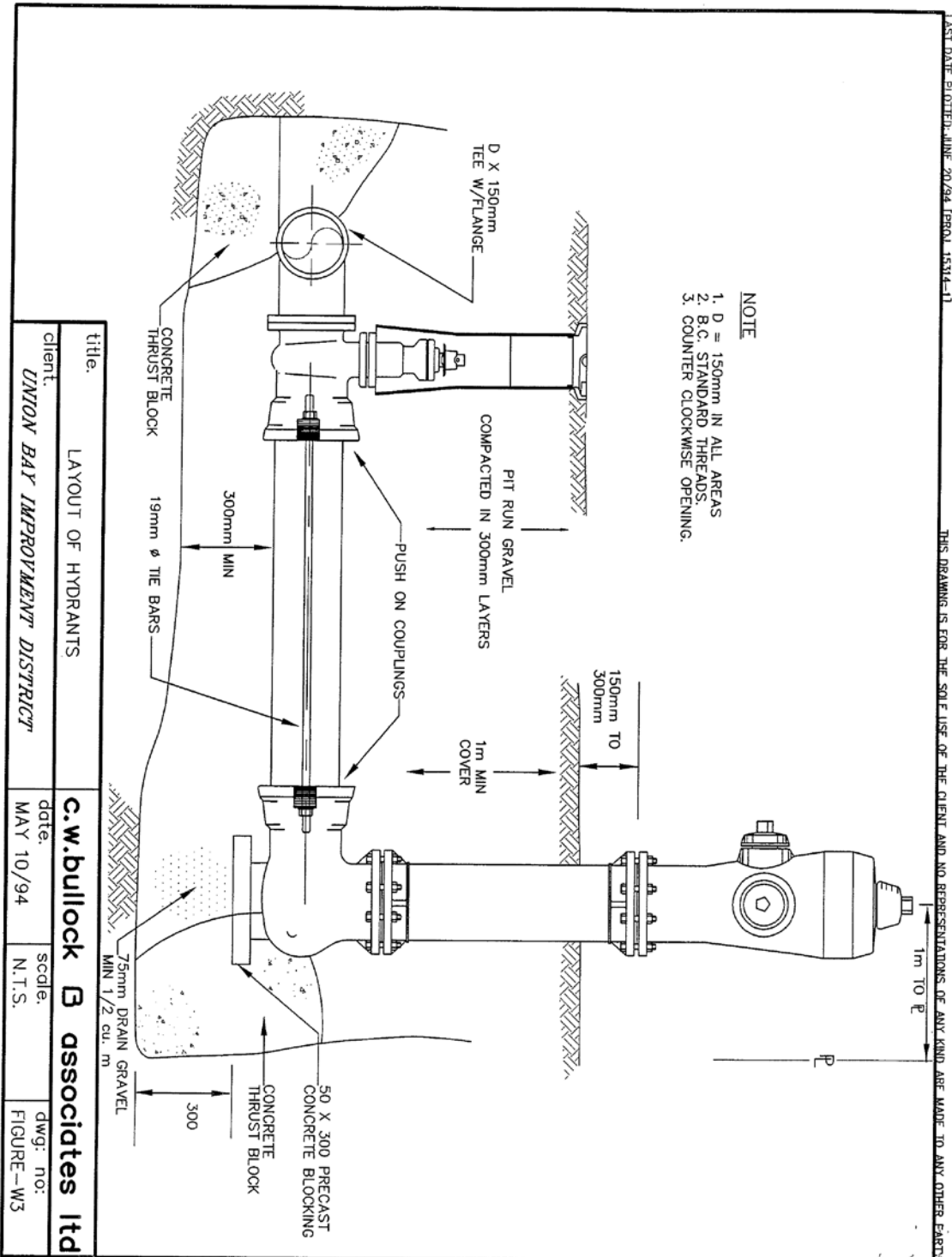
**UNION BAY IMPROVEMENT DISTRICT
BYLAW NO. 176
Subdivision Water Regulation**

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LAST DATE PLOTTED: MAY 16/94 [PROJ. 15314-1]

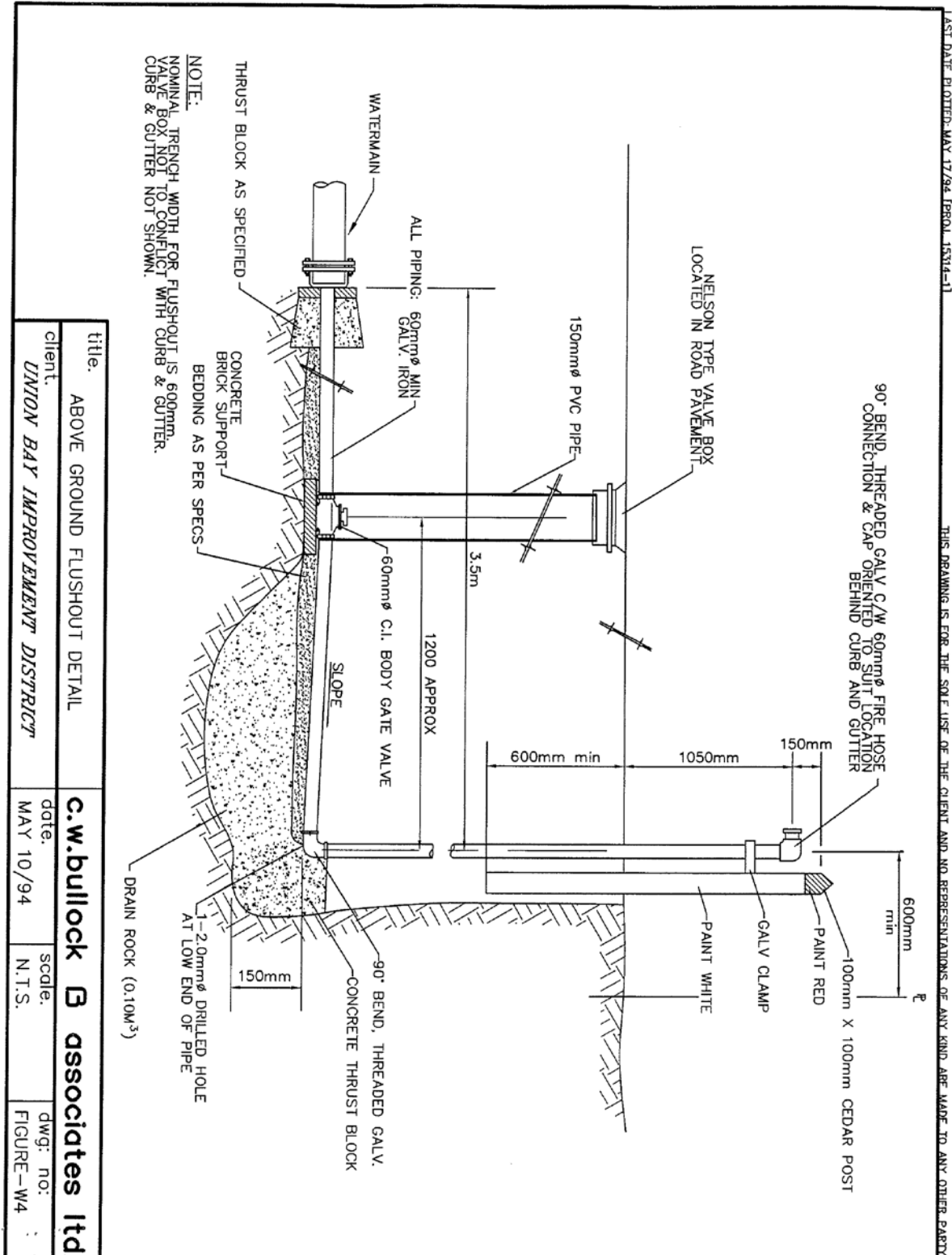


title.	GATE VALVE DETAIL	c.w.bullock B associates ltd					
client.	<i>UNION BAY IMPROVEMENT DISTRICT</i>	date.	MAY 10/94	scale.	N.T.S.	dwg: no:	FIGURE-W2

UNION BAY IMPROVEMENT DISTRICT BYLAW NO. 176 Subdivision Water Regulation



**UNION BAY IMPROVEMENT DISTRICT
BYLAW NO. 176
Subdivision Water Regulation**

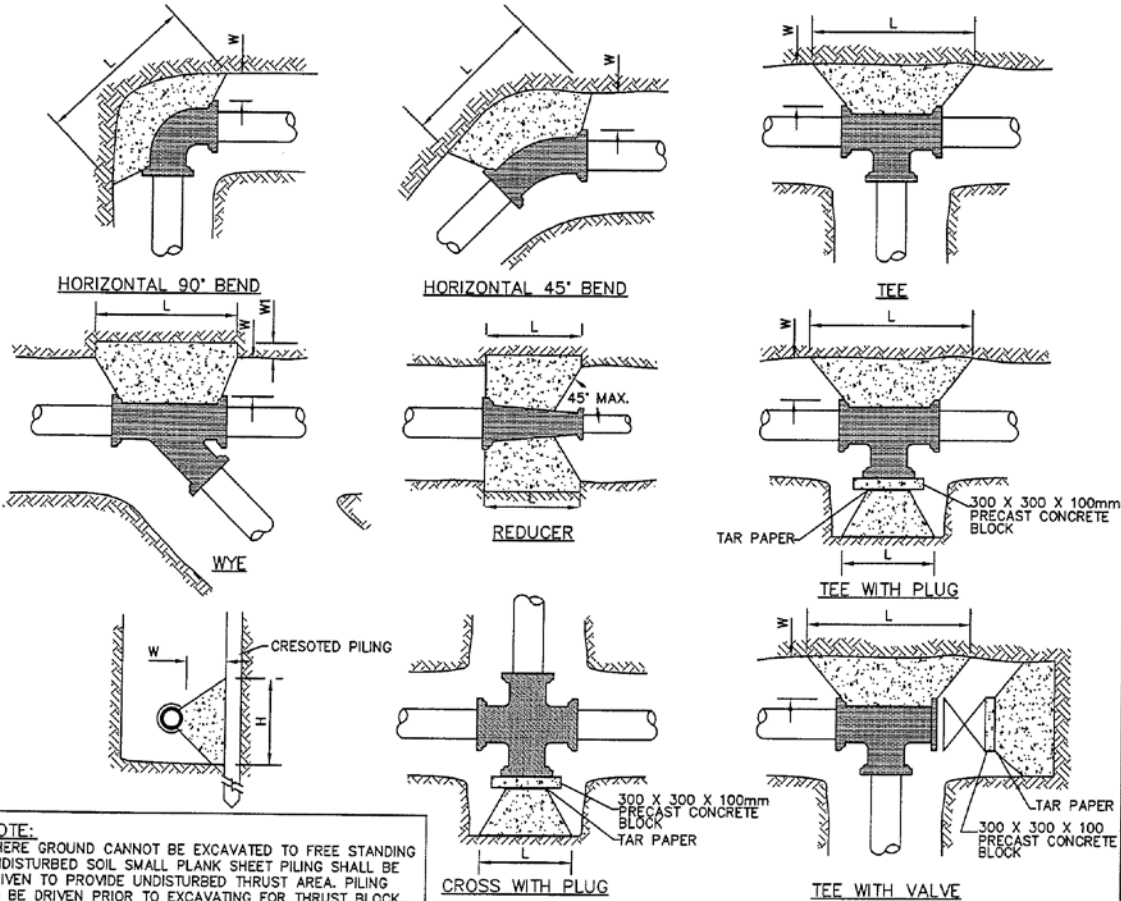


UNION BAY IMPROVEMENT DISTRICT BYLAW NO. 176 Subdivision Water Regulation

MINIMUM THRUST AREAS FOR FITTINGS AT 1034kPa PRESSURE AND FOR SOILS WITH MIN. BEARING OF 96kPa
(NOT TO BE USED FOR SOFT CLAY, MUCK, PEAT etc)

TYPE OF FITTING	FITTING SIZE	OUTSIDE OF FITTING TO BEARING FACE	LENGTH	HEIGHT	TYPE OF FITTING	FITTING SIZE	OUTSIDE OF FITTING TO BEARING FACE	RECESS IN TRENCH	LENGTH	HEIGHT
	D	W	L	H		D	W	W	L	H
90° BEND	150	300	900	450	CROSS	150	300		600	450
	200	350	1050	600		200	350		750	600
	250	375	1450	750		250	375		1000	750
	300	400	1650	900		300	400		1200	900
45° BEND	150	300	450	450	45° WYE	150	300	300	450	450
	200	350	600	600		200	350	400	600	600
	250	375	750	750		250	375	500	750	750
	300	400	900	900		300	400	600	900	900
11 1/4" BEND 22 1/2" BEND	150	300	450	225	* REDUCER	150	300	150	450	450
	200	350	600	300		200	350	200	600	600
	250	375	835	450		250	375	250	750	750
	300	400	900	450		300	400	300	900	900
TEE	150	300	600	450	CAPS AND PLUGS (IF NOT BOLTED)	150	300		450	450
	200	350	750	600		200	350		600	600
	250	375	1000	750		250	375		750	750
	300	400	1200	900		300	400		900	900

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS
* DIMENSIONS APPLY TO THE LARGER DIAMETER END OF FITTING

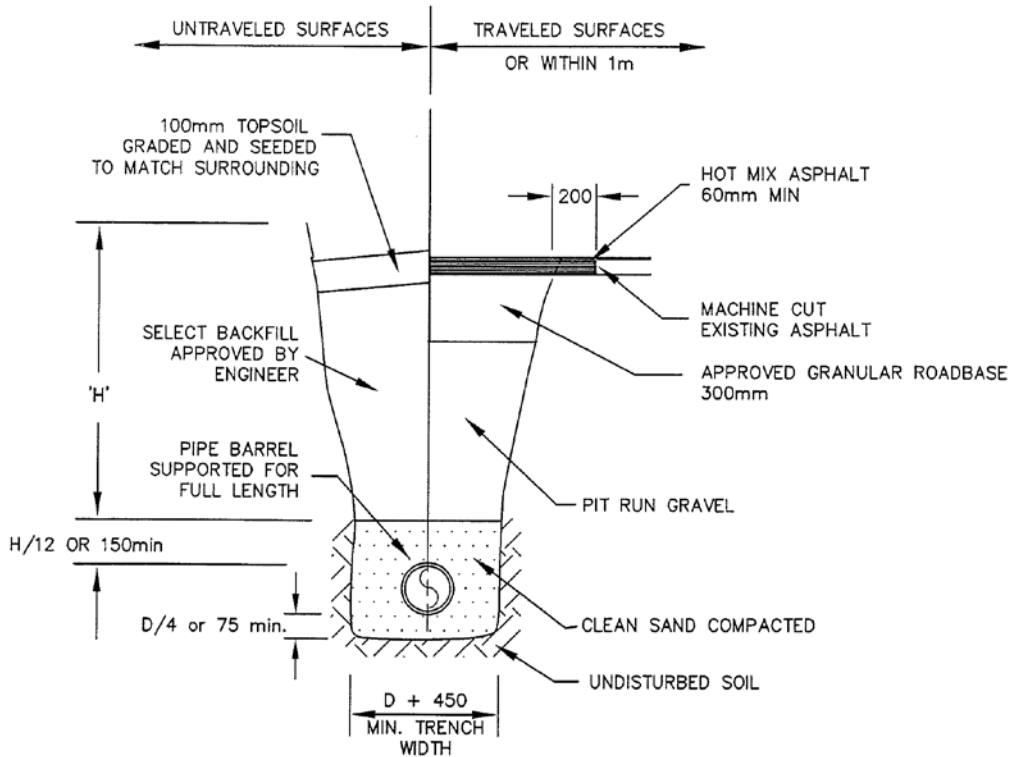


NOTE:
WHERE GROUND CANNOT BE EXCAVATED TO FREE STANDING UNDISTURBED SOIL SMALL PLANK SHEET PILING SHALL BE DRIVEN TO PROVIDE UNDISTURBED THRUST AREA. PILING TO BE DRIVEN PRIOR TO EXCAVATING FOR THRUST BLOCK. PILING SHOULD BE USED ONLY BELOW THE PERMANENT WATER TABLE.

THIS DRAWING IS FOR THE SOLE USE OF THE CLIENT AND NO REPRESENTATIONS OF ANY KIND ARE MADE TO ANY OTHER PARTY.
LAST DATE PLOTTED: MAY 16/94 [15314-1]

title. THRUST BLOCK DETAILS		c.w.bullock B associates ltd	
client. <i>UNION BAY IMPROVEMENT DISTRICT</i>	date. MAY 10/94	scale. N.T.S.	dwg. no: FIGURE-W5

**UNION BAY IMPROVEMENT DISTRICT
BYLAW NO. 176
Subdivision Water Regulation**



NOTES

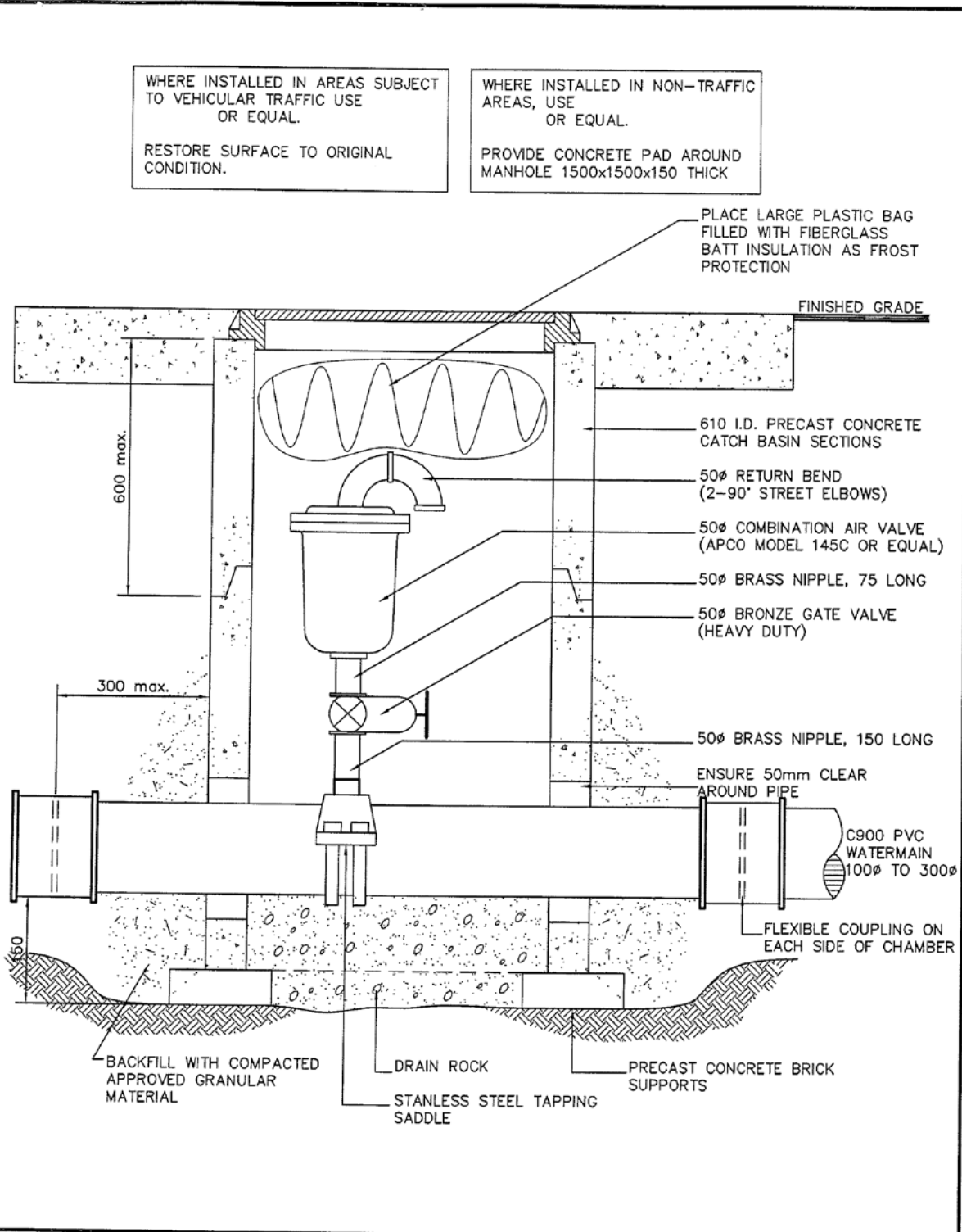
1. ALL BEDDING AND MATERIAL USED FOR BACKFILL SHALL BE COMPACTED IN MAX 300mm LAYERS TO MIN 95% SPD.
2. UNDER ROADS AND WALKWAYS, BACKFILL SHALL BE PITRUN GRAVEL.
3. ROCK TRENCHES SHALL BE EXCAVATED 150mm BELOW PIPE BOTTOM AND FILLED WITH GRAVEL AND COMPACTED IN DEPTH.
4. ALL TRENCHES AND EXCAVATIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND REGULATIONS OF THE WORKERS COMPENSATION BOARD.

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LAST DATE PLOTTED: MAY 16/94 [15314-1]

title. TYPICAL TRENCH AND CLASS 'B' BEDDING	c.w.bullock B associates ltd		
client. UNION BAY IMPROVEMENT DISTRICT	date. MAY 10/94	scale. N.T.S.	dwg: no: FIGURE-W6

UNION BAY IMPROVEMENT DISTRICT BYLAW NO. 176 Subdivision Water Regulation

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LAST DATE PLOTTED: MAY 16/94 [15314-1]



WHERE INSTALLED IN AREAS SUBJECT TO VEHICULAR TRAFFIC USE OR EQUAL.
RESTORE SURFACE TO ORIGINAL CONDITION.

WHERE INSTALLED IN NON-TRAFFIC AREAS, USE OR EQUAL.
PROVIDE CONCRETE PAD AROUND MANHOLE 1500x1500x150 THICK

PLACE LARGE PLASTIC BAG FILLED WITH FIBERGLASS BATT INSULATION AS FROST PROTECTION

FINISHED GRADE

610 I.D. PRECAST CONCRETE CATCH BASIN SECTIONS

50 ϕ RETURN BEND (2-90° STREET ELBOWS)

50 ϕ COMBINATION AIR VALVE (APCO MODEL 145C OR EQUAL)

50 ϕ BRASS NIPPLE, 75 LONG

50 ϕ BRONZE GATE VALVE (HEAVY DUTY)

50 ϕ BRASS NIPPLE, 150 LONG

ENSURE 50mm CLEAR AROUND PIPE

C900 PVC WATERMAIN 100 ϕ TO 300 ϕ

FLEXIBLE COUPLING ON EACH SIDE OF CHAMBER

BACKFILL WITH COMPACTED APPROVED GRANULAR MATERIAL

DRAIN ROCK

PRECAST CONCRETE BRICK SUPPORTS

STAINLESS STEEL TAPPING SADDLE

title. STANDARD AIR VALVE INSTALLATION	c.w.bullock B associates ltd		
client. <i>UNION BAY IMPROVEMENT DISTRICT</i>	date. MAY 10/94	scale. N.T.S.	dwg: no: FIGURE-W7