



THE CORPORATION OF THE CITY OF NORTH VANCOUVER

**“Subdivision and Development Control Bylaw,  
2010, No. 8014”**

**CONSOLIDATED FOR CONVENIENCE – JUNE 14, 2021**

<b>Amending Bylaw #</b>	<b>Adoption Date</b>	<b>Subject</b>
8230	May 28, 2012	Schedule A
8278	September 9, 2013	Pedestrian Curb Drop Design and MMCD Updates
8848	June 14, 2021	Quick-Start Updates to Servicing Requirements for Developments
9042	July 22, 2024	Fees and Charges

# THE CORPORATION OF THE CITY OF NORTH VANCOUVER

## BYLAW NO. 8014

### A Bylaw to regulate and require the provision of works and services in respect of the subdivision and development of lands and to establish the standard of services to be provided.

The Council of the Corporation of the City of North Vancouver, in open meeting assembled, enacts as follows:

#### PART 1 – INDEX

**101** This Bylaw, for purposes of convenience only, is divided into the following parts:

Part	Title
1.	Index
2.	Title
3.	Definitions
4.	Administration
5.	Application
6.	Approvals
7.	Servicing Requirements
8.	Completion of Works
9.	Bylaw Schedules
10.	Repeal

#### PART 2 – TITLE

This Bylaw may be cited for all purposes as the “**Subdivision and Development Control Bylaw, 2010, No. 8014**”.

#### PART 3 – DEFINITIONS

**301** Words defined in the *Land Title Act* and regulations pursuant thereto and in the *Community Charter* and *Local Government Act* shall have the same meaning when used in this Bylaw, or any resolution of Council passed pursuant thereto, unless otherwise defined in Section 302 of this Bylaw or unless the context otherwise requires. [Bylaw 8848, June 14, 2021]

**302** In this Bylaw, unless the context otherwise requires;

“accepted” means as accepted by the City Engineer.

“access” means an area improved for vehicular travel located on the highway, running from property line to the traveled way.

“Advisory Design Panel” means an advisory body established by the Council of the City by Bylaw.

“Approving Officer” means the person who is appointed by Council under the Land Title Act

“arterial” means a highway so designated in Schedule E.

“building area” means that part of a parcel of land on which can be constructed a building in accordance with the relevant Bylaws of the City.

“Chief Building Official” means the person appointed by Council to serve as the Chief Building Official. [Bylaw 8848, June 14, 2021]

“City Engineer” means the chief administrator of the Engineering, Parks and Environment Department and his/her successors in function and their respective nominees.

“collector” means a highway so designated in Schedule E.

“Community Charter” means the *Community Charter*, S.B.C. 2003, c. 26 and regulations enacted pursuant thereto, as may be amended. [Bylaw 8848, June 14, 2021]

“complete” or any variation thereof when used with respect to the works referred to herein, means completion to the acceptance of the City Engineer.

“conditional approval” means the conditional approval by the Approving Officer of a proposed subdivision plan, and outlines the requirements which must be fulfilled to obtain approval of a subdivision plan.

“crossing” means a sidewalk, curb or boulevard crossing for vehicular access.

“drainage system” means a system of works designed and constructed to control the collection, conveyance and disposal of surface and other storm water.

“lane” means a highway allowance less than 10m in width.

“Land Title Act” means *Land Title Act*, R.S.B.C. 1996, c. 250 and regulations enacted pursuant thereto, as may be amended. [Bylaw 8848, June 14, 2021]

“Landscape Architect” means a member of good standing registered in the British Columbia Society of Landscape Architects.

“Local Road” means a highway so designated in Schedule E.

“Owner” means an Owner as defined in the Land Title Act or his/her duly authorized representative.

“Owner's contractor” means the person or firm appointed by the Owner to construct the works.

“Owner's Engineer” means the Professional Engineer engaged by the Owner to design and/or supervise the works.

“Parcel” means any lot, block or other area in which land is held or into which it is subdivided, but does not include a highway.

“Professional Engineer” means a person who is registered or licensed under the Engineers Act.

“Professional Governance Act” means the Professional Governance Act, S.B.C. 2018, c. 47, and regulations enacted pursuant thereto, as may be amended. *[Bylaw 8848, June 14, 2021]*

“sanitary sewer system” means a system of works designed and constructed to control the collection, conveyance and disposal of sanitary sewage.

“security deposit” means cash or a letter of credit acceptable to the City Treasurer/Collector.

“storm water management” means a plan indicating the means by which storm plan” water will be managed within and through a subdivision or development.

“storm water sewer system” means a system of works designed and constructed to control the collection, conveyance, and disposal of storm water. *[Bylaw 8848, June 14, 2021]*

“subdivision” means the division of land into two or more parcels, whether by plan, apt descriptive words, or otherwise.

“street” means a highway allowance of 10m or more in width.

“surveyor” means a land surveyor licensed and registered in the province of British Columbia.

“walkway” (and for clarity includes “sidewalk”) means a highway intended for the predominant use of pedestrian traffic. *[Bylaw 8848, June 14, 2021]*

“water system” means a system of works designed and constructed to control the supply, conveyance and distribution of potable water within the meaning of the Health Act.

“works” means any service, facility or utility which is required by this Bylaw and included facilities for the supply and distribution of water, collection and disposal of sewage; collection and disposal of storm water; street lighting; highways, curbs, gutters, sidewalks, boulevards, boulevard landscaping, on-site landscaping; and, the underground supply and distribution of electrical power, telephone, gas and cablevision.

“Zoning Bylaw” means “Zoning Bylaw, 1995, No. 6700”, as amended from time to time. *[Bylaw 8848, June 14, 2021]*

## **PART 4 – ADMINISTRATION**

- 401** The Approving Officer shall maintain a record of all subdivision applications submitted under this Bylaw which shall indicate the final disposition of all applications.
- 402** The City Engineer or Inspections Manager or their designated representatives are hereby authorized to enter at all reasonable times upon any property to ascertain whether the regulations or directions of this Bylaw are being observed.
- 403** The provisions of this Bylaw are severable. If, for any reason, any provision is held to be invalid by the decision of a court of competent jurisdiction, such decision shall not affect the validity of the remaining provisions of this Bylaw.
- 404** Where a parcel being created by a subdivision fronts on a highway, the Approving Officer may, under Section 506(2) of the Local Government Act, exempt a parcel from the statutory or bylaw minimum frontage requirements. *[Bylaw 8848, June 14, 2021]*

## **PART 5 – APPLICATION**

- 501** Before applying for approval of a subdivision plan an Owner may apply for conditional approval.
- 502** Applications for conditional approval shall be submitted to the Approving Officer on the prescribed form accompanied by the fee as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”. The application form is to be signed by the Owner. *[Bylaw 9042, July 22, 2024]*
- 503** An application for a building permit shall be submitted to the Community Development Department on the prescribed form.
- 504** Owners are required, as a condition of subdivision plan approval or building permit issuance, to provide works and services in accordance with this Bylaw.
- 505** All works required pursuant to Section 504 shall be constructed and installed at the expense of the Owner prior to the granting of subdivision plan approval or prior to the issuance of a building permit, unless the Owner of the land complies with the requirements of Part 8 and other relevant parts of this Bylaw.
- 506** Prior to the issuance of any building permit, the Owner shall provide a refundable security deposit for damage to public facilities. The value of the security deposit shall be determined in accordance with Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”. *[Bylaw 9042, July 22, 2024]*
- 507** Application for Subdivision will not be accepted if the land, or land containing heritage buildings or structures identified in the City of North Vancouver Heritage Inventory, Primary and Secondary Inventory Buildings, until Council has considered the possible heritage protection of the land or land and structures. *[Bylaw 8848, June 14, 2021]*

## **PART 6 – APPROVALS**

- 601** When all the requirements of the conditional approval have been met the Owner may apply for subdivision plan approval. Where a conditional approval has not been requested formal approval will be withheld until all appropriate fees, charges and required agreements have been deposited.
- 602** A letter requesting subdivision plan approval shall be accompanied by the appropriate fee as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”. *[Bylaw 9042, July 22, 2024]*
- 603** Applications for subdivision plan approval and building permits will be reviewed for compliance with the requirements of this Bylaw and other relevant municipal and provincial legislation. Approval of a subdivision plan or the issuance of a building permit does not imply that the City will expend City funds on works in support of the subdivision or development.
- 604** Where a proposed subdivision included the creation of a highway across an established right-of-way or easement held by a railway company, a public utility or any other authority, the Owner shall be required to provide, at his/her own expense, from the holder of such right-of-way or easement, the necessary legal agreements regarding the creation of the highway containing all necessary services and utilities before final approval for subdivision is granted.
- 605** The Owner shall satisfy the requirements of the Land Title Act with respect to flooding prior to requesting subdivision plan approval.
- 606** The conditional approval of any proposed subdivision shall not be construed as approval of subdivision for Land Title Act purposes. Additional conditions may be established by the Approving Officer at any time in the event that new information becomes available which affects the conditional approval. *[Bylaw 8848, June 14, 2021]*

## **PART 7 – SERVICING REQUIREMENTS**

- 701** Every subdivision and development shall provide Works as required in Schedule A for each zone noted prior to final subdivision approval or issuance of building permit as the case may be. Works required in Schedule A shall be constructed in accordance with the specifications in Schedule C. In lieu of constructing the Works in advance of approval of subdivision or issuance of building permit as the case may be, the City Engineer or Approving Officer may permit the following in respect of constructing some or all of the required work:
- A Servicing Agreement in accordance with Schedule B; or
  - one or more street use permits and sufficient security deposits.
- [Bylaw 8848, June 14, 2021]*
- 702** The servicing provisions of this Bylaw may be waived by the Approving Officer or the City Engineer:
1. for land which is subdivided for the purpose of creating parcels to support the installation of public facilities, utilities, structures and associated equipment;

2. for applications where the subdivision proposes a lot line adjustment, and each parcel affected is serviced by an existing water and sewer system connection and where no future subdivision potential exists; or
3. for applications where the proposed improvements do not increase the floor area, and/or increase the utility demands of the serviced parcel.

*[Bylaw 8848, June 14, 2021]*

### **703 Non-Residential Renovations**

The securities and servicing provisions for non-residential renovation developments for this bylaw apply as follows:

1. Up to \$200,000 construction value:
  - a. Security/Property Damage Deposit as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000” may be required.
2. Renovations between \$200,000 and \$600,000 construction value:
  - a. Necessary utility and public realm upgrades as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000” to a maximum of 10% of the construction value of the building permit as determined by the Chief Building Official, and
  - b. Security/Property Damage Deposit as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”.
3. Renovations over \$600,000 construction value:
  - a. All required Works according to Schedule A, and
  - b. Security/Property Damage Deposits as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”.
4. Full redevelopment:
  - a. All required Works according to Schedule A, and
  - b. Security/Property Damage Deposits as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”.

Notwithstanding the preceding in Section 703, all non-residential developments shall provide all utility upgrades necessary to service its intended use according to Schedule A.

*[Bylaw 8848, June 14, 2021] [Bylaw 9042, July 22, 2024]*

### **704 Residential Renovations**

The securities and servicing provisions for residential renovation developments for this bylaw apply as follows:

1. Up to \$200,000 construction value – Security/Property Damage Deposit as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”.
2. Renovations between \$200,000 and \$600,000 construction value:

- a. Necessary utility upgrades as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000” to a maximum of 5% of the construction value of the building permit as determined by the Chief Building Official, and
  - b. Security/Property Damage Deposit as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”.
3. Renovations over \$600,000 construction value:
- a. All required Works according to Schedule A, and
  - b. Security/Property Damage Deposits as set out in Schedule D to the “Fees and Charges Bylaw, 2024, No. 9000”.
4. Full redevelopment:
- a. All required Works according to Schedule A, and
  - b. Security/Property Damage Deposits as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000”.

Notwithstanding the preceding in Section 704, all coach houses and other new residential infill structures shall provide all utility upgrades necessary according to Schedule A. *[Bylaw 8848, June 14, 2021] [Bylaw 9042, July 22, 2024]*

## **PART 8 – COMPLETION OF WORKS**

- 801** All works required to be constructed and installed at the expense of the Owner shall be constructed and installed to the standards prescribed in Schedule "A" and before the Approving Officer approves the subdivision plan or the Chief Building Official issues the building permit, the Owner:
- 1. deposits with the City, a security deposit in the amount of 130% of the estimated construction cost, as accepted by the City Engineer, based on professional detailed designs and estimates for installing and paying for all works required under this Bylaw; and
  - 2. enters into a Servicing Agreement with the City substantially in the form of agreement attached as Schedule "B," to construct and install the required works by a specified date or forfeit to the City the amount secured by the security deposit.
- [Bylaw 8848, June 14, 2021]*
- 802** Where the physical construction of part or all of the works required under this Bylaw is considered by the City Engineer to be premature, the requirement may be fulfilled by the payment of a non-refundable cash deposit equal to 130% of the amount estimated by the City to cover the cost of the required works. This deposit will be used by the City at a future time when construction of the works becomes feasible.
- 803** Where works and services are to be installed on the property to be developed without City Inspection prior to the signing of a subdivision plan, the installed works and services shall not be connected to the City's works, services or utilities, and the City shall not accept the works and services installed on-site until:



1. The works have been certified by a Professional Engineer as designed and constructed in substantial compliance with Schedule A of this Bylaw.
2. Drawings have been received and accepted.
3. The City has inspected the works and notified the Owner in writing of not detecting any apparent construction deficiencies and that the works are in substantial compliance with Schedule A of this Bylaw.
4. The Owner has entered into an agreement with the City, in which he covenants and agrees to:
  - a. Maintain all of the said works and services in complete repair for a period of two (2) years.
  - b. Remedy any defects which develop during the maintenance period and pay to the City any costs resulting from damage to other works or property resulting therefrom.
  - c. Pay a maintenance deposit which shall remain on deposit with the City for the duration of the maintenance period. The maintenance deposit shall be a minimum 20% of the estimated construction cost.  
The developer must request the deposit refund upon completion of the works. If after 2 years from the date of the Certificate of Total Completion, and or Final Occupancy, the applicant has not requested the refund of the deposits, the funds will default to the City.
  - d. Pay to the City all administration fees as set out in Schedule D of the “Fees and Charges Bylaw, 2024, No. 9000” all fees and legal costs incurred by the City in accepting and taking over such works and services. *[Bylaw 9042, July 22, 2024]*
  - e. The Owner has made application for connections to City works.

## **PART 9 – BYLAW SCHEDULES**

**901** The following is a list of schedules attached hereto and which form a part of this Bylaw:

Schedule A	Required Works
Schedule B	Form of Servicing Agreement
Schedule C	Design Criteria, Specifications and Standard Drawings
Schedule D	Fees and Deposits – Deleted <i>[Bylaw 9042, July 22, 2024]</i>
Schedule E	Highway Classification Map

**PART 10 – REPEAL**

**1001** City of North Vancouver Subdivision Control Bylaw, 1991, No. 6200”, as amended, is hereby repealed.

READ a first time by the Council on the 13<sup>th</sup> day of December, 2010.

READ a second time by the Council on the 13<sup>th</sup> day of December, 2010.

READ a third time and passed by the Council on the 13<sup>th</sup> day of December, 2010.

RECONSIDERED and finally adopted by the Council, signed by the Mayor and City Clerk and sealed with the Corporate Seal on the 10<sup>th</sup> day of January, 2011.

“Darrell R. Mussatto”

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MAYOR

“Robyn G. Anderson”

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CITY CLERK

## SCHEDULE A REQUIRED WORKS

### General

Applicants for Subdivision and Building Permits are required to provide Works identified in Sections 1 to 10 unless otherwise provided by Development Variance Permit.

**Levels of Infrastructure Improvement Table**

	1-Unit	2-Unit	3-Units & larger	Subdivision
<b>Highways/Public Realm</b>				
Roads Repaving			50%	50%
Lanes Repaving			50%	50%
Sidewalk	x <sup>1</sup>	x <sup>1</sup>	x	x
Curb and Gutter	x <sup>1</sup>	x <sup>1</sup>	x	x
Lane dedication	x	x	x	x
Off-site landscaping	Professional not required	Professional not required	x	x
Water severance	x	x	x	x
Water connection	x	x	x	x
Watermain extension and upgrade	May be required <sup>2</sup>	May be required <sup>2</sup>	If demand exceeds capacity	If demand exceeds capacity
Fire Hydrants			x	x
Storm severance	x	x	x	x
Storm connection	x	x	x	x
Storm main extension	May be required <sup>3</sup>	If required to connect to storm system	If required to connect to storm system	If required to connect to storm system
Sanitary severance	x	x	x	x
Sanitary connection	x	x	x	x
Sanitary main extension and upgrade	May be required <sup>4</sup>	May be required <sup>4</sup>	If load exceeds capacity	If load exceeds capacity
Street lighting		x <sup>1</sup>	x	x
Hydro, telephone & cable underground servicing			x	x
Hydro, telephone & cable distribution & transmission line Undergrounding, where feasible, by Outside Utility agencies			x	x
<b>Private lands</b>				
On-site landscaping	Professional not required	Professional not required	x	x

<sup>1</sup> Applies to frontage only.

<sup>2</sup> Applies when water supply demand increases beyond existing supply due to new sprinkler load.

<sup>3</sup> Applies where property is not serviced by a storm sewer, extension is flat rate as per the “Sewerage and Drainage Utility Bylaw, 1995, No. 6746”.

<sup>4</sup> Applies when property load will exceed existing capacity, improvement is flat rate as per the “Sewerage and Drainage Utility Bylaw, 1995, No. 6746”.

[Bylaw 8848, June 14, 2021]

## 1. HIGHWAYS

Highways in or immediately adjacent to the noted uses shall be provided in accordance with Table 1 and designed and constructed in accordance with Schedule C. Where a Highway abuts two different uses, the highest requirement shall apply.

### 1. Lane Dedication

Where a development abuts onto a lane allowance which is less than 6.1 metres in width, or where the established lane pattern is incomplete, the Approving Officer or Inspections Manager may require that a portion of property be dedicated as lane allowance.

### 2. Access to Highways

- a. For all parcels in the City, pedestrian access to an opened lane, street or walkway may be permitted at any location.
- b. Unless otherwise specifically provided for in this or some other Bylaw; for parcels fronting on both an opened street and an opened lane, vehicular access shall be from the lane.
- c. Any crossing for which approval has been withdrawn shall be removed and replaced in accordance with Schedule C.
- d. All access design and construction shall comply with the provisions of Schedule C.
- e. The number, location and width of driveways for each parcel shall be in accordance with Zoning Bylaw.

**TABLE 1**

<b>USES*</b>		
	<b>Commercial/Industrial High Density Residential</b>	<b>Others</b>
<b>Right of Way width for:</b>		
• arterials	30m	24m
• collector	24m	24m
• local	20m	20m
• lanes	6.1m	6.1m
<b>Pavement width of:</b>		
• arterials	20m	20m
• collector	15m	12m
• local	12m	9m
• lanes	5m	5m

Concrete curb, gutter and sidewalks are required on both sides of all highways in all zones.\*\*

\* For the purposes of Table 1:

Commercial/Industrial/High Density Residential Uses means all parcels zoned under the Zoning Bylaw which are designated for Commercial, Industrial purposes or Residential areas with densities of 175 units per hectare and over.

Others mean all parcels zoned under the Zoning Bylaw which are designated for uses not included in Commercial/Industrial/High Density Residential.

\*\* Where construction standards within the block under redevelopment meet all of the following, the City Engineer may permit the retention of the standard existing on the street:

- consistent for at least 75% of the street frontage;
- have no significant defects;
- are not more than 20 years old;
- are at variance with the design standards contained in this Bylaw.

## **2. WATER SYSTEM**

All parcels shall be serviced by potable water and a fire hydrant system supplied from municipal mains designed and installed in accordance with Schedule C to this Bylaw and the Building Bylaw.

## **3. STORM DRAINAGE**

All parcels shall be serviced by a municipal drainage system designed and installed in accordance with Schedule C, considering on site drainage system to the City Engineer's and Inspections Manager's satisfaction. Alternative storm water management is required with overflow to the municipal drainage system.

Refer to Metro Vancouver's (as the GVRD) Report on Storm Water Management, "Stormwater Best Management Practices" (1991) and Provincial Stormwater Planning reference "Stormwater Planning: A Guidebook for British Columbia" ( May 2002)

All the storm water initiatives shall be maintained by the property owner in perpetuity.

## **4. SANITARY SEWER**

All parcels shall be serviced by a municipal sanitary sewer system designed and installed in accordance with the requirements of Schedule C, and owners shall ensure that sanitary sewage meets GVS & DD standards.

## **5. STREET LIGHTING**

Illumination on all streets is required in accordance with Schedule C and shall meet current IES design standards for pedestrian and roadway lighting.

## **6. HYDRO, TELEPHONE, AND CABLEVISION**

1. All new distribution systems shall be underground and all new services to each parcel shall be underground, except for 1-Unit dwelling parcels, unless created through subdivisions after January 10, 2011.

2. Where a permit to excavate a street or lane is refused by the City Engineer, an electrical service connection may have overhead access.
3. The above requirement shall not apply to an electrical access to existing buildings until such time as the building is demolished or where the cost of renovations requested are greater than 50% of the assessed value.

## 7. LANDSCAPING

1. On-site
  - a. All parcels which are the subject of a building permit application, shall submit to the Inspections Manager a Landscape plan and detailed specifications, prepared by a Landscape Architect and designed in accordance with British Columbia Society of Landscape Architect Standards. Plans submitted for one unit and two unit family residential uses, as defined in the Zoning Bylaw, do not require preparation by a Landscape Architect.

Plans submitted shall address the following:

- all areas to be planted, including the boulevard.
  - native trees and or planting to retained, restored or replaced.
  - fencing of private yards and screening of garbage storage areas.
  - on site storm water management
  - treatment of all exterior surfaces including walkways, decks, patios, driveways on private yards including the boulevard.
  - grading, lighting and drainage of planted areas.
  - a detailed plant list specifying the botanical and common names, size, species and condition of all plant material to be used.
  - other relevant landscape features including trellis, benches, gazebo, fountain, light fixtures, etc.
- b. Landscape plans are subject to review by the Advisory Design Panel and approval of the City Engineer and Inspections Manager;
  - c. Building Permits will not be issued until an agreement and security deposit pursuant to Schedule B of this Bylaw have been received.
2. Boulevard

Boulevards shall be landscaped to include street trees, ground cover and entrances (walks and/or crossings) and shall be designed and constructed in accordance with Schedule C.

**SCHEDULE B  
FORM OF SERVICING AGREEMENTS**

1. Servicing Agreement
2. Landscaping Agreement

**TYPICAL SERVICING AGREEMENT**

No. \_\_\_\_\_

*between*

**THE CORPORATION OF THE CITY OF NORTH VANCOUVER**

*and*

\_\_\_\_\_

Date \_\_\_\_\_

**SERVICING AGREEMENT**

THIS AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_;

**BETWEEN:**

THE CORPORATION OF THE CITY OF NORTH VANCOUVER, a Municipality incorporated under the “*Local Government Act*” of the Province of British Columbia, and having its Municipal Offices at 141 West 14th Street, North Vancouver, British Columbia,

(hereinafter called the "Municipality")

OF THE FIRST PART

**AND:**

(hereinafter called the "Owner")

OF THE SECOND PART

A. The Owner holds an interest in lands and premises within the City of North Vancouver, in the Province of British Columbia, more particularly known and described as follows:

FOR CLARITY, ALSO KNOWN AS:

(hereinafter called the "Lands")

B. The Owner desires to subdivide the Lands or develop on the Lands.

C. The Approving Officer or the Building Inspector has agreed to approve the subdivision of the Lands or the development respectively, subject to the terms and conditions contained in this Agreement, and the posting with the Municipality of the security deposit described herein.

**NOW THEREFORE THIS AGREEMENT WITNESSETH** that in consideration of the promises, covenants and agreements hereinafter set forth, the parties hereto covenant, agree, represent and promise as follows:

<b>APPENDICES</b>	1.	The following Appendices will be read with and form part of this Agreement:  Appendix A - A copy of the subdivision plan of the Lands or the building permit for the development on the Lands.  Appendix B - Also known as <i>Schedule of Deposits</i> . A list of the Works and an estimate of their respective construction costs.  Appendix C - Construction drawings to be used for the construction of the Works.
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<b>OWNER TO DO WORK</b>	2.	The Owner covenants and agrees to construct and provide all the Works listed and shown on Appendices B and C hereto, as approved by the Municipality, in accordance with the standards contained in Schedule A of Subdivision and Development Control Bylaw, 1991, No. 6200 and amendments thereto. The Owner will, upon the request of the Municipality and to the satisfaction of the Municipality, do, or cause to be done, all such further acts or deeds, or provide any necessary rights-of-way, easements and assurances for the execution of this Agreement.
<b>TRANSFER OF INTEREST IN WORKS</b>	3.	The Owner covenants and agrees with the Municipality to assign, transfer and convey to the Municipality all of its right, title and interest in the Works in rights-of-way on any and all of the Lands, upon or in which the Works are situate, upon the completion of the Works, as witnessed by the issuance of a Certificate of Final Completion prepared, signed, stamped and submitted by the Owner's Engineer to the City Engineer.
<b>PERMISSION TO DO WORK</b>	4.	The Municipality covenants and agrees to permit the Owner to construct the Works on the terms and conditions herein, as specified in Appendix C. Nothing in this Agreement shall be construed as an undertaking, promise or covenant on the part of the Municipality to make available the use of or access to the Works for any purpose, but rather the Municipality reserves the right in its sole and absolute discretion to make available, operate, alter, use, extend, diminish, discontinue, tear up, sell, rent or otherwise dispose of the Works as the Municipality from time to time deems fit.
<b>CHANGES TO BYLAWS</b>	5.	The Owner covenants and agrees to comply with any changes in subdivision requirements or standards enacted by Bylaw prior to the actual commencement upon the Lands of the Works contemplated by this Agreement.
<b>LOT GRADING</b>	6.	The Owner covenants and agrees to adhere in all respects to the contours, elevations and drainage patterns indicated on the lot grading plan or storm water management plan and the traffic management plan prepared by the Owner's Engineer indicated in Clause 11 hereof, and which are attached as Appendix C to this Agreement.
<b>START OF WORK</b>	7.	The Owner covenants and agrees not to commence work until the City Engineer provides the Owner with written permission to proceed with construction.
<b>COMPLETION OF WORK</b>	8.	The Owner shall complete the construction of the Works, specified in Appendix B and C to the satisfaction of the Municipality, within 365 days of the date of this Agreement. In the event that landscape work cannot be completed due to inclement weather conditions, the Security Deposit as required in Clause 29, shall be renewed so as to include two complete growing seasons.

<b>OWNERS TO GRANT RIGHTS OF WAY</b>	9.	The Owner covenants and agrees to grant to the Municipality all necessary road dedications, statutory rights-of-way and easements over the Lands to accommodate the Works. Where the Works are located upon or under privately owned lands other than the said Lands, the Owner shall obtain at the Owner's expense and to the satisfaction of the Municipality, all necessary road dedications, statutory rights-of-way and easements over such lands, in favour of the Municipality where applicable, to accommodate the Works.
<b>DESIGN</b>	10.	<p>The Owner covenants and agrees that all Works required herein, shall be designed by a Professional Engineer, who shall be registered with the Association of Professional Engineers and Geoscientists of British Columbia, or, as appropriate, a Professional Landscape Architect registered with the BC Society of Landscape Architects and retained by the Owner. Plans and specifications for the Works shall be prepared by or under the direct supervision of the Professional Engineer or Landscape Architect, and all plans shall bear the seal and signature of the Owner's Engineer.</p> <p>For convenience "Owner's Engineer" shall include "Landscape Architect" as appropriate.</p> <p>The Owner covenants and agrees to ensure that the Owner's Engineer (as specified in Clause 11) maintains professional liability, and errors and omissions insurance to a value of \$2,000,000.00 per occurrence during the term of his engagement. The Owner covenants and agrees to retain the Owner's Engineer during the construction period for the purposes of inspection to ensure compliance with the approved design and to provide certification of the "Record Drawings".</p>
<b>DESIGN DRAWINGS</b>	11.	<p>The Owner covenants and agrees that the Owner shall construct fully completed Works in accordance with sound engineering and construction practices and in a good and workmanlike manner and to the satisfaction of the Municipality and in strict compliance with the plans and specifications prepared by:</p> <p>under Drawing Nos.:</p> <p>SEE APPENDIX C</p> <p>and as received for the purposes of this Agreement by the City Engineer on the _____ day of _____, A.D., 20__.</p>
<b>CHANGES TO DESIGN BY MUNICIPALITY</b>	12.	The City Engineer may, during the course of this agreement, require that the plans be altered because of conditions at the site, so that the Works function and operate in a manner satisfactory to the City Engineer. Should the Works, as provided herein, prove to be in any way defective or should they not operate to the satisfaction of the City Engineer, then the Owner shall, at his own

		expense modify and reconstruct the Works so that the Works shall be fully operative and function to the satisfaction of the City Engineer.
<b>COMMENCEMENT OF CONSTRUCTION</b>	13.	The Owner shall give the City Engineer not less than five (5) clear days' delivered written notice before commencing initial construction or installation of the Works or any portion thereof and thereafter shall keep the City Engineer properly and adequately advised of the progress of construction and installation of the Works or any portion thereof and the Owner shall call for inspections, after giving the City Engineer not less than five (5) clear days' written notice, at all important stages.
<b>DIRECTIONS</b>	14.	The Owner shall ensure that any comments or directions, including requests for alterations, given or made by the City Engineer, shall be promptly responded to and complied with, and shall ensure that the City Engineer is satisfied with such response and compliance and is provided with the opportunity to be so satisfied.
<b>DELIVERY OF REPORTS</b>	15.	During construction and installation of the Works the Owner shall, no later than five (5) days following receipt of same, deliver to the City Engineer true copies of all inspection and testing reports prepared during the construction and installation of the Works or any portion thereof.
<b>INSPECTION</b>	16.	The Owner shall make the Works or any portion thereof available to the Municipality, its employees and contractors at all times for inspection and testing including without limitation video inspection of all or part of the Works during construction up to the expiration of the Warranty Period or Extended Warranty Period as the case may be and tests may be carried out at such times, and as frequently as the City Engineer in his sole discretion deems necessary.
<b>DAMAGE REPAIR</b>	17.	The Owner shall repair any damage to the property of the Municipality or highways, including sidewalks arising directly or indirectly from any work undertaken by the Owner pursuant to this Agreement. Such repairs shall be completed to the satisfaction of the City Engineer within the time period imposed by the City Engineer. Without limiting the generality of the foregoing, the Owner acknowledges and agrees that repairs may be required to be completed prior to completion of the construction of the Works despite the fact that future construction of the Works could result in similar damage which the Owner would also be required to repair.
<b>CERTIFICATES OF COMPLETION</b>	18.	Upon completion of the Works, the Owner's Engineer shall inspect the Works and on being satisfied that they are complete, sign, date, stamp and deliver to the City Engineer a certificate of inspection of all the Works in form and content acceptable to the City Engineer certifying that the Works have been constructed and completed in accordance with this Agreement ("Certificate of Total Completion of the Works"). Upon receipt of the Certificate of Total Completion

		of the Works, the City Engineer shall issue to the Owner a Certificate of Substantial Completion of the Servicing Agreement. This Certificate shall not be construed as acceptance of the Works to be provided by the Owner.
<b>RECORD DRAWING SUBMISSION</b>	19.	The Owner covenants and agrees to submit to the Municipality the final Record Drawings and records of construction and test results, as accepted by the City Engineer, pursuant to Schedule A of the Subdivision and Development Control Bylaw, 1991, No. 6200 and amendments thereto within 60 days of the date of the Certificate of Substantial Completion of the Servicing Agreement.
<b>WARRANTY OF WORKS AND MAINTENANCE OBLIGATIONS</b>	20.	Without limiting or derogating from the covenants of the Owner contained in this Agreement, the Owner covenants, with respect to all the Works, that all workmanship shall be of good quality and that all materials shall be free of defects and deficiencies and suitable for the purposes to which they are put. The Owner further covenants and agrees, at its cost and expense to carry out ordinary and customary day-to-day maintenance of the Works, to make good any and all defects and deficiencies in all the Works, to keep all the Works in the condition of good repair (save and except normal wear and tear, acts of God and damage caused by the negligence of the City, its servants or agents or by those for whom the Owner is not vicariously liable) and free of defects and deficiencies and including without limitation, any defects arising from or related to design, construction or installation (including, without limitation, materials used) to the satisfaction of the City Engineer for a period of two (2) years following the date the City Engineer, pursuant to the terms of Section 2.4, acknowledges in writing to the Owner that all the Works have been totally completed to the satisfaction of the City Engineer and that he accepts all the Works (hereinafter called the " <b>Warranty Period</b> "). The Owner acknowledges and agrees that such ordinary and customary day-to-day maintenance during the Warranty Period shall include the watering and maintenance of landscaping installed as part of the Works. At the end of the Warranty Period, the Owner shall no longer have such maintenance obligations, except for those Works the Owner is obligated to maintain in perpetuity in accordance with City bylaws or pursuant to a section 219 covenant, and the City may, at the City Engineer's discretion, but shall not be obligated to, carry out the ordinary and customary day-to-day maintenance of the Works or any portion thereof.
<b>CITY'S RIGHT TO REPAIR</b>	21.	Should the Owner for any reason fail to maintain when ordered, then the City Engineer, at his option, after giving the Owner seven days written notice (emergencies excepted), may, but is not obligated to, do so, and the whole costs, charges and expenses so incurred by the Municipality will be payable by the Owner, as provided for herein. The decision of the City Engineer will be final

		with respect to; the necessity for repairs, or the adequacy of any work done.
<b>REPLACEMENT OF WORKS</b>	22.	The Owner covenants and agrees that should any or all of the Works require repair or replacement during the Warranty Period of such Works, to the extent the City Engineer determines (save and except normal wear and tear, acts of God and damage caused by the negligence of the Municipality, its servants and agents or by those for whom the Municipality is vicariously liable) in his sole discretion such repair or replacement to be major or significant, the City Engineer may, by written notice to the Owner, cause the Warranty Period for those Works so repaired or replaced to be extended, together with all consequential obligations of the Owner under this Agreement, by a period of two (2) years from the date of completion of such repair or replacement. This extended two (2) year period is hereinafter called the "Extended Warranty Period".
<b>BUILDER'S LIENS</b>	23.	The Owner will, throughout the term of this Agreement, keep the Lands, free of any builders' liens relating to the Works or any portion thereof. In the event that a lien or claim is filed in regard to work done, labour and materials supplied to the Lands in connection with the Works or so claimed or alleged, the Owner will discharge same within fifteen (15) days after request made by the Municipality of the Owner. The Owner will indemnify and save harmless the Municipality from and against all costs, damages, expenses and actual lawyers costs and fees arising from or relating to any builders' liens filed or registered against the Lands, or claims against the Municipality in connection with the Works or any portion thereof.
<b>CERTIFICATE OF COMPLETION OF SERVICING AGREEMENT</b>	24.	The Municipality covenants and agrees that upon satisfactory completion by the Owner of all of the covenants and conditions in this Agreement, including the maintenance of the Works in complete repair for the Warranty Period or Extended Warranty Period as the case may be, to provide the Owner with a Certificate of Completion of the Servicing Agreement, signed by the City Engineer. This will be issued by the City Engineer when all deficiencies have been corrected, Record Drawings and service location cards received, and the Warranty Period or Extended Warranty Period as the case may be has expired. The Works remain at the risk of the Owner until the Certificate of Completion of the Servicing Agreement has been issued.
<b>FINAL BUILDING INSPECTION</b>	25.	The Owner covenants and agrees that the Municipality will withhold the granting of a Final Inspection for the use of any building or part thereof, constructed upon the Lands until all the essential services herein have been completed to the satisfaction of the City Engineer.
<b>OWNER INDEMNIFIES MUNICIPALITY</b>	26.	The Owner hereby jointly and severally:

	<p>(a) releases and discharges the Municipality, its officers, employees, servants, agents and invitees and covenants and agrees to indemnify and save harmless the Municipality, its officers, employees, servants, agents and invitees from and against all damages, losses, costs, actions causes of action, claims, demands, builders' liens, liabilities, expenses, indirect or consequential damages (including the loss of profits and loss of use) which may arise or accrue to any person, firm or corporation against the Municipality, its officers, employees, servants, agents and invitees or which the Municipality, its officers, employees, servants, agents and invitees may pay, incur, sustain or be put to:</p> <ul style="list-style-type: none"> <li>(1) by reason of the Municipality, its officers, employees, servants, agents and invitees: <ul style="list-style-type: none"> <li>(A) reviewing, accepting or approving the design, specifications, materials and methods for construction of the Works or any portion thereof; or</li> <li>(B) inspecting the Works or any portion thereof; or</li> <li>(C) performing any work in accordance with the terms of this Agreement;</li> </ul> </li> <li>(2) that arise out of or would not have been incurred but for: <ul style="list-style-type: none"> <li>(A) this Agreement; and</li> <li>(B) the design, construction, installation and existence of the Works or any portion thereof;</li> </ul> </li> </ul> <p>unless such damages, losses, costs, actions, causes of action, claims, demands, builders' liens, liabilities, expenses, indirect or consequential damages (including loss of profits and loss of use) relate in any way to negligent or willful acts or omissions on the part of the Municipality, its officers, employees, servants, agents or invitees; and</p> <p>(b) covenants and agrees to indemnify and save harmless the Municipality, its officers, employees, servants, agents and invitees from and against all damages, losses, costs, actions, causes of action, claims, demands, builders' liens, liabilities, expenses, indirect or consequential damages (including loss of profits and loss of use) which may arise or accrue to any person, firm or corporation against the Municipality or which the Municipality may pay, incur, sustain or be put to, by reason of:</p> <ul style="list-style-type: none"> <li>(1) any negligent act or omission or willful misconduct of the Owner or any of its invitees, licensees, contractors, subcontractors, employees, agents and permittees in connection with the exercise of the obligations of the Owner under this Agreement; or</li> </ul>
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		<p>(2) any default in the due observance and performance of the obligations and responsibilities of the Owner under this Agreement.</p> <p>The obligations of the Owner under Clauses 23 and 26 will survive any expiration or termination of this Agreement.</p>
<b>INSURANCE BY OWNER</b>	27.	The Owner will at his sole expense, until the date of Total Completion of Works, carry Comprehensive Liability Insurance acceptable to the Municipality in the amount of at least five million dollars (\$5,000,000.00) with insurance companies licensed to carry on business in the Province of British Columbia in partial discharge of its obligations under Clause 26.
<b>INSURANCE COVERAGE</b>	28.	<p>The Owner covenants and agrees to provide the following insurance coverage, and prior to commencement of any construction of the Works:</p> <p>(a) To protect the Owner and the Municipality against all claims arising out of:</p> <ul style="list-style-type: none"> <li>(i) Death or injury to persons;</li> <li>(ii) Damage to, or loss of use of, any property of third persons; and</li> <li>(iii) Damage to or loss of any municipal buildings, structures, stores, equipment and materials included in or required for the carrying out of the Works.</li> </ul> <p>(b) Every policy of insurance required will:</p> <ul style="list-style-type: none"> <li>(i) Name "THE CORPORATION OF THE CITY OF NORTH VANCOUVER" as an additional insured;</li> <li>(ii) State that the policy applies to each insured in the same manner and to the same extent as if a separate policy had been issued to each insured; and,</li> <li>(iii) State that the policy cannot be cancelled, lapsed or materially changed without at least thirty (30) days written notice to the Municipality, delivered to The Corporation of the City of North Vancouver's Clerk.</li> </ul>
<b>SECURITY DEPOSIT</b>	29.	As security for the due performance of all of the covenants and promises contained in this Agreement the Owner has forthwith deposited with the Municipality a security deposit in the amounts identified in Appendix B, in the form of cash or a Letter of Credit acceptable to the Municipality (herein called the "Security Deposit").

<b>FORFEIT OF SECURITY DEPOSIT</b>	30.	<p>In the event that the Owner is in default of its obligations under this Agreement including a failure to provide the Works prescribed herein within the time specified in Clause 8, the Security Deposit or that portion of the Security Deposit not yet released by the City Engineer will be forfeited to the Municipality.</p> <p>The Owner shall be deemed to be in default of this Agreement if the Owner files a voluntary petition of bankruptcy, or is adjudicated bankrupt or insolvent, or files any petition or answer seeking any reorganization, arrangement, liquidation, dissolution or similar relief under any enactment respecting bankruptcy, insolvency or other relief for debtors.</p>
<b>USE OF SECURITY</b>	31.	<p>If the Owner is in default of any of its obligations under this Agreement including its obligations in respect to the construction and installation of the Works or any portions thereof, the Municipality may cash the Security Deposit to secure completion of all or a portion of the Works in compliance with the terms of this Agreement and any payment obligations of the Owner in respect of the Works that remain unpaid including the discharge of any builders' liens, and such monies shall be applied to remedy the default and complete all or a portion of the Works and to satisfy the Owners warranties in respect of same in the place and stead of the Owner and ensure compliance with the terms of this Agreement. In addition, the Municipality may cash, retain and use the Security Deposit to remedy any emergency condition which, in the sole opinion of the City Engineer, is associated with, arises from or is a result of the Works and requires expedient action.</p> <p>Notwithstanding the foregoing, the Municipality may cash, retain or use the Security Deposit to pay, settle or compromise any claim against the Municipality for which the Owner indemnified the Municipality pursuant to Clause 23 and 26. If the proceeds from the Security Deposit is not sufficient to pay all the costs and expenses incurred by the Municipality in completing all or a portion of the Works including the Municipality's normal overhead charges and satisfying the warranties therefore, curing other default by the Owner, or satisfying any amounts owing to the Municipality pursuant to Clause 23, 26 and 32 the Owner shall forthwith pay to the Municipality the difference upon receipt from the Municipality of invoices for the same together with all interest thereon at the commercial prime rate of interest plus two percent from the date of receipt by the Owner of the invoices for same and continuing until payment in full.</p>
<b>COMPLIANCE WITH AGREEMENT</b>	32.	<p>The Owner acknowledges and agrees that compliance with the terms and conditions of this Agreement is of paramount importance to the Municipality and agrees that the Owner's failure to fulfill certain covenants and conditions herein contained may not, in the sole discretion of the City Engineer, be capable of or desirable to remedy by the Municipality. The Owner further acknowledges and</p>



		<p>agrees that injunctive relief may not be the appropriate relief in all circumstances.</p> <p>Accordingly, without limitation to any other remedies available to the Municipality under this Agreement and at law or in equity, the Owner covenants and agrees to pay to the Municipality, in respect of each covenant and condition unfulfilled by the Owner which, in the opinion of the City Engineer, is not capable of remedy or desired to be remedied by the Municipality, as liquidated damages, the sum of \$ ▼ in respect of each covenant and condition not fulfilled by the Owner plus \$ ▼ each day such covenant and condition remains unfulfilled.</p>
<b>RELEASE OF SECURITY</b>	33.	<p>If the City Engineer is of the opinion that the Works or any portion thereof have been adequately completed, and the Owner's covenants performed in compliance with this Agreement, and if there is no litigation pending or threatened by any third party against the Municipality as a result of, or arising from, the construction of the Works, the City Engineer may, but is not obligated to, issue a (Partial) Release of Security Deposit, for any portion of the Security Deposit to the Owner at such times and in such amounts as he may deem proper, provided that he will retain an amount not less than 20% of the Security Deposit, with a minimum of \$2,000.00 to secure the performance of the maintenance required of the Owner (hereinafter called the "Maintenance Security Deposit").</p>
<b>RETURN OF MAINTENANCE SECURITY</b>	34.	<p>If the City Engineer is satisfied that the Owner has complied with the covenants contained in this Agreement and if there is no litigation pending threatened by any third party against the Municipality as a result of, or arising from, the construction of the Works, and the Warranty Period or Extended Warranty Period has expired, the City Engineer may issue a Maintenance Security Deposit Release.</p>
<b>ADMINISTRATION FEE</b>	35.	<p>The Owner covenants and agrees to pay to the Municipality a non-refundable fee in the amount identified in Appendix B to cover Municipal administration and processing costs. These fees are payable with the signing of this Agreement.</p>
<b>NO OTHER REPRESENTATIONS</b>	36.	<p>It is understood and agreed that the Municipality has made no representations, covenants, warranties, guarantees, promises or agreements (verbal or otherwise) with the Owner other than those in this agreement.</p>
<b>ASSIGNMENT RESTRICTIONS</b>	37.	<p>The Owner shall not assign its rights or obligations under this Agreement without the prior consent in writing of the Municipality, which consent may be withheld or be granted on conditions at the sole discretion of the Municipality unless the Owner has assigned its obligations to a purchaser of the Lands and that purchaser has executed and delivered to the Municipality an assumption of the</p>

		obligations of this Agreement in form and substance acceptable to the Municipality.
<b>DELEGATION BY CITY ENGINEER</b>	38.	A power or discretion exercisable hereunder by the City Engineer may be exercised by his designate.
<b>NO DEROGATION</b>	39.	Nothing contained or implied herein shall derogate from the obligations of the Owner under any other agreement with the Municipality or, if the Municipality so elects, prejudice or affect the Municipality's rights, powers, duties or obligations in the exercise of its functions pursuant to the Local Government Act and the Community Charter as amended from time to time or the functions of the Approving Officer for the Municipality pursuant to the Land Title Act as amended from time to time and the rights, powers, duties and obligations of the Municipality under all public and private statutes, bylaws, orders and regulations, which may be, if the Municipality or the Approving Officer so elects, as fully and effectively exercised in relation to the Lands and Works as if this Agreement had not been executed and delivered by the Owner and the Municipality.
<b>FURTHER ASSURANCES</b>	40.	The parties hereto shall do such things and execute such documents and in such form necessary in order to perfect the intention of this Agreement.
<b>NO WAIVER</b>	41.	The Owner acknowledge and agree that no failure on the part of the Municipality to exercise and no delay in exercising any right under this Agreement shall operate as a waiver thereof nor shall any single or partial exercise by the Municipality of any right under this Agreement preclude any other or future exercise thereof or the exercise of any other right. The remedies herein provided shall be cumulative and not exclusive of any other remedies provided by law and all remedies stipulated for the Municipality herein shall be deemed to be in addition to and not restrictive of the remedies of the Municipality at law or in equity.
<b>LATECOMER CHARGES</b>	42.	The Owner covenants and agrees that if the Works or any portion thereof constructed or installed by the Owner shall be considered excess or extended services pursuant to Section 939 of the Local Government Act, as amended from time to time, then the length of any obligation of the Municipality to collect latecomer's charges will not exceed fifteen (15) years after the date the Works or any portion thereof are constructed and installed and the Owner will reimburse the Municipality for any costs whatsoever incurred by the Municipality in the preparation and administration of any latecomer's resolutions and agreements including without limitation legal, accounting, engineering, consulting and administration costs (including those incurred internally by the Municipality) and the Owner will not apply for nor enter into any latecomer agreements with the Municipality with respect to the Works or any portion thereof except in accordance with the provisions of this clause and the Owner hereby releases and discharges the Municipality, its

		officers, employees, servants, agents and invitees and covenants and agrees to indemnify and save harmless the Municipality, its officers, employees, servants, agents and invitees from and against all damages, losses, costs, actions, causes of action, claims, demands and expenses (including legal fees and litigation costs) which may arise or accrue to any person, firm or corporation against the Municipality, its officers, employees, servants, agents and invitees for which the Municipality, its officers, employees, servants, agents and invitees may pay, incur, sustain or be put to by reason of the application of Section 939 of the Local Government Act as amended from time to time.
<b>TIME</b>	43.	Time shall be of the essence of this Agreement.
<b>LAWS OF BRITISH COLUMBIA</b>	44.	This Agreement shall be governed by and construed and enforced in accordance with the laws of the Province of British Columbia.
<b>GENDER</b>	45.	If the singular, masculine or neuter is used in this Agreement, the same will be deemed to include references to the plural, feminine or body corporate according to the context of which it is used.
<b>COMPLIANCE WITH BYLAWS</b>	46.	Subject to this Agreement, the Works and/or the development herein shall comply with all applicable federal, provincial and municipal laws, statutes, resolutions, bylaws, orders and policies and the Owner shall obtain all necessary government approvals and permits concerning all the Works and the construction and installation thereof.
<b>PRIME CONTRACTOR</b>	47.	Pursuant to Section 118 of the Workers' Compensation Act, R.S.B.C. 1996, c.492 (as amended) (the "WCA") the parties hereby acknowledge and agree that in respect of all matters pertaining to the Works and this Agreement the Owner shall be the prime contractor as defined in the WCA for the purposes of the WCA and shall the discharge the responsibilities of the prime contractor under the WCA and the Occupational Health and Safety Regulation, B.C. Reg. 296/97. Without limiting the foregoing the parties covenant and agree that nothing in this Agreement shall make the Municipality the prime contractor under the WCA.

**WHENEVER** the word will is used in this Agreement it will be construed as imperative and mandatory.

**WHENEVER** the singular or the masculine is used in the Agreement it will be construed as meaning the plural or the feminine or body corporate or politic where the context or the parties hereto so require.

**THIS CONTRACT SHALL INURE TO THE** benefit of and be binding upon the parties hereto, and their respective heirs executors, administrators, successors and assigns.



## APPENDIX C

Plans and specifications will be prepared by the following consultants:

Civil	<Company Name>
Landscaping	<Company Name>
Mechanical	<Company Name>
Architectural	<Company Name>
Geotechnical	<Company Name>

under Drawing Numbers:

Discipline	Drawing Number	Revision No.	Revision Date m/d/y
Civil	Key and Servicing Plan - Sheet 1 of 1	F	11/06/08
	Stormwater Management Plan - Sheet 1 of 1	-	-
Landscape	Drawing No. <>	1	10/17/08
	Drawing No. <>	-	-
Mechanical	Drawing No. <>	4	10/17/08
	Drawing No. <>	4	10/17/08
Architectural	Drawing No. <>	8	10/17/08
Geotechnical	Drawing No. <>	-	-
	Drawing No. <>	-	-
	Drawing No. <>	-	-
	Drawing No. <> (Sheet 1 of 2)	-	-
	Drawing No.<> (Sheet 2 of 2)	-	-
Other	Eg. Construction Management Plan A1.0 - Received	-	-

## LANDSCAPING AGREEMENT

THIS AGREEMENT dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

BETWEEN:

**THE CITY OF NORTH VANCOUVER,**  
a municipal corporation having its offices at  
141 West 14th Street, North Vancouver,  
British Columbia, V7M 1H9  
(the “City”)

AND: **(Company)**  
  
**(the “Owner”)**

WHEREAS:

- A. The Owner has agreed to assume obligations pursuant to the City’s landscape requirements;
- B. The City has approved a landscape plan submitted by the Owner as shown in Schedule 1 which forms part of this Agreement; and
- C. In return for the sum of One (\$1.00) Dollar paid to the Owner, the receipt and sufficiency of which is hereby acknowledged, and the mutual agreements set out below, the parties agree as follows:

### 1. Definitions

In this Agreement:

- a. “Certification” means the certification of the Landscape Architect that the Landscaping Works other than the Maintenance have been substantially completed to the satisfaction of the Landscape Architect;
- b. “Deposit” means a security deposit in the amount of **\$(amount)** in the form of a **Letter of Credit**;
- c. “Landscape Architect” means **a registered British Columbia Landscape Standard professional**;
- d. “Maintenance” means maintenance or replacement of the Landscaping Works as determined by the Landscape Architect for a period of one (1) year from the date of Certification;
- e. “Property” means the property located at **(Site Address)** more particularly described as **P.I.D. (), Lot (), Resub (), Block (), D.L. (), Plan ()**.
- f. “Reduced Deposit” means a security deposit in the amount of twenty (20%) percent of the Deposit, with a minimum of One Thousand (\$1,000) Dollars to secure the performance of the Maintenance;

- g. "Landscaping Works" means the landscaping works including all plant material, screening, treatment of all exterior surfaces, lighting, drainage of planted areas, and all hard landscape features, as set out in the landscape plan respecting the Property as shown in Schedule 1 attached to this Agreement, and the Maintenance.

## **2. Landscaping Obligations**

The Owner:

- a. shall, upon execution of this Agreement, deposit the Deposit with the City to secure due and proper performance of this Agreement, together with a non-refundable administration fee of Fifty (\$50.00) Dollars to cover the City's administration and processing costs;
- b. shall complete the installation of the Landscaping Works in accordance with the British Columbia Landscape Standards, edition 6, and amendments thereto, and provide the Certification to the Building Inspector within 730 days of the date of this Agreement. In the event that the Landscaping Works are delayed due to inclement weather conditions, Certification may be postponed to include one complete growing season;
- c. shall retain the Landscape Architect to prepare and seal the landscape plans and specifications, and supervise and inspect the installation of the Landscaping Works;
- d. represents that the Landscape Architect is a member in good standing registered in the British Columbia Society of Landscape Architects.

## **3. Changes to Landscaping by Owner**

- a. Any changes to Schedule 1 shall be approved by the Landscape Architect in writing and submitted to the building inspector for approval prior to commencement of any of the Landscaping Works.
- b. In the event that the Works installed are at variance with Schedule 1, an as-built landscape plan and a written approval shall be submitted from the Landscape Architect. Otherwise the City may remedy the default under paragraph 6 of this Agreement.

## **4. Notice to Transferees**

The Owner shall advise all prospective purchasers of the Property, other than prospective purchasers of individual strata lots to be formed upon stratification of the property, and any applicable strata corporation of the City's landscape requirements. If the Owner wishes to transfer the Property prior to the completion of the Landscaping Works, the Owner shall deliver to the building inspector an agreement in substantially the same form as this Agreement executed by the proposed transferee which acknowledges assumption of the Deposit or the Reduced Deposit by the proposed transferee.

## **5. Return of Deposit**

- a. Upon receipt of the Certification:
  - i. The building inspector shall, after inspection of the Landscaping Work to ensure satisfactory completion, return the Deposit to the Owner, without interest, upon receipt of a Reduced Deposit or reduce the Deposit security by eighty (80%) percent or a written two (2)-year guarantee on plant material and maintenance from the landscape contractor responsible for the installation.
  - ii. The owner shall perform the Maintenance and the building inspector shall retain the Reduced Deposit as security for such performance.
- b. After one year from the date of Certification, the building inspector shall return the Reduced Deposit to the Owner (as specified on Page 1 of this agreement) without interest, if the City is satisfied that the Owner has complied with the terms of this Agreement.

## **6. Default**

- a. If the Owner fails to perform the Owner's obligations under this Agreement or is otherwise in default of this Agreement, the building inspector may, without notice:
  - i. call for and receive the funds secured by the Deposit or Reduced Deposit, as the case may be, for the use of the City to complete the landscaping works; and/or
  - ii. enter the Property and install all or part of the Works with its authorized work force using the funds received from the Deposit or the Reduced Deposit.
- b. If the Landscaping Works are not completed prior to the thirtieth (30th) day before the expiry of the Deposit or Reduced Deposit, as the case may be, the building inspector may, without notice, call for and receive the funds secured by the Deposit or Reduced Deposit and retain the funds until the Owner delivers a replacement Deposit or Reduced Deposit security to the City satisfactory to the City.

## **7. Bankruptcy is Default**

The Owner shall be deemed to be in default of this Agreement if the Owner files a voluntary petition of bankruptcy, or is adjudicated bankrupt or insolvent, or files any petition or answer seeking any reorganization, arrangement, liquidation, dissolution or similar relief under any enactment respecting bankruptcy, insolvency or other relief for debtors.

## **8. General Terms**

This Agreement shall ensure to the benefit of and be binding upon the parties and their respective heirs, executors, administrators, personal representatives, successors and permitted assigns. Time shall be of the essence in this Agreement.





**SCHEDULE 1**

**List of Landscape Plans**

Prepared by: Professional  
Address  
City, Province. Postal Code

Project Address: Address  
City, Province

<b>Sheet No.</b>	<b>Sheet Title</b>	<b>Sheet Date</b>	

## SCHEDULE C

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#### SECTION I – DESIGN CRITERIA

##### 1.0 GENERAL, SURVEY INFORMATION, DRAWING SUBMISSION

##### 1.1 GENERAL

The purpose of this section is to outline the minimum standards and requirements the City will accept in the design and “Record Drawing” submissions for engineering work(s).

It is the specific intent of the City to require quality submissions for design and “Record Drawing” submissions. It is recommended that whenever engineering works are required or proposed, the Owner’s Engineer arrange for a pre-design meeting to ensure compliance with the latest municipal standards, specifications and policies.

Incomplete or substandard submissions will be returned to the Owner’s Engineer without comment on the drawings and with a short letter of explanation as to why the drawings are being returned. A subsequent re-submission which remains incomplete or substandard will result in a request to meet with the Owner’s Engineer and the Owner.

Where sub-consultants are employed in the design process the City will expect the prime consultant to represent their work for administrative and procedural purposes.

City review of design drawings submitted by the Owner’s Engineer is procedural only and does not confirm the accuracy of the design. The City will not accept responsibility for any costs or damages incurred by the Owner due to errors, omissions, or deficiencies in the design.

The Owner’s Engineer shall be responsible for the provision of layout and the co-ordination and inspection of the construction and installation of the required works and

services, and shall submit certified drawings to the City Engineer within 60 days of issuance of Certificate of Substantial Completion.

If the Owner's Engineer sub-contracts the layout and inspection works it shall be the Owner's Engineer who shall sign and seal the drawings. It shall remain the responsibility of the Owner's Engineer to ensure inspection and certification is provided.

Inspection services performed by the City are for procedural purposes only and do not relieve the Owner's Engineer of his obligation to certify drawings. The City's Inspector will not issue any direct order to the Owner's Contractor except for stop work orders related to emergency situations. All communication will be through the Owner's Engineer or his representative.

Where a question arises, please contact the Engineering Department for clarification. All submissions shall reflect and comply with the following:

1. All applicable requirements of Schedule C
2. Applicable requirements of all Bylaws, including but not limited to:
  - a. The Subdivision and Development Control Bylaw
  - b. The existing Zoning Bylaw(s)
  - c. The Street and Traffic Bylaw
  - d. The Parking Bylaw.

## **1.2 SURVEY INFORMATION**

All surveys shall be conducted in a manner that safeguards the workers and the general public with the least inconvenience to traffic or general public. The permission of the registered owners is required before entering private property.

All elevations shall be from Geodetic Datum and survey shall be tied to the City's integrated survey monuments. Information regarding the location and elevation of Benchmarks and Monuments may be obtained from the Engineering Department.

Originating benchmarks and integrated survey monuments will be noted on all plans as well as those to be established in the work.

Coordinated survey monuments shall be constructed as required by the City Engineer and the survey monuments shall be incorporated in the works of subdivisions as specified by the City Engineer and referenced on the subdivision plan.

Copies of legible field notes will be made available to the City upon request.

Centre lines (or offset lines) are to be marked and referenced in the field and all chainage will be keyed to the legal posting.

All existing items such as manholes, catch basins, fire hydrants, poles, existing dwellings, fences, trees, hedges and unusual ground will be noted as required.

Where applicable, cross sections will be required. The section will include centreline, edge of pavement or gutter line, property line, and an existing ground elevation inside property line.

The chainage shall be as given by the Engineering Department or if acceptable, as established by previous engineering design. Generally, chainage shall increase from left to right and from bottom to top on a drawing. North should be at the top or left side of a drawing.

### **1.3 DRAWING SUBMISSIONS**

All drawings shall be prepared in accordance with the following requirements and all other applicable requirements of Schedule C.

All drawings shall be signed and sealed by a Professional Engineer registered in British Columbia.

The City will supply to the Owner's Engineer, for a nominal charge, the required number of blank drawing sheets with the City's standard title block. The City Project number must be noted in the lower right-hand corner of all drawings. City Drawing Numbers will be issued when drawings are approved.

All drawings shall be "teroyed" or "computer assisted" and shall clearly identify the works in sufficient detail. Road cross-sections may be by hand, provided they are of good quality and clarity.

All new works are to be drafted in bold lines.

Notes pertaining to the construction of a service are to be shown on that service drawing.

Baseline is to be referenced to legal corner(s) on each sheet.

Offsets are to be shown to both sides of the road allowance or to one side with the road allowance width annotated.

The plan view shall show the legal layout of roads and properties, with all legal descriptions (lots and plan numbers) and dimensions (to the nearest 0.001 m), all other dimensions to the nearest 0.01 m. Also show existing house numbers and all registered statutory rights-of-way.

A complete set of Engineering Design drawings shall include, in the following sequence:

1. Cover Sheet

Noting the Owner's Engineer's name, and Owner's address and phone number, the City project number, the legal description of the lands involved, a key plan at a 1:5000 scale, and an index.

The key plan shall note all proposed roads and the proposed subdivision layout. The cover sheet may be utilized to show the drainage catchment area (ref. 1.3.3.c.).

The cover sheet shall contain an administrative block as shown in Standard Drawing.

2. Site Plan

The Site Plan shall be at a 1:500 scale and shall note all proposed services, including street lighting and all non-standard connection off-sets. If more than one sheet is required, note the westerly or southerly portion first and identify as Site Plan A with additional plans noting B and C, etc. The development site is to be outlined with a bold line.

3. Storm Water Management Plan

Shall be at 1:500 scale and identified as per site plan system if more than one sheet is required. The Storm Water Management Plan shall note:

- a. the pre-development contour lines at maximum 1.0 m intervals. This topography shall extend a minimum 30.0 m outside the development site;
- b. all existing lot corner elevations (uncircled);
- c. all proposed lot corner elevations (circled);
- d. the proposed slope of the lot (directional arrow), noting a minimum 1% grade on the lots and lot dimensions;
- e. the minor (10 year return) storm sewer system with the flows noted per section and the accumulated flows from all upstream sections. Provision must be made for upstream development potential where applicable;
- f. the major (100 year return) system. The Owner's Engineer shall note wherever the major system is not in the pipe or the roadway, showing the routing, flows and velocities etc. for the 100 year return;
- g. how the development proposal will affect adjacent lands. No surface drainage shall be proposed to flow off-site over adjacent lands unless off-site work(s) are proposed and in compliance with municipal standards. Attempts should be made to "meet" existing elevations along the development boundary;
- h. a legend noting all items proposed in the Storm Water Management Plan. Applicable "General Notes" should also be included;
- i. a key plan showing the catchment areas involved. This generally can be at a scale of 1:5000 and set as an insert on the sheet. Where this is not physically possible, it is suggested that the catchment area(s) be noted on the "cover sheet". Size of catchment areas (hectares) and run-off coefficients to be noted. All catch basins to be shown with elevations noted.

4. Road and Water Drawings

Plan and profile drawings shall show all grades including curb returns, grades and beginning of curb, two intermediate points and end of curb, inverts, curves, radii, valves, hydrants, bends, ground profiles at property lines, etc. The scale shall be 1:500 for plans and 1:50 for profile. The full pipe shall be shown for the watermain on the profile. All crossover points with sewers shall be noted and where the invert of the watermain is less than 0.5 m above the top of any sewer, the watermain shall be protected in accordance with Ministry of Health requirements. On the plan,

a list of the watermain fittings is to be “boxed in” for each location and tied to chainages. On the profile, the fittings are to be shown and the chainages indicated.

5. Storm and Sanitary Sewers Drawings

Plan and profile drawings shall show grades, inverts, manholes, catch basins, etc. The scale shall be 1:500 for Plan and 1:50 for profile. Symbols to denote the service connection elevation at the property line shall be shown on the profile plan, as well as the minor and major system hydraulic grade lines. The full pipe shall be shown on the profile. Rim elevations are required for all manholes, cleanouts and catchbasins.

6. Road Cross Sections

Shall be scaled at 1:100 horizontal and 1:50 vertical and shall note the existing ground elevation, the proposed elevations of the road centerline, the curb and gutter (or road edge) and property lines. Cross-sections are required at 15.0 m intervals. Additional sections may be required or requested where excessive cuts or fills are involved. These plans may be by hand, provided they are of good quality and clarity.

7. Ornamental Street Lighting Plan

Shall be a plan view (1:500) of the street lighting proposal designed, signed and sealed by a Professional Electrical Engineer. There shall be General Notes included on the Plan noting reference(s) to the City Standards and Specifications and the appropriate design criteria. Generally, street lights shall be located at all intersections *and within one metre of the property lines*. Any street lighting plan(s) should include the photometric calculations.

8. Construction Details

Wherever possible, use the Standard Construction Details included in the Master Municipal Tender Document and refer to it by number. Show all proposals for construction which are not covered or specifically detailed in the City Standards and Specifications. Where there is a City Standard, refer to the Drawing Number. It is not necessary to include or provide work(s) for which there is a Standard Drawing.

9. Standard Note Sheet

A mylar copy of the City's standard note sheet is available to the Owner's Engineer free of charge. This sheet is not to be changed in any way and is to be included as the last page of all submissions.

10. Engineer's Seal

The Owner's Engineer's seal and signature shall be noted on all sheets of all design submissions. Failure to do so will result in the Plans being returned without comment. The Owner's Engineer's seal and signature shall infer that all works as proposed are structurally sound, comply with the applicable design criteria of this manual and good engineering practice.

11. Design Submission Details

Notwithstanding the previously detailed requirements, the following additional information is to be noted in design submissions:

- \* the size, grade, inverts, and type of material on profile sections;
- \* the locations, off-sets, curvatures, size and identification of the mains noted on the Plan sections;
- \* the clearance between mains at all cross-over points;
  - \* all existing structures, including houses, sheds, fences and underground structures shall be shown on the appropriate drawing(s), with a notation indicating their fate (i.e. to be removed, filled, etc.).

12. Material Required with First Design Submission

The first complete design submission shall consist of:

- \* One complete electronic set of design drawing
- \* Five complete sets of design drawings
- \* Two additional sets of the water system drawings including site and key plan with each set (for Ministry of Health approval)
- \* soils report (to verify road structure design)  
(Soils reports shall be required on all new road construction design.)
  - \* All applicable utility calculations (water, sanitary, and storm sewer)
  - \* Cost estimates

13. Material Required with Subsequent Design Submission

Subsequent design submissions requiring changes to the previous submission shall consist of:

- \* two complete sets of drawings
- \* a complete construction estimate
- \* all submissions subsequent to first submission shall have highlighted with yellow any changes made by the Owner's Engineer which are in addition to "Red Line" changes required by the City.
  - \* items "Red Lined" must be addressed by the Owner's Engineer.

14. Material Required with Final Design Submission

The final submission for municipal acceptance shall consist of:

- \* four complete sets of drawings
- \* two storm water management plans
- \* five key plans
- \* a complete construction estimate
- \* two street lighting plans.
  - \* Owner's Engineers are requested to fold drawings to facilitate processing. The Administrative Block is to be visible on the top of the drawing submission.



#### 1.4 CONSTRUCTION COST ESTIMATE CALCULATION

The Engineering Department will require a detailed format for the breakdown of the offsite requirements. The developer's professionals shall provide cost estimates, which will be used to determine the security deposits. These items and costs will be reviewed and amended where or if necessary.

**Note:** All Hydro and Telephone costs are to be bonded, and are to be included in the calculation of the Administration Fee.

#### 1.5 ENGINEERING SERVICES SYSTEM RECORDS

The Engineering Department will require the location dimensioned to the nearest property corner, size, etc., of each municipal utility connection shown and detailed clearly and accurately. The engineering service system records are considered part of the "Record Drawing" submission.

#### 1.6 RECORD DRAWING SUBMISSIONS

The following procedures shall be followed in the submission of "Record Drawings" for City acceptance.

1. Required Sets

The Owner's Engineer shall submit five complete sets of paper prints and electronic format as per the Information Technology Policies and Procedures Manual, including for the road cross-section sheet(s), and a complete set of engineering service records for City review.

2. Revisions

If necessary one marked-up set of the "Record Drawing" paper prints will be returned to the Owner's Engineer for revision. If there are minor changes, it may be requested that the mylars with the revisions noted, be submitted for municipal acceptance. If there are numerous amendments, it is likely that the Owner's Engineer will be requested to resubmit five sets of revised paper prints for a second review. The municipal file number will have been noted on each drawing for identification of the mylar drawings.

3. Certification

When the City is satisfied with the "Record Drawings" submission, the Owner's Engineer will be requested to submit the following:

- a. One set of mylar drawings identified in bold letters with the words "CERTIFIED RECORD DRAWINGS". Mylars shall not be taped together, and where originals are taped, every attempt should be made to match printing densities of the component parts. Mylars will not be signed and sealed. The municipal file number must be added to the mylar drawings.
- b. Two sets of paper prints with the following certification:  
**"I certify this drawing represents the works and services as designed, installed, and inspected."**

The signature and seal shall be by the Professional Engineer who personally performed the required inspections. One set will be returned to the Owner's Engineer upon acceptance by the City.

- c. A digital copy of the certified record drawings shall be provided as per the Information Technology Policies and Procedures Manual.
- d. A Certificate of Inspection is to be signed by the Owner's Engineer.

#### 4. Deposit Retention

Once the "Record Drawings" and "Engineering Service System Record" are accepted by the City, the Engineering Department will automatically authorize a reduction of the security deposit, to reflect this.

#### 5. Presentation

Record drawings shall be presented as follows:

- a. Key plan noting water, sanitary, storm mains, street lights and roadworks. The plan shall show the as-constructed offsets for those works and the locations of all service connections relative to the lot lines.
- b. Detailed plan profile drawings for water, sanitary, storm and roadworks. Elevations, inverts and offsets to show the works as constructed. The profile drawings for the utilities shall state the pipe materials used.
- c. Where required in the design submission, the stormwater management plan including lot grading. The plan shall note the elevations at all lot corner pins, lawn basin and catch basin rims and swale inverts. Uniform grades between lot corners will be assumed (to a tolerance of "150 mm).
- d. Street light drawings shall show make, model and type of luminaire unit. Locations of service bases and photocells to be shown.
- e. Plans of details for which there is no City standard (pump stations etc.).
- f. In all cases notes with instructions to the Contractor are to be removed or amended to indicate the result of construction. Previously existing works that have been deleted as a result of construction, or reconstructed in accordance with design shall be removed or amended to show works as constructed. It is intended that the "record drawings" shall show the works as they have been constructed in order to provide accurate and detailed information when adding to, or maintaining, the works shown on the plans.
- g. The Record Drawings shall be submitted together with service connection records.

## 2.0 WATER SYSTEMS

### 2.1 WATER DISTRIBUTION SYSTEM

#### 1. Community Water Supply

Watermain design shall conform to the requirements of the Provincial Ministry of Health and this Schedule.

The system shall be designed to provide day-to-day domestic requirements and also shall provide adequate flows for fire protection. The required flow shall be the sum of the maximum daily domestic flow plus the required fire flow.

2. General

- a. Water utilities shall be located within existing or proposed highway rights-of-way. Locating the utility within other than highway rights-of-way will be considered only if technically necessary.
- b. Watermain extensions which are not the result of subdivision shall be extended a minimum distance of 5 metres along the lot frontage to provide for convenient service connections.
- c. Lots shall be serviced by a watermain fronting the property, not by a connection through an adjoining lot.
- d. Service connections to lots created for Industrial use shall not be installed at the time of subdivision unless type, size and location of the services are known at the time of Engineering plan acceptance and the requirements of the applicable Bylaw have been satisfied. It will be the responsibility of the Owner to make application for Industrial connections at the time of the Building Permit application.

**2.2 PER CAPITA DEMAND**

Water system demand will be provided by Engineering through utilization of a computer model of the water system

Design Computations shall be based on the Hazen-Williams formula:

$$Q = \frac{CD^{2.63}S^{0.54}}{278,780}$$

- where
- Q = Rate of flow in litres/sec
  - D = Internal pipe diameter in mm
  - S = Slope of hydraulic grade line in m/m
  - C = Roughness coefficient (125 for all new mains)

**2.3 FIRE FLOW DEMAND**

Fire flows shall be in accordance with the criteria outlined in “Water Supply for Public Fire Protection - A Guide to Recommended Practice 1981” published by Public Fire Protection Survey Services.

The following minimum Fire Flows shall be met for the noted zones:

<b>Zone</b>	<b>Required Fire Flow</b>
Family Residential	60 litres/sec
Multi-family Residential*	90 litres/sec
Commercial	150 litres/sec
Public Use & Assembly	150 litres/sec
Industrial, Waterfront	225 litres/sec
Other	150 litres/sec

\*Multi-family Residential includes all residential zones, and Comprehensive Development Zones containing residential uses (except Single-Family Residential Zones).

## **2.4 WATER PRESSURE**

Minimum pressure at peak demand	300 kPa
Maximum allowable pressure	1035 kPa
Minimum fire hydrant pressure (residual)	150 kPa

All service connections where the services pressure exceeds 517 kPa shall be individually protected by pressure reducing valves in the dwelling.

## **2.5 HYDRAULIC NETWORK CONSIDERATIONS**

1. Where there is an existing hydraulic network in place, the City will provide information for design calculations.
2. Depending on the complexity and extent of the proposed distribution system, the City may require a hydraulic analysis design showing minimum flows and pressures.
3. The maximum desirable length of any permanent non-interconnected watermain shall be 150 m. All mains exceeding 150 m in length, unless it is a temporary situation, shall be looped, except with the approval of the City Engineer.
4. In residential areas, watermains servicing fire hydrants shall be 200 mm diameter or larger. Watermains 150 mm in diameter may be permitted for domestic service on dead end roads where no further extension is planned. Wherever practical, watermains shall be looped. Dead-end mains should not be promoted.
5. In commercial/industrial/institutional areas, the minimum watermain size shall be 200 mm diameter.

## **2.6 MINIMUM DEPTH OF COVER**

The minimum cover over any watermain shall be 1.2 m.

## **2.7 MINIMUM / MAXIMUM GRADE**

The minimum grade for a main shall be 0.1%.

The maximum grade shall be 15.0 % unless provisions are made to anchor the pipe to the bottom of the trench with concrete poured in place. Refer to standard drawings.

## **2.8 MINIMUM CLEARANCE**

Where pipes cross, the invert of a watermain shall not be less than 0.5m above the top of any sewer unless the watermain is adequately encased either by a carrier pipe or concrete. The concrete encasement shall be as noted in Standard Drawing.

Where pipes do not cross, the minimum horizontal clearance between a watermain and any sewer shall be 3.0m unless the watermain is concrete encased or installed in a carrier pipe.

## **2.9 VALVING**

In general, valves shall be located as follows:

1. In intersections, in a cluster at the pipe intersection or at the projected property lines, to avoid conflicts with curbs and sidewalks;
  - a. 3 valves at “X” intersection
  - b. 2 valves at “T” intersection so that specific sections of mains may be isolated.
2. Not more than 220 m apart for single family residential. All other zones shall require special designs.
3. Not more than 1 hydrant isolated.

Valves shall be the same diameter as the main. Valves 350 mm diameter and greater shall be equipped with a bypass valve.

Butterfly valves may be used in mains 300 mm and larger, subject to the approval of the City Engineer.

## **2.10 HYDRANTS**

Fire hydrants to City standard shall be located in general at street intersections, and at a maximum spacing of 150 m in residential areas. In high density residential, commercial, and industrial areas, hydrants shall be located at a maximum of 75 m or as approved by the City Engineer and the City Fire Department.

In mid-block locations, fire hydrants shall be located at the property lines. It shall be the Owner’s Engineer’s responsibility to ensure the design and proposed locations of the fire hydrants will not conflict with existing or proposed street lights, power poles, etc.

## **2.11 AIR VALVES**

Air release valves shall be installed at the grade summit of peaks of all mains of 150 mm diameter and larger.

## **2.12 BLOW-OFFS**

Blow-offs are required at the ends of all watermains. See Standard Drawings.

## **2.13 THRUST BLOCKING**

Concrete thrust blocking shall be provided at bends, tees, wyes, reducers, plugs, caps, and blow-offs. See Standard Drawing.

## **2.14 CHAMBER DRAINAGE**

Chambers or manholes containing valves, blow-offs, meters, or other appurtenances shall be connected directly to the storm sewer system. Minimum pipe size is 200 mm.

## **2.15 SERVICE CONNECTIONS**

Minimum 19mm diameter service connections shall be required for all lots. These connections shall typically be located at the property line adjacent to the applicable property. A corporation stop at the main and a curb stop shall be installed for each connection. Water meters, shall be installed in the meter boxes in ground on public property, complete with valve shut offs for easy access to the meter.

All service connections larger than 50mm diameter shall be installed complete with a check valve assembly, as shown in Standard Drawings attached. These larger services shall have gate valves at the main line and property line.

## **2.16 WATER SYSTEM LOCATION/CORRIDORS**

Watermains shall be located within the road right-of-way as noted in the applicable Standard Drawing Typical Cross-section for that road.

When the utility is required to cross private land(s), the right-of-way shall be a minimum of 3.0 m wide.

When a utility is located within a right-of-way, and manholes, valve chambers, or other appurtenances which require maintenance are located within the right-of-way, the Owner may be required to provide for a constructed road access from a Municipal road for maintenance vehicles. The maintenance access shall be constructed as a gravel lane or approved equal, adequate to support the maintenance vehicles for which the access is intended.

## **3.0 DRAINAGE**

### **3.1 INTRODUCTION**

All drainage systems in the City have been, or will be, reviewed with respect to storm drainage and the effects of development within the drainage catchment areas.

Designers shall consult with the Engineering Department to determine what existing information may be of assistance to them.

The presence of an existing municipal drainage system does not mean, or imply, that it has adequate capacity to receive the proposed design flows, nor does it indicate that the existing system pattern is acceptable to the City. Existing facilities which are over sized or inadequate to accept additional drainage must be upgraded at the Owner's expense to accommodate the appropriate flows. Alternative drainage proposals may be considered.

Pumped Discharges must be to a piped system.

It must be shown that all downstream drainage facilities for a distance of 1.5 km are capable of handling the projected increase in drainage created by any development.

All developments or works which will cause drainage discharge into existing municipal drainage systems and/or natural drainage or water courses must ensure that no silt, gravel or debris enters those systems (see also Section 3.3).

All storm sewer systems shall be designed for closed joint construction unless otherwise specified.

## **GENERAL**

In the design of a drainage collection system, provision shall be made for, but not limited to, the following:

- \* Roadway, lane, walkway, and emergency access to drainage facilities.
- \* Control of surface drainage across the land(s) being subdivided.
- \* Protecting the established amenities of the existing and adjacent or adjoining land(s).
- \* The impact of the proposed drainage system on the existing drainage system and the downstream adequacy of the existing system to accept the additional flows of the proposed system.

Drainage utilities shall be located within existing or proposed highway rights-of-way. Locating the utility within other than highway rights-of-way will be considered only if technically necessary.

Storm sewer extensions which are not the result of subdivision shall be extended a minimum distance of 5 metres along the lot frontage to provide for convenient service connections.

Storm sewer extensions required at the time of subdivision shall be extended across the entire frontage of the original parcel.

Service connections to lots created for industrial use shall not be installed at the time of subdivision unless type, size and location of these services are known at the time of Engineering plan acceptance and the requirements of the applicable Bylaw have been satisfied. It will be the responsibility of the Owner to make application for industrial connections at the time of Building Permit application.

For commercial and industrial developments or subdivisions, a storm water management plan may be required at the time of Building Permit application.

### **3.2 MINOR AND MAJOR SYSTEMS**

Each drainage system shall consist of the following components:

1. The Minor System

It shall consist of pipes which convey flows of a 10 year return frequency. Driveway culverts that form part of the minor system shall be designed to the 10 year return frequency with the design headwater not to exceed the top of the culvert.

2. The Major System

It shall consist of surface flood paths, roadways and watercourses which convey flows of a 100 year return frequency. Major flood path routing is required wherever surface overland flows in excess of 0.05 m<sup>3</sup>/s are anticipated.

Driveway Culverts that form part of the major system shall be designed to accommodate the 100 year return frequency. Surcharging at the inlet for the 100 year flow is acceptable provided the headwater profile does not intersect habitable property.

In all cases, consideration must be given to the design of the major flows within storm sewers, should any inlet facility become blocked or restricted.

### 3.3 DRAINAGE DESIGN METHODS AND FLOWS

Storm drainage systems shall be designed using conventional methods and Storm Water Management techniques.

#### 1. Conventional Systems

Proposed drainage system shall be designed using the Rational Formula (generally for developments where the tributary areas are less than 10 hectares), or incorporating the use of Hydrographs (for larger areas and for any drainage system including detention facilities). The Owner shall provide to the City all calculations pertinent to the design of the proposed drainage system. All designs shall take into consideration post-development upstream flows.

##### a. Rational Method      $Q = RAIN$

where:

Q = Flow in m<sup>3</sup>/s

R = Runoff coefficient

A = Drainage area in ha

I = Rainfall Intensity in mm/hr

N = 0.00278

##### b. Hydrograph Methods

i. Manual Methods may be attained through several means including those noted in American Public Works Association Special Report No. 43 entitled: "Practices in Detention of Urban Storm Water Runoff" or by the U.S. Soil Conservation Service (SCS) method as described in SCS Technical Release No. 55 entitled: "Urban Hydrology for Small Watersheds."

ii. Computer Modelling systems may be by either the "Stormwater Management Model" (SWMM) or the "Illinois Urban Drainage Area Simulator" (ILLUDAS).

#### 2. Storm Water Management Systems



Storm Water Management Systems shall incorporate such techniques as lot grading, surface infiltration and sub-surface disposal, storage or other acceptable methods, to limit the peak runoff from the development.

Storm Water Management shall be used for all comprehensive developments and should be included, where feasible for conventional developments.

A proper Storm Water Management Plan should include all drainage facilities, lot grading (showing pre- and post-development elevations), major flood path routing, and all other appropriate information pertinent to the design as identified in Section 3.1.

### 3.4 RUNOFF COEFFICIENTS

The following runoff coefficient shall be used in the calculation for the Rational Formula:

TYPE OF AREA	COEFFICIENT		
	Low	High	Standard
Low Density Housing	0.45	0.55	0.50
Medium Density Housing	0.55	0.65	0.60
High Density Housing	0.60	0.80	0.70
Commercial, Industrial	0.80	0.90	0.85
Institutional	0.70	0.90	0.80
Park or Golf Course	0.15	0.25	0.20
Churches or Schools	0.60	0.85	0.75
Grassland	0.15	0.30	0.20
Cultivated	0.30	0.50	0.40
Woodland	0.10	0.40	0.25
Roofs or Pavements	0.90	1.00	0.95

Standard values are for general application. The Owner's Engineer should verify the coefficient applicable for the area involved. The City Engineer shall be the final authority on the coefficient to be utilized.

### 3.5 DRAINAGE AREAS

The entire tributary drainage area for the storm drainage system under design shall be according to the natural contours of the land. While contour maps provided through the Engineering Department, can be expected to be reasonably indicative of the actual condition, Owner's Engineers are cautioned not to interpret them to be exact and correct.

It is the Owner's Engineer's responsibility to ensure that they obtain true and accurate elevations for the development site.

### 3.6 RAINFALL INTENSITIES

#### 1. Time of Concentration

Flows in storm sewers and ditches, channels or watercourses and overland flows shall be considered in computing the time of concentration by using the following formula:

$$T_c = \frac{C_t \times L \times n}{12 \times s^{0.5}}$$

where:

- T<sub>c</sub> = Time of concentration in minutes
- C<sub>t</sub> = Concentration coefficient depending on the type of flow rate  
 = 0.5 for natural watercourses or ditches: 1.4 for overland flow, 0.5 for storm sewer flow
- L = Length of watercourse, conduit or overland flow in metres, along the drainage path from the furthest point in the basin to the outlet (maximum length = 300 m)
- n = Channel friction factor  
 = 0.050 Natural Channels  
 = 0.030 Excavated ditches  
 = 0.016 Overland flow on smooth paving  
 = 0.400 Overland flow on natural areas  
 = 0.013 Concrete pipe  
 = 0.011 PVC
- s = Basin slope in metre/metre

Actual flow velocities in storm sewers shall be used. A composite value for T<sub>c</sub> shall be calculated in cases where the type of flow along the longest path varies or the slope changes.

## 2. Rainfall Return Frequency

The following return frequencies shall be used for design:

- a. Minor Systems 10 year return
- b. Major Systems 100 year return

## 3. I.D.F. Curves

Rainfall Intensity/Duration/Frequency (IDF) curves are shown on a Standard Drawing.

### 3.7 SITE AND LOT GRADING

Developments in the City shall incorporate proper site and lot grading techniques. The following criteria shall be used:

1. Each lot should be graded to drain to a municipal drainage system, independent of adjacent lots where possible. Minimum lot grades to be 1.0 percent.
2. Areas around building (or proposed building sites) shall be graded away from the (proposed) foundations to prevent flooding.
3. Lots lower than adjacent roadways should be avoided where possible or acceptable storm water management techniques must be incorporated to direct drainage to an existing or proposed drainage system.

4. Habitable portions of buildings or proposed buildings must be sited above the Major System hydraulic grade line. Minimum floor elevation shall be shown on each lot.
5. Individual lot(s) will not be permitted to direct storm water discharge or drainage into any natural watercourse, park or green belt area(s), without the approval of the Ministry of Environment and the City Engineer.

**NOTE:** The Owner is advised that lot grading is considered an “essential service” and is required prior to the issuance of building permits. To facilitate Building Permit issuance, and to provide the builders with accurate site information, the submission and acceptance of the lot grading record drawing(s) is required prior to issuance of the building permits.

### 3.8 ROOF DRAINAGE

1. Roof drainage must be discharged into the City’s drainage system.
2. On flat roofs, controlled-flow roof drain devices shall be installed to provide temporary storage and retard the discharge to the ground or storm sewer system if the roof is designed as part of a retention system. Generally, this is applicable in commercial, industrial, and institutional developments.

### 3.9 DETENTION FACILITIES

For the most part, development in urban areas and in industrial areas will be serviced by Site-Specific Detention Facilities.

Large developments, generally independent of existing drainage facilities, or where the existing drainage system is known or proven to be inadequate, will be required to provide detention of the storm water to the pre-development runoff flows.

Due to a variety of site-specific characteristics, and the numerous detention facility designs, it is not feasible to delineate all the unique or typical situations that may exist for any one particular area. The Owner’s Engineer shall review all proposals for detention systems with the City Engineer prior to detailed design.

Detention facilities shall be designed with bottom drainage to ensure the facility is dry when not in use.

### 3.10 FLOW CAPACITIES

The following information shall be referred to when calculating flow capacities for:

#### **Storm Sewers and Open Channels**

Use Manning’s Formula  $Q = \frac{AR^{0.667} S^{0.5}}{n}$

**where:**

Q	=	Design flow in m <sup>3</sup> /s
A	=	Cross sectional area in m <sup>2</sup>
R	=	Hydraulic radius in m
S	=	Slope of hydraulic grade line in m/m
n	=	Roughness coefficient
	=	0.011 for PVC pipe
	=	0.013 for asbestos cement, clay and concrete pipe
	=	0.024 for corrugated steel pipe
	=	0.020 for gravel lined channels
	=	0.013 for concrete or asphalt lined channels
	=	0.050 for natural streams and grassed channels

**Culverts**

**NOTE:** Downsizing of storm sewers will not be accepted for sizes 600 mm diameter or less. A maximum downsizing of two pipe sizes for storm sewers larger than 600 mm diameter will be considered.

**3.11 SEWER LOCATION/CORRIDORS**

Storm sewers shall be located within the road right-of-way as noted in the applicable Standard Drawing Typical Cross-section for that road.

When the utility is required to cross private land(s), the right-of-way required shall be a minimum of 3.0 m wide. Where both storm and sanitary sewers are in one right-of-way, the width shall be a minimum of 5.0 m wide.

When a utility is located within a right-of-way, and manholes or other appurtenances which require maintenance are located within the right-of-way, the Owner may be required to provide a constructed road access from a City road for maintenance vehicles. The maintenance access shall be constructed to a gravel lane standard or approved equal adequate to support the maintenance vehicles for which the access is intended.

**3.12 UTILITY SEPARATION(S)**

Refer to Section 2.8 for clearance with watermains.

**3.13 MINIMUM SIZE OF PIPE DIAMETERS**

The minimum size of storm sewers shall be 200mm diameter

Catch basin leads shall be a minimum 200mm diameter.

Service connections shall be a minimum 150mm diameter (residential / industrial / commercial).

Driveway culvers shall be a minimum 300mm diameter.

The minimum road crossing culvert size shall be 375mm diameter.

### 3.14 MINIMUM DEPTH OF COVER

The minimum depth of cover shall be 1.2 m for storm sewer pipes up to 600 mm, and 0.3 m for culverts across roads and driveways, subject to the correct pipe loading criteria. For pipe sizes larger than 600 mm, an engineering design for cover will be required.

The elevation of storm sewers at the upstream tributary points must be of sufficient depth to service all of the tributary lands.

### 3.15 SERVICE CONNECTIONS

Service connections shall:

1. Be installed to all lands fronting the main, except where lands have an acceptable alternative existing drainage system, so that the lands may be provided with a 'gravity-flow' connection.
2. Have a diameter of a minimum 150 mm for residential, industrial and commercial.
3. Have a slope of not less than 2.0%.
4. Be installed at the lower (downstream) portion of the lot for larger lots or parcels of land. In urban developments, connections shall be as noted on Standard Drawings.
5. Be single connections only.
6. When the design proposes to infill an existing ditch, all existing service connections are to be connected to the proposed main.

### 3.16 MINIMUM/MAXIMUM VELOCITY

The minimum velocity for pipes flowing full, or half full, shall be 0.75 m/s.

There is no maximum velocity, however, where grades exceed 15%, scour protection may be required and anchor blocks will be required.

Where drainage discharge enters a natural watercourse, the Ministry of Environment generally requires adequate Rip Rap protection and maximum velocities under 1.0 m/s.

### 3.17 CURVILINEAR SEWERS

Where curvilinear sewers are proposed, the minimum radius should not be less than 60 m and only where the maximum joint deflection or bending radius is one half of the pipe manufacturers' recommendations. Only one curve will be permitted between manholes.

### 3.18 MANHOLES

Manholes are required at:

- |  |                            |
|--|----------------------------|
| * every intersecting sewer             | * all changes in pipe size |
| * all changes in direction             | * all changes in grade     |
| * downstream end of curvilinear sewers |                            |

- \* every 150 m for pipes less than 900 mm diameter
- \* every 300 m for pipes 900 mm diameter and larger

### 3.19 HYDRAULIC LOSSES IN MANHOLES

The following criteria shall be used:

1. Generally the crown of the downstream pipe shall not be higher than the crown of the upstream pipe.
2. Minimum drop in invert levels across manholes:
  - a. straight run - no drop required
  - b. deflections up to 45° - 20 mm drop
  - c. deflection 45° to 90° - 30 mm drop
3. Outside drop connections shall be provided wherever the drop exceeds 0.6 metres.

### 3.20 TEMPORARY CLEAN-OUTS

Temporary clean-outs may be provided at terminal sections of a main provided that:

- \* future extension of the main is proposed or anticipated.
- \* the length of sewer to the downstream manhole does not exceed 45.0 m.
- \* the depth of the pipe does not exceed 2.0 m at the terminal point.

**NOTE:** Clean-outs shall *not* be considered a permanent structure.

### 3.21 CATCH BASINS

Catch basins shall be provided at regular intervals along roadways, at intersections, and at low points.

Catch basin spacing shall be designed to drain a maximum area of 500 m<sup>2</sup> on road grades up to 5% and 400 m<sup>2</sup> on steeper grades.

Catch basin leads shall be minimum 200 mm in diameter for single C.B.s and 250 mm for double C.B.s. Where possible, C.B. leads should be taken into manholes. See Standard Drawing. Each catch basin lead shall connect to a main. Double catchbasins shall connect to a common lead at a "wye."

### 3.22 INLET AND OUTLET STRUCTURES

Standard Drawings for inlet and outlet structures shall be used in the design of these facilities.

Outlets having discharge velocities in excess of 1.0 m/s shall require rip rap protection or an accepted energy dissipating structure to control erosion.

A safety grillage shall be required at the outlets of all storm sewers over 600 mm in diameter and which exceed 30 m in length. Trash racks at the inlets shall be required on all storm sewers which utilize safety grillages.

### **3.23 FRENCH DRAINS**

The use of French drains shall only be permitted where the topography and soil conditions are proven adequate to the acceptance of the City Engineer. A soils report will be required to support the design as per Standard Drawing.

### **3.24 SILTATION CONTROLS**

The Owner's Engineer is required to demonstrate how work will be undertaken and completed so as to prevent the release of silt, raw concrete and concrete leachate, and other deleterious substances into any ditch, storm sewer, watercourse or ravine. Construction and excavation wastes, overburden, soil, or other deleterious substances shall be disposed of or placed in such a manner as to prevent their entry into any water-course, ravine, storm sewer system, or restrictive covenant area.

Should siltation controls be required, details of the proposed works are to be included in the approved drawings and shall be installed as part of the works.

All siltation control devices shall be situated to provide ready access for cleaning and maintenance.

Proposed siltation control structures must be maintained throughout the course of construction and to the end of the maintenance period (final acceptance). Changes in the design of the structure will be required if the proposed structure is found to be inadequate.

### **3.25 NATURAL WATERCOURSES**

All proposals for works in and adjacent to natural watercourses must be forwarded (by the designer) to the following Federal and Provincial Government Agencies:

- |   |  |
|---|--|
| <p>1. Fisheries and Oceans<br/>Suite 400 - 555 W. Hastings St.<br/>Vancouver, B.C. V6B 5G3<br/>(tel.: 604-666-3545)</p>                 | <p>2. Fish and Wildlife Branch<br/>Ministry of Environment<br/>10334 - 152A Street<br/>Surrey, B.C. V3R 7P8<br/>(tel.: 604-584-8822)</p> |
| <p>3. Water Management Branch<br/>Ministry of Environment<br/>10334 - 152A Street<br/>Surrey, B.C. V3R 7P8<br/>(tel.: 604-584-8822)</p> |  |

Should siltation controls be required by the above agencies, details of the proposed works are to be included in the approved drawings and shall be installed as part of the works.

## **4.0 SANITARY SEWER**

## 4.1 SANITARY SEWER SYSTEMS

Sanitary sewer systems shall be designed in accordance with the requirements of the Ministry of Environment, Waste Management Branch, "Guidelines for Assessing Sewage Collection Facilities", latest Edition, and the requirements noted below.

### General

Sewer utilities shall be located within existing or proposed highway rights-of-way. Locating the utility within other than highway rights-of-way will be considered only if technically necessary.

Sewer main extensions which are not the result of subdivision shall be extended a minimum distance of 5 metres along the lot frontage to provide for convenient service connections.

Service connections to lots created for Industrial use shall not be installed at the time of subdivision unless type, size and location of the services are known at the time of Engineering plan acceptance and the requirements of the applicable Bylaw have been satisfied. It will be the responsibility of the Owner to make application for industrial connections at the time of Building Permit application.

Development will not be permitted on the basis of private "package" sewage treatment plants.

## 4.2 DESIGN FLOWS

The sanitary sewer system shall be designed using the following average daily flows for the zone noted:

Residential/institutional	=	410 litres/capita/day
Industrial/commercial	=	22,500 litres/hectare/day

An infiltration rate of 0.1 litres/sec/hectare shall be added to the above flows.

The design flows shall be calculated using the average daily flows plus the infiltration rate.

Peak flows shall be 5 times the average daily flow for contributing areas with populations less than 1,000; and 4 times the average daily flow for contributing areas with populations between 1,000 and 3,000.

For commercial and industrial lands, peak flows shall be determined using the population equivalent of the calculated average daily flow. Therefore, the peaking factor shall be selected for the appropriate equivalent population when the average daily flow is divided by 410 l/cap/day.

## 4.3 PIPE FLOW FORMULAS

### Gravity Sewers

Manning's formula shall be used:  $Q = \frac{AR^{0.667} S^{0.5}}{n}$



where Q = design flow in m<sup>3</sup>/s  
 A = cross sectional area in m<sup>2</sup>  
 R = hydraulic radius (area/wetted perimeter) in m  
 S = Slope of hydraulic grade line in m/m  
 n = Roughness coefficient  
     = 0.013 for concrete pipe  
     = 0.011 for PVC pipe

#### Force Main Sewers

Hazen-Williams formula shall be used:  $Q = \frac{CD^{2.63} S^{0.54}}{278,780}$

where Q = rate of flow in litres/sec  
 D = internal pipe diameter in mm  
 S = slope of hydraulic grade line in m/m  
 C = friction coefficient = 120

#### 4.4 MANHOLES

Manholes shall be required at:

- \* all changes in grade
- \* all changes in direction
- \* all terminal sections
- \* downstream end of curvilinear sewers
- \* every 150 m
- \* all intersecting sewers
- \* all changes in pipe sizes

Through-manholes shall be placed where future extensions are anticipated.

Sanitary manhole rim elevations in off road areas shall be designed above the adjacent storm manhole rim elevation, and above the surrounding ground so that infiltration from ponding will not occur.

#### 4.5 HYDRAULIC LOSSES ACROSS MANHOLES

The following criteria shall be used:

1. The crown of the downstream pipe shall not be higher than that of the upstream pipe.
2. Minimum drop in invert levels across manholes:
  - a. Straight run - no drop required
  - b. Deflections up to 45o - 20 mm drop
  - c. Deflections 45o to 90o - 30 mm drop
3. A drop pipe shall be installed when the drop between inverts exceeds 0.6 m.
4. Inside ramps will be permitted up to 450 mm from invert to channel bed.

#### 4.6 TEMPORARY CLEANOUTS

Temporary cleanouts may be provided at terminal sections of a main provided that:

- \* future extension of the main is proposed or anticipated.
- \* the length of sewer to the downstream manhole does not exceed 45.0 m.
- \* the depth of the pipe does not exceed 2.0 m at the terminal point.

**NOTE:** Clean-outs shall *not* be considered a permanent structure.

#### **4.7 MINIMUM PIPE DIAMETER**

The minimum size of pipe shall be 200 mm except for the last upstream section which may be 150 mm, provided the sewer cannot be extended in the future.

#### **4.8 VELOCITIES**

The minimum velocity shall be 0.75 m/sec. There is no maximum velocity, however, consideration must be given to scour problems where flows exceed 2.5 m/sec., and anchoring should be incorporated where the grade(s) of the sewer are 15% or greater.

#### **4.9 MINIMUM GRADE**

The grade(s) of any sewer is governed by the minimum velocity required (0.75 m/sec). However, the last section of a main that will not be extended in the future, shall have a minimum grade of 1.5% where 150 mm diameter pipe is proposed.

#### **4.10 MINIMUM DEPTH OF COVER**

The minimum cover over any main shall be 1.2 m.

The depth of the sewer must be sufficient to provide 'gravity flow' service connections to both sides of the roadway and must allow for future extension(s) to properly service all of the upstream tributary lands for ultimate development.

#### **4.11 CURVILINEAR SEWERS**

Where permitted, horizontal curves will require a constant offset and/or shall be uniform throughout the curve. The radius of the curve shall not be less than 60 m. The design velocity must exceed 0.6 m/sec., the minimum grade shall be 1.0% and each joint is to be located by survey. Only one curve between manholes shall be allowed.

#### **4.12 SEWER LOCATION/CORRIDORS**

Sanitary sewers shall be located within the road right-of-way as noted in the applicable Standard Drawing Typical Cross-section for that road.

When the utility is required to cross private land(s), the right-of-way shall be a minimum of 3.0 m wide. Where both storm and sanitary sewers are in one right-of-way, the width shall be a minimum of 5.0 m wide.

When a utility is located within a right-of-way, and manholes, or other appurtenances which require maintenance, are located within the right-of-way, the Owner may be required to provide for a constructed road access from a City road for maintenance vehicles. The maintenance access shall be constructed to standards or approved equal adequate to support the maintenance vehicles for which the access is intended.

#### 4.13 SERVICE CONNECTIONS

1. Connections to Main
  - a. Service connections shall be provided to each lot fronting the main. All services shall enter the main at a point just above the springline.
  - b. Single connections only will be permitted.
  - c. Connections to new mains shall be made using wye fittings; connections to existing mains shall be made using saddles.
  - d. The standard size for service connections shall be 100 mm.
  - e. The minimum grade of service connections from the main to the property line shall be 2.5%.
  - f. The minimum depth of a service at the property line shall be 1.0 m and the maximum depth of a service at the property line shall be 2.0 m unless otherwise accepted by the City Engineer.
2. Service connections may be permitted into manholes provided that:
  - a. The connection is not in an adverse direction to the flow in the sewer main.
  - b. The provisions noted in Section 4.5 are met.
3. Inspection Chambers

Inspection chambers (I.C.) are required for all residential connections. See Standard Drawings.
4. Control Manholes

Control manholes are required for all industrial and light industrial connections. Control manholes will be required for commercial connections at the discretion of the City Engineer. See Standard Drawing.

#### 4.14 SANITARY PUMP STATIONS

If at all possible, the use of sanitary pump stations is to be discouraged. Any proposed use of pump stations must receive prior approval from the City Engineer. Any sanitary pump station, must be located within a right-of-way outside the road dedication.

The size, capacity and type of these stations will be dependent upon the development and catchment area involved.

Generally, the following criteria shall be considered:

1. All sanitary pump stations shall be designed with two pumps, each capable of handling the maximum flow conditions independent of the other.
2. Each pump must be:
  - \* capable of passing solids up to 75 mm in size
  - \* equipped with hour meters
  - \* easily removed for maintenance
  - \* operate on a 347/600 volt electrical source (pump motors over 5 h.p. are to be 600 volt phase 3 type)

- \* able to operate alternately and independently of each other
3. Motor cables, power cables, etc. shall be continuous from within the pump station to within the kiosk. In no instance shall a cable be spliced.
  4. Level controls shall be either a Flygt float level type (mercury) or Multi-Probe system or an acceptable alternative. Guides must be used for all float levels.
  5. All auxiliary equipment and control panels shall be mounted in a suitable kiosk adjacent to the station. The kiosk shall be located a minimum of 3.0 m from the station lid.
  6. The control kiosk shall be designed to contain all control and telemetry equipment on the front panel and all power equipment on the rear panel.
  7. Check valves shall be weight and lever type.
  8. All stations shall require an explosion-proof exhaust fan which can be activated by opening the entrance cover and/or by manual switch, and be of sufficient capacity to exchange the total volume of air inside the station with fresh air within 3 minutes of activation.
  9. The entrances to all stations must be waterproof and be provided with a suitable lock. The cover may be either aluminum or iron and must have a counter weight to facilitate opening. The entrance should be at ground level where feasible but, in no case, more than 300 mm above the ground. An explosion-proof light with a protective cover should be located in a suitable location in the station and the light should be activated by the entrance cover.
  10. Access into the stations shall be by an aluminum ladder. The location of the ladder shall not interfere with the removal and installation of the pumps, etc. The ladder shall be designed to extend and lock at least 600 mm above the station entrance. A platform is to be provided above the high water level float to permit wet well access wherever the total depth from ground level to wet well floor exceeds 2.40 metres.
  11. All wiring shall be explosion-proof, Class 1, Division 2, and electrical design and installation is subject to the acceptance of the Provincial Safety Inspector. Metal stations shall be protected by at least two 32 lb. packaged magnesium anodes.
  12. All stations shall provide an automatic generator for standby power in case of power failure. Provision for a telemetry system must be included for connection into the City's Telemetry System.
  13. All equipment must be CSA approved and have at least a one year guarantee for parts and labour. The supplier is to provide to the City three sets of Operating and Maintenance Manuals. All pumps must be factory tested prior to installation.
  14. A gate valve is required on the influent line and on each pump discharge. The valves shall be outside the station and be complete with square operating nut and Nelson box.

15. A water connection for cleaning purposes must be provided. A backflow preventer is required for connections in the station.
16. The roof and cover of the pump station should be designed to withstand a loading of H-25 (Highways Standard).
17. Provision(s) must be made for standby pumping from an external source. An adaptor flange ("Kamlock") complete with a quick coupling and lockable cap will be required.
18. The control panel must incorporate an extra plug-in; a Crouse Hinds receptacle and a transfer switch for a standby power source. Underground electrical wiring is required.
19. The area around the station and all associated equipment or building shall be asphalted. The size of the area to be determined by the requirements for maintenance.
20. A receptacle compatible with the City's removable lifting arm shall be incorporated into the design of the pump station to facilitate the removal and installation of the pump(s).
21. The interior surfaces of all steel and fibreglass stations shall receive at least two coats of two component white epoxy enamel.
22. The wet well bottom shall be benched to direct all solids into the pump suction. The influent line shall be located tangent to the wet well to encourage scouring of the wet well.
23. The pump control panel must incorporate the following indicator lamps:
  - \* pump on (green), each pump.
  - \* pump fail (red), each pump, manual reset.
  - \* high water level (red), manual reset.
  - \* low water level (red), manual reset.

## **5.0 ROADS**

### **5.1 INTRODUCTION**

All roads in the City shall be designed in accordance with the recommended practice as outlined in the "Manual of Geometric Design Standards for Canadian Roads" (1999 Metric Edition) and/or latest edition as published by the Transportation Association (T.A.C.) or as stated elsewhere in Schedule C or as accepted by the City Engineer.

#### **General**

Highway systems must provide for extension and connection to existing or proposed systems adjacent to or beyond the subdivision.

All highways shall be designed in accordance with recognized Community Planning and Traffic Engineering principles and shall include:

- \* Discouragement of through traffic within residential subdivisions
- \* Provision for right angles at intersections
- \* Restricting access to arterial highways

Vehicular access details from proposed highways to each proposed parcel in the subdivision may be requested as part of the engineering drawings.

## 5.2 CLASSIFICATIONS

The City Engineer will advise the Owner of the Classification of each road. The design of these roads shall be in accordance with the Standard Drawing for each road type.

Generally, the following criteria will be applicable; although traffic volumes and predominant type of development may require adjustment:

### ROW and Road Widths

Classification*	Right-of-Way Width	Urban Paved **
Major Arterial	20-30m	12-30m (3.5m lane width)
Minor Arterial	20-30m	11.6-30m (3.3m lane width)
Collector	20.0m	11-12.2 (3-3.3m lane width)
Local	20.0m (15m for local residential streets)	8.2-11m (3-3.2 lane width) (8.2 for local residential streets)
Lane	6.1 m	4.3 m for RS & RT zoned

\* Classification changed to reflect Transportation Plan road class

\*\* Inserted lane widths to define pavement width

### Sidewalk Width

Pedestrian Area*	Minimum Clear Width **	One Side	Both Sides
Pedestrian Precinct	3.0m		✓
Primary Pedestrian Generators	2.0m		✓
Secondary Pedestrian Generators	1.8m		✓
Low Pedestrian Generators	1.8m	✓	

\* Defined in the Transportation Plan, Map 1

\*\* Clear Width - Definition

## 5.3 GRADES

The maximum longitudinal grades generally shall be as follows:

- |    |                           |     |
|----|---------------------------|-----|
| a. | local residential streets | 14% |
| b. | cul-de-sac                | 8%  |
| c. | collectors                | 6%  |
| d. | arterials                 | 6%  |

The minimum longitudinal grade generally shall be 0.5%.

Where topographical constraints restrict the attaining of the above noted grades, special considerations may be given by the City Engineer. Under no circumstances should the grades be less than 0.35 %.

**NOTE:** Where sidewalks are required refer to Section 6.3.

#### 5.4 CROSS-SLOPES

Standard cross-slopes on new streets shall be 3.0% with the crown point in the centre of the pavement.

Where extreme topography is involved, limited local roads may be designed with cross-slopes from 2% to 4% and with one-way cross falls at horizontal curves.

On existing roads which have to be capped a parabolic design formula for cross-slopes is used as follows:

$$\text{(constant) } 4p = \frac{X^2}{Y} = \frac{Xn^2}{Yn}$$

Where X = Horizontal distance from crown to gutter.  
Y = Elevation difference between crown and gutter base on crossfall grade.  
Xn = Horizontal distance from crown to point 'n' on crossfall section.  
Yn = Elevation difference between crown to point 'n' on crossfall section.

#### 5.5 VERTICAL CURVES

Vertical curves shall be governed by the design speed of the road.

Generally, the following criteria shall be followed:

##### **Crest vertical curvature for minimum stopping sight distance:**

L - length of vertical curve, metres  
S - minimum stopping distance, metres  
L > S  
h<sub>1</sub> - height of driver's eye, 1.05 m  
h<sub>2</sub> - height of object, 0.38 m  
A - algebraic difference in grades, percent  
K =  $\frac{L}{A}$

Design Speed (km/h)	Minimum Stopping Sight Distance (m)	Minimum Crest, K (m)
40	45	4
50	65	7
60	85	15
70	110	22
80	140	35
90	170	55
100	200	70
110	220	85
120	240	105
130	260	120

\*L (in metres) should be not less than design speed in kilometres per hour

#### Sag vertical curvature for minimum stopping sight distance

- L\* - length of vertical curve in metres
- S - minimum stopping sight distance in metres
- L > S
- hs - height of head lamps 0.6 m
- 1o - angle of light beam upward from plane of vehicle
- A - algebraic difference in grade percent
- K -  $\frac{L}{A}$

Design Speed km/h	Minimum Stopping Sight Distance, m	Headlight Control	Minimum Sag, M	Comfort Control, K
40	45	7		4
50	65	11		6
60	85	20		10
70	110	25		15
80	140	30		20
90	170	40		20
100	200	50		25
110	220	55		25
120	240	60		30
130	260	65		

\*L (in metres) should be not less than design speed in kilometres per hour.  
Centripetal acceleration 0.3 m/s<sup>2</sup>

## 5.6 HORIZONTAL CURVES

Horizontal curves shall be governed by the design speed of the road.



Design Speed (km/h)	Minimum radius for low speed urban design (m)	
	0.04 m/m <sup>emax</sup>	0.06 m/m
30	20	20
40	45	40
50	80	75
60	130	120
70	185	170

## 5.7 CURB RETURNS

The minimum curb return radii shall be as follows for each road classification noted:

Industrial	7.6 m
Commercial	7.6 m
Arterials & Collector	7.6 m
Local*	6.4 m
Lanes	3.0 m

**\* Local roads in Industrial and Commercial zones shall have minimum curb radii of 7.6 m**

Greater curb return radii may be required to suit local traffic conditions (e.g. bus and truck routes).

The 'higher' road standard shall apply where two different road classifications meet.

Corner bulge and radii criteria for classification of roads will vary to suit conditions.

## 5.8 CUL-DE-SACS AND P-LOOP

Design of cul-de-sacs shall follow the applicable Standard Drawing.

The following minimum radii shall apply for roads in the zones noted:

Road	Pave Radius	R.O.W. Radius
Residential	9.6	10.0
Commercial	14.0	17.0
Industrial	15.0	18.5

No cul-de-sac shall exceed a length of 150 metres as measured from the beginning of it's turnaround to the nearest right-of-way line of an intersecting highway having more than one access, unless an emergency access is provided.

No P-loop shall exceed a total street length of 850 metres provided however that the length of the entrance leg to such P-loops shall not exceed 230 metres, and all P-loops shall be provided with an emergency access.

The maximum total street length of a P-loop may be increased in suburban residential zones; provided, however, that in no case such P-loop shall provide frontage to more than 60 lots created in a subdivision.

The emergency access required above shall directly connect from the turnaround of a cul-de-sac or from the loop road of a P-loop to an adjacent highway or as otherwise acceptable to the City Engineer.

The design of cul-de-sacs is not limited to the above and the Owner's Engineer may propose alternatives provided that good engineering practice is followed. Alternative designs are subject to review by the City Engineer.

## 5.9 TEMPORARY TURNAROUNDS

In cases where the proposed road exceeds 50 m in length and is to be extended in the future, temporary turnarounds shall be required.

A temporary turnaround can be by way of a hammerhead design. See Standard Drawing.

## 5.10 INTERSECTIONS

Particular attention shall be given to the design of all intersections.

The Owner's Engineer should employ good engineering practice in assessing the following concerns:

- \* Approach grades and grade transitions
- \* Crossing sight distance
- \* Design speed
- \* Intersection cross-slopes
- \* Curb Returns
- \* Intersection alignment

Specifically, grades of major and minor roads at intersections shall be adjusted where topographic or other conditions dictate the use of maximum or near maximum permissible grades. Such adjustments are essential to provide reasonable stopping opportunities during extreme roadway icing conditions.

**TABLE A  
VERTICAL ALIGNMENT AT INTERSECTIONS  
Major Roads**

Major Road	Maximum Grade/Minimum Flattened Distance* for Major Road at Intersection with:		
	Arterials	Collector	Local
Arterials	4%/120m	5%/60m	6%/30m
Collector	-----	5%/60m	6%/30m
Local	-----	-----	6%/30m

\*Distances are measured from the end of the approach vertical curve (EVC) to the beginning of the departure vertical curve (BVC).

**TABLE B  
VERTICAL ALIGNMENT AT INTERSECTIONS  
Minor Roads**

Minor Road	Maximum Grade/Minimum Flattened Distance* for Minor Road at Intersection with:		
	<i>Arterials</i>	<i>Collector</i>	<i>Local</i>
<i>Arterials</i>	2%/60m	-----	-----
<i>Collector</i>	2%/30m	2%/25m	-----
<i>Local</i>	2%/25m	2%/20m	2%/10m

\*Distances are measured along the minor road from the ultimate near curb line of the major road to the beginning of the vertical curve (BVC).

### 5.11 CROSS SECTION CONSIDERATIONS

The basic design road width and thickness, etc., shall be determined by:

1. The Standard Drawings applicable and,
2. The results of soils tests and analysis of Benkleman Beam tests, or by the CBR asphalt pavement design method.

Maximum side slope in earth fills or cuts shall be 1.5H:1V. Flatter slopes shall be used where unstable soil conditions are encountered. If area is required in addition to the right-of-way area to support construction, it shall be registered in favour of the City in the form of a right-of-way.

In urban areas, wherever the side slopes beginning at a point 600 mm from the back of the sidewalk create a depth of vertical cut or fill at the existing property line in excess of 600 mm at 2H:1V slope, a concrete retaining wall shall be constructed unless otherwise permitted by the City Engineer. Retaining walls, if required, shall be adequately drained, contain a vehicle and pedestrian access to each property, and be equipped with railings.

Where applicable, the design shall ensure that the road cross-sections are established to accommodate the Major Flood Path Routing.

### 5.12 ROAD BASE AND PAVEMENT DESIGN

The structural design of the road pavement shall be adequate for an expected road life of 20 years under the expected traffic conditions for the class of road.

1. Existing Road Upgrading

Road construction and asphalt overlay design shall be based on the analysis of the results of the Benkleman Beam tests and test holes carried out on the existing road which is to be upgraded, or by the CBR asphalt pavement design method.

2. New Road Construction

The design of new roads shall be based on the results of the analysis of materials from test holes dug on the proposed road site at representative intervals, or by the CBR asphalt pavement design method. Test holes and samples shall be undertaken by a qualified soils test company and all reports shall be signed and sealed by a qualified Geotechnical Engineer.

3. Benkleman Beam Deflections

Where the Benkleman Beam design method is used, the maximum seasonally adjusted design deflections (mean plus two standard deviations) shall be as follows:

Standard Classification	Min. Granular Sub-base Thickness (100 mm minus Pit run)	Min. Granular Base Thickness (20 mm minus crushed gravel)	Min. Asphalt Thickness	Maximum Seasonally Adjusted Benkleman Beam Rebound Reading(mm)		
				Granular Surface	Base	Finished Pavement
Lane	150 mm	75 mm	50 mm	-----	3.10	1.50
Local	150	100	65	35	2.60	1.50
Collector	200	100	50 (fine) 65 (base)	40	2.20	1.20
Arterial	200	100	50 (fine) 65 (base)	40	1.90	1.00

**5.13 PAVEMENT MATERIALS**

The standard pavement material in the City is hot mixed, machine laid, asphaltic concrete.

The use of concrete may be considered.

Gravel, surface treated, or flush-coated roads are not acceptable for new road construction.

**5.14 VEHICULAR ACCESS**

Each parcel must have sufficient road frontage to accommodate vehicular access to the following standards and specifications:

1. Widths and locations of vehicular accesses shall be in accordance with City Bylaws.
2. Doors and gates must not open into a street, lane or walkway allowance.
3. Pedestrian access to lanes must be designed to provide an unobstructed view of traffic.

4. Vehicular access off a street must conform to City Standard Drawings.
5. Vehicular access off a lane must be designed to prevent the spillage of lane drainage onto private property.
6. Vehicular accesses shall be designed to prevent contact with the underside of vehicles expected to enter the property. The City Engineer may require plan and profile drawings showing access paths of typical design vehicles.
7. Notwithstanding Sections 5.14.1, .2 and .5, the City Engineer may modify design standards to suit site specific traffic requirements.

#### **5.15 LANES**

Lanes shall conform to Standard Drawings.

All lane to street intersections shall be within 50 of a right angle.

#### **5.16 EMERGENCY ACCESS**

The requirement for emergency access is governed by this Bylaw and in consultation with the Fire Department.

Where required, any emergency access must be able to support a wheel axle bearing load of 9.1 tonnes.

The travel surface shall be concrete and shall have chain link fencing on both sides and have bicycle baffles at each end.

#### **5.17 BOULEVARDS**

Topsoil and seeding of boulevards in accordance with Schedule C, Specifications, may be required at the discretion of the City Engineer where it appears that the boulevards will not be developed or upgraded in the near future.

#### **5.18 SIGNS**

All street signs, pavement markings and traffic advisory signs required for each project will be installed by the City at the Owner's expense.

### **6.0 CURBS, SIDEWALKS AND WALKWAYS**

#### **6.1 CURBS AND GUTTERS**

All roads shall be complete with concrete barrier curbs and gutters on both sides of the road.

Where there is no sidewalk, the road support structure for the road(s) shall be constructed to a point 0.3 m wider than the curb in order to provide support for the curb. Refer to Section 6.3 for road base widths where there is a sidewalk.

## **6.2 WHEELCHAIR RAMPS**

Wheelchair ramps are required at all intersections. The design for wheelchair ramps shall be in accordance with the Standard Drawing.

Special designs for the assistance of the physically handicapped shall be encouraged.

A catch basin must be located to intercept road drainage in advance of the wheelchair ramp. This may influence road grade designs or cross slopes.

## **6.3 SIDEWALKS**

Sidewalks shall be required as noted on the Standard Drawing. A sidewalk is also required on any road that provides a pedestrian link to a school, community centre, walkway, park, etc. These sidewalks will be identified in the Preliminary Layout Approval.

For cul-de-sacs, a sidewalk will be required on one side of the access road to the bulb portion. Where a pedestrian generating access route (i.e. walkway or emergency access) is proposed off the bulb portion, the sidewalk is to be extended around and connected to that facility.

All through roads, and all roads in Commercial zones, shall require sidewalks on both sides.

Sidewalks shall abut the curb and shall be continuous around curb returns and for a minimum of 3.0 m after the curb return into roads not requiring sidewalks.

The grade of the sidewalk shall be consistent with the grade of the road.

All sidewalks adjacent to barrier style curbs shall be a minimum 100 mm thick. The preparation of the road base and subbase shall be done to a point 0.30 m wider than the sidewalk to provide structurally sound support for the sidewalk.

Residential driveway accesses shall be restricted to a minimum 7.6 m from the property line adjacent to the intersection with an arterial road, and no closer than 7.6 m from any intersection as measured from the property line. Commercial and industrial driveway accesses shall be as per Standard Drawing. A note is to be added to the design drawings indicating the access location restriction.

## **6.4 WALKWAYS**

All walkways shall be in accordance with the Standard Drawing.

Walkways shall be concrete with chain link fencing on both sides and bicycle baffles at both ends.

The maximum grade shall not exceed 12.0%, unless steps and hand rails independent of the chain link fencing are provided.

## **6.5 HANDRAILS**

All handrails shall be constructed and installed in accordance with Standard Drawing. Handrails shall be required for walkways and sidewalks where grades are determined to warrant such installations or where steps are provided due to grades in excess of 12.0%.

Handrails may also be required along the top of major storm sewer outfalls, along walkways and sidewalks where steep or excessive side-slopes may be encountered, or in any location as deemed necessary by the City Engineer where, in his opinion, the safety of pedestrian traffic or the protection of the public so requires. Where steep or excessive slopes are proposed or encountered, the slope must be no greater than 3:1 and no closer than 1.0 m from the walkway or sidewalk.

## **7.0 STREET LIGHTING**

### **7.1 GENERAL**

Design of street lighting systems shall be prepared by a Professional Electrical Engineer, register with the Association of Professional Engineers and Geoscientists of British Columbia. All works must meet current IES design standards for pedestrian and roadway lighting.

### **7.2 STREETLIGHT POLE LOCATIONS**

Generally, streetlight poles shall be designed as follows:

1. Arterial roads - opposite or staggered spacing
2. Collector roads - staggered spacing
3. Local roads - spaced on one side

Poles shall be located within 1.0 m of property corners and shall not conflict with proposed driveway and/or underground services.

### **7.3 UNDERGROUND DUCTS**

Underground wiring for street lighting shall be designed in accordance with B.C. Hydro Specifications and shall conform to the rules and regulations of the Canadian Electrical Code (Part 1), the Provincial Electrical Inspection amendments and any municipal codes or bylaws and other authorities having jurisdiction shall be followed.

The standard off-set for the location of the underground street lighting ducts in road rights-of-way shall conform to the applicable Standard Drawing for the road type.

The minimum depth for the underground ducts shall be 0.6 m in boulevards and 1.0 m below the finished grade of the roadway.

It is the Owner's Engineer's responsibility to ensure that the supply service to the street lighting system receives approval from B.C. Hydro.

7.4 MINIMUM LEVELS OF ILLUMINATION

**TABLE 2**  
Illumination Levels

Level of Service	Average Illuminance Levels (Lux)	Illuminance Uniformity Ratio (Avg:Min)
<b>Arterials (Major or Minor)</b>		
A	17	3:1
B	13	3:1
C	9	3:1
<b>Collector</b>		
A	12	4:1
B	9	4:1
C	6	4:1
<b>Local</b>		
A	9	6:1
B	7	6:1
C	4	6:1

Where Level of Service:

A = heavy night-time, vehicular and/or pedestrian traffic volumes on a frequent basis

B = moderate night-time, pedestrian traffic volumes

C = light night-time, pedestrian traffic volumes

Levels of service are as determined by the City Engineer

**NOTE:** At all major intersections, the values noted in the above table shall be increased by fifty percent. The illumination of all major intersections shall be at least equal to the sum of the illumination values provided on the streets forming the intersection.

Luminaires of wattage greater than 150 w. H.P.S. shall not be used without prior approval of the City Engineer.



## SECTION II – SPECIFICATIONS

### 1.0 WORKS

The works are provided in accordance with the Master Municipal Construction Document, Volume II, Master Municipal Specifications and Standard Drawings as amended by the City’s Supplementary Specifications.

The Master Municipal construction Document, Volume II, published in January 2000 and all revisions as they may occur by the Master Municipal Construction Documents Association and filed in the City Clerk’s office are hereby incorporated by reference into this Bylaw.

### 1.1 SUPPLEMENTARY SPECIFICATIONS

The following Supplementary Specifications shall govern over the Master Municipal Specifications. The corresponding Section and Clause numbers being superseded in the Master Municipal Specification are quoted for ease of reference.

MMCD Section	Sub Section	Title	Supplementary
01561	1.1	Fires	Delete Sub Sections 1.1.1, 2 and 3 and replace with: “Burning of rubbish is not allowed.”
02111	3.5	Removal and Disposal	Delete Sub Sections 3.5.3, 4 and 5 and replace with: “Dispose of cleared and grubbed materials to approved off-site disposal area.”
02223	1.3	Definitions	Delete Sub Section 1.3.5 and replace with: “Topsoil: as defined I Section 02921, Sub Section 2.4.”
	1.8	Limitations of Open Trench	Delete Sub Section 1.8.1 and replace with: “Excavate trenches only as far in advance of pipe laying operation as safety, traffic and weather conditions permit and, in no case, to exceed 10m. Before stopping work on last day of work before weekend or holiday, completely backfill every trench.”
	3.6	Surface Restoration	Delete Sub Section 3.6.7.1 and replace with “install permanent pavement within 60 days of placement of permanent patch”
02224	3.1	General	Delete Sub Section 3.1.3 and replace with: “Surface drainage: as per Section 01561, Sub Section 1.3, Drainage.”
02226	2.5	River Sand	Delete Sub Section 2.5.1 and replace with: “River sand, to be used only where shown on Contract Drawings or specifically specified or approved by Engineer, to be free of organic material, salt and foreign objects and conform to gradations shown in Sub Section 2.5.1.”

<b>MMCD Section</b>	<b>Sub Section</b>	<b>Title</b>	<b>Supplementary</b>																						
	2.7.1	Granular Pipe Bedding and Surround Material	Crushed or graded gravels to conform to the gradation for Type 1.  <table> <thead> <tr> <th><b>Sieve Designation</b></th> <th><b>Type 1</b></th> </tr> </thead> <tbody> <tr> <td>25mm</td> <td>100</td> </tr> <tr> <td>19mm</td> <td>90-100</td> </tr> <tr> <td>12.5mm</td> <td>65-85</td> </tr> <tr> <td>9.5mm</td> <td>50-75</td> </tr> <tr> <td>4.75mm</td> <td>25-50</td> </tr> <tr> <td>2.36mm</td> <td>10-35</td> </tr> <tr> <td>1.18mm</td> <td>6-26</td> </tr> <tr> <td>0.6mm</td> <td>3-17</td> </tr> <tr> <td>0.3mm</td> <td></td> </tr> <tr> <td>0.075mm</td> <td>0-5</td> </tr> </tbody> </table>	<b>Sieve Designation</b>	<b>Type 1</b>	25mm	100	19mm	90-100	12.5mm	65-85	9.5mm	50-75	4.75mm	25-50	2.36mm	10-35	1.18mm	6-26	0.6mm	3-17	0.3mm		0.075mm	0-5
<b>Sieve Designation</b>	<b>Type 1</b>																								
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0.3mm																									
0.075mm	0-5																								
02234	2.1	Specified Materials	Delete Sub Section 2.1.1.2 and replace with: "100 mm pit run gravel." Delete Sub Section 2.1.1.3.																						
02242	2.1	Materials	Add Sub Sections 2.1.4 and 5 which read: 2.1.4. "Resin and water." and 2.1.5 "Dust Control Materials to be environmentally friendly."																						
02523	1.4	Measurement for Payment	Add Sub Section 1.4.12 which reads: "Adjustment of catch basins is incidental to installation of curb and gutter."																						
	3.6	Extruded Sections	Add Sub Section 3.6.6 which reads: "Tolerance in accordance with Sub Section 3.3.6."																						
	3.18	Adjustment of Existing Catchbasins	Delete Sub Section 3.18 and replace with: "Bring all existing catch basin grates of Catch to finished gutter grade as part of Basin Grate curbing installation. Use concrete bricks and mortar. Remove all excess material from inside of catch basin."																						
	Drawing Number S11	Top Inlet Catchbasin Connection lead	Delete 150 dia PVC DR 35 and replace with 200 dia PVC DR 35																						

### **SECTION III – STANDARD DRAWINGS**

**Roads** SA1-Curb-12, SA1-LANE-01-A, SA1-Lane-02, SA1-LANE-03, SA1-CURB-14 (1 of 3, 2 of 3 and 3 of 3), and Transportation Network Road Classification Map

All formal Streetscape Guidelines endorsed by Council are a supplement of this bylaw and are required to the satisfaction of the City Engineer.

SA1-Curb-12

SA1-LANE-01

SA1-LANE-01-A

SA1-Lane-02

SA1-LANE-03,

SA1-CURB-14 (1 of 3, 2 of 3 and 3 of 3)

SA1-ROAD-01

Transportation Network Road Classification Map

## SCHEDULE D

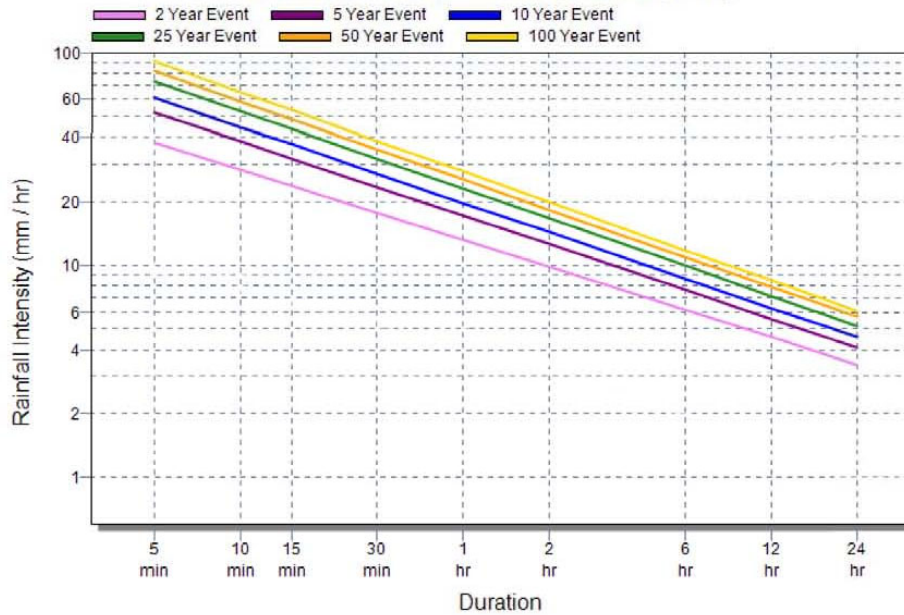
Deleted – [Bylaw 9042, July 22, 2024]

### Intensity Duration Frequency Analysis

#### North Vancouver City Hall

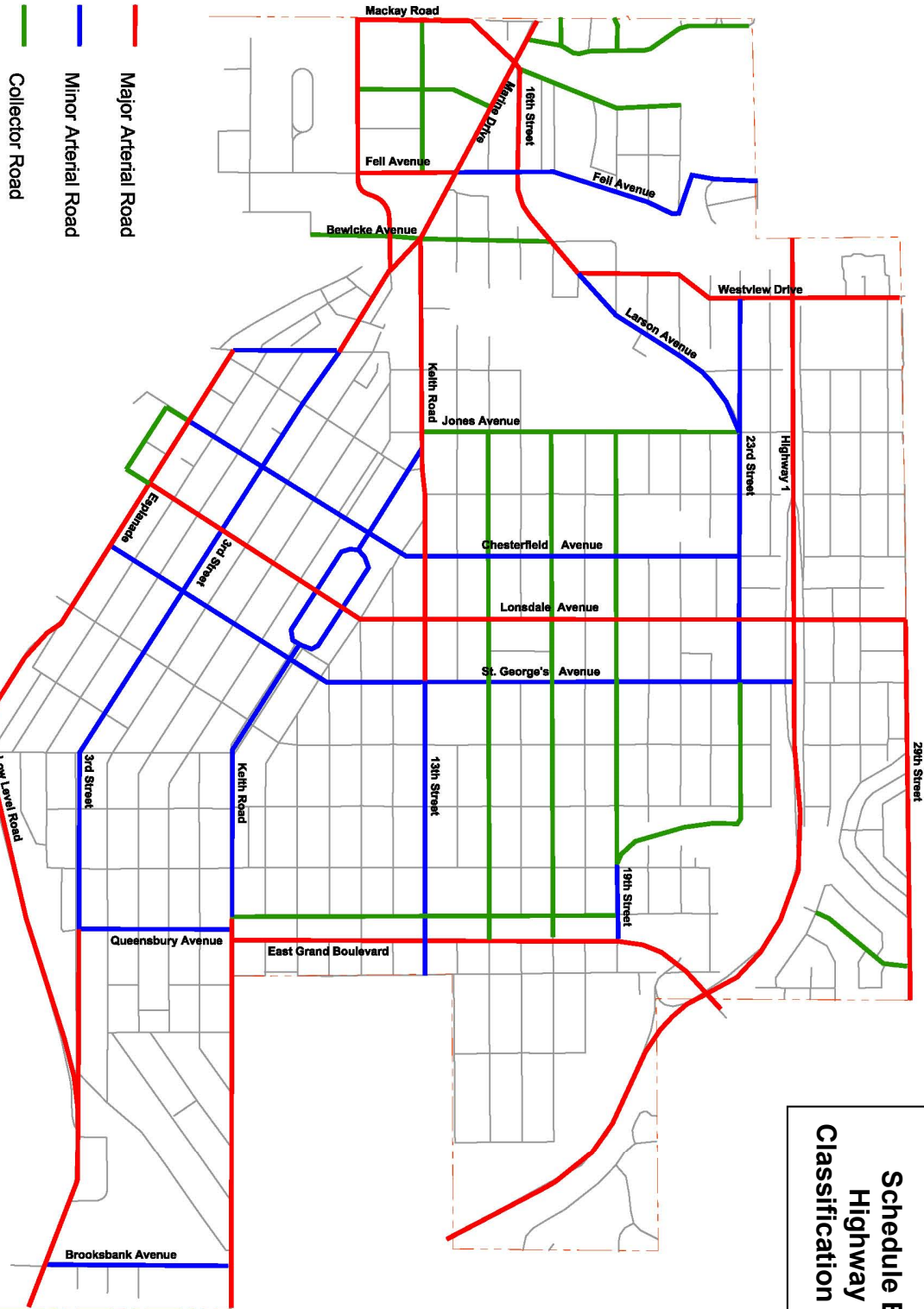
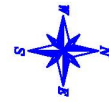
Rainfall Period: 12/8/2010, 12:00 AM – 12/8/2010, 11:55 PM

Historical Data: North Vancouver District Hall, 1964 - 2000 (37 Years)



Total Rainfall During Period 12.2 mm  
Hours in Period 23.9 hrs

	5 min	10 min	15 min	30 min	1 hr	2 hrs	6 hrs	12 hrs	24 hrs
Current Period	9.6	8.4	7.2	5.2	5.0	3.5	1.8	0.0	0.0
2 Year Event	38.0	28.3	23.8	17.7	13.2	9.8	6.2	4.6	3.4
5 Year Event	52.1	38.2	31.9	23.4	17.1	12.6	7.7	5.6	4.1
10 Year Event	61.4	44.7	37.2	27.1	19.7	14.4	8.7	6.3	4.6
25 Year Event	73.1	52.9	43.8	31.7	23.0	16.6	10.0	7.2	5.2
50 Year Event	81.8	59.0	48.7	35.2	25.4	18.3	10.9	7.9	5.7
100 Year Event	90.3	65.0	53.6	38.6	27.7	20.0	11.8	8.5	6.1



Schedule E  
Highway  
Classification Map