

City of Chilliwack

Bylaw No. 3055

A bylaw to regulate the development of lands and to establish the standard of services to be provided

The Council of the City of Chilliwack in open meeting assembled enacts as follows:

1. This Bylaw may be cited as the “**Land Development Bylaw 2014, No. 3055**”.
2. “Subdivision and Development Control Bylaw 1995, No. 2227” and amendments thereto are hereby repealed.

INTERPRETATION

3. In this Bylaw, unless the context or the *Land Title Act* otherwise requires, the following words and terms shall have the meanings hereinafter assigned to them:

“AWWA” means American Water Works Association;

“Approving Officer” means the person appointed by Council as the Approving Officer or their designate;

“Building Area” means that part or Parcel of land on which can be constructed a building in accordance with this Bylaw, Zoning Bylaw, Building Regulation Bylaw and other relevant Bylaws of the City, in force from time to time;

“Bylaw” means the “Land Development Bylaw 2014, No. 3055”, in force from time to time, and all amendments thereto;

“Chief Building Official” means the person designated in, or appointed to that position by the City and any person named by Council to act in place of the Chief Building Official;

“City” means the City of Chilliwack;

“Contractor” means the person or persons or the company undertaking the construction of works in a Subdivision Development, land development and/or on municipal property, or their employees, subcontractors or their duly authorized representative.

“Coordinating Registered Professional” means the Principal Professional Engineer engaged and designated by the Owner/Developer who shall coordinate the design work and field reviews of all registered professionals required for the project in order to ascertain that the design will substantially comply with the requirements of this document and all other applicable enactments;

“Council” means the Council of the City of Chilliwack;

“Cul-de-sac” means a street or road that does not provide through access – also known as a dead-end road;

- “Development” means the improvement of land requiring the installation of works and/or services, and typically represented by construction plans for Subdivisions, and civil site plans for building permits;
- “Drainage System” means a system of works designed and constructed to control the collection, conveyance and disposal of surface and other waters and conforming to the guidelines, policies, and procedures noted herein;
- “Engineering Director” means the person appointed by Council as the Director of Engineering or designate;
- “Final Approval” means that approval granted by the Approving Officer when all relevant requirements of this Bylaw, the *Local Government Act*, the *Land Title Act* and any other relevant Bylaws and legislation have been fulfilled;
- “Frontage” means any portion of public road that is contiguous with a front, side or rear boundary line of a property;
- “Ground Discharge System” means a drainage structure designed by a Professional Engineer to permit the subsurface disposal of storm waters;
- “Highway” includes a public street, path, walkway, trail, lane, bridge, road, thoroughfare and any other public way;
- “Local/Minor Local Road” means a Highway with an existing or proposed right of way width of 15 to 20 metres that is part of a major system within the City, servicing local needs. Local roads are designated in the City of Chilliwack Transportation Plan, as amended from time to time;
- “Maintenance Deposit” means the reduced value of a Security Deposit, separate cash or an irrevocable and automatically renewable Letter of Credit to be deposited with the City for the duration of the maintenance period, according to the standards set out or referred to in Schedule “A”, attached hereto and forming part of this Bylaw, as a guarantee for the stability and sufficiency of the Works and Services completed by the Developer;
- “Manager of Land Development” means the person appointed by Council as the Manager of Land Development or designate;
- “Major Arterial Road” means a Highway with an existing or proposed right of way width of 30 metres that is part of a major system within the City, servicing through traffic needs. Major Arterial Roads are designated in the City of Chilliwack Transportation Plan, as amended from time to time;
- “Major/Minor Collector Road” means a Highway with an existing or proposed right of way width of 20 metres that is part of a major system within the City, servicing local and through traffic needs. Major/Minor Collector Roads are designated in the City of Chilliwack Transportation Plan, as amended from time to time;
- “MCC” means Motor Controller Center;
- “Minimum Basement Elevation (MBE)” means the lowest level at which a habitable floor on a lot may be constructed;

“Minor Arterial Road” means a Highway with an existing or proposed right of way width of 25 metres that is part of a major system within the City, servicing through traffic needs. Minor Arterial Roads are designated in the City of Chilliwack Transportation Plan, as amended from time to time.

“Necessary Services” means a proven potable water supply, an approved sewage disposal system, a proven Drainage System, Rural Roads constructed in accordance with the Bylaw and those works required for the issuance of a Highway Access Permit;

“Owner/Developer” means the owner of land or the holder of a bona-fide interim agreement or option to purchase land, who has made application to the City for, or is engaged in undertaking the Development of such land and shall include their duly authorized representative;

“Parcel” means any lot, block, or other area in which land is held or developed, or into which land is subdivided, but does not include a Highway;

“PLC” means Programmable Logic Controller;

“P-Loop” means a loop street from a single access point;

“Preliminary Subdivision Approval” means the conditional approval by the Approving Officer of a proposed Subdivision plan, and outlines the requirements that must be fulfilled to obtain Final Approval;

“Project Engineer” means the Principal Professional Engineer engaged and designated by the Owner/Developer who shall be responsible to coordinate the design, supervision, preparation of drawings, specifications, record drawing submissions, and estimates for the construction of works within a Development and/or within City property;

“Professional Engineer” means a person who is registered or duly licensed as such, under the provisions of the *Engineers and Geoscientists Act* for the Province of British Columbia.

“Rural” generally means areas within the agricultural, Rural or similar zones with a Development density of less than four dwelling units per hectare;

“Rural Road” generally means a Highway in a Rural area constructed without curbs, gutters and sidewalks;

“Security Deposit” means cash or an irrevocable, and automatically renewable Letter of Credit;

“Sewer System” means a system owned, operated and maintained by the City for the collection, treatment and disposal of sanitary sewage;

“Storm Water Management Plan” means a plan indicating the means by which storm water will be managed within or through a Development;

“Subdivision” means the division of land into two or more Parcels, whether by plan, apt descriptive words, or otherwise, and shall include a plan consolidating two or more Parcels into a fewer number of Parcels;

“Surveyor” means a land Surveyor currently licensed and registered in the Province of British Columbia;

“TAC” means Transportation Association of Canada;

“Urban” generally means areas of commercial or industrial zoned Development, and residential zones with a density greater than four dwelling units per hectare;

“Urban Road” generally means a Highway that is located in an Urban area, and includes curbs, gutters and sidewalks; “Urban Road” is often used interchangeably with the term “street”;

“Water System” means a system of waterworks approved under the *Health Act* and owned and operated by the City, or a Local Service Area under the *Community Charter*, or a utility company under the *Water Utility Act*;

“Works And Services” means any service, facility or utility which is required by this Bylaw and without restricting the generality of the foregoing includes: the supply and distribution of water; collection and disposal of sewage; collection and disposal of drainage water; street lighting; access roadways, curbs, gutters, and sidewalks; and the supply and distribution of electrical power, telephone and cablevision.

ADMINISTRATION

4. The Development and Regulatory Enforcement Services Department shall maintain a record of all Subdivision applications submitted under this Bylaw and shall indicate the final disposition of those applications.
5. Employees of the City who by reason of their position or nature of employment have responsibility for administering or enforcing this Bylaw, are hereby authorized to enter at all reasonable times upon any property or premises to inspect to ascertain whether the provisions of this Bylaw are being complied.
6. The servicing provisions of this Bylaw may be waived by the Manager of Land Development where the land is being subdivided for the purpose of creating Parcels of land as required for the installation of public facilities, utilities, structures and associated equipment;
7. The provisions of this Bylaw are severable. If any provision is for any reason held to be invalid by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining provisions of this Bylaw.

APPLICATION FOR SUBDIVISION OR DEVELOPMENT

8. An application for Preliminary Approval of a Subdivision Plan shall be submitted to the City's Development and Regulatory Enforcement Services Department on the prescribed “Form F-14 Subdivision Application”, attached hereto and forming part of this Bylaw. The application form shall be signed by the Owner.
9. The application for preliminary approval shall be accompanied by an application fee, plus any additional fees required by the City. (Fees are established under a separate Bylaw.)

OFF-SITE SERVICES

10. The Council hereby delegates to the Manager of Land Development Council's powers under Section 938(6) of the *Local Government Act*.

ON-SITE SERVICES REQUIRED IN CONNECTION WITH BUILDING PERMIT

11. The Council hereby delegates to the Manager of Land Development, Council’s powers under Section 938(6) of the *Local Government Act*.

RIGHT OF RECONSIDERATION

12. An Owner who is subject to a requirement imposed under Sections 10 or 11 may, in accordance with Sections 13 and 14, apply to have the decision imposing that requirement reconsidered by Council.
13. An application for reconsideration must be submitted in writing to the City Clerk within thirty days of the day on which the decision is delivered to the Owner.
14. An application for reconsideration must contain the following information:
- (1) the Owner’s name and address;
 - (2) a copy of the decision to be reconsidered;
 - (3) the reasons the Owner objects to the decision;
 - (4) a description of the requirements, if any, that the Owner considers should be made in place of the requirement to which the Owner objects;
 - (5) any submissions or other information the Owner wishes to have considered by Council upon its reconsideration of the decision;
 - (6) a statement indicating whether or not the Owner wishes to be heard at the meeting at which the reconsideration will occur.
15. The City Clerk must place an application for reconsideration on the agenda of a meeting to be held
- (1) not earlier than the earlier of:
 - (a) a date requested by the Owner; and
 - (b) two weeks from the date on which the application was submitted; and
- not later than two months from the date on which the application was submitted.
16. The City Clerk must notify the Owner of the date of the meeting at which the reconsideration will occur.
17. After considering the decision at the meeting, the Council may either confirm the decision or substitute its own requirement or decision.

APPROVALS

18. Where applicable, the Owner shall be responsible for and be required to obtain approvals of their Subdivision or Development from other agencies having jurisdiction.
19. The Owner of the land being subdivided shall satisfy the requirements of the Official Community Plan, in force from time to time, with respect to providing parkland in accordance with the requirements of the *Local Government Act*.
20. Preliminary Subdivision Approval may be revoked, at any time prior to Final Approval, by the Approving Officer.

HIGHWAYS

21. Where an Owner is required by or under this Bylaw, the *Land Title Act* or any other enactment to provide or improve Highways, those Highways shall be dedicated in accordance with the *Land Title Act* and constructed in accordance with the standards set out in Schedule “A” attached hereto and forming part of this Bylaw.

DRAINAGE SYSTEM

22. The Owner of lands being subdivided shall provide to the Manager of Land Development a Storm Water Management Plan prepared by a Professional Engineer showing a proposed Drainage System for the servicing of the lands being developed, according to Chilliwack’s “Policy and Design Criteria for Surface Water Management”.
23. The Manager of Land Development shall approve the Storm Water Management Plan if they are satisfied that the plan proposed provides a Drainage System in conformance with the standards set out or referred to in Schedule “A”, attached hereto and forming part of this Bylaw, and will provide adequate drainage for the lands being developed.
24. The Owner shall ensure that a Drainage System on the lands being developed is provided, located and constructed in accordance with:
 - (1) the Storm Water Management Plan approved under Section 23;
 - (2) the standards set out or referred to in Schedule A, attached hereto and forming part of this Bylaw; and,
 - (3) the City’s Storm Sewer System Connection and Regulation Bylaw, in force from time to time, and any other applicable enactment.

WATER DISTRIBUTION SYSTEM

25. The Owner of lands which are being subdivided or developed shall provide each Parcel of land within the proposed Subdivision or Development with a water distribution system, and a fire hydrant system, including the standard service connection thereto, all of which shall be constructed in accordance with the standards contained in Schedule “A”, attached hereto and forming part of this Bylaw, and shall be connected to the existing water distribution system of the City. The owner shall be responsible for obtaining an approval to construct from the Fraser Health Authority under the *Health Act*.
26. Notwithstanding Section 25, where a community Water System is not available, each Parcel in the Subdivision shall have a proven source of potable ground water, the quantity of which shall be not less than 2200 litres per lot per day. The quality of water shall be certified potable by completing Form F-5, attached hereto and forming part of this Bylaw, based on the results of chemical analysis determined by a certified laboratory confirming conformity of water quality to the standards set out at the relevant time in the Drinking Water Protection Regulation, B.C. Reg 200/2003.
27. The Owner shall be required to provide a certificate from a Professional Engineer or other competent authority certifying that a pump test was performed and that the yield from the well conforms to the requirements outlined in Section 26.
28. The fire flow standards set out in Schedule A, attached hereto and forming part of this Bylaw, do not apply to a Subdivision where all of the following apply:
 - (1) the Subdivision is one that will create no more than two additional lots;

- (2) there is an existing water main within a portion of a Highway immediately adjacent to each of the lots being created;
- (3) there are at least two dwellings on lots immediately adjacent to the site being subdivided that are connected to the water main referred to in Subsection 28(2); and,

SEWAGE COLLECTION AND DISPOSAL SYSTEM

29. The Owner of any lands which are being developed or subdivided shall:

- (1) comply with the City's Sanitary Sewer System Regulation Bylaw, in force from time to time;
- (2) provide each Parcel of land within the proposed Subdivision with a sanitary sewage collection and disposal system including the standard service connection thereto, constructed in accordance with Schedule “A”, attached hereto and forming part of this Bylaw, and the said sewerage system shall be connected by trunk sewer mains to the existing sanitary Sewer System of the City.

30. Where an approval is required under the *Health Act*, all private on-site sewage disposal facilities required by a Subdivision or building permit shall be designed and certified by a qualified professional and registered in accordance with the requirements of the Ministry of Health.

APPLICABLE STANDARDS

31. Where, in respect of the Subdivision of land or the issuance of a building permit, works or services are required to be constructed or installed by or under this Bylaw, the *Land Title Act* or any other enactment, those Works and Services shall be constructed or installed:

- (1) in accordance with the standards set out in this Bylaw, or
- (2) where this Bylaw does not set out an applicable standard, as per Master Municipal Construction Documents (MMCD); or,
- (3) where this Bylaw or the MMCD does not set out an applicable standard as per standards generally accepted as good engineering practice.

COMPLETION OF WORKS AND SERVICES

32. Prior to the Approving Officer approving the Subdivision or the Chief Building Official issuing a Building Permit and the commencement of the installation of any Works and Services, the Owner of the land being subdivided or developed in which Works and Services are required to be installed shall:

- (1) Deposit with the City a Security Deposit, by way of cash or an irrevocable and automatically renewable Letter of Credit, as per the City's Policy Directive No. C-17 – Letters of Credit, in the amount of 125% of the estimated construction cost, as estimated by the Project Engineer, for the Works and Services required under this Bylaw; and,

- (2) Enter into a Servicing Agreement with the City to fully construct all such Works and Services by a specified date to the standards set out or referred to in Schedule “A”, attached hereto and forming part of this Bylaw, or forfeit to the City the Security Deposit. The standard format of the Servicing Agreement is contained in Schedule “B”, attached hereto and forming part of this Bylaw.
33. Notwithstanding Sections 32, a Security Deposit is required to be placed with the City for the maintenance period in accordance with the provisions of the Servicing Agreement and the standards set out or referred to in Schedule “A”, attached hereto and forming part of this Bylaw.
34. Notwithstanding Section 32, where the City determines that the physical construction of part or all of the Works and Services required under this Bylaw is premature, the owner of the land being subdivided or developed will be required to install those Works and Services as deemed necessary by the Manager of Land Development.

SERVICE LEVELS

35. The City requires different levels of service to be provided in different areas of the City consistent with the Official Community Plan.
36. Oversizing of works shall be in accordance with Section 939 of the *Local Government Act*.

EFFECTIVE DATE

37. This Bylaw shall come into effect on January 1, 2005.

“Subdivision and Land Development Bylaw 2004, No. 3055” adopted on the 18th day of October, 2004.

Amendment Bylaw No. 3455 adopted on the 19th day of November, 2007.

Amendment Bylaw No. 3980 adopted on the 1st day of April, 2014.

Amendment Bylaw No. 4735 adopted on the 20th day of August, 2019.

“Clint Hames”

Mayor

“Robert L. Carnegie”

Clerk

CITY OF CHILLIWACK

“Land Development Bylaw 2014, No. 3055”

SCHEDULE “A”

**DESIGN CRITERIA
MASTER MUNICIPAL CONSTRUCTION DOCUMENTS
AND STANDARD DRAWINGS**

**AVAILABLE FROM THE
DEVELOPMENT AND REGULATORY ENFORCEMENT SERVICES DEPARTMENT**

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1.0 GENERAL INFORMATION

1.1 INTRODUCTION

This schedule forms Schedule 'A' to the “Land Development Bylaw 2014, No. 3055”, in force from time to time, and identifies the Design Criteria, Master Municipal Construction Documents, and Standard Drawings acceptable to the City.

In adopting this schedule, Council through its Development and Regulatory Enforcement Services Department, has reviewed the needs of the City with respect to Development Standards, compared the benefits of alternative practices, and identified the most acceptable approaches to provide good engineering standards.

This schedule is to be referred to in the design construction and acceptance of Development Works within the City. Additional information, clarification or suggestions for changes and amendments should be directed to:

Manager of Land Development

City of Chilliwack
8550 Young Road
Chilliwack BC V2P 8A4
Telephone: 604-793-2905

1.2 DEFINITIONS

In this schedule, unless the context otherwise specifies:

“Works” means and includes those Works and Services and anything and everything to be done for the setting out, the execution and fulfillment of the Specifications in this schedule.

1.3 SCOPE AND USE OF THIS SCHEDULE

This schedule shall be taken to mean the Design Criteria, Master Municipal Construction Documents and Standard Drawings to be referred to, and incorporated in, Subdivisions, Developments, and on municipal properties or rights of way, in the City of Chilliwack.

1.4 REVISIONS

Revisions to this schedule may be made from time to time as conditions change and/or improvements are warranted. The most current issue of this schedule or any part thereof shall supersede all previous issues.

Recommendations or suggestions for improvements, additions or amendments to this schedule should be made, in writing, to the attention of the Manager of Land Development.

1.5 MANAGER OF LAND DEVELOPMENT AND DEVELOPER/CONTRACTOR PERFORMANCE RESPONSIBILITY

1.5.1 PREAMBLE

When Development works within existing, or proposed road allowances, statutory rights of way/easements are to be constructed and installed, as required by Subdivision/Development and/or as proposed for construction, the Developer/Contractor shall be aware of the areas and degrees of performance and responsibility.

1.5.2 MANAGER OF LAND DEVELOPMENT'S STATUS

The Manager of Land Development, or their duly authorized representative, shall be the City's representative during the construction period and shall observe the works in progress on behalf of the City.

1.5.3 WORK PERFORMANCE

The whole of the works, and the manner of performing the same, shall be done to the acceptance of the Manager of Land Development, and they shall be the sole judge of the works and materials in respect to both quantity and quality and their decision with regard to works and materials shall be final and binding.

1.5.4 VARIATION OF WORKS AT DEVELOPER'S/CONTRACTOR'S REQUEST

Any variation to the works previously proposed, or as previously accepted in design, shall be subject to review by the Manager of Land Development. All or any requests for variation(s) to works designed and sealed by a Professional Engineer on behalf of a Developer and accepted by the City shall be made in writing by the Project Engineer. All requests for variation(s) from the Developer's Engineer shall include a signed and sealed revision to the previously accepted drawing(s). The Manager of Land Development's decision as to the acceptability of any proposed revision(s) shall be final and binding.

1.5.5 UNFORESEEN CONDITIONS

If at any time after the drawings have been accepted for construction, unforeseen conditions or circumstances become known which make it necessary that changes in the design or extra works be done in order to complete the project in an acceptable manner, the Manager of Land Development shall have the right to order such changes or extra works as the Manager of Land Development deems necessary to complete the works in an acceptable manner. All costs of such extra works shall be borne by the Developer/Contractor.

1.5.6 VERBAL AGREEMENTS

No verbal instruction, objection, claim or notice by any party to the other shall change or modify any of the terms or obligations contained in any of the specifications and none of the Specifications shall be held to be waived or modified by reason of any act whatsoever, other than by an agreed waiver or modification thereof in writing.

1.5.7 SERVICE OF NOTICES

Any notice, order, direction, request or other communication given by the City to the Developer/Contractor shall be deemed to be well and sufficiently given to the Developer/Contractor if the same be left at any office used by the Developer/Contractor or be delivered to any of their officers, clerks, or servants, including the Developer's/Contractor's Project Engineer, or be mailed in any Post Office addressed to the Developer's/Contractor's last known place of business.

1.6 CONDUCT OF WORK

1.6.1 RESPONSIBILITY

1.6.1.1

The Developer shall be held as fully responsible to the City for the acts and omissions of the Developer's agents and of persons directly or indirectly employed by them. The Developer agrees to bind all agents or employees to the specifications and drawings applicable to their work.

1.6.1.2

The Developer shall appoint a coordinated Registered Professional for the duration of the project up to and including final acceptance by the City. The Coordinating Registered Professional, or duly authorized representative, shall be responsible for the coordination of all aspects and submission of the project including supervision of design, preparation of drawings and specifications, construction inspection and quality testing, construction cost estimates of the works, the record drawing submission and completion certification. The Coordinating Registered Professional shall complete and submit “Form F-15 Confirmation of Commitment by the Owner and Coordinating Registered Professional” of this Schedule and forming part of this Bylaw prior to commencement of the works.

1.6.1.3

No work may start on City lands, road allowances or statutory rights of way without written permission from the Manager of Land Development in the form of a permit as outlined in “Form F-1 Permission to Construct” of this Schedule and forming part of this Bylaw.

1.6.1.4

The Developer, the Coordinating Registered Professional, the Project Engineer and the General Contractor may be required to attend a pre-construction meeting at the discretion of the Manager of Land Development, prior to the start on construction of the required works.

1.6.2 MATERIALS AND WORKMANSHIP

The whole of the works shall be done in a substantial and workman-like manner with materials, articles and workmanship of the best quality and description and as required by and in strict conformity with this schedule. Unless otherwise specified, all materials shall be new.

1.6.3 LEGAL POSTINGS

All legal posts, stakes and monuments within and outside the area of the work, and all construction stakes and marks on adjoining works, shall be preserved undisturbed and visible. In the event any of the above are disturbed, lost or destroyed they shall be replaced to the acceptance of the Manager of Land Development. All costs for replacement shall be borne by the Developer.

1.6.4 WORK OF OTHERS

The City, its servants and agents shall be at liberty to enter upon the site of the work with its workmen and materials to do other work, and the Developer/Contractor shall afford any such workmen all reasonable facilities to the acceptance of the Manager of Land Development.

The Developer/Contractor shall arrange their work and dispose of their materials in such a manner as will not interfere with the work or storage of materials of others upon the site of the Work. The Developer/Contractor shall join their work to that of others and perform their work in proper sequence in relation to that of others to the acceptance of the Manager of Land Development.

1.6.5 EXISTING STRUCTURES AND UTILITIES

Any plans or descriptions, verbal or otherwise, of existing piping or structures that are given to the Developer/Contractor are intended only as an aid in the location of these items. Measurements and locations of the existing underground piping and structures shown on the drawings are compiled from the most reliable information available, and must be verified by the Developer/Contractor prior to proceeding with construction. The City accepts no responsibility for the accuracy of any plans, maps or elevations provided to the Developer/Contractor/Project Engineer.

1.6.6 DRAINAGE

The Developer/Contractor shall keep all portions of the site properly and efficiently drained during construction and until final acceptance by the City, the Developer/Contractor shall be held responsible for all damage which may be caused or result from water backing up or flowing over, through, from or along any part of the works, or which any of their operations may cause to flow elsewhere.

Existing culverts, drains and ditches affected by the works shall be kept clear of excavated material at all times during construction. When it is necessary to temporarily remove an existing drainage structure, the Developer/Contractor shall provide suitable temporary ditches or other accepted means of handling the drainage.

Culverts and drain pipes shall be replaced at the time of trench backfilling and shall be adequately supported such that trench settlement does not disrupt the flow of water. Culverts, drains, and ditches shall be replaced in a condition which is at least equal to that which existed before construction commenced and ditch walls shall be reinstated so as to prevent any erosion or seepage.

At all times, during the course of construction and to the end of the maintenance period (final acceptance), the Developer shall ensure that there will be no discharge of any silt, dirt or debris into any existing or new drainage facility or watercourse. The Developer shall clean streets, catch basins, manhole sumps and maintain siltation controls as often as the Manager of Land Development deems necessary.

1.6.7 WORK TO FIT WITH OTHERS

The Developer/Contractor shall do all cutting, fitting or patching of their work that may be required to properly fit or receive existing structures and utilities.

The Developer/Contractor shall not endanger any existing work by cutting, digging or otherwise and shall not cut or alter the work of any other except with the written consent of the Manager of Land Development.

1.6.8 DAMAGE TO WORK

The Developer/Contractor shall bear the risk of and shall bear all loss or damage which may occur on the work until the same has been delivered to and accepted by the City as specified and if any loss or damage occurs before such acceptance by the City, the Developer/Contractor shall immediately, at their own expense, repair, restore or re-execute the works so damaged or which may have been destroyed.

All such repair, restoration or re-execution of the works so damaged or which may have been destroyed, shall be carried out and completed in accordance with this schedule, to the acceptance of the Manager of Land Development and at no cost to the City.

1.6.9 USE OF COMPLETED PORTIONS

The City shall have the right to take possession of and use any completed or partially completed portion of the works, but such possession and use shall not be deemed an acceptance of such works. If such prior use increases the cost of uncompleted works or causes refinishing of completed works beyond normal wear and tear, the Developer/Contractor shall be entitled to such compensation, as the Engineering Director may determine.

1.6.10 CITY'S RIGHT TO REPAIR, RESTORE OR RE-EXECUTE THE WORKS

Should the Developer/Contractor fail to perform the works to the acceptance of the Manager of Land Development by failing to begin work or to repair, restore, re-execute or in any manner fails to comply with the Standards and Specifications of this schedule as it applies to any part or parts of the works as requested by the Manager of Land Development within a period of seven (7) days from sending of such notice in writing to do so, (emergencies excepted) the City shall become empowered to do the work itself or to employ such person or persons to repair, restore or re-execute the works provided that the entire expense of repair, restoration or re-execution shall be charged to the Developer/Contractor. The repair, restoration or re-execution shall in no way affect the Developer's/Contractor's duties and liabilities nor in any way relieve them from the performance and fulfillment of any or all of their obligations and duties described in this schedule. All such repair, restoration or re-execution of the works shall be carried out and completed in accordance with this schedule and to the acceptance of the Manager of Land Development. The fact of the City not having disapproved of or rejected any part or parts of the works, or any of the materials supplied in connection at the time of the Manager of Land Development making an estimate, or at any other time during the execution of the works shall not be deemed or be construed to be an acceptance of any such part or parts of the works or any such materials.

The provisions of this clause shall remain in full force and effect and be applicable for the period of the execution of the works and for a period of twelve calendar months after the date of the issuance of a notice of completion by the City.

1.6.11 EMPLOYEE AND PLANT SAFETY, ADEQUACY

The Developer/Contractor alone shall at all times be responsible for the safety of their employees in the work and for the safety, adequacy, efficiency and sufficiency of their plant, their equipment and their method of executing the works specified herein.

The Developer/Contractor shall be responsible for notification of the proposed works to the Workers' Compensation Board and shall conduct all works in compliance with the regulations of the Workers' Compensation Board. A copy of the notification letter is to be forwarded to the Manager of Land Development.

1.6.12 PAYMENT OF ACCOUNTS BY DEVELOPER

The Developer shall pay all accounts for labour, services and materials, incurred by the City, as a result of executing any or all clauses of these specifications during the execution of the works, as and when such accounts become due and payable. Should payment of such accounts not be made when they become due, the City shall deduct the payment from the Security Deposit. In the event that the amount is greater than that owing to the Developer, the City shall charge the Developer the difference.

1.6.13 PUBLIC CONVENIENCE, ACCESS, CLEAN-UP

In carrying out the works, or any portion thereof, the convenience of the public must always be considered and provided for by the Developer/Contractor, who must not obstruct any street, thoroughfare or sidewalk longer or to any greater extent than is absolutely necessary in the Manager of Land Development's opinion, and shall in no case tear up or open more of any street, roadway or place than is ordered or sanctioned by the Manager of Land Development in writing. The Developer/Contractor shall provide safe access to driveways, buildings and property, both for vehicles and pedestrians, whenever necessary, and for passing along all roadways and sidewalks and for crossing the same where it is practicable to do so, both during the execution of the works and at other times, and for this purpose shall construct and maintain, in good order and serviceable condition, suitable and convenient platforms, approaches, structures, bridges, crossings or other works as required by the Manager of Land Development. The Developer/Contractor shall not deposit any material upon any street, sidewalk, boulevard, grass plot, or other public property without considering same, in co-operation with the Manager of Land Development, so that the least damage will be incurred, nor shall the Developer/Contractor allow material to remain thereon longer than necessary.

During all phases of the operations the Developer/Contractor shall take precautions to abate nuisance caused by mud or dust by clean- up, sweeping, sprinkling with water, or other means as necessary to accomplish results acceptable to the Manager of Land Development. If the Developer/Contractor fails to clean up the site in a reasonable time, the City will undertake the work and invoice the registered owner for the cost.

1.6.14 TRAFFIC CONTROL, BARRIERS AND LIGHTS

1.6.14.1

The Developer/Contractor must apply for a Highway Works Application and Permit, as per the City's Highway and Traffic Bylaw, in force from time to time, seven days prior to any planned traffic lane closure, road closure, sidewalk closure or any other disruption to vehicle or pedestrian traffic. The Developer/Contractor must comply with all conditions that may be applied to the permit.

1.6.14.2

The Developer/Contractor must, at their own expense, in accordance with the Ministry of Transportation and Infrastructure “Traffic Control Manual for Work on Roadways”:

- (1) Responsibly provide, erect and maintain all required signs, barriers, fences or other proper protection, and must provide, keep and maintain all operating lights with amber globes or provide Traffic Control persons as may be necessary in order to ensure safety to the public as well as to those engaged about the premises or works;
- (2) Keep any roadway open for travel for the use of the public for such width as the Highway Works Application and Permit allows;

- (3) Provide any signs or notices, to be placed at a distance from obstruction to serve sufficient warning to the travelling public and maintain such signs in good order in conspicuous places wherever any roadway, sidewalk or thoroughfare is torn up or dangerous and so long as it remains unsafe or unfinished.

1.6.14.3

All vehicular or pedestrian traffic warning, control or barrier devices shall be subject to the acceptance of, or conditions of, the Manager of Land Development.

1.6.15 NOTICE OF RELEASE

On completion of works on private property, City property, or City rights of way, the Developer/Contractor shall submit to the Manager of Land Development a “Form F-13 - Notice of Release” for each property owner affected, verifying that the clean up has been performed and completed to the property owner’s acceptance, and that the property owner has no further claim upon the Developer/Contractor or the City as a result of such works. All such releases shall be retained by the Manager of Land Development as part of the City’s records.

1.6.16 ARBITRATION

In the case of any dispute between the City and the Developer/Contractor during the progress of the works or afterwards, as to any matter arising there under, either party may at Developer/Contractor’s option give to the other notice of such dispute and demand arbitration thereof; and the parties may, with respect to the particular matters then in dispute, agree to submit the same to arbitration in accordance with the laws of the Province of British Columbia; provided, however, that if arbitration has not been agreed upon either party may elect to have such dispute determined by a Court or Courts of competent jurisdiction. Arbitration shall not be a cause for the stoppage of works.

1.6.17 MAINTENANCE PERIOD AND GUARANTEE

1.6.17.1

The maintenance period shall be the one year period for civil design works and the two year period for pump stations, reservoirs, major structures, landscaping and screening items commencing from the date shown on the Manager of Land Development’s issued “Form F-3 - Certificate of Substantial Completion”.

1.6.17.2

Notwithstanding the existing maintenance period, the maintenance period will be extended for one additional year from the date of any major repair commencing from the date of the completion of the major repair.

1.6.17.3

The Developer shall guarantee the stability and sufficiency of the materials and workmanship supplied and the whole of the works performed and shall be responsible for and shall make good all defects, imperfections, vandalism acts and settlements which become apparent during the maintenance period.

1.6.17.4

Should the Developer fail to make good any defects, imperfections, vandalism acts and settlements after being given at least seven days’ notice in writing during the maintenance period, the City shall be entitled to make alternative arrangements for the execution of the repairs and to recover the costs from the Developer pursuant to Clause 1.6.12 and/or the Servicing Agreement.

1.7 AGREEMENTS, BONDING, INSURANCE, PERMITS

1.7.1 SERVICING AGREEMENTS

1.7.1.1

Prior to the Approving Officer approving the Subdivision or the Chief Building Official issuing the Building Permit, and prior to the commencement of the construction and installation of any Works and Services, the Developer shall enter into a Servicing Agreement with the City. The purpose of the Agreement is to ensure the completion of all Works and Services required for the Development and to protect the City against claims, including liability for matters arising from the construction, installation and inspection of the required Works and Services. The Servicing Agreement makes provision for the Security Deposit Indemnity Clause, insurance requirements, maintenance periods, maintenance deposits and administration fees. The standard Servicing Agreement is attached hereto as Schedule “B” and forming part of this Bylaw.

1.7.1.2

Servicing Agreements may be obtained from the Development and Regulatory Enforcement Services Department. Servicing Agreements must be signed, sealed, and returned to the Manager of Land Development along with the following:

- (1) A Security Deposit in the form of cash or an irrevocable, and automatically renewable Letter of Credit, as per the City’s Policy Directive No. C-17 – Letters of Credit. The deposit amount will be 125% of the Project Engineer’s certified estimated construction cost for the works to be constructed. Letters of Credit must identify the project to which they apply.
- (2) “Form F-11 Insurance Certification” as per the requirements of the Servicing Agreement.
- (3) A copy of the letter to the Workers’ Compensation Board of BC providing notification of the proposed works.
- (4) Three complete sets of drawings, signed and sealed, which must be identical to the drawings accepted for construction.
- (5) A non-refundable administration fee based upon the Project Engineer’s certified estimated construction cost for the works to be constructed, as per the requirements of the Servicing Agreement.

1.7.2 SECURITY DEPOSIT

The City will require a Security Deposit from the Developer, to be submitted to the Manager of Land Development, to ensure the construction, installation and maintenance of the works as identified in the Servicing Agreement as per Section 1.7.1.1 of this Schedule.

1.7.3 INDEMNITY CLAUSE

1.7.3.1

The Developer shall release within the Servicing Agreement, and does hereby indemnify and save harmless from and against:

- (1) all costs, expenses, damages, claims, demands, actions, suits, and liabilities by whomever brought or made and however arising, directly or indirectly, from the construction or installation of the works and any injury or damage thereby caused to person or property (including death);
- (2) all expenses and costs that may be incurred by reason of the construction and installation of the works resulting in damage to any property owned, in whole or in part, by the City or that the City is obliged by law, directly or indirectly, in any way or to any degree to construct, repair or maintain;
- (3) all expenses and costs by reason of:
 - (a) liens for non-payment of labour and material, federal or provincial taxes, or Workers’ Compensation assessments; and,
 - (b) the presence of encroachments owing to mistakes in surveying or construction.
- (4) Workers’ Compensation assessments and Employment Insurance payments required to be paid by the City as a result of the City’s election to complete the construction and installation of the works.
- (5) except to the extent that such actions, proceedings, costs, damages, expenses, claims and demands as set out in Sections 1.7.3.1(1) to 1.7.3.1(4), exclusive inclusive from the negligence of the City.

1.7.3.2

The indemnity shall terminate upon completion of the maintenance period or completion of all deficiencies, whichever is later.

1.7.4 PUBLIC LIABILITY AND PROPERTY DAMAGE

1.7.4.1

Prior to the commencement of any works, the Developer shall obtain and maintain or cause to be obtained and maintained, in force during the term of the Servicing Agreement and the maintenance period, a policy of insurance acceptable to the City, with limits not less than those shown in the following items:

- (1) Comprehensive Public Liability Insurance and Property Damage Insurance providing coverage of at least \$5,000,000 inclusive against liability for bodily injury or death and/or damage to property on an all risk basis.
- (2) Motor Vehicle Insurance for public liability and property damage providing coverage of at least \$5,000,000 inclusive on owned, non-owned or hired vehicles.

- (3) Completed operations coverage on all-risk occurrence basis of at least \$5,000,000 inclusive against liability for bodily injury, death and/or damage to property of others arising out of the existence of any condition in the works when completed or any installation or repair operations during the period of twelve calendar months next ensuing after the issuance of a “Form F-3 - Certificate of Substantial Completion” by the City.

1.7.4.2

The Developer shall ensure that:

- (1) the following insurance coverage is included to protect the Owner and the City against all claims arising out of:
 - (a) death or injury to persons;
 - (b) damage to, or loss of use of any property of third persons, including real property, chattels, land, works, buildings, structures, wires, conduits, pipes, mains, shafts, sewers, tunnels, and apparatus’ in connection therewith, even when the damage or loss of use is caused by vibration, moving, shoring, underpinning, raising, rebuilding, or demolition of any building, structure, or support, or by excavation, tunneling, or other work below the surface of the ground or water; and,
 - (c) damage to or loss of all buildings, structures, stores, equipment and materials included in or required for the carrying out of the works.
- (2) every policy of insurance will:
 - (a) except for motor vehicle insurance, name the City as an additional insured;
 - (b) 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. In all such policies, each contractor engaged in the works shall be named as an additional insured in respect of the performance of the works; and,
 - (c) state the policy cannot be cancelled, lapsed or materially changed without at least thirty days written notice delivered to the City Clerk of the City of Chilliwack.

1.7.4.3

The Developer shall maintain the insurance policy until the works have received final acceptance by the Manager of Land Development. The Developer’s insurance policy shall save the City, its officers, agents, servants and employees harmless from liability of any nature or kind.

1.7.4.4

As a condition precedent to issuing “Form F-1 - Permission to Construct, the Developer shall be required to submit to the City, along with a copy of the insurance policy, an insurance certificate signed by a licensed insurance agent certifying the following:

“I hereby certify that the attached insurance policy provides insurance coverage as required by Servicing Agreement number _____ between the City of Chilliwack and (the Developer), and that the attached Insurance Policy No. _____ is valid for the period of the Servicing Agreement.”

No works may commence or continue on the works if this provision has not been satisfied.

1.7.5 PATENTS AND/OR COPYRIGHTS

The Developer shall pay all royalties, patent and license fees and hold and save the City, its officers, agents, servants and employees, harmless from liability of any nature or kind, including costs and expenses, for or on account of any copyrighted or un-copyrighted composition, secret process, patented or unpatented invention, articles, or appliances manufactured or used in the execution of the works, including their use by the City, and if the Developer shall fail to save the City, its officers, agents, servants and employees in manner aforesaid any monies collected from the City, its officers, agents, servants and employees by reason of such failure shall be recoverable from the Developer.

1.8 INSPECTION AND SECURITY DEPOSIT REDUCTIONS

1.8.1 INSPECTION OF THE WORK

1.8.1.1

The Project Engineer shall submit daily inspection reports to the Manager of Land Development on a weekly basis, complete with a cover sheet summarizing each report.

1.8.1.2

All inspection reports submitted to the City shall include:

- (1) the date, time, and weather conditions of the inspection;
- (2) the civic address of the Development;
- (3) the City assigned folder number for the Development; and,
- (4) the name and signature of the Inspector and/or the Project Engineer.

1.8.1.3

The Project Engineer shall submit a “Form F-2 - Certificate of Inspection” to the Manager of Land Development, as per Section 1.8.3.1, certifying that the works have been constructed as per the approved design and meet the specifications and restrictions of this Bylaw.

1.8.1.4

All or any part of the works and all workshops or other places where material for the works is being prepared or stored may be inspected by the Manager of Land Development when and as often as the Manager of Land Development shall deem it necessary, and the Developer/Contractor shall afford the Manager of Land Development every facility and access requested by the Manager of Land Development and shall give the Development Engineer any and all information requested.

1.8.1.5

The Developer/Contractor shall also supply representative samples of materials as and when requested by the Manager of Land Development. Furthermore, the Developer/Contractor shall provide available competent labour required by the Manager of Land Development on site in connection with survey, measurements, inspections, and testing of the works. No payment shall be made for the cost to the Developer/Contractor of any labour, material, work, or delay occasioned by this requirement.

1.8.1.6

The Developer/Contractor shall, at the request of the Manager of Land Development and within such time as the Manager of Land Development shall designate, open for inspection any part or parts of the work that have been covered up. If the work uncovered is found to be acceptable to the Manager of Land Development, the expense of the opening shall be paid by the City.

1.8.1.7

Inspections by the Manager of Land Development are limited to ensuring that the works are in compliance with this Schedule and that the finished product will generally conform with the intent of the accepted plans and in a condition acceptable to the City. They do not constitute supervision or coordination of the works and neither are they intended to serve in place of proper inspection by the Project Engineer of the works.

1.8.1.8

The Developer is responsible for making arrangements to ensure proper engineering supervision and coordination of the works, processing progress payments to the Contractor and for ensuring that all requirements of the City are carried to a satisfactory conclusion within the stipulated time limits.

1.8.1.9

The Developer may hire the City for video inspections of new works at least ten business days prior to the intended inspection date. If the City is unavailable to complete a video inspection, the Developer may hire a private video inspection company, under supervision by the City, at the approval of the Manager of Land Development.

1.8.2 SECURITY DEPOSIT REDUCTIONS

1.8.2.1

As the works progress, the Project Engineer shall prepare and submit to the Manager of Land Development an estimate of the quantity, value and percentage of the works completed. Upon verification of the estimate by the Manager of Land Development the reduction of the Security Deposit held by the City to no less than 10% of the estimated construction costs of the works for the Development, may be authorized.

1.8.2.2

Requests for reductions may be denied by the Manager of Land Development where in their opinion it is required to cover the remainder of the works. No release period shall be less than one month. Security Deposit reductions are for the convenience of the Developer and in no case shall be taken as acceptance of the material and/or works or as a release of the Developer from their responsibilities for the works.

1.8.3 CERTIFICATE OF SUBSTANTIAL COMPLETION

1.8.3.1

On completion of the works, the Project Engineer shall submit to the Manager of Land Development:

- (1) a completed “Form F-2 Certificate of Inspection”;
- (2) a completed “Form F-17 - Substantial Completion Pre-Inspection Checklist”;
- (3) one draft hardcopy set of Record Drawings for review as per Paragraph 2.1.9.2 of this Schedule; and,
- (4) two sets of service connection cards for each legal address within the Development as per-Section 2.1.8 of this Schedule.

1.8.3.2

The Manager of Land Development shall, upon acceptance and receipt of the submission required in Section 1.8.3.1, arrange a Substantial Completion Inspection of the works with the Project Engineer and any other City representatives deemed necessary, and arrange a video inspection of the works in accordance with Section 1.8.1.9 of this Schedule.

1.8.3.3

Upon completion of a Substantial Completion Inspection, the Project Engineer shall submit to the Manager of Land Development:

- (1) a list of works to be completed or repaired, with the estimated cost of these works; and,
- (2) a complete Record Drawing submission in accordance with Section 2.1.9.2 of this Schedule.

1.8.3.4

The Manager of Land Development, upon acceptance and receipt of the submission required in Section 1.8.3.3, shall issue a “Form F-3 Certificate of Substantial Completion”, of this Schedule, specifying the start and end dates of the maintenance period, subject to Section 1.6.17 of this Schedule whereby all monies held by the City shall be released to the Maintenance Deposit, as per Section 1.8.4 of this Schedule.

1.8.4 MAINTENANCE DEPOSIT

1.8.4.1

Upon the issuance of “Form F-3 Certificate of Substantial Completion” by the Manager of Land Development, the City shall release the Security Deposit, less a Maintenance Deposit of 10% of the estimated cost of the total works or \$5,000.00, whichever is greater, plus 125% of the value of any works to be constructed or repaired during the maintenance period, as certified by the Project Engineer to insure payment of any maintenance or repair.

1.8.4.2

The Manager of Land Development shall release the Maintenance Deposit, less the cost of any repair chargeable to the Developer by these specifications, at the expiry of the maintenance period, but not prior to the issuance of “Form F-4 Certificate of Acceptance”, when so requested in writing by the Developer.

1.8.5 TESTING OR CONFIRMATION OF WORKS COMPLETED

The City reserves the right to conduct independent testing of any or all works constructed or being constructed. Generally, these tests will be conducted on a random basis and are for the expressed purpose of ensuring that the works being accepted by the City meet the minimum standards.

In addition, to ensure the City has proper and accurate records of the works done, survey spot-checks may be conducted from time to time to verify the authenticity of the as-built information for general compliance.

The cost(s) for testing or surveying shall be borne by the Developer.

1.8.6 ISSUANCE OF BUILDING PERMITS

In new Subdivisions where municipal services are being installed, all essential services including water, storm and sanitary systems, lot grading, road base, gas and electrical (where available) shall be in place and accepted by the Manager of Land Development prior to the issuance of occupancy/final inspection of the building.

In areas designated in the “Official Community Plan Bylaw 2014, No. 4025”, Development Permit Area 2 – Hillside and Upland Areas, where municipal services are being installed, all essential services including water, storm and sanitary systems, lot grading, road base, gas and electrical (where available) shall be in place and accepted by the Manager of Land Development prior to the issuance of building permits. (AB#4735)

2.0 DESIGN CRITERIA

2.1 INTRODUCTION, SURVEY INFORMATION, DRAWING SUBMISSION

2.1.1 INTRODUCTION

2.1.1.1

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 Development works.

It is the specific intent of the Development and Regulatory Enforcement Services Department to require quality submissions for design and Record Drawings submissions. It is recommended that whenever Development works are required or proposed, the Project 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 Project 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 sub-standard will result in a request to meet with the Project Engineer, the Developer and the Engineer.

Where a question arises, please contact the Development and Regulatory Enforcement Services Department for clarification.

2.1.1.2

All submissions shall reflect and comply with the following:

- (1) All applicable requirements of this Bylaw in force from time to time.
- (2) All application requirements of the City’s Bylaws, in force from time to time, including but not limited to:
 - (a) Zoning Bylaw
 - (b) Highway and Traffic Bylaw
 - (c) Soil Removal and Deposit Bylaw
 - (d) Development Site Preparation Bylaw;
 - (e) Tree Management (Land Development) Bylaw;
 - (f) Fire Prevention and Protection Bylaw;
 - (g) Sanitary Sewer System Regulation Bylaw;
 - (h) Storm Sewer System Connection and Regulation Bylaw; and,
 - (i) Waterworks Regulation Bylaw.
- (3) All applicable requirements of the Hillside Development Guidelines.
- (4) All applicable requirements of the City’s Policy Directive No. G-6 – Subdivision and Development Control
- (5) All applicable requirements of the Master Municipal Construction Documents, in accordance with Section 3.1 of this Schedule.

2.1.2.1

All surveys shall be conducted in a safe manner so as not to create a nuisance to traffic or the public at large. The permission of the registered owners is required before entering onto private property.

2.1.2.2

All survey point elevations shall be relative to the North American Datum of 1983 (NAD 83) geodetic datum, and locations shall be referenced to the NAD 83 UTM Zone 10 North coordinate system.

2.1.2.3

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

2.1.2 SURVEY INFORMATION

2.1.2.4

When a Subdivision approval results in property Development requiring the NAD 83 system, the applicant/developer must install a standard benchmark monument (e.g. a brass survey marker set in a concrete base located in a secure position) in close proximity to the Development, and have its NAD 83 UTM Zone 10 North coordinate system and NAD 83 geodetic elevation determined by an appropriate professional (e.g. a BCLS or P. Eng.), and provide a record to the City for publication.

2.1.2.5

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

2.1.2.6

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

2.1.2.7

All existing items such as manholes, edge of asphalt, curbs and gutters, sidewalks, driveways, catch basins, fire hydrants, poles, existing dwellings, fences, trees, hedges and unusual ground shall be noted as required.

2.1.2.8

Where applicable, cross sections will be required. The section shall include centerline, edge of pavement or gutter line, edge of shoulder, ditch invert, top of ditch, property line, and an existing ground elevation inside the property line, which is representative of the average slope of the ground before any major break in ground profile.

2.1.3 DRAWING SUBMISSIONS

2.1.3.1

All drawings shall be prepared as per the requirements contained in Sections 2.1.3, 2.1.4, 2.1.5, 2.1.6, and 2.1.9 and all other applicable requirements of the Land Development Bylaw, in force from time to time.

2.1.3.2

All drawings shall be signed and sealed by a Professional Engineer registered in the Province of British Columbia. The drawing submission is to be accompanied by a checklist signed by the Project Engineer

2.1.3.3

The Municipal Project number must be noted in the lower right-hand corner of all drawings as per Policy Directive G-6 - Subdivision and Development Control.

2.1.3.4

All drawings shall be computer drawn and submitted as metric standard A1 size drawings unless otherwise approved by the Manager of Land Development.

2.1.4 DESIGN DRAWINGS

2.1.4.1

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

(1) Cover Sheet

Noting the Project Engineer's name, the Client's name, the Municipal project number, the legal description of the lands involved, a site plan at, no greater than 1:5000 scale, an index, and a complete drawing list.

The site plan shall note all proposed roads and the proposed Subdivision layout. The cover sheet may be utilized to show the drainage catchment area (Section 2.1.3.3).

General Notes should be located on this sheet.

(2) Key Plan

The Key Plan shall be at a 1:500 scale and shall note all proposed services, including street lighting. If more than one sheet is required, note the westerly or southerly portion first and identify as Key Plan “A” with additional plans noting “B” and “C”, etc.

(3) Erosion and Sediment Control Plan

Erosion and sediment control plans shall be at a 1:500 scale and shall clearly show all measures required to prevent on-site erosion and the transportation of mud, silt laden run-off water and other deleterious materials to adjacent properties, City roads, storm Drainage System, and watercourses. Reference the City’s Standard Drawings DC-4, DC-5, DC-6, D-7, and D-8.

(4) Storm Water Management Plan

Storm Water Management Plan submissions are to be as per Section 5 of Policy and Design Criteria Manual for Surface Water Management.

(5) Roads

Plan and profile drawings shall show all, horizontal and vertical design elements as required for design, layout and construction of the road works, and all grades, inverts, curves, offsets, pipe material, service connections, fittings, fire hydrants, air release/vacuum valves, booster pumping facilities and all other infrastructure as required to meet City standards for water design identified in this document. The scale shall be 1:500 for plans and 1:50 for profile. Typical cross-sections, in accordance with the standards identified in this document, are to be shown for each classification of roadway being developed as part of this project. The full lengths of pipe shall be shown for the water main on the profile. All crossover points with sewers shall be noted and where the separation between the invert of the water main and the top of any sewer is less than 0.5 m, the water main shall be protected in accordance with Ministry of Health requirements.

(6) Storm and Sanitary Sewers

Plan and profile drawings shall show grades, inverts, offsets, pipe material, service connections, manholes, catch basins and all other infrastructure as required to meet City standards identified in this document. 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. Directions of flow are to be identified on plan views. Culverts greater than 30 m in length shall be considered a storm main and shall be located within a City right of way.

(7) 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 20.0 m intervals. Additional sections may be required or requested where excessive cuts or fills are involved.

(8) Ornamental Street Lighting Plan

Shall be a plan view at a scale of 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 this Bylaw and the Master Municipal Construction Documents and any other appropriate design criteria. Generally, street lights shall be located at all intersections and within 1 m of the property lines. Any street lighting plan(s) are to be accompanied with the photometric calculations.

(9) Construction Details

Shall show all proposals for construction which are not covered or specifically detailed in this Bylaw and the Master Municipal Construction Documents. Where there is a Municipal Standard, it is expected to refer to the document and drawing number. It is not necessary to include or provide details of works for which there is an MMCD or City Standard Drawing.

2.1.4.2

All public utilities including, but not limited to, water, sanitary sewer and storm drainage are to be located within the public road right of way in accordance with the requirements of this Bylaw. Rear yard utility main installations are only permitted with the expressed written approval of the Engineering Director. If permitted, such utilities shall be located within a minimum 6.0 metre wide statutory right of way having a maximum cross-fall of 5% and shall be paved.

2.1.4.3

The Project Engineer's seal and signature shall be noted on all sheets of all design submissions as per the standards as set out by the Association of Professional Engineers and Geoscientists of BC. Failure to do so will result in the Plans being returned without comment. The Project Engineer's seal and signature shall infer that all works as proposed are structurally sound, comply with the applicable design criteria of this schedule, and good engineering practice applied.

2.1.4.4

Notwithstanding the requirements detailed in Sections 2.1.4.1, 2.1.4.2 and 2.1.4.3, the following additional information is to be noted in design submissions:

- (1) the size, grade, inverts in NAD 83 geodetic elevations, and type of material on profile sections;
- (2) the locations, off-sets, curvatures, direction of flow, size and identification of the mains noted on the Plan sections;
- (3) the clearance between mains at all cross-over points;

- (4) all existing structures, including houses, sheds, fences, wells, septic tanks and fields, shall be shown on the appropriate drawing(s), with a notation indicating their fate (i.e. to be removed, filled, etc.).
- (5) in Rural Subdivisions, with an open ditch Drainage System, note the size of driveway culverts required to conform to the design, including the design invert in NAD 83 geodetic elevations of each culvert.

2.1.4.5

The first complete design submission shall consist of:

- (1) two complete full size sets of drawings;
- (2) one complete reduced set of drawings on 11” x 17” size paper;
- (3) soils report signed and sealed by Professional Geotechnical Engineer (to verify road structure design and use of rock pits, soak-away structures etc.); and,
- (4) all applicable utility design calculations (water, sanitary, storm sewer).

2.1.4.6

Subsequent design submissions requiring changes to the previous submission outlined in Section 2.1.4.5 shall consist of:

- (1) three complete sets of drawings;
- (2) all submissions subsequent to first submission shall have any significant changes made by the Project Engineer highlighted with yellow or noted with a revision cloud, which are in addition to “red line” changes required by the City; and,
- (3) items that are “red lined” must be addressed by the Project Engineer, failure to do so will result in submissions being returned.

2.1.4.7

The final submission for municipal acceptance shall consist of:

- (1) three complete sets of drawings;
- (2) a complete construction estimate in accordance with Section 2.1.7 of this Schedule;
- (3) a complete estimate of the soils or material to be deposited or removed in cubic metres, in accordance with the City’s Soil Removal and Deposit Bylaw, in force from time to time, signed and sealed by the Project Engineer.

2.1.5 CONSTRUCTION DRAWINGS

2.1.5.1

Prior to commencement of construction, the Project Engineer shall submit:

- (1) three complete sets of full-sized drawings;
- (2) two sets of reduced drawings on 11” x 17” paper; and,
- (3) one digital set of drawings in Adobe Acrobat PDF file form, clearly marked ‘ISSUED FOR CONSTRUCTION’.

2.1.5.2

All manholes are to be clearly identified on construction drawings using numbering provided by the City at the time of municipal acceptance of the design submission.

2.1.6 GAS, ELECTRIC, TELEPHONE, AND CABLEVISION DRAWING SUBMISSIONS

2.1.6.1

Privately owned utility companies such as gas, electric, telephone and cablevision etc., shall:

- (1) if within or for a Development, submit three sets of hardcopy design drawings to the Project Engineer. The Project Engineer shall review the drawings for conflicts with existing or new works. Upon review, the Project Engineer shall submit to the Manager of Land Development all three sets of design drawings, along with a signed and sealed letter certifying there are no conflicts. After review and acceptance, the Manager of Land Development shall return one accepted hardcopy set to the utility company.
- 2.1.6 if not within or for a Development, submit three sets of hardcopy design drawings to the Manager of Land Development. After review and acceptance, the Manager of Land Development shall return one accepted hardcopy set to the utility company.

2.1.6.2

All design drawings shall meet the requirements as set out in the City’s Policy Directive No. G-6 – Subdivision and Development Control and shall include:

- (1) the signature and seal of the Professional Engineer responsible for the design;
- (2) the Professional Engineer’s name, the client’s name, the location or legal description of the lands involved, and an index;
- (3) all existing public and private utilities showing the size and NAD 83 UTM Zone 10 North coordinate location and NAD 83 geodetic invert elevation;
- (4) all existing structures, including houses, sheds, fences, wells, septic tanks and fields, with a notation indicating their fate (i.e. to be removed, filled, etc.); and,
- (5) the clearance between mains at all cross-over points.

2.1.6.3

One set of Record Drawings shall be submitted to the City upon completion of the works, signed and sealed by the Professional Engineer responsible for the design.

2.1.7 CONSTRUCTION ESTIMATE CALCULATION

2.1.7.1

Construction estimates shall be submitted prior to commencement of any works signed and sealed by the Project Engineer and are to:

- (1) be in Master Municipal Construction Document (MMCD) format;
- (2) include a detailed listing of materials (with quantities, prices and totals) in accordance with MMCD format;

- (3) clearly define the separation between off-site and on-site works; and,
- (4) be attached to a cover sheet summarizing costs identified in the detailed listings as totals for each major cost area.

2.1.7.2

The items and costs in Section 2.1.7.1 will be reviewed and accepted by the Manager of Land Development and will be amended by the Project Engineer if necessary.

2.1.7.3

Hydro and telephone costs are to be bonded but are not to be included in the calculation of the administration fee.

2.1.8 SERVICE CONNECTION CARDS

Service connection cards shall indicate clearly and accurately the size, the NAD 83 UTM Zone 10 North coordinate location and NAD 83 geodetic invert elevation, etc., of each municipal utility connection. The legal lot description, civic address and the municipal project number shall be required on all cards, in accordance with City of Chilliwack Standard Drawing DC-3. Service connection cards are considered part of the record drawing submission and are to be provided to the Manager of Land Development prior to the Substantial Completion Inspection, in accordance with Section 1.8.3.

2.1.9 RECORD DRAWING SUBMISSIONS

2.1.9.1

Information shown on the record drawings shall be considered as-constructed. The Project Engineer shall be responsible for ensuring that the works have been constructed as per the approved design the specifications and restrictions of this Bylaw. All final drawing submissions will be free from copyright, ownership and printing/distribution restrictions. Drawing and digital file ownership reverts to the City upon final submission.

2.1.9.2

In conjunction with Section 1.8.3 of this Schedule, the following procedures shall be followed in the submission of record drawings for the City’s acceptance:

- (1) Upon completion of all works within the Development and prior to the Substantial Completion Inspection, the Project Engineer shall submit one draft hardcopy set of record drawings, excluding the road cross-section sheet(s).
- (2) When the City is satisfied with the draft record drawing submission, prior to the issuance of “Form F-3 - Certificate of Substantial Completion”, the Project Engineer will be required to submit the following:
 - (a) Three sets of original paper prints of record drawings signed and sealed, plotted with waterproof ink, metric size A1 or equivalent with the following certification:

“I certify this drawing represents the constructed Works and Services which have been periodically inspected by our company and are in substantial compliance with the approved design plans and changes.”

The signature and seal shall be by the Project Engineer certifying that all works have been constructed as per the approved design and with the specifications and restrictions of this Bylaw.

- (b) One set of record drawings in Adobe Acrobat PDF file form and one complete set in AutoCAD file format on CD clearly marked as “Record Drawings”, including all relevant files associated with the drawings (including, but not limited to x-references, .shx files, .ctb files, etc.) exactly representing the signed and sealed Record Drawings as set out in Clause 2.1.9.2(1) above.
- (3) Record Drawings shall include the following:
 - (a) Key plan noting water, sanitary, storm mains, street lighting, and road works. The plan shall show the as-constructed offset for those works and the locations of all service connections relative to the lot lines.
 - (b) Detailed plan and profile drawings for water, sanitary, storm and road works. Elevations, inverts, pipe lengths and offsets to show and read as constructed. The profile drawings for the utilities shall state the pipe materials used.
 - (c) Detailed plans showing street lighting.
 - (d) Coversheet noting the drawings submitted .
- (4) The Project Engineer shall submit three complete sets of Operations and Maintenance Manuals for all equipment, comprised in the work, and as required by Manager of Land Development.
- (5) All elevations will be relative to the NAD 83 geodetic datum and all horizontal coordinates shall be referenced to the NAD 83 UTM Zone 10 North coordinate system. All coordinates shall be in metres and have two decimal places of precision. North should be towards the top or right side of the drawings whenever possible.

2.2 WATER SYSTEMS

2.2.1 GENERAL

Water supply and distribution system design shall conform to the requirements of the Provincial Ministry of Health and this Bylaw as amended from time to time. All standards not specifically described in this schedule shall be in accordance with appropriate American Water Works Association (AWWA) Standards or as directed by the Engineering Director.

The water supply and distribution system shall be designed to supply water in adequate quantities at adequate pressures for both domestic/commercial use under peak consumption conditions and fire flows. Water mains shall be sized to convey peak hour flow or maximum day flow plus the fire flow, whichever is the greater.

The owner of any lands which are proposed to be developed or subdivided shall provide each Parcel of land with a water distribution system, and a fire hydrant system, including the standard pre-service connection as required by Section 11 of the Bylaw.

2.2.2 PER CAPITA DEMAND FLOW

2.2.2.1

Domestic flow values are as follows:

| | |
|---------------------------|------------------------|
| Average day domestic flow | 450 litres/capita/day |
| Maximum day domestic flow | 1360 litres/capita/day |
| Peak hour domestic flow | 2270 litres/capita/day |

2.2.2.2

Table 2.2.2 below is a guideline for applying minimum density by land use to determine flow:

Table 2.2.2: Minimum Density by Land Use

| Residential Density | Persons/Unit |
|--|--|
| Standard SFD: ≤ 16 units per hectare | 3.0 |
| Small Lot SFD (R1-D): ≥ 17 and ≤ 20 units per hectare | 3.0 |
| Strata Retirement Rancher: 21 units per hectare | 2.0 |
| Townhouse: ≥ 22 and ≤ 44 units per hectare | 2.3 |
| Apartment – 4 Storey: ≥ 45 and ≤ 200 units per hectare | 1.9 |
| Apartment – High Rise: ≥ 200 and ≤ 400 units per hectare | 1.9 |
| Non-Residential Density | Equivalent Population/Hectare (Gross) |
| Commercial | 75 |
| Industrial | 50 |
| Institutional | 75 |

2.2.2.3

For non-residential areas, design flows shall be calculated for the actual proposed use, as well as flow based on Table 2.2.2. The larger of the two calculations shall be used for system sizing.

2.2.2.4

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 L/s
- D = Internal pipe diameter in mm
- S = Slope of hydraulic gradeline in m/m
- C = Hazen-Williams coefficient (120 for all mains)

The maximum allowable design velocity should be 4.0 m/s.

2.2.3 FIRE FLOW DEMAND

2.2.3.1

Minimum fire flows shall be met for the noted zones as per Table 2.2.3:

Table 2.2.3: Minimum Fire Flows

| Zone | Minimum Required Fire Flow |
|--|--|
| HR, SR, R1-A, R1-B, R1-C, R1-D, R2, R2-A, R3, R3-A, R3-B: One and Two Family Residential RMH: Mobile Home Park | 60 litres/sec (800 Igpm) for 2.0 hours |
| R4: Low Density Multi-Family Residential - 40 units/hectare R4-A: Townhouse Multi-Family Residential - 50 units/hectare | 150 litres/sec (2000 Igpm) for 2.5 hours |
| R5: Medium Density Multi-Family Residential - 135 units/hectare - building height 15 metres - 4 floors (maximum) | 150 litres/sec (2350 Igpm) for 2.5 hours |
| R7: Residential – Special Service - mixed use, multi-family with commercial - 100 units/hectare - building height 15 metres - 4 floors (maximum) | 225 litres/sec (2650 Igpm) for 2.5 hours |
| R6: High Density Multi-Family Residential - 185 units/hectare or more - building height 25 metres or more - 5 floors or more | 225 litres/sec (3000 Igpm) for 3.0 hours |
| R8: Town Centre High Rise Multi-Family Residential - 185 units/hectare or more - building height 25 metres or more - 5 floors or more | 225 litres/sec (3000 Igpm) for 3.0 hours |
| C1, C1-A, C2, C3, C4, C5, CS1, CS2, CSM, CP, C6, C7: Commercial | 200 litres/sec (2650 Igpm) for 2.5 hours if sprinklered |
| M1, M2, M3, M4, M5, M6, M1-A: Industrial | 225 litres/sec (3000 Igpm) for 3.0 hours |
| P1, P2, P3, P4, P5, P6: Institutional | 225 litres/sec (3000 Igpm) for 3.0 hours |

2.2.3.2

The fire flow requirements for any zone or build form not identified in Section 2.2.3.1 are subject to the approval of the Engineering Director.

2.2.3.3

The minimum required fire flow can be provided from two hydrants. Hydrants shall be located within a distance of 150 m for single family residences and within a distance of 90m for Industrial, Commercial, Institutional and High Density Residential Development. Hydrant locations shall be as per Section 2.2.10.

2.2.3.4

Fire Sprinklers must be installed in all new homes constructed within the City’s fire limits area defined in Schedule “K” of the City’s Building Regulation Bylaw, in force from time to time, when:

- (1) homes are located greater than 8 kilometers by road from the nearest City of Chilliwack fire hall;
- (2) road grades to homes are greater than 12%; or,
- (3) driveway grades are greater than 15% and homes are constructed greater than 45 m from the road.

2.2.4 WATER PRESSURE

2.2.4.1

Standard water pressures are as follows:

| | |
|---|-------------------|
| Minimum pressure at peak hour demand | 300 kPa (44 psi) |
| Maximum allowable pressure | 850 kPa (125 psi) |
| Minimum fire hydrant pressure (residual) | 150 kPa (22 psi) |
| Minimum pressure in system during design fire flow and maximum day demand | 150 kPa (22 psi) |

2.2.4.2

The maximum allowable pressure shall be measured under static conditions.

2.2.4.3

The minimum pressure shall be measured or calculated at the main floor elevation of the highest proposed house. All proposed lots with design pressures less than 50 psi shall be serviced with 25 mm diameter copper water connections.

2.2.4.4

Minimum residual pressure at any hydrant shall be measured under maximum day demand plus fire flow conditions.

2.2.4.5

All service connections shall be individually protected by pressure reducing valves in the building, where the maximum pressure exceeds 515 kPa (76 psi).

2.2.5 HYDRAULIC NETWORK CONSIDERATIONS

2.2.5.1

Where there is an existing hydraulic network in place, the City will provide information for design calculations.

2.2.5.2

Depending on the complexity and extent of the proposed distribution system, the City may require a hydraulic analysis design showing minimum flows and pressures.

2.2.5.3

The maximum desirable length of any permanent non-interconnected water main shall be 150m. All mains exceeding 150m, unless it is a temporary situation, shall be looped, except with the approval of the Engineering Director.

2.2.5.4

The minimum water main size shall be 200 mm diameter. Fire hydrant connections are to be 150 mm diameter.

2.2.5.5

In one and two family residential areas, looped distribution mains with lengths less than 500m, the diameter can be reduced to 150 mm provided it is demonstrated that fire flow requirements can be met, subject to the approval of the Engineering Director. In Rural areas water mains 75 mm in diameter may be permitted for domestic service where no further extension is planned, subject to the approval of the Engineering Director. Wherever practical, water mains shall be looped. Dead-end mains should not be promoted.

2.2.5.6

For short cul-de-sacs with no fire hydrants the distribution main can be reduced to 100 mm in diameter depending on demand and if the length of the main is less than 50 m.

2.2.5.7

Water mains 100 mm diameter or larger shall be ductile iron pipe conforming to AWWA C151.

2.2.6 MINIMUM DEPTH OF COVER

The minimum cover over any water main shall be 1.0 m. Placement of a water main at a depth less than 1.0 m requires approval of the Engineering Director prior to construction. Submissions for a variance are to identify need and mitigative measures to be taken to protect the integrity of the Water System.

2.2.7 WATERMAIN GRADES

2.2.7.1

The maximum grade of any water main shall be 10.0% unless provisions are made to anchor the pipe to the bottom of the trench with concrete poured in place (Refer to MMCD Standard Drawing G8). Steeper slopes without anchors will require recommendation of geotechnical engineer. Damsac or rockfill plugs and cross ditches may be required on steep slopes to prevent erosion of trench fill.

2.2.7.2

Water mains shall be designed with a rising grade of minimum 0.1% whenever possible to minimize high points in the system. Where a high point is unavoidable, a service or air release valve shall be installed at that location, as per Section 2.2.11 of this Schedule. Hydrants shall not be a substitute for an air release valve.

2.2.8 MINIMUM CLEARANCE

2.2.8.1

The invert of a water main shall be at least 500 mm above the crown of a storm or sanitary sewer.

2.2.8.2

The minimum horizontal separation between a water main and a storm or sanitary sewer shall be 3.0 m unless the sewer main is installed in a carrier pipe.

2.2.8.3

Where the clearance identified in Section 2.2.8.2 is not possible, approval is required from the Fraser Health Authority and the Engineering Director. The following measures are to be taken in accordance to Ministry of Health requirements:

- (1) When the water main is closer than 500 mm to a storm or sanitary sewer but above the storm or sanitary sewer the water main must be laid in such a manner that crossing is made midway between joints on a full length of water main. The water main joints are to be wrapped with heat shrink plastic or packed with compound and wrapped with tape over a length extending 3.0 m on either side of the sewer main.
- (2) When the water main is beneath the sewer there shall be a minimum 300 mm separation. The crossing shall be made midway on a full length of water main pipe. The water main joints are to be wrapped with heat shrink plastic or packed with compound and wrapped with tape over a length extending 3.0 m on either side of the sewer main.
- (3) When 3.0 m horizontal separation is unattainable, all water main joints are to be wrapped with heat shrink plastic packed with compound and wrapped with tape.

2.2.9 VALVING

2.2.9.1

In general, valves shall be located as follows:

- (1) At intersections so that specific sections of mains may be isolated;
 - (a) 3 valves at “X” intersection
 - (b) 2 valves at “T” intersection
- (2) Not more than 200 m apart for single family residential. All other zones shall require special designs.
- (3) Not more than one hydrant isolated.
- (4) On a new water main at the connection point to the existing water main.
- (5) Not more than 20 service connections isolated.

2.2.9.2

Valves shall be the same diameter as the main up to 300 mm diameter. Gate valves shall be used up to and including 300 mm diameter.

2.2.9.3

Butterfly valves may be used for mains 350 mm and larger. Valves on mains 350 mm diameter and larger may be one size smaller than the water main (with suitable reducers) subject to the approval of the Engineering Director.

2.2.10 HYDRANTS

2.2.10.1

Fire hydrant locations will be dependent upon the fire flow requirement for the designated zoning. In general, fire hydrants shall be located at street intersections and at a maximum spacing of 150 m in low density residential areas and no more than 90 m from a building. In medium and high density residential, institutional, commercial and industrial areas, hydrants shall be located at a maximum spacing of 90 m or as approved by the Engineering Director. Additional hydrants may be required by the Engineering Director at schools or other major Developments.

2.2.10.2

Hydrants shall be located near the highest and/or lowest point of the water mains subject to the Engineering Director approval. Hydrants shall not be installed within 12 m from a building to be protected.

2.2.10.3

In mid-block locations, fire hydrants shall be located at the property line, between adjacent properties where possible. It shall be the Project 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, underground hydro, telephone, gas or cablevision work, etc. A hydrant shall not be located within 3 m of a utility pole or light standard, within 1.5 m horizontally of underground service pipes or open ditches, within 2.0 m of the back of the curb or 1.0 m from any other obstruction, or 0.5 m of the back of the sidewalk.

2.2.10.4

Hydrants to be installed within Rural areas shall be as per City Standard Drawing DW-1.

2.2.10.5

All fire hydrants that are to be connected to existing water mains shall be installed by the City at the expense of the Developer

2.2.10.6

Pumper ports (100 mm) are required on all hydrants installed on 150 mm diameter or greater size water mains complete with a quick connect Storz connection.

2.2.10.7

Centre of any hose outlet shall not be less than 575 mm above final grade.

2.2.10.8

The hydrant barrel flange is to be a minimum of 100 mm and a maximum of 150 mm above the finished grade adjacent to the hydrant location.

2.2.10.9

All public and private hydrants are to be painted with General Paint’s self-priming urethane enamel as follows:

Public: Body – Yellow No. 16-202
 Top – Red No. 16-208
 Pumper Port Cap – Black No. 16-216
 Hose Port Caps (2) – Red No. 16-208

Private: Body – Yellow No. 16-202
 Top – Mid-Green No. 10-136
 Pumper Port Cap – Black No. 16-216
 Hose Port Caps (2) – Mid-Green No. 10-136

2.2.11 AIR VALVES

2.2.11.1

Air release valves shall be single acting air valves or as approved by the Engineering Director.

2.2.11.2

Air release valves shall be installed at the summit of all mains except where the difference in grade between the summit and valley is less than 600 mm. Combination air/vacuum valves are required on any main on steep slopes where changes in grade or diameter would produce a vacuum pressure upon sudden heavy flow of water and on the summit of any main where service connections are more than 100 m apart.

2.2.11.3

Air release valves shall be installed in a chamber within the boulevard, behind the curb or sidewalk, wherever possible as per the City’s Standard Drawing DW-3.

2.2.12 BLOW OFFS

2.2.12.1

Blow-offs shall be required at low points as required by the Engineering Director and at the ends of all water mains.

2.2.12.2

Blow-offs shall be installed within the boulevard, behind the curb or sidewalk, wherever possible as per the City’s Standard Drawing DW-2.

2.2.13 THRUST RESTRAINT

2.2.13.1

Concrete thrust blocking and/or joint restraints shall be provided at bends, tees, wyes, reducers, plugs, caps, hydrants, and blow-offs. (Refer to MMCD Standard Drawing W1) Thrust blocking on water mains greater than 300 mm shall be sized by a Professional Engineer.

2.2.13.2

All fittings that have a separation of less than 2 m shall be tie-rodged together or joint restraint couplings will be provided.

2.2.14 CHAMBER DRAINAGE

2.2.14.1

Chambers or manholes containing valves, blow-offs, meters, or other appurtenances shall be drained to a storm sewer or ditch where they are not subjected to flooding by surface water, or to absorption pits underground subject to adequate soils conditions.

2.2.14.2

The design of facilities housed within a chamber must meet the approval of the Engineering Director. Where a high water table is present, a sump pump installation may be required.

2.2.14.3

Chambers shall be of adequate size and laid out to allow acceptable working room for maintenance personnel, including head room and side room. These structures are to be located in the boulevard areas wherever possible. The access shall allow for ease of entrance by using a light lockable H20 loading hinged door where there is any possibility of vehicles crossing it. A ladder shall also be installed in each chamber. Access openings must be suitable for removing valves and equipment.

2.2.15 SERVICE CONNECTIONS

2.2.15.1

The requirements of the City’s Waterworks Regulation Bylaw shall apply to pre-servicing, connection, temporary turn off, disconnection and fire service. The design assembly of all connections and meter devices must meet the approval of the Engineering Director and AWWA standards.

2.2.15.2

Water service connections shall be:

- (1) a minimum size of 19 mm diameter;
- (2) a maximum size of 25 mm, unless approved by the Engineering Director;
- (3) a minimum of 25 mm where the water pressure in the City water main is less than 345 kPa (50 psi);
- (4) Type K copper when 25 mm diameter or smaller;
- (5) installed with a corporation stop.

2.2.15.3

New pre-service water connections shall be installed in accordance with the City’s Standard Drawings DW-7A and DW-7B.

- (1) The water meter box or chamber and water meter setter models determined by size in Table 2.2.15 below, or a City approved equivalent, are required for all new pre-service water connections.

- (2) All meter chambers for 100 mm, 150 mm, 200 mm and 250 mm meter sizes shall be installed with a lid complete with galvanized steel hatch, in accordance with the City’s Standard Drawings DW-9 and DW-10.

Table 2.2.15 – Water Meter Box and Setter Models for Pre-Service Water Connections

| Size | Meter Box/Chamber Model | | Meter Setter Model |
|----------------|-------------------------|---------------|--|
| | Langley Concrete | A.E. Concrete | |
| 19 mm (3/4”) | - | B-937 | Ford VBHH92-15W-44-33A-Q |
| 25 mm (1”) | - | T266 | Ford VBHH92-15W-44-44A-Q |
| 38 mm (1 1/2”) | - | T266 | Ford VBHH76-86-12BHC-1166 c/w #6 idler and 2 Ford model C87-66 pack joint couplers |
| 50 mm (2”) | - | 5686 | Ford VBHH77-87-12BHC-177 c/w #7 idler and 2 Ford model C87-77 pack joint couplers |
| 100 mm (4”) | 2121 | | - |
| 150 mm (6”) | 2121 | | - |
| 200 mm (8”) | 2121 | | - |
| 250 mm (10”) | 3151 | | - |

2.2.15.4

All new water connections shall be installed as per the City’s Standard Drawing DW-8, by the City of Chilliwack.

- (1) All new water connections shall have the water meter chamber pre-installed by the Developer, as per Table 2.2.15 and the City’s Standard Drawings DW-9 and DW-10, unless approved by the Engineering Director.

2.2.15.5

New water connections shall typically be located as per the City’s Standard Drawings DC-1 and DC-2, and the curb stop and meter box located within the road right of way adjacent to the property line.

2.2.15.6

Water services and water meters shall not be located within a driveway or vehicle access unless approved by the Engineering Director.

- (1) Where it is not possible for a water meter to be outside of a driveway or vehicle access, the water meter box or chamber lid must be rated for static H-20 loading.

2.2.15.7

All domestic and combined water connections shall require a backflow prevention device to be installed on private property, located after the water meter but before any onsite connections.

The backflow preventer shall be:

- (1) installed prior to connection to the City’s live Water System;
- (2) in compliance with the City’s Cross Connection Control Program; and,
- (3) tested annually.

2.2.15.8

In all Urban areas with new concrete curb and gutter, the location of the water service shall be clearly identified with the letter “W” on the face of the curbing. The letter is to be 50 mm high and permanently and clearly cast into the concrete at time of pouring. In areas of existing concrete curbing and where the retention of the existing concrete curbing has been approved, the service location shall be identified with a 6 mm deep saw cut painted blue on the top face of the existing curb.

2.2.16 PRIVATE WATER WELLS (FORM F-5)

Private water wells, buildings and appurtenances required for servicing of development located outside of the service area of the community water supply system shall be as per the requirements of the latest editions of the BC Ministry of Health, BC Safe Water Drinking Regulations and the Guidelines for Canadian Drinking Water Quality, and shall be to the acceptance of the Fraser Health Authority. Any buildings shall be reviewed and conform to the applicable Building Code.

2.2.17 RESERVOIRS

2.2.17.1

Reservoirs, where required, shall be designed to suit the particular circumstances of the application. Reservoir capacity shall be not less than:

$$\text{Total Storage Requirement} = A + B + C$$

- Where
- A = Fire Storage
 - B = Equalization Storage (25% of maximum day demand)
 - C = Emergency Storage (25% of A & B)

The requirement for emergency storage may be reduced by the Engineering Director if the reservoir is part of a large system.

2.2.17.2

Reservoir design shall conform to good general design practice as identified in MMCD and AWWA design manuals. In general, the design shall incorporate the following features:

- (1) structures to be below ground and covered, unless specifically approved otherwise;
- (2) Material shall be reinforced concrete (unless approved by Engineering Director);
- (3) Two cells, each containing one-half of total required volume, and capable of being drained and filled independently;
- (4) The structure shall be designed to meet seismic requirements;

- (5) Two access openings in roof for cleaning and maintenance – minimum dimension 1 m x 1 m each, one to be located between overflow pipe and wall;
- (6) Hatches to be watertight aluminum complete with hinges and related hardware, drains, locks and intrusion alarms;
- (7) All interior surfaces of the reservoir to be epoxy lined to AWWA Standards;
- (8) Ventilation pipes or openings;
- (9) Slope floor to sump;
- (10) Drain sump in concrete reservoirs to be a minimum 1,000 mm x 1,000 mm x 400 mm; invert of drain pipe to be flush with sump floor; grating to be installed over sump;
- (11) Sub-drain under floor to collect and drain any leakage;
- (12) Interior wall ladders from roof accesses to floor (no exterior ladder required);
- (13) Fall prevention railings;
- (14) All pipework within the reservoir to be stainless steel, steel, or ductile iron coated to AWWA standards;
- (15) All metal parts within the reservoir including bolts, nuts, screws, anchors, ladders, etc. to be stainless steel;
- (16) Pressure transducer or ultrasonic level controls for each cell;
- (17) Washdown connection in each cell, complete with backflow preventer and 65 mm diameter pipe;
- (18) Above ground reservoirs require a ground level maintenance access opening;
- (19) Inlet, outlet pipe to be designed to disperse water throughout the reservoir;
- (20) Each inlet pipe to be equipped with a Tideflex Mixing System or an approved alternate;
- (21) Outlet pipes from each cell to be equipped with a tap for water sampling;
- (22) Overflow drain to be provided and sized to transmit the maximum pump discharge. The overflow drain shall be connected to an acceptable point of discharge;
- (23) Paved access roads;
- (24) Fencing, lighting, locks, alarms, and other security facilities to minimize vandalism and prevent water contamination;
- (25) Electrical control to be housed in a building;
- (26) Telemetry to City’s SCADA system. Supply and installation of the City’s SCADA system shall be completed by the City at the expense of the Developer;
- (27) Geotechnical report on foundation conditions;

- (28) Additional features that may be required, subject to system details, include the following:
- (a) sampling ports for inlet, outlet and reservoir water;
 - (b) flow measurement and recording;
 - (c) heat, light and ventilation to local and WCB standards;
 - (d) chlorine residual analyzer;
 - (e) provision for re-chlorination facilities;
 - (f) provision for de-chlorination facilities.

2.2.17.3

Reservoir valve chamber design shall incorporate the following features

- (1) All valves associated with the reservoir operation;
- (2) Entrance at a grade large enough to permit safe removal of largest equipment;
- (3) Lifting beams and hoists, where necessary, to enable removal of equipment;
- (4) Interior and exterior of all steel piping to be coated to AWWA standards, or use stainless steel;
- (5) Include a drainage sump in valve chamber floor, connected to overflow pipe;
- (6) Include a 50 mm valve outlet off-supply line within valve chamber for water supply for cleaning reservoir;
- (7) Have OS and Y valves throughout.

2.2.17.4

Design submission to the City shall include:

- (1) Certified design drawings for the reservoir including civil, structural and electrical components.
- (2) A design brief identifying the design service area, capacity, location, control philosophy, control set points, alarm and trip signals, operator interface materials, mixer system, etc.

2.2.17.5

Operation and Maintenance Manual submissions shall be provided to the City, prior to the City commissioning of the reservoir, and incorporate the following features:

- (1) Three copies bound in heavy duty ACCO expandable type catalogue binders with glossy black fabric;

(2) Shall be in the following format:

Part A: General Project Data – shall include:

- (a) Section 1 – Reservoir Design Report - to be prepared by the Professional Engineer responsible for the reservoir design. The report shall include:
 - (i) a general description of the reservoir;
 - (ii) the design criteria, including the reservoir catchment area; and,
 - (iii) the Professional Engineer’s signature and seal.
- (b) Section 2 – Electrical Engineering Report - to be prepared by the Professional Engineer responsible for the electrical design. The report shall include:
 - (i) the control philosophy;
 - (ii) the control set points;
 - (iii) the alarm and trip signals;
 - (iv) the operator interface; and
 - (v) the Professional Engineer’s signature and seal.
- (c) Section 3 – Project Directory
- (d) Section 4 – Record Drawings
- (e) Section 5 – Letters of Assurance

Part B: Building Architectural – Layout, detail elevation drawings and sections, etc., to be included as related to the specific project. Section numbering shall be included as needed and continued from Part A, subject to approval by the Engineering Director.

Part C: Equipment – Mixer, valves, etc., to be included as related to the specific project. Section numbering shall be included as needed and continued from Part B, subject to approval by the Engineering Director.

Part D: Building Mechanical – Fans, heating, security, lighting, etc., to be included as related to the specific project. Section numbering shall be included as needed and continued from Part C, subject to approval by the Engineering Director.

Part E: Electrical – All related electrical equipment and material listing to be included as related to the specific project. Section numbering shall be included as needed and continued from Part D, subject to approval by the Engineering Director.

Part F: Instrumentation – All related instrumentation equipment to be included as related to the specific project. Section numbering shall be included as needed and continued from Part E, subject to approval by the Engineering Director.

2.2.18 PUMP STATIONS

2.2.18.1

Booster pump stations shall be designed to meet maximum day demands with the largest pump out of service with the balancing storage online. If the balancing storage is not online, pump station capacity must meet peak hour demand with the largest pump out of service.

2.2.18.2

Booster pump stations are permitted to supply water to storage reservoirs only. No closed water supply systems are allowed with booster pump stations in place.

2.2.18.3

A standby power supply shall also be provided unless approved by the Engineering Director.

2.2.18.4

A minimum of two fire pumps are required. The station shall be able to supply fire flow with one unit out of service.

2.2.18.5

Pump station design must conform to good general design practice as identified in MMCD and AWWA design manuals. In general the design shall incorporate the following features:

- (1) Aesthetically pleasing reinforced concrete, split face concrete block, or brick construction;
- (2) the structure shall be designed to meet seismic requirements;
- (3) access doorways sized so that the largest single piece of equipment may be safely removed and replaced;
- (4) Lifting hooks or rails with pulley blocks as required;
- (5) roof hatches for removing pumps with crane;
- (6) Electric motors to be 600 volt, 3 phase, premium efficiency, with thermal protection. Lower voltage (208 Volt 3 phase) may be considered, depending upon service voltage available from power company;
- (7) Motors 100 hp and above to have analogue vibration recording and protection;
- (8) Air relief discharge and pilot lines to be piped to floor drains;
- (9) Housekeeping pads for MCCs;
- (10) Hydraulically operated or motorized pump control valves with isolation valves, unless pumps have variable speed drives that control transient pressures;
- (11) Pumps to start and stop individually. Start and stop to be based on water levels in reservoir. Automatic alternation of pump sequence;
- (12) Power failure protection with manual reset;
- (13) High water override start plus alarm;
- (14) High pressure (discharge) override start;
- (15) low pressure (discharge) override start plus alarm;
- (16) low pressure/no flow (suction) override start;
- (17) alarms to be audible and visible;
- (18) control valves to minimize starting and stopping surges;
- (19) power factor correction, as required by power authority;

- (20) hour meters on each pump;
- (21) recording flow meter at each pump station, as per the City’s Standard Drawing DW-12;
- (22) recording suction and discharge pressure gauges at each pump station;
- (23) spring return “silent” check valves;
- (24) high pressure and surge relief valves with isolation valves, if warranted by system characteristics and transient analysis;
- (25) mechanical pump seals;
- (26) water quality sampling ports;
- (27) Interior and exterior of pipework coated to AWWA standards, or use stainless steel;
- (28) Pump station floor drainage to be connected to sanitary Sewer System;
- (29) automatic heating, ventilating and dehumidifying systems;
- (30) in-station lighting;
- (31) Chlorination room equipped with sodium hypochlorite system;
- (32) drainage to be provided for all areas of the pump station;
- (33) telemetry and pump controls to City’s SCADA system. Supply and installation of the City’s SCADA system will be completed by the City at the expense of the Developer;
- (34) electrical phase loss protection;
- (35) electrical drawing schematics for control panels;
- (36) duplex strainers on control panel;
- (37) paved access roads;
- (38) pump, electrical, equipment, and operations manual;
- (39) work desk and chair;
- (40) bookshelf suitable for storage of operation and maintenance manuals and associated literature;
- (41) interior wall surfaces insulated to minimum R14 with ¾” G1S plywood painted white;
- (42) ceilings insulated to minimum R40 with ½” gyproc filled, sanded and painted white. Painted wood trim strip to be provided at joint between ceiling and walls;
- (43) noise attenuation to suit location and City’s Noise Control Bylaw, in force from time to time;
- (44) building size to adequately accommodate the above noted equipment and provide adequate clearances for operation and maintenance purposes;

- (45) one heavy duty Schlage “C” dead bolt #D660P per door and one heavy duty Schlage “C” entrance set #D53PD per door;
- (46) minimum clearance of 1.0 m from any equipment to a wall or other obstruction;
- (47) security fence around the site.

2.2.18.6

Design submissions to the City shall include:

- (1) Certified drawings for the design, including civil, structural, mechanical, and electrical components.
- (2) Pump characteristic curves showing pump capacities at various heads, operating point, efficiency, and rated speed.
- (3) Design brief identifying design average day, maximum day, peak hour, and fire flows, location, control philosophy, control set points, alarm and trip signals, operator interface, materials, etc.

2.2.18.7

Operation and maintenance manual submissions shall be provided to the City, prior to the City commissioning of the pump station, and incorporate the following features:

- (1) Three copies bound in heavy duty ACCO expandable type catalogue binders with glossy black fabric;
- (2) Shall be in the following format:

Part A: General Project Data – shall include:

- (a) Section 1 – Pump Station Design Report to be prepared by the Professional Engineer responsible for the pump station design. The report shall include:
 - (i) a general description of the pump station;
 - (ii) the design criteria, including the pump performance curve; and,
 - (iii) the Professional Engineer signature and seal.
- (b) Section 2 – Electrical Engineering Report - to be prepared by the Professional Engineer responsible for the electrical design. The report shall include:
 - (i) the control philosophy;
 - (ii) the control set points;
 - (iii) the control modes;
 - (iv) the alarm and trip signals;
 - (v) the operator interface; and,
 - (vi) the Professional Engineer’s signature and seal.
- (c) Section 3 – Project Directory
- (d) Section 4 – Record Drawing

- (e) Section 5 – Manufacturer Recommended Maintenance Schedules for Major Equipment - to include:
 - (i) the manufacturer’s data on operation, maintenance, replacement parts list, lubrication charts, and recommended inspection intervals for all mechanically and/or electrically operated items of equipment, including but not limited to, pumps, valves, electrical lighting, controls, switches, heating and ventilating equipment, access hatches, etc.; and,
 - (ii) the manufacturer’s data including maintenance schedule for the equipment, which shall include a list of required activities, as well as the recommended frequency for each activity.

- (f) Section 6 – Letters of Assurance

Part B: Building/Kiosk Architectural – Layout, detail elevation drawings and sections, etc., to be included as related to the specific project. Section numbering shall be included as needed and continued from Part A, subject to approval by the Engineering Director.

Part C: Equipment – Generator, pumps, valves, etc., to be included as related to the specific project. Section numbering shall be included as needed and continued from Part B, subject to approval by the Engineering Director.

Part D: Building/Kiosk Mechanical – Fans, heating, security, lighting, etc., to be included as related to the specific project. Section numbering shall be included as needed and continued from Part C, subject to approval by the Engineering Director.

Part E: Electrical – All related electrical equipment and material listing to be included as related to the specific project. Section numbering shall be included as needed and continued from Part D, subject to approval by the Engineering Director.

Part F: Instrumentation – All related instrumentation equipment to be included as related to the specific project. Section numbering shall be included as needed and continued from Part E, subject to approval by the Engineering Director.

2.2.19 PRESSURE REDUCING STATIONS

2.2.19.1

All pressure reducing stations shall be included in the design where required. The design of the pressure reducing stations shall be designed as per the City’s Standard Drawing DW- 4A and DW-4B to a good engineering standard and meet the approval of the Engineering Director.

2.2.19.2

Pressure reducing station design must conform to good general design practice as identified in MMCD and AWWA design manuals. In general the design shall incorporate the following features:

- (1) minimum chamber size 3m x 2m x 2m (inside height);
- (2) structure to meet seismic requirements;
- (3) parallel pressure reducing valves;
- (4) isolating valves;
- (5) air release valves;
- (6) upstream and downstream pressure gauges;
- (7) interior and exterior of steel pipework coated to AWWA standards, or use stainless steel;
- (8) fresh air ventilation;
- (9) external kiosk, to house electrical and electronic equipment;
- (10) PLC controls including security switches, discharge and suction pressure transmitters and modem;
- (11) Telemetry to the City’s SCADA system. Supply and installation of the City’s SCADA system shall be completed by the City at the expense of the developer.

2.2.19.3

Operation and maintenance manual submissions shall be provided to the City, prior to the City commissioning of the pressure reducing station, and incorporate the following features:

- (1) Three copies bound in heavy duty ACCO expandable type catalogue binders with glossy black fabric;
- (2) Shall be in the following format:
 - (a) Section 1 - Pressure Reducing Station Design Report
 - (b) Section 2 - Project Directory
 - (i) 2.1 - Engineer/Designer
 - (ii) 2.2 - Letters of Assurances
 - (iii) 2.3 - Contractor and Subcontractors
 - (iv) 2.4 - List of Suppliers
 - (c) Section 3 - Record Drawings
 - (d) Section 4 - Materials
 - (e) Appendix A - System Analysis, Fire Flow Demand, Peak Hour Demand, Average Hour Demand

2.2.20 WATER SYSTEM LOCATION/CORRIDORS

2.2.20.1

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

2.2.20.2

When the utility is permitted to cross private land(s), the right of way or utility corridor shall be a minimum width of 6 metres and the maximum single diameter for a single utility located within the right of way shall be 300 mm or as approved by the Engineering Director. Refer also to Section 2.1.4.2.

2.2.20.3

Notwithstanding Section 2.2.20.2, the right of way shall be increased by an amount to be determined by the Engineering Director for a right of way containing more than one utility and/or where the depth from designed finished surface grade to top of pipe exceeds 1.0 m and/or where the proposed diameter of the utility exceeds 300 mm or as approved by the Engineering Director. Additional right of way width may also be required in order to accommodate manholes, valve chambers, or other appurtenances.

2.2.20.4

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 Developer may be required to provide for a constructed road access from a Municipal road for maintenance vehicles. The maintenance access shall be constructed to a paved surface adequate to support the maintenance vehicles for which the access is intended.

2.2.21 CROSS CONNECTION CONTROL

All Developments shall meet the American Water Works Association’s (AWWA) cross connection control standards, City’s Waterworks Regulation Bylaw, in force from time to time, and specifications of the Engineering Director.

2.2.22 CORROSION EVALUATION

An evaluation of each water main site shall be made for corrosion protection by a duly qualified Professional Engineer.

2.3 DRAINAGE

All drainage related items are contained in the City of Chilliwack “Policy and Design Criteria Manual for Surface Water Management”.

Copies may be purchased at the City of Chilliwack’s Development and Regulatory Enforcement Services Department or found online at www.chilliwack.com.

2.4 SANITARY SYSTEMS

2.4.1 SANITARY SEWER SYSTEMS

Sanitary Sewer Systems shall be designed in accordance with these engineering standards and to the approval of the Engineering Director.

2.4.2 DESIGN FLOWS

The sanitary Sewer System shall be designed using the average daily flows of 410 litres/capita/day for the zone noted under Section 2.4.2.2.

2.4.2.2

Table 2.4.2 below is a guideline for applying minimum density by land use to determine flow:

Table 2.4.2 - Minimum Density by Land Use

| Residential Density | Persons/Unit |
|--|--|
| Standard SFD: ≤ 16 units per hectare | 3.0 |
| Small Lot SFD (R1-D): ≥ 17 and ≤ 20 units per hectare | 3.0 |
| Strata Retirement Rancher: 21 units per hectare | 2.0 |
| Townhouse: ≥ 22 and ≤ 44 units per hectare | 2.3 |
| Apartment – 4 Storey: ≥ 45 and ≤ 200 units per hectare | 1.9 |
| Apartment – High Rise: ≥ 200 and ≤ 400 units per hectare | 1.9 |
| Non-Residential Density | Equivalent Population/Hectare (Gross) |
| Commercial | 75 |
| Industrial | 50 |
| Institutional | 75 |

2.4.2.3

For non-residential areas, flows should be based on specific data related to the actual Development or zoning use, as well as flow based on Table 2.4.2. The larger of the two calculations shall be used for system sizing.

2.4.2.4

Specific flow information shall be provided if requested by the Engineering Director.

2.4.2.5

An infiltration rate of 0.1 litres/sec/hectare shall be added to the flows identified in Sections 2.4.2.1, 2.4.2.2 and 2.4.2.3. Peak factors are not to be applied to infiltration flows.

2.4.2.6

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

2.4.2.7

Peak flows shall be 3.5 times the average daily flow for contributing areas with population less than 500; and 3 times the average daily flow for contributing areas with population between 500 and 2,000.

2.4.2.8

For populations greater than 2000, peak flows are calculated by a peaking factor using the 80% Harmon Peak Factor curve times the average daily flows.

$$Peak\ Factor = 0.80 \left(1 + \frac{14}{4 + \sqrt{P}} \right) \text{ (Harmon Formula)}$$

Where P = equivalent contributing population in thousands.

2.4.2.9

Design populations used in calculating average daily flows shall be computed in accordance with the City population predictions or with the planned Development in the area to be served, whichever is larger.

2.4.2.10

Design Flow Q = Peak Wet Weather Flow = population equivalent x per capita flow x peaking factor + infiltration allowance.

2.4.3 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 m³/s
A = cross sectional area in m²
R = hydraulic radius (area/wetted perimeter) in m
S = slope of hydraulic grade line in mm
n = roughness coefficient = 0.013 for all 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 l/s
D = internal pipe diameter in mm
S = slope of hydraulic grade line in m/m
C = Hazen-Williams coefficient = 120 for all pipe

2.4.4 MANHOLES

2.4.4.1

Manholes shall be required at:

- (1) all changes in grade
- (2) all changes in direction
- (3) all changes in pipe sizes
- (4) all intersecting sewers
- (5) all terminal sections
- (6) downstream end of curvilinear sewers

2.4.4.2

Manholes shall be placed where future extensions are anticipated and shall be spaced no greater than 150 m apart.

2.4.4.3

Both outside and inside of manholes should be grouted to prevent infiltration. Where below the water table, all manhole risers should be sprayed outside with two coats butyl asphaltic spray and 100 mm wide ConWrap installed around outside joints.

2.4.4.4

Sanitary manhole rim elevations shall be designed to be:

- (1) above the adjacent storm manhole rim elevation
- (2) above the surrounding ground so that infiltration from ponding will not occur.

2.4.4.5

Manholes shall be designed and installed to meet the Worker’s Compensation Board of BC Occupational Health and Safety (OHS) Regulation.

2.4.4.6

Force main discharges should be directed into the receiving manhole outflow pipe. Manhole benching should be extended a minimum of 200 mm above the force main crown. If a manhole cannot be avoided, a drop pipe inside the manhole is required.

2.4.5 HYDRAULIC LOSSES ACROSS MANHOLES

The following criteria shall be used:

2.4.5.1

The springline of the downstream pipe shall not be higher than that of the upstream pipe.

2.4.5.2

Minimum drop in invert levels across manholes:

- (1) Straight run – no drop required;
- (2) Deflections up to 45° - 30 mm drop;
- (3) Deflections 45° to 90° - 50 mm drop.

2.4.5.3

An outside drop pipe shall be installed where the drop between inverts exceeds 600 mm. outside ramp type shall be used where the drop between inverts is between 300 mm and 600 mm as per MMCD Standard Drawing S3.

2.4.5.4

Inside ramps will be permitted up to 300 mm from invert to channel bed.

2.4.6 TEMPORARY CLEAN-OUTS

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

- (1) future extensions of the main is proposed or anticipated, and
- (2) the length of sewer to the downstream manhole does not exceed 45.0 m
- (3) the depth of the pipe does not exceed 2.0 m at the terminal point.

Note: 1. Temporary clean-outs shall not be considered a permanent structure.
2. Mid-block clean-outs are not permitted.

2.4.7 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.

2.4.8 VELOCITIES

The minimum velocity at peak design flow shall be 0.60 m/sec. In cases where the minimum pipe grade is limited, subject to the approval of the Engineering Director, the minimum velocity may be reduced to 0.45 m/sec provided the depth of flow at the peak design flow exceeds 25% of the pipe diameter. However, in no case shall a pipe grade be less than 0.35%.

2.4.9 MINIMUM GRADE

2.4.9.1

The grade(s) of any sewer is governed by the minimum velocity of 0.6 m/sec; however, the upstream section of a residential sewer serving a design population of 25 or less should have a minimum grade of 1.5%, unless otherwise approved by the Engineering Director.

2.4.9.2

Sanitary force main grades shall:

- (1) Have a maximum grade of 10.0% unless provisions are made to anchor the pipe to the bottom of the trench with concrete poured in place (refer to MMCD Standard Drawing G8). Steeper slopes without anchors will require recommendation of a geotechnical engineer. Damsac or rock fill plugs and cross ditches may be required on steep slopes to prevent erosion of trench fill;
- (2) Be designed with a rising grade of minimum 0.1% whenever possible to minimize high points in the system. Where a high point is unavoidable, air release valve shall be installed at that location, as per Section 2.4.15.2 of this Schedule.

2.4.10 MINIMUM DEPTH OF COVER

The minimum cover over any main shall be 1.0 m.

The Minimum Basement Elevation (MBE) shall be set a minimum of 1.1 m above the sanitary invert at property line. The highest gravity service connection shall establish the MBE. 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.

2.4.11 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 0.90 m/sec. The minimum grade shall be 1.0% and each joint is to be located by survey. Joint deflection should not exceed 75% of the maximum recommended by the pipe manufacturer.

2.4.12 SEWER LOCATION/CORRIDORS

2.4.12.1

Sanitary sewers shall be located within the road right of way as noted in the standard drawing typical cross-section for the applicable road classification.

2.4.12.2

When the utility is permitted to cross private land(s), the right of way or utility corridor shall be a minimum width of 6.0 m and the maximum single diameter for a single utility located within the right of way shall be 300 mm or as approved by the Engineering Director. Refer also to Section 2.1.4.2.

2.4.12.3

Notwithstanding Section 2.4.12.2, the right of way shall be increased by an amount to be determined by the Engineering Director for a right of way containing more than one utility and/or where the depth from designed finished surface grade to top of pipe exceeds 1.0 m and/or where the proposed diameter of the utility exceeds 300 mm or as approved by the Engineering Director. Additional right of way width may also be required in order to accommodate manholes, valve chambers or other appurtenances.

2.4.12.4

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 Developer may be required to provide for a constructed road access from a Municipal road for maintenance vehicles. The maintenance access shall be constructed to a paved surface adequate to support the maintenance vehicles for which the access is intended.

2.4.13 SANITARY SEWER SERVICE CONNECTIONS

2.4.13.1

Sanitary sewer connections shall be:

- (1) required for all new lots and new Development on existing lots where a new or existing sanitary main is adjacent to the lot;
- (2) a minimum of 100 mm;
- (3) a minimum grade of 1.5% from the main to the property line;
- (4) a minimum depth of 1.0 m at the property line;
- (5) a maximum depth of 1.2 m at the property line, unless otherwise approved by the Engineering Director;
- (6) connected at a point just above the spring line;
- (7) connected to new mains using wye fittings;
- (8) connected to existing mains using saddles;
- (9) connected to existing mains using inserta tee

2.4.13.2

Sanitary sewer connections shall typically be located as per the City’s Standard Drawings DC-1 and DC-2, with an inspection chamber (IC) as per the City’s Standard Drawing DS-4, located within the road right of way adjacent to the property line.

2.4.13.3

All sanitary sewer service connections that are to be connected to existing sanitary sewer mains shall be installed as per the City’s Standard Drawing DS-3, by the City of Chilliwack at the expense of the Developer.

2.4.13.4

Control manholes may be required for non-residential sanitary sewer service connections instead of an inspection chamber.

2.4.13.5

Sanitary sewer service connections are not to be made into manholes. Where no alternative exists and approval is granted by the Engineering Director, the connection may be made provided that:

- (1) the connection is not in an adverse direction to the flow in the sewer main; and,
- (2) the provisions noted in Section 2.4.5 are met.

2.4.13.6

In all Urban areas requiring new concrete curb and gutter, the location of the sanitary sewer service shall be clearly identified with the letter “S” on the face of the curbing. The letter is to be 50 mm high permanently and clearly cast into the concrete at time of pouring. In areas of existing concrete curbing, the service location shall be identified with a 6 mm deep saw cut painted red on the top face of the existing curb.

2.4.14 SANITARY PUMP STATIONS

2.4.14.1

This Bylaw is applicable to all pump stations with a firm capacity less than 50 L/s and a pump motor size less than 50 hp. For pump stations that exceed those sizes, consult the City for project specific requirements.

2.4.14.2

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 Engineering Director. Any sanitary pump station must be located within a utility lot, where the maintenance and operation of the pump station is to be by the City.

2.4.14.3

The size, capacity and type of sanitary pump stations will be dependent upon the Development and catchment area involved. Hydraulic design requirements (minimum wet well volume, number of starts per hour, etc.) shall be provided by the Engineering Director.

2.4.14.4

Sanitary pump stations are to be designed as shown in City of Chilliwack Standard Drawings DS-8 to DS-13B. Variations from the Standard Drawings require the approval of the Engineering Director prior to construction.

2.4.14.5

Generally, the following criteria shall be considered:

- (1) All sanitary pump stations shall be designed with a minimum of two pumps. The station shall be capable of handling the peak wet weather flow conditions with one pump out of service. The structure shall be designed to meet seismic requirements. A mixer should be provided, or one pump equipped with automatic flush valve.
- (2) Pump requirements:
 - (a) ITT Flygt or Myers model pump;
 - (b) capable of passing solids up to 75 mm in size;
 - (c) equipped with hour meters;
 - (d) easily removed for maintenance without workers having to enter the sump;
 - (e) Designed to operate on a 208/347/600 volt electrical source
 - (f) Maximum motor speed: 1750 rpm. For small flows (less than or equal to 10.0 L/s), 3500 rpm may be considered, subject to City approval.
 - (g) Be able to operate alternately and independently of each other.

- (3) All stations must be fiber glassed with a minimum of two coats of two-component white epoxy enamel. No metal stations are allowed;
 - (a) In wet well and well below grade valve chambers, electrical installations are made to meet the minimum hazardous area requirements of the Canadian Electrical Code, and the electrical design and installation is subject to the acceptance of the Provincial Safety Inspector. Classify the wet well and below grade valve chamber as per the latest version NFPA 820 – Standards for Fire Protection in Wastewater Treatment and Collection Facilities. Provide the City with documentation of the approach for setting the Hazardous Area Classification.
 - (b) Minimum design to meet the requirement of a Class 1, Zone 2.
- (4) The use of ventilation equipment to lower the applicable Hazardous Area Classification is only upon authorization by the City.
- (5) Minimum wet well size: 2.1 m diameter.
- (6) Check valves and plug valves required on each pump discharge.
- (7) Level controls shall be as required.
- (8) A level control float shall be provided for high level alarm back-up.
- (9) All auxiliary equipment and control panels shall be mounted in a suitable building or kiosk adjacent to the station. Supply and installation of the City’s SCADA System will be done by the City at the developer’s expense.
- (10) The entrances to all stations must be waterproof and be provided with a suitable lock. The cover may require a counter weight to facilitate opening. The entrance should be at ground level where feasible, but, in no case, more than 1.0 m 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.
- (11) Access into the stations shall be by a marine grade aluminum ladder. The ladder must be bolted in place to the bottom of the station and secured at the top. The location of the ladder shall not interfere with the removal and installation of the pumps, etc.
- (12) Power and control cables to be continuous from within the pump station to within the kiosk.
- (13) Control kiosk to be designed to contain control and SCADA equipment on the front panel and power equipment on rear panel. Concrete base to be minimum 75 mm above finished grade.
- (14) Station to be complete with an Uninterruptible Power Supply (UPS) to serve alarms and controls.
- (15) Station may require magnetic flow meter with totalizer and connection to SCADA, depending on their size and discharge location.

- (16) For pump stations with design capacity greater than 7.5 hp, provide an automatic generator for standby power in case of power failure, unless this requirement is waived by the City. The automatic generator will be sized to run a minimum of either two pumps up or the firm capacity of the pump station, whichever is the greater requirement.
- (17) Pump stations may require variable frequency drives (VFD's) depending on their size and discharge location.
- (18) One heavy duty Schlage “C” Dead Bolt # D660P per door and one heavy duty Schlage “C” Entrance Set #D53PD per door.
- (19) 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.
- (20) Sized so that each motor does not cycle more than six times in one hour under normal operating conditions.
- (21) A gate valve and clean-out assembly is required on the force main outside the pump station.
- (22) A 50 mm water connection for cleaning purposes equipped with heaters and insulation must be provided. An approved reduced pressure backflow preventer is required for connections in the station.
- (23) Where a lift station is installed adjacent to a park or school or other sensitive area within the City, at the City's discretion, install chain link fencing as per City walkway standards, or other specified security provisions by the City.
- (24) The roof and cover of the pump station should be designed to withstand a loading of H20 (Highways Loading) where there is any possibility of vehicles running over it.
- (25) The control panel must incorporate operator interface with indicator lamps, an extra plug-in; a Crouse Hinds receptacle and a transfer switch for a standby power source. Where the control panel(s) are located outside the station, underground electrical wiring is required.
- (26) The area around the station and all associated equipment or building shall be asphalted. All electrical panels located outside the station shall be elevated and shall be protected by concrete filled steel pipe bollards or as approved by the Engineering Director.
- (27) A removable lifting arm shall be incorporated into the design of the pump station to facilitate the removal and installation of the pump(s). Where access by crane truck is provided, the requirement for a lockable lifting arm may be waived by the Engineering Director.
- (28) Odour control as required.

2.4.14.6

Access the potential for transient pressures on all pump stations.

- (1) Detailed assessment is not required if:
 - (a) pumping systems have flows less than 6 L/s;
 - (b) pumping systems have a static head of less than 10 m
- (2) Conduct a more thorough assessment if:
 - (a) total dynamic head is greater than 15 m and the flow rate exceeds 30 L/s;
 - (b) any system in which column separation can occur:
 - (i) systems with “knees” (high points);
 - (ii) force mains that require automatic venting or air vacuum valves;
 - (iii) force mains longer than 100 m with a steep gradient followed by a long, shallow gradient.

2.4.14.7

Valve chambers shall use the following criteria:

- (1) The valve chamber shall be sized as follows:
 - (a) For discharging piping sizes 150 mm diameter or larger, use rectangular valve chambers with a minimum internal dimension of 2400 mm by 2400 mm.
 - (b) For pipe sizes less than 150 mm, circular manholes with a minimum diameter of 1800 mm are acceptable, subject to meeting the minimum clearance as defined in 2.4.14.7(2).
- (2) Provide the minimum clearances as follows:
 - (a) Sidewall clearance around to end of flange: 300 mm for valves.
 - (b) Clearance from wall to flange: 100 mm.
 - (c) Internal clearance between valves (as measured from edge of flange): 750 mm.

2.4.14.8

Wet well sizing shall be determined using the Active Storage Volume, as determined by the maximum pump starts per hour, for constant speed application:

- (1) Based on single pump operation.
- (2) As per the manufacturer’s requirements, but not to exceed six starts per hour. Provide calculations.
- (3) Minimum of 150 mm between start/lead start/stop control elevations, and high and low level alarms.
- (4) Progressive start and stop of pumps (i.e. both pumps should not start or stop at the same elevation). Note the implication of this for a duplex pump station is a minimum active depth of 450 mm (from Lag start to Lead Stop) and a total monitored depth of 750 mm (includes high level and low level).

- (5) Low-level alarm should be 100 mm to 150 mm above the minimum recommended water level for the pump.

2.4.14.9

Design submissions to the City shall include:

- (1) Certified drawings for the design including civil, structural, mechanical, and electrical components.
- (2) Pump characteristic curves showing pump capacities at various heads, operating point, efficiency, rated speed, and maximum solids size.
- (3) Design brief identifying design average day and peak flow, active wet well volume, and maximum number of starts per hour, location and catchment map, control philosophy, control set points, alarm and trip signals, operator interface etc.

2.1.14.10

Operation and Maintenance Manual submissions shall be provided to the City, prior to the City commissioning of the pump station, and incorporate the following features:

- (1) Three copies bound in heavy duty ACCO expandable type catalogue binders with glossy black fabric.
- (2) Shall be in the following format:

Part A: General Project Data – Shall include:

- (a) Section 1 – Pump Station Design Report - to be prepared by the Professional Engineer responsible for the pump station design. The report shall include:
 - (i) a general description of the pump station;
 - (ii) the design criteria, including the pump performance curves;
and,
 - (iii) the Professional Engineer’s signature and seal.
- (b) Section 2 – Electrical Engineering Report - to be prepared by the Professional Engineer responsible for the electrical design. The report shall include:
 - (i) the control philosophy;
 - (ii) the control set points;
 - (iii) the control modes;
 - (iv) the alarm and trip signals;
 - (v) the operator interface;
 - (vi) the Professional Engineer’s signature and seal.
- (c) Section 3 – Directories
 - (i) Section 3.1 – Project Directory
 - (ii) Section 3.2 – Subcontractor Directory
 - (iii) Section 3.3 – Major Supplier Directory
- (d) Section 4 – Record Drawings
- (e) Section 5 – Manufacturer Recommended Maintenance Schedules for Major Equipment - it shall include:

- (i) the manufacturer’s data on operation maintenance, replacement parts list, lubrication charts, and recommended inspection intervals of all mechanically and/or electrically operated items of equipment including, but not limited to pumps, valves, electrical lighting, controls, switches, heating and ventilating equipment, access hatches, etc.;
 - (ii) the manufacturer’s data shall include a maintenance schedule for the equipment which shall include a list of required activities as well as the recommended frequency for each activity;
 - (iii) the warranty commencement date and duration of warranty.
- (f) Section 6 – Letters of Assurance

Part B: Building/Kiosk Architectural – Layout, detail elevation drawings and sections, etc., are to be included as related to the specific project. Section numbering shall be included as needed and continued from Part A, subject to the approval by the Engineering Director.

Part C: Equipment – Generator, pumps, valves etc., to be included as related to the specific project. Section numbering shall be included as needed and continued from Part B, subject to approval by the Engineering Director.

Part D: Building Mechanical – Fans, heating, security lighting, etc., to be included as related to the specific project. Section numbering shall be included as needed and continued from Part C, subject to approval by the Engineering Director.

Part E: Electrical – All related electrical equipment and material listing to be included as related to the specific project. Section numbering shall be included as needed and continued from Part D, subject to approval by the Engineering Director.

Part F: Instrumentation – All related instrumentation equipment to be included as related to the specific project. Section numbering shall be included as needed and continued from Part E, subject to approval by the Engineering Director.

2.4.15 SANITARY FORCE MAIN

In conjunction with sanitary pumping facilities, the following criteria shall be noted in the design of sanitary force main systems.

2.4.15.1

Velocity

At the lowest pump delivery rate anticipated to occur at least once per day, a cleansing velocity of at least 0.9 m/sec should be maintained. Maximum velocity should not exceed 1.5 m/s.

2.4.15.2

Air Relief Valve

Unless authorized by the City, provide an air/vacuum valve at all high points and grade changes along the force main route. Take best reasonable efforts to avoid high points and grade changes along the force main and resultant requirements for air/vacuum relief valves. Isolate each air/vacuum relief valve with an isolation valve.

Air/vacuum relief valve to be housed in a chamber as per the City’s Standard Drawing DS-17.

Air/vacuum valves to be made out of stainless steel - Vent-O-Mat RGX series, or A.R.I. Provide sizing documentation to the City.

2.4.15.3

Termination

Force mains should enter the gravity Sewer System at a point not more than 600 mm above the flow line of the receiving manhole. An inside drop pipe is required.

2.4.15.4

Size

The minimum size for force mains shall be 100 mm diameter. Smaller diameter force mains may be used for private systems that would not be maintained by the City. Minimum discharge assembly size shall be 75 mm.

2.4.15.5

Materials

The materials selected for force mains shall meet the municipal standards and shall adapt to local conditions, such as character of industrial wastes, soil characteristics, exceptionally heavy external loadings, abrasion and similar problems. The minimum acceptable class of pipe shall be PVC DR-25 or HDPE DR-18. Use of alternate materials may be substituted subject to the approval of the Engineering Director.

All force mains shall be designed to prevent damage from superimposed loads, or from water hammer or column separation phenomena.

2.4.15.6

Force main Service Connection

Force main service connections shall be as shown on standard drawing DS-7.

2.4.15.7

Pig Launch and Pigging Retrieval Flush Out Chambers

Flush out chambers shall be provided at 1000 m minimum spacing for force mains. See the City’s Standard Drawing DS-14. A water connection complete with pressure reducer and backflow preventer shall be provided adjacent to the flush out chamber if there is a water main in the vicinity.

2.4.16 GATE VALVES

Gate valves for sanitary force main and pumping station shall be to AWWA C509 to a working pressure of 1380 kPa. Valves shall be solid wedge gate, resilient seat with non-rising stem.

2.4.17 AERIAL CROSSINGS

Aerial crossings of ditches, creeks and water courses must receive approval from the Engineering Director. Design considerations shall include abutment details, pipe supports, pipe insulation, isolating valves at each side of the crossing and the maximum flow depth in the water courses.

2.5 ROADS

2.5.1 INTRODUCTION

The City of Chilliwack is a diverse city with distinct Urban and Rural areas as well as locations with varying terrain ranging from the flood plain of the Fraser River to the steep mountainsides that are located along the periphery of the city. The design and construction of roads within these different areas requires consideration of the Development location and the appropriate design guidelines.

All roads within the City of Chilliwack shall be designed in accordance with the recommended practice as outlined in the most current edition of the following documents.

- TAC Geometric Design Guide for Canadian Roads
- Manual of Uniform Traffic Control Devices for Canada

These documents will govern unless stated elsewhere in this manual or otherwise accepted by the Engineering Director.

2.5.2 CLASSIFICATION

2.5.2.1

All public roads within the City of Chilliwack have been classified in a hierarchal system, permitting an orderly set of standards to apply to each class.

2.5.2.2

Within the general categories of Rural/Urban, the City shall establish the road classifications. Table 2.5.2 identifies the types of road classification and the right of way and pavement width.

Table 2.5.2 - Right of Way and Pavement Width

| Road Classification | Right of way Width (m) | Pavement Width | |
|---------------------|-------------------------------------|---------------------|---------------------|
| | | Urban (m) | Rural (m) |
| Major Arterial | 30.0 m ¹ | 21.0m ¹ | 19.0 m ¹ |
| Minor Arterial | 25.0 m ¹ | 19.5 m ¹ | 12.0 m ¹ |
| Major Collector | 20.0 m | 14.0 m | 10.0 m |
| Minor Collector | 20.0 m | 11.0 m | 10.0 m |
| Local | 17.5 m / 20.0 m (20m Rural only) | 8.5/11.0 m | 10.0 m |
| Minor Local | 15.0 m (20m Rural only) | 8.5 m | 7.0 m ² |

¹ Widths are minimum and will vary depending on whether auxiliary lanes are required.

² Suitable only for non-through roads to farm residences.

2.5.3 GRADES

2.5.3.1

The minimum longitudinal grades shall be 0.5% for curbed roads. In areas where a geotechnical engineer considers that the soils are susceptible to settlement the minimum grade shall be 0.75%. For roads with no curbs the grade may be flat provided that there is positive cross-fall on the road of no less than 2% and that there is adequate roadside drainage.

2.5.3.2

The maximum longitudinal grades shall be as noted in Table 2.5.3 below and as noted in the TAC design guidelines. The maximum allowable grades may be increased up to 2% over distances less than 200 m at the discretion of the Engineering Director where environmental impact or safety conditions warrant. It is expected that in the flat areas of the City the maximum allowable grades would only be used on roads that lead directly to interchanges, overpasses and bridges.

Table 2.5.3 - Maximum Grades

| Road Classification | Terrain Type | |
|---------------------|--------------|-------------|
| | Flat | Mountainous |
| Major Arterial | 6% | 8% |
| Minor Arterial | 6% | 8% |
| Major Collector | 6% | 10% |
| Minor Collector | 8% | 10% |
| Cul-de-sac Bulb | 4% | 6% |
| Local | 8% | 12% |

2.5.4 DESIGN AND OPERATING SPEED

For arterials and collectors the minimum design speed shall be 10 km/h higher than the posted speed.

The design speed for local roads and cul-de-sacs shall be a minimum of 30 km/h. A desirable operating speed on local roads and cul-de-sacs would be 30 km/h.

2.5.5 VERTICAL CURVES

The sag and crest vertical curves shall be in accordance with the TAC guidelines. At intersections it is desirable to provide decision sight distance. The following table shows the minimum allowable K Values that can be used to calculate the length of the vertical curves. It is desirable whenever possible to use K Values greater than the minimum.

Table 2.5.5 - Minimum K Values

| Design Speed (km/h) | Vertical Curve Type | | |
|---------------------|---------------------|-------------------------|-----------------------|
| | Crest | Sag (Headlight Control) | Sag (Comfort Control) |
| 30 | 2 | 4 | 2 |
| 40 | 4 | 7 | 4 |
| 50 | 6 – 7 | 11 – 12 | 5 – 6 |
| 60 | 10 – 13 | 15 – 18 | 8 – 9 |
| 70 | 16 – 23 | 20 – 25 | 10 – 12 |
| 80 | 24 - 36 | 25 – 32 | 12 – 16 |
| 90 | 32 - 53 | 30 – 40 | 15 – 20 |
| 100 | 45 - 80 | 37 - 50 | 18 - 25 |

Note: Based on Tables 2.1.3.2 and 2.1.3.4 in TAC Geometric Design Guide for Canadian Roads

2.5.6 HORIZONTAL CURVES

Horizontal curves shall be used on all changes of direction in excess of 0.5° (30 minutes). All horizontal curves shall comply with the minimum radius (80 m for 50 km/h, and 140 m for 60 km/h) curves or as shown in TAC. Low-speed design may be used for design speeds up to 60 km/h in Urban areas. High-speed designs shall be used for design speeds in excess of 60 km/h and for all designs in Rural areas.

Where extreme topography is involved, minor local and local roads may be designed with criteria provided in TAC, under Geometric Design Guide for Canadian roads.

Super elevation is required for horizontal curves on arterial and Collector Roads. The maximum super elevation rate shall be between 4% and 6%. It is expected that for most Urban applications the maximum rate of super elevation will be 4%. The super elevation rate shall be as noted in the TAC manual. The Development of the super elevation shall be as noted in TAC.

2.5.7 INTERSECTIONS

2.5.7.1

Intersections shall be designed in accordance with the guidelines found in TAC using design vehicles for geometric details. Selection of the appropriate design vehicle is an important element of intersection design practice.

2.5.7.2

Tables 2.5.7(A-1) and 2.5.7(A-2) identify the vehicle classification and design dimensions to be used based on the TAC Geometric Design Guide for Canadian Roads, Section 1.2.4 and Tables 1.2.4.1, 1.2.4.2 and 1.2.4.3.

Table 2.5.7(A-1): Design Dimensions for Vehicle Classifications¹

| Design Dimension | Vehicle Type (Classification) | | | |
|--------------------|-------------------------------|--------------------|------------------|------------------|
| | Passenger Cars (P) | Single-Unit Trucks | | |
| | | Light (LSU) | Medium (MSU) | Heavy (HSU) |
| Length (m) | 5.6 | 6.4 | 10.0 | 11.5 |
| Front Overhang (m) | 1.1 | 0.8 | 0.8 | 0.8 |
| Rear Overhang (m) | 1.3 | 2.2 | 2.7 | 2.7 |
| Wheelbase (m) | 3.2 | 3.4 | 6.5 | 6.5 |
| Width (m) | 2.0 | 2.6 ¹ | 2.6 ¹ | 2.6 ¹ |

¹ Maximum dimension allowed without permit. Statistical data is not available.

Table 2.5.7(A-2): Design Dimensions for Vehicle Classifications¹

| Design Dimensions | Vehicle Type | | | | Single-Unit Bus (B-12) |
|-------------------|----------------------|------------------|------------------|------------------|------------------------|
| | Tractor-Semitrailers | | Doubles | | |
| | (WB-19) | (WB-20) | A-Trains (ATD) | B-Trains (BTD) | |
| Length (m) | 20.7 | 22.7 | 24.5 | 25.0 | 12.2 |
| Front Overhang | 0.8 | 0.8 | 0.8 | 0.8 | 2.2 |
| Rear Overhang (m) | 1.7 | 3.3 | 1.5 | 1.3 | 2.8 |
| Wheelbase 1 (m) | 6.2 | 6.2 | 5.1 | 6.1 | 7.2 |
| Wheelbase 2 (m) | 12.0 | 12.4 | 6.9 | 9.0 | - |
| Wheelbase 3 (m) | - | - | 6.9 | 7.0 | - |
| Wheelbase 4 (m) | - | - | 3.3 ¹ | 0.8 ² | - |
| Width (m) | 2.6 ³ | 2.6 ³ | 2.6 ³ | 2.6 ³ | 2.4 |

¹ Includes 1.2 m from the rear effective axle to the hitch point and 2.1 m from the hitch point to the lead effective axle of the following unit.

² Represents the distance from the hitch point to the lead effective axle of the following unit.

³ Maximum dimensions allowed without permit. Statistical data is not available.

2.5.7.3

Tables 2.5.7(B) and 2.5.7(C) show the vertical alignment at intersections requirements for major and minor roads.

Table 2.5.7(B): Vertical Alignment at Intersections – Major Roads

| Major Road | Maximum Grade/Minimum Flattened Distance ¹ | | |
|------------|---|-----------|-----------|
| | Arteria | Collector | Loca |
| Arterial | 4% / 120 m | 5% / 60 m | 6% / 30 m |
| Collector | - | 5% / 60 m | 6% / 30 m |
| Local | - | - | 6% / 30 m |

¹ Distances are measured from the end of the approach vertical curve (EVC) to the beginning of the departure vertical curve (BVC)

Table 2.5.7(C): Vertical Alignment at Intersections – Minor Roads

| Major Road | Maximum Grade/Minimum Flattened Distance ¹ | | |
|------------|---|-----------|-----------|
| | Arteria | Collector | Loca |
| Arterial | 2% / 60 m | - | - |
| Collector | 2% / 30 m | 2% / 25 m | - |
| Local | 2% / 25 m | 2% / 20 m | 2% / 10 m |

¹ 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).

2.5.7.4

The City will establish the appropriate design vehicle class for the location. The design vehicle will be used to determine the geometric characteristics of the intersection in conjunction with the design traffic volumes, number of lanes and horizontal and vertical alignments of the intersecting roads.

2.5.7.5

Table 2.5.7(D) below shows the minimum sight dimensions required for intersections involving passenger cars on two lanes roads. Other vehicle types and intersection configurations will require review by City staff.

Table 2.5.7(D): Intersection Sight Distances

| Design Speed (km/h) | Minimum Stopping Sight Distance (m) | Minimum Approach Sight Distance (m) | Minimum Departure Sight Distance (m) | |
|---------------------|-------------------------------------|-------------------------------------|--------------------------------------|--|
| | | | Left turn onto major road | Right turn onto or crossing major road |
| 20 | - | 15 | - | - |
| 30 | - | 25 | - | - |
| 40 | 4 | 35 | - | - |
| 50 | 6 | 40 | 105 | 95 |
| 60 | 8 | 50 | 130 | 110 |

2.5.8 CUL-DE-SACS

The minimum radius of the bulb shall be able to accommodate an MSU vehicle in residential areas. In all other areas the design vehicle shall be used to determine the radius required for the cul-de-sac bulb. Where the Engineering Director has specified that the design vehicle shall be a MSU then the minimum curb radius of the cul-de-sac bulb shall be 14 m.

2.5.9 TEMPORARY TURNAROUNDS

When a road is greater than 50 m in length and will be extended in the future a temporary turnaround shall be required. A hammerhead or other innovative design may be used for the temporary turnaround.

2.5.10 CROSS SECTIONAL ELEMENTS

Cross sectional elements are the elements of the road template and will define what the road will look like. They include the following items.

2.5.10.1

Cross Fall

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

2.5.10.2

Lanes

All travel lanes on multi-lane roads that are not used exclusively for turning movements shall be between 3.3 and 3.7 m wide, or as per “TAC” Standard.

2.5.10.3

Auxiliary Lanes

Auxiliary lanes are lanes that are not used for through travel movements - instead they are used exclusively for turning movements or parking. As a result these lanes can be somewhat narrower than lanes that are used for through travel movements. Lanes used for turning movements shall be a minimum of 3.0 m wide. Where truck traffic or turning safety is an issue, the minimum lane width shall be increased to 3.3 m. Lanes used exclusively for parking shall be a minimum of 2.4 m wide. If in the future parking lanes may be converted to driving lanes, then the parking lane shall be designed as a regular lane.

2.5.10.4

Curbs

Concrete curb and gutters are normally used on Urban Roadways. In certain environmental conditions the designer may request that curbs be omitted. Usually these conditions occur in developed areas near fish bearing creeks. However the designer must demonstrate to the Engineering Director that pavement drainage can be adequately handled by other means. In addition the designer is reminded that the clear zone requirements change when curb and gutter is not present.

- (1) Table 2.5.10 indicates where curbs will be required, permitted and not permitted. “Permitted” indicates that more than one curbing philosophy may be applicable for a particular class of road as determined by the City. “Required” indicates that a particular curbing philosophy is necessary for a particular class of road. “Not Permitted” indicates that a particular curbing philosophy is not permitted for a class of road as decided by the City. Under special conditions the type of curb and gutter can be changed at the direction of the Engineering Director.

Table 2.5.10 Location of Curbs

| Location | | No Curb | Barrier Curb | Roll-Over Curb |
|--------------|---------------------------|----------------------------|------------------------|----------------|
| Urban | Commercial (all roads) | Not Permitted ¹ | Required | Not Permitted |
| | Industrial (all roads) | Not Permitted ¹ | Required | Not Permitted |
| | Major Arterial | Not Permitted ¹ | Required | Not Permitted |
| | Minor Arterial | Not Permitted ¹ | Required | Not Permitted |
| | Major Collector | Not Permitted ¹ | Required | Not Permitted |
| | Minor Collector | Not Permitted ¹ | Permitted | Permitted |
| | Local or Cul-de-sac | Not Permitted ¹ | Permitted | Permitted |
| Rural | Major Arterial | Permitted | Permitted ² | Not Permitted |
| | Minor Arterial | Permitted | Permitted ² | Not Permitted |
| | Major Collector | Permitted | Permitted ² | Not Permitted |
| | Minor Collector | Permitted | Permitted ² | Not Permitted |
| | Local or Cul-de-sac | Permitted | Permitted ² | Not Permitted |

¹The City may permit a “no curb” philosophy on Urban Roadways where this is consistent with a “low imperviousness” Storm Water Management Development Plan.

²The City will require a barrier curb on the downhill side of Rural Roads exceeding 8% grades.

- (2) Wheelchair ramps are required at all intersection and other locations where pedestrians are permitted to cross. The wheelchair ramps shall be designed as shown in Figures C8 and C9 of this document.
- (3) Where appropriate catch basins shall be located to one side of the wheel chair ramp intercepting road drainage as shown in MMCD Standard Drawings C8 and C9. Where flows are expected from both directions it may be necessary to construct two catch basins on either side of the wheel chair ramp.

2.5.10.5

Sidewalks & Boulevards

Sidewalks shall be provided on both sides of all Urban streets. On Rural Roads bicycle lanes and/or paved sidewalks shall be provided on both sides. Street trees may be required in landscaped boulevards provided that the clear-zone requirements established in Section 2.5.11.4 are met. See Section 2.9.2 of this specification for tree spacing, tree size and tree type.

2.5.10.6

Medians

Medians are required at all major intersections to accommodate left and right turning traffic. On major Arterial Roads, the median width (dimensional allowance to accommodate a turn lane and a raised curbed median) in the road cross section template will be constant to accommodate mid-block or other left turn movement needs in the future.

2.5.10.7

Pavement Drainage

The designer shall ensure that the pavement has adequate drainage through the use of suitable cross-fall and longitudinal grades. On super-elevated sections the designer shall check that there is adequate drainage where the pavement cross-fall changes. See Section 2.5.10.3 of this document for pavement drainage requirements.

2.5.10.8

Bridges/Overpasses

All bridges and overpasses shall have sidewalks on both sides and additional pavement width to accommodate cyclists.

2.5.11 ROADSIDE SAFETY AND CLEAR ZONES

Roadside safety guidelines and the Clear Zone concept shall be applied on all new roadway facilities including those with curbs and gutters. These design principles are described in the TAC Design Guide.

In general, the designer will use these guidelines to establish safety setback provisions for roadside features such as utility poles, street lights, signs and vegetation/trees. Where safe setbacks cannot be provided, the designer will determine the appropriate use of protective traffic barriers as an alternative road safety design method.

In Urban areas with curbs the minimum setback from the edge of travel lane to an obstruction shall be 0.5m for new construction. Wherever possible this minimum distance should be exceeded.

2.5.12 ON-STREET BICYCLE FACILITIES

On-street bicycle facilities will consist of the following:

- wider shoulder lanes to accommodate cyclists
- delineated shoulder bicycle lanes for exclusive use by cyclists on all collector and Arterial Roadways.

The minimum lane widths shall be as noted in TAC and/or City of Chilliwack Bicycle Transportation Plan.

2.5.13 ON-STREET PARKING

On-street parking shall be limited to locations where the road is sufficiently wide to allow clearance between the parked cars and the other vehicular and bicycle traffic on the streets. In addition the parked vehicles shall be located in such a manner that there is sufficient sight distance at unsignalized intersections and driveways for vehicles entering and exiting.

2.5.14 TRAFFIC CONTROL

2.5.14.1

All traffic control signage shall be installed as per the latest editions of the TAC Manual of Uniform Traffic Control Devices for Canada, the Motor Vehicle Act, and the Electrical and Traffic Engineering Manual – Province of BC. The supply and installation of traffic control signage and street name signs shall be the responsibility of the Developer and shall be erected prior to commencement of building construction. All required signage shall meet the following specifications:

- (1) Posts: Shall be 0.060 m Ø x 3.048 m long, “Long Gatorshield” Posts. No substitutes will be accepted.
- (2) Post Installation: Posts are to be placed into 0.064 m Ø (inside) x 0.457 m long, Schedule 40 steel sleeves, and cast into 0.305 m² x 0.457 m deep concrete anchors. Posts are to be inserted into the sleeve and secured with a steel wedge.

Alternative Mounting:

- (a) Signs may be mounted to ornamental light standards provided that the lamp standard is at the optimal location for the signage. Secure sign to lamp standard with “Band-it” fasteners.
- (b) Signs may be mounted to concrete sidewalks utilizing a galvanized steel base plate and 0.064 m Ø (inside) x 0.152 m long, Schedule 40 steel sleeve, anchored to the surface of the sidewalk with 0.111 m Hilti bolts. Posts are to be inserted into the sleeve and secured with a steel wedge.

2.5.14.2

A partial listing of typical signs is identified in Table 2.5.14:

Table 2.5.14: Typical Sign Specifications

| Description | TAC Designation | Size |
|-------------|-----------------|--------------------------------------|
| Stop | RA-1 | 60 cm x 60 cm |
| Cul-de-Sac | ID-31 | 60 cm x 60 cm |
| Yield | RA-2 | 75 cm |
| No Parking | RB-51 | 30 cm x 30 cm or 45 cm x 45 cm |

2.5.14.3

Road name signs are to be 300 mm high x length to suit, extruded aluminum blade as follows:

- (1) Alcan shape 5 15116 or Indalex shape VS1682 covered with 3M brand (or equivalent) Engineering Grade white reflective sheeting.
- (2) Letters to be 100 mm upper case “Arial” font on green 3M #3277 reflective sheeting.
- (3) Mounting hardware to be HS-1, SS-1, SS-2, and Cantilever aluminum brackets by Signal Signs Ltd. No substitutes will be accepted.

2.5.14.4

Overhead road name signs to be 300 mm high x length to suit, sign grade aluminum as follows:

- (1) Sheeting to be green on white 3M “Diamond” grade sheeting;
- (2) Clearview font;
- (3) Arrows as required;
- (4) Sign materials and blank dimensions shall conform to the most recent version of the “BC Ministry of Transportation Specifications for Standard Highway Sign Materials, Fabrication and Supply”.

2.5.14.5

Multi-housing strata properties shall post a site map at any strata driveway entrance clearly indicating civic address, building and road layout, unit numbers, and fire hydrant locations.

2.5.14.6

Emergency access routes, when secured by bollards, chains, gates, or other approved removable assemblies, shall be posted with reflective signage (on each side) indicating “EMERGENCY ACCESS ONLY – NO PARKING”.

2.5.15 PAVEMENT MARKINGS

All pavement markings shall be placed in accordance with the *Manual of Uniform Traffic Control Devices for Canada*. The developer is responsible for supplying and installing all the permanent and temporary pavement markings of the material type as specified by the Engineering Director. The City specifications for pavement markings are “Thermoplastic”.

2.5.16 ACCESS MANAGEMENT

The provision of safe access onto and off of City roads will be in accordance with TAC access management philosophy. TAC design principles provide criteria to install driveways safely and effectively by setting out guidelines for: driveway width, curb radii, intersection angle, spacing, corner clearances, sight distance and grade. The design principles are to be applied to new driveways and changes to existing driveways (including change in width, configuration, traffic volume, and change in type of the associated land use).

Where ever feasible, the following design standards are to be applied:

- When access is available to a property from two different roads, access is to be taken from the road of lower functional classification.
- Driveway access permits onto Arterial Roads will require a signed release agreement, to be registered on title, releasing the City from any financial liability claims if access is ever limited by future installation of a median barrier / island, or by signage. Permits onto Arterial Roads will also require the granting of access easements for the benefit of adjacent properties or a statutory right-of-way in favour of the City.
- Corner clearance between driveways and signalized intersections shall be a minimum of 70 metres for an arterial, 55 metres for a collector and 15 metres for a local. Clearance is measured from edge of pavement and or gutter flow-line.
- Corner clearance between driveways and unsignalized intersections shall be a minimum of 35 metres for an arterial, 25 metres for a collector and 15 metres for a local. Clearance is measured from edge of pavement and or gutter flow-line.
- Except in association with a one or two family residential use, off-street parking spaces shall not be accessed directly from a street, but shall be accessed by a driveway(s) as required.

2.5.17.1

Driveways

Rural Driveways - All Rural driveway crossings of watercourses shall be designed in accordance with the Policy and Design Criteria Manual for Surface Water Management and in no case shall a driveway culvert have a nominal diameter less than 300 mm and a length less than 6 m. The driveway shall be of sufficient width to provide safe vehicle turning movements for the use intended. In no case shall the driveway width be less than 4.0 metres.

Urban Driveways - Driveways in Urban Developments with barrier curb and gutter will require driveway letdowns as shown on the Standard Drawings. All Urban driveways shall conform to the following range of widths.

| | |
|---------------------------|--------------|
| Single Family Residential | 4.0 – 6.0 m |
| Multi-Family Residential | 4.0 – 9.0 m |
| Commercial/Industrial | 6.0 – 18.0 m |

Note: For two-way commercial/industrial crossings minimum driveway width is 8 m.

All driveway accesses shall be designed and constructed to permit the appropriate vehicular access for the area without “bottoming-out” or “hanging-up”. Where appropriate the existing shoulder grade shall be maintained for the width of the shoulder before any changes in grade begins. The maximum driveway grades are shown in Table 2.5.17 below.

Table 2.5.17 - Maximum Driveway Grades

| Adjacent Road Classification | Development Type | |
|------------------------------|------------------|-----------------------|
| | Residential | Commerical/Industrial |
| Arterial & Collector | 10% | 10% |
| Local | 15% | 10% |

2.5.17 ACCESS ROUTES OR FIRE LANES

2.5.17.1

Access routes or fire lanes shall meet the BC Building Code requirements.

2.5.17.2

Access routes or fire lanes shall:

- (1) be a minimum clear width of 6 m and shall be posted with signage stating “NO PARKING – FIRE LANE” as required to maintain the minimum required clear width;
- (2) be a minimum centerline radius of 12 m;
- (3) be a minimum overhead clearance of 5 m;
- (4) incorporate turnaround facilities for any “dead end” portion of any access route exceeding 90 m long; and
- (5) be designed to support fire apparatus and be surfaced with concrete, asphalt, or other material designed to permit accessibility under all climatic conditions.

2.5.18 SOLID WASTE COLLECTION ACCESS

2.5.18.1

All strata and multi-family Developments, except apartments, shall provide solid waste collection as per the City of Chilliwack “Solid Waste Collection and Disposal Bylaw 2009, No. 3602”, in force from time to time, and provide a Collection Access Route as per Section 2.5.18.3, to each unit to be serviced by curbside collection in townhouse and bareland strata Developments greater than 4 units.

2.5.18.2

All strata and multi-family Developments with less than 5 units, except apartments, shall provide solid waste collection as per the City of Chilliwack “Solid Waste Collection and Disposal Bylaw 2009, No. 3602”, in force from time to time, and provide a storage area as per Section 2.5.18.4 and loading area as per Section 2.5.18.5.

2.5.18.3

A Collection Access Route shall:

- (1) provide a turnaround area for the collection service vehicle for a “dead end” strata access road longer than 15 m in length from the curb face of the nearest intersecting City road or strata access road. Collection vehicles shall be able to enter the site, collect the garbage and recyclables, and exit the site in a forward motion.
 - (a) A hammerhead turnaround for solid waste collection shall have a minimum width of 6 m.
 - (b) A circular turnaround for solid waste collection shall have minimum inside turning radius of 10 m and a minimum outside turning radius of 12.8 m.
- (2) be located to minimize any interference with pedestrian traffic and vehicular access, including underground garage and parking lots; and,
- (3) maintain a minimum vertical clearance of 7.5 m.

2.5.18.4

A storage area shall:

- (1) be used only for the purpose of depositing and collecting recyclable material generated by occupants, visitors, and users of a multi-family Development;
- (2) have containers grouped into garbage, recycling and yard trimmings, with a minimum separation distance of 0.5 m between groupings, regardless of type of container. The separation distance can be reduced if a permanent wall is installed between groupings;
- (3) include signs to ensure material is deposited into the appropriate containers. If the storage area is not enclosed, then signs shall be on appropriate containers;
- (4) have sufficient container capacity to store all materials generated for a minimum of 7 days;
- (5) be located:
 - (a) on the lot of the multi-family Development it serves;
 - (b) at the rear end of the lot if accessed by a public lane;
 - (c) so that containers are a minimum of 3 m from any building;
 - (d) so that noise and odour impacts to residents are minimized;
 - (e) at ground level, or no more than one storey below grade.
- (6) be graded to the storm water management system of the multi-family Development and finished with a drivable surface;
- (7) maintain a minimum clearance of 7.5 m;
- (8) not block or impede any fire exits, public right-of-ways, or pedestrian and vehicular accesses.
- (9) be sized as set out in Table 2.5.18 below, for multi-family Developments of a maximum of 4 Dwelling Units, utilizing 121 litre collection containers or bags;

**Table 2.5.18 - Storage Area Dimensions for Multi-Family Development
(Maximum 4 Dwelling Units)**

| Number of Units | Minimum Internal Width (with Fixed Wall) | Minimum Internal Width (without Fixed Wall) | Minimum Internal Depth |
|------------------------|---|--|-------------------------------|
| 3 | 3.4 m | 4.0 m | 2.9 m |
| 4 | 5.9 m | 6.5 m | 2.0 m |

2.5.18.5

A loading area shall:

- (1) be graded to the storm water management system of the multi-family Development and finished with a drivable surface;
- (2) be located so that noise and odour impacts to residents are minimized;
- (3) maintain a minimum clearance of 7.5 m;
- (4) be a drivable surface that is a minimum of 6 m wide and 15 m long;
- (5) be connected to the storage area via a continuous slope or with a level grade to allow any wheeled recycling containers to be easily moved from the storage area to the loading area for servicing; and,
- (6) not block or impede any fire exits, public right of ways, or pedestrian and vehicular accesses.

2.5.19 ROAD AND SAFETY AUDITS

A road safety audit will be conducted on all new road designs. The audits shall be conducted during the design and construction stages as noted in the TAC guidelines for road safety audits.

2.5.20 ROAD BASE AND PAVEMENT DESIGN

2.5.20.1

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

2.5.20.2

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.

2.5.20.3

New Road Construction

The design for new roads shall be based on the analysis of the results of a soils test on the proposed road alignment and/or test holes carried out on adjacent roads having similar sub-grade soil conditions as the proposed road. The soils test shall be by analysis of material from test holes dug on the proposed road site, and shall be conducted by a qualified soils testing company. All soils reports shall be prepared by a qualified soils engineer.

2.5.20.4

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

Table 2.5.20 - Benkelman Beam Requirements

| Road System Type | Minimum Granular Thickness | | Minimum Asphalt Thickness | | Maximum Benkelman Beam Heading ³ |
|-----------------------|----------------------------|------------------------|---------------------------|--------------|---|
| | Sub-Base ¹ (mm) | Base ² (mm) | Base (mm) | Surface (mm) | Finished Pavement (mm) |
| Walkway/Lane | 20 | 100 | 65 | - | 1.50 |
| Rural | 300 | 100 | 40 | 35 | 1.50 |
| Local | 300 | 100 | 40 | 35 | 1.50 |
| Minor/Major Collector | 300 | 100 | 40 | 35 | 1.30 |
| Minor/Major Arterial | 300 | 100 | 40 | 35 | 1.30 |

¹ Sub-Base shall be 75mm minus pit run.

² Base shall be 20 mm minus crushed gravel.

³ Maximum seasonally adjusted rebound reading.

2.5.21 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.

2.5.22 PAVING PROCEDURE

The paving of roads shall be done in 2 lifts.

- (1) The first minimum 40 mm asphaltic base course shall be laid on a pre-determined and compacted aggregate road base.

- (2) The final lift (minimum 35 mm) shall be laid on the primed asphaltic base course one year following “Substantial Completion” or at such time that all construction in the Development is substantially complete and all foreseeable utility construction is complete.
- (3) The top surfaces of all manhole frames and lids, valve boxes, chambers, and other such appurtenances located within the paved portion of any roadway are to be set to match the surface of the first asphaltic base course, and shall be adjusted to match the design contour and grade of the finished asphalt surface at the time of placement of the final lift. The use of “riser rings” for the adjustment of these appurtenances is not permitted.
- (4) The finished asphalt surface shall be within 6 mm of the design elevation, but not uniformly higher or lower.
- (5) The finished asphalt surface shall not have irregularities exceeding 6 mm when checked with a 3 m straight edge placed in any direction.

2.5.22.2

The paving and/or upgrading of existing roads shall be done in accordance with the recommendations noted from the Benkleman Beam and soil test results. The designer shall attempt to conform to all Municipal requirements for new road construction design.

2.5.22.3

When it is deemed physically or economically unfeasible to conform to new road construction design criteria, the Engineering Director may consider alternatives outside the limits noted in this manual.

2.5.23 RETAINING STRUCTURES

2.5.23.1

All retaining structures within, or visible from, City of Chilliwack public corridors are to be constructed in accordance to this Bylaw, and the City’s Hillside Development Standards.

2.5.23.2

Any retaining structure over 1.2 metres in height:

- (1) must be designed, inspected, and certified by a Professional Engineer registered with British Columbia Association of Professional Engineers;
- (2) within or visible from a public corridor are subject to review and acceptance by the City of Chilliwack for “Form and Character”;
- (3) that is adjacent to or within the public corridor may be required to be installed with concrete no-post barriers, complete with handrails, as specified in Section 2.6.3 of this Bylaw.

2.5.23.3

Designs of retaining structures are to be submitted by the Design Engineer as part of the site grading plan or typical section design for roadways, laneways, and pedestrian walkways.

2.6 SIDEWALKS, WALKWAYS, AND HANDRAILS

2.6.1 SIDEWALKS

2.6.1.1

Sidewalks shall be required as noted on the City’s Standard Drawing for the cross-section of the applicable road classification.

2.6.1.2

The grade of the sidewalk(s) shall be consistent with the grade of the road.

2.6.1.3

All sidewalks adjacent to rollover style curbs shall be a minimum 150 mm thick. All sidewalks adjacent to barrier style curbs shall be a minimum 100 mm thick. Sidewalks crossing driveways are to be 150 mm thick in residential zones and 200 mm thick in all other zones. The preparation of the road base and sub-base shall be done to a point 0.30 m wider than the sidewalk to provide structurally sound support for the sidewalk.

2.6.2 WALKWAYS

2.6.2.1

All walkways with grades less than 8% in grade shall be constructed in accordance with Standard Drawing C10.

2.6.2.2

Urban walkways shall be constructed with chain link fencing on both sides and off-set gates at both ends.

2.6.2.3

Walkways with grades exceeding 8.0% shall be constructed with steps and hand rails (as per Section 2.6.3) independent of the chain link fencing and shall meet standards to allow for access by the physically handicapped.

2.6.3 HANDRAILS

2.6.3.1

All handrails shall be constructed and installed in accordance with MMCD Standard Drawing C14.

2.6.3.2

Handrails shall be required for walkways and/or sidewalks where grades are determined to warrant such installations or where steps are provided due to grades in excess of 8.0%.

Handrails may also be required along the top of major storm sewer outfalls, along walkways and/or sidewalks where steep or excessive side-slopes may be encountered, or in any location as deemed necessary by the Engineer where, in their 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.

2.7 PRIVATE UTILITIES

2.7.1 SERVICING REQUIREMENTS

2.7.1.1

In areas of the City designated other than Rural or agricultural under the City’s Official Community Plan Bylaw, in force from time to time, extension of electrical, telephone, and cablevision distribution systems and connection are to be underground.

2.7.1.2

Underground electrical, telephone, and cablevision services shall be required for:

- (1) Subdivisions or boundary adjustments within the Urban containment boundary, as defined in the City’s Official Community Plan, in force from time to time;
 - (a) of three lots or greater; or,
 - (b) of two lots, where the distribution system is adjacent to the Subdivision.
- (2) all new commercial and industrial buildings or building additions greater than 50% of the existing floor area;
- (3) all new multi-family Developments.

2.7.2 DESIGN REQUIREMENTS

Gas, electric, telephone and cablevision design drawings shall be submitted to the City for acceptance prior to the start of construction as per Section 2.1.6 of this schedule.

2.8 STREET LIGHTING

2.8.1 GENERAL

2.8.1.1

Design of street lighting systems shall be prepared by a Professional Electrical Engineer, registered with the Association of Professional Engineers of British Columbia. A copy of the lighting calculations shall be submitted.

2.8.1.2

All davit type luminaires shall be GE M-250R2 HPS with cutoff optics (flat glass).

2.8.1.3

Heritage style luminaires, in accordance with the City’s Standard Drawings DE-1 and DE-2, may be used subject to City approval.

2.8.1.4

Hand-holes on all metal luminaire poles shall:

- (1) be securely welded closed with four 25 mm long welds at corners immediately following streetlight acceptance and activation; or,
- (2) be equipped with a WireSentry anti-theft plate.

2.8.2 MINIMUM LEVELS OF ILLUMINATION

The minimum level(s) of illumination in average lux shall be as per Table 2.8.2 below:

Table 2.8.2 – Minimum Levels of Illumination

| Road Classification | ZONE | | |
|-----------------------------------|-------------|------------|------------|
| | Residential | Industrial | Commercial |
| Arterial Roads | 10.0 | 13.0 | 22.0 |
| Collector & Minor Collector Roads | 6.5 | 10.0 | 13.0 |
| Local Roads | 4.0 | 6.5 | 10.0 |

NOTES:

- (a) At all major intersections, the values noted in Table 2.8.2 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.
- (b) The lowest lux value of any point on a roadway shall not be less than one-third of the average value, with the exception of residential roadways where it may be as low as one-sixth of the average value, using a maintenance factor of 0.75.

2.8.3 STREETLIGHT POLE LOCATIONS

Generally, streetlight poles shall be designed as follows:

- (a) Arterial Roads - opposite or staggered spacing
- (b) Collector and Minor Collector Roads - staggered spacing
- (c) Local roads - staggered spacing or one sided
- (d) Minor local roads - one side

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

2.8.4 UNDERGROUND DUCTS

2.8.4.1

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 by-laws and other authorities having jurisdiction shall be followed.

2.8.4.2

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

2.8.4.3

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.

2.8.4.4

Underground ducts must be located beneath concrete or asphalt surfaces where possible. Where it is not possible and the duct is accessible under landscaping, the duct must be galvanized steel conduit or encased with a minimum of 0.1 m of concrete above the pipe.

2.8.4.5

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

2.9 LANDSCAPING

2.9.1 GENERAL

Fencing, Screening and Landscaping requirements are contained in the City of Chilliwack Zoning Bylaw in force from time to time.

2.9.2 LANDSCAPING PLAN

- (a) A landscaping plan shall be submitted to the City, as part of an application for Subdivision or a building permit concerning new Developments, or changes to an existing Development or use in excess of 50 percent of the property - in terms of site area or building space.
- (b) The following information shall be included in a final landscaping plan:
 - (i) Date, scale, north arrow, and the names, addresses, and telephone numbers of both the property owner and the person preparing the plan;
 - (ii) Project name and street address;

- (iii) Existing and proposed contour lines sufficient to identify and properly specify landscaping for areas where grade changes and screening are proposed (0.3 to 0.5 metre contour intervals are recommended);
 - (iv) Approximate natural boundaries of existing water courses, and the location and size of existing and proposed streets and alleys, utility easements, driveways, and sidewalks on or adjacent to the property;
 - (v) Project data information, including the total area of the property, building foot prints, parking and other vehicular use areas, and landscaped (general and extensively planted) areas;
 - (vi) Location, height and material of the proposed plant materials, screening, fencing and berms; are to be considered in relation to fire hydrants and fire department connections.
 - (vii) Locations and dimensions of proposed landscape setbacks and buffers;
 - (viii) Complete description of plant materials shown on the plan, including names (common and botanical names), locations, quantities, container or caliper sizes, heights, spread and spacing at installation;
 - (ix) Location, height/size and type of existing vegetation to be preserved;
 - (x) A description of how existing vegetation proposed for preservation will be protected during construction;
 - (xi) Parking layout;
 - (xii) Size, height, location and material of the proposed seating, lighting, planters, sculptures and water features.
 - (xiii) Location and dimensions of visibility triangles on the property per the City's Zoning Bylaw from time to time in force;
 - (xiv) Total value of the landscape installation and a breakdown of the value by its major components.
 - (xv) For size, height, type and location of tree planting on City boulevards, consult City's Parks and Recreation Department.
- (c) Prior to issuance of a Building Permit for a Development or final Subdivision approval in which landscaping is required, the owner or their agent shall post a Security Deposit in the amount of 125% of the estimated value of the landscaping.
- (d) Following issuance of an occupancy permit for a Development, or Final Approval of a Subdivision, the Security Deposit may be reduced to 10% of the estimated value of the landscaping. Such Security Deposit will be maintained for a period not exceeding two years, to assure maintenance and growth of the landscaping.

3.0 MASTER MUNICIPAL SPECIFICATIONS

3.1 COPIES AND ENQUIRIES

This Bylaw does not include a copy of the MMCD document. To obtain copies of the MMCD document, or if you have any enquiries or comments regarding the documents, please contact:

Master Municipal Construction Documents Association
 #102 - 211 Columbia Street
 Vancouver, BC V6A 2R5
 Phone: 604-681-0295
 Fax: 604-681-4545

You can also visit their website at www.mmcd.net for the latest information about the document and the MMCD Association.

3.2 MASTER MUNICIPAL CONSTRUCTION DOCUMENT

The “**Master Municipal Construction Document (MMCD)**”, dated **2009 (or latest edition thereof)** save and except the following sections and clauses of the MMCD identified in Table 3.2, which are not applicable or have been deleted or amended, will reflect those standards to be applied within the City of Chilliwack.

Table 3.2 - MMCD Amendments

| Part | Description |
|--|---|
| Section 31 05 17: Aggregates and Granular Materials | |
| 2.7.2 | Delete “pit run sand” and “river sand” |
| Section 33 11 01: Waterworks | |
| 1.5 | Delete in whole and insert “shop drawings and technical data are required for all valves, hydrants and appurtenances”. |
| 2.1.1 | Delete “PVC”. |
| 2.2.2 | Delete in whole. |
| 2.2.3 | Delete in whole. |
| 2.2.5 | Delete in whole. |
| 2.2.6 | Delete in whole. |
| 2.3.2.1 | Delete “solid wedge or double disc valves and”. |
| 2.3.2.2 | Delete in whole. |
| 2.3.2.7 | Delete “as specified in Contract Documents” and insert “Clow or Mueller.” |
| 2.3.3 | Add “Acceptable manufacturer is Pratt.” |
| 2.3.5 | Delete “Air/Vacuum and Combination Air”. |
| 2.3.5.5 | Add “Air release valves shall be 25 mm Terminal City, Apco Model 50, or Val Matic Model 22, single acting air valves or as approved by the Engineering Director |

| | |
|-----------|--|
| 2.3.6.1.1 | Delete in whole. |
| 2.4.1 | Delete “200 mm” and insert “100 mm”. |
| 2.4.2 | Add “Refer to City of Chilliwack Development and Regulatory Enforcement Services Department for specific details. |
| 2.5.1 | Delete in whole and insert “Pipe diameters of 19 mm & 25 mm shall be Type K annealed copper to ASTM B88M. Pipe diameters greater than 25 mm and up to 75 mm are to be Pressure Class 160 PVC certified to CSA B137.1 and shall be fitted with 28 gauge tracer wire. Pipe diameters greater than 75 mm to be ductile iron pipe to AWWA C151”. |
| 2.6.1.1 | Delete “or slide gate”. |
| 2.6.1.6.2 | Delete in whole and insert Hydrant ‘Pumper Port’ to be 100 mm nominal diameter equipped with a “Quick Connect” Storz adaptor”. |
| 2.6.1.6.3 | Delete in whole. |
| 2.6.2 | Delete “as specified in Contract Documents” and insert “All public and private hydrants are to be painted with General Paints self-priming urethane enamel as follows: Public: Body – Yellow No. 16-202 Top – Red No. 16-208 Pumper Port Cap – Black No. 16-216 Hose Port Caps (2) – Red No. 16-208 Private: Body – Yellow No. 16-202 Top – Mid-Green No. 10-136 Pumper Port Cap – Black No. 16-216 Hose Port Caps (2) – Mid-Green No. 10-136” |
| 2.6.3 | Delete “specified in Contract Documents or Municipal Supplementary Specifications.” and insert “follows: 1. Terminal City C-71P 2. Canada Valve Century 3. Or equal as approved by the Engineer. |
| 2.7.2.2 | Delete in whole and insert “To be Mueller CC15008 for tapping 19 mm to 25 mm and Ford F1000 & FB1700 for all other applications from 13 mm to 50 mm.” |
| 2.7.3.3 | Delete in full and insert “To be Ford Z41-111 (13 mm), Ford BH41-233 (19 mm), and Ford B41-344 (25 mm) compression x IPT.” |
| 2.8.1 | Delete in whole and insert “Granular Pipe Bedding and Surround Materials shall be as per Section 02226 Part 2 – 7 for all water main installations.” |
| 3.2.1 | Delete “fis” and insert “fittings” |
| 3.5.7 | Delete in whole and insert “Use imported bedding material.” |
| 3.6.6 | Delete “Do not exceed maximum joint deflection specified in AWWA C600 nor maximum joint deflection recommended by pipe manufacturer” and insert “Do not exceed 50% of maximum joint deflection specified in AWWA C600 nor 50% of maximum joint deflection recommended by pipe manufacturer.” |
| 3.10.4 | Delete “200 mm” and insert “150 mm”. |
| 3.10.5 | Delete “200 mm” and insert “150 mm”. |

| | |
|---|--|
| 3.17 | Delete in full and insert “City of Chilliwack Operating Procedure for the Acceptance of New Water Main Construction to apply.” |
| 3.18 | Delete in full and insert “City of Chilliwack Operating Procedure for the Acceptance of New Water Main Construction to apply.” |
| 3.19 | Delete in full and insert “City of Chilliwack Operating Procedure for the Acceptance of New Water Main Construction to apply.” |
| Section 33 30 01: Sanitary Sewers | |
| 2.2.1 | Add “Ribbed PVC pipe is not acceptable for sanitary sewers”. |
| 2.3.8.2 | Delete in whole. |
| 2.5.2 | Add “Pit-run sand or river sand is not permitted for use as pipe bedding or surround material.” |
| 3.6.6.1 | Delete “and ribbed profile PVC plastic pipe”. |
| 3.8.4 | Delete in whole. |
| 3.10.1 | Delete “Standard Detail Drawing S7” and insert “City of Chilliwack Standard Drawings DC-1, DC-2, and DS-3 as applicable”. |
| 3.10.2 | Delete “Standard Detail Drawing S7” and insert “City of Chilliwack Standard Drawings DC-1, DC-2, and DS-3 as applicable”. |
| 3.10.3 | Delete “Standard Detail Drawing S9” and insert “City of Chilliwack Standard Drawing DS-4”. |
| 3.12.1 | Add “.6 – Ovality test”. |
| 3.13.4 | Delete “840” and insert “2130”. |
| 3.16.1 | Add “An ovality test may be performed in lieu of ball test at discretion of Contract Administrator.” |
| 3.18.2 | Add “An ovality test may be performed in lieu of ball test at discretion of Contract Administrator.” |
| 3.19.5.2 | Delete in full and insert “Acceptable ponding for mainline sewer of any size is 5% over 3 m length of pipe.” |
| Section 33 34 01: Sewage Force Mains | |
| 1.8.5 | Delete “W8”. |
| 2.3.2.1 | Delete “solid wedge and”. |
| 2.3.2.2 | Delete in whole. |
| 2.3.4.1 | Delete in full and insert “Stainless steel Vent-O-Mat model or approved alternate by City of Chilliwack Engineering Director, to be housed in a chamber as per City of Chilliwack Standard Drawing DS-4.” |
| 2.3.5.1.1 | Delete in whole. |
| 2.3.5.1.2 | Delete “as specified in Contract Documents” and insert “to be Nelson type”. |
| 2.5.2 | Add “Pit run sand or river sand is not permitted for use as pipe bedding or surround material.” |
| 3.6.6 | Delete “Do not exceed maximum joint deflection specified in AWWA C600 nor maximum joint deflection recommended by pipe manufacturer” and insert “Do not exceed 50% of maximum joint deflection specified in AWWA C600 nor 50% of maximum joint deflection recommended by pipe manufacturer.” |

| Section 33 40 01: Storm Sewers | |
|--|--|
| 2.1.1 | Delete “900 mm” and insert “600 mm”. |
| 2.1.2 | Delete “900 mm” and insert “600 mm”. |
| 2.4 | Delete in whole. |
| 3.5.6 | Delete in whole. |
| 3.6.2 | Delete “Steel Spiral Rib Pipe to CAN3-G401”. |
| 3.6.6.3 | Delete in whole. |
| 3.10.1 | Delete “on Standard Detail Drawing S8” and insert “on City of Chilliwack Standard Drawings DC-1, DC-2, DD-2, and DD-4.” |
| 3.10.2 | Delete “on Standard Detail Drawing S8” and insert “on City of Chilliwack Standard Drawings DC-1, DC-2, and DD-4.” |
| 3.10.3 | Delete “where specified.” Delete “Standard Detail Drawing S7 or Drawing S10” and insert “City of Chilliwack Standard Drawings DC-1, DC-2, DD-2, and DD-4.” Delete “Standard Detail Drawing S9 or Drawing S10 as applicable” and insert “City of Chilliwack Standard Drawing DD-2.” |
| 3.12.3 | Add “.4 In areas subject to infiltration due to high groundwater levels, the Engineer may require that testing be carried out in accordance with Section 33 30 01 – Sanitary Sewers.” |
| Section 33 42 13: Pipe Culverts | |
| 2.1 | Delete in whole. |
| 2.3 | Delete in whole. |
| 2.2.1 | Delete “maximum diameter 900 mm” and insert “maximum diameter 600 mm”. |
| 2.2.2 | Delete “greater than 900 mm” and insert “greater than 600 mm”. |
| 3.10 | Delete “S15” and insert “City of Chilliwack Standard Drawing DD-7”. |
| Section 33 44 01: Manholes and Catch Basins | |
| 2.1.7 | Delete “Standard Detail Drawing S1” and insert “City of Chilliwack Standard Drawings DD-1 for storm sewers and DS-1 for sanitary sewers”. |
| 2.1.11 | Insert after “diameter” “for single catch basins and a minimum of 200 mm diameter for double catch basins”. |
| 2.1.23 | Delete in whole. |
| 3.3.18 | Delete in whole. |
| 3.4.1 | Delete “Standard Detail Drawing S6” and insert “City of Chilliwack Standard Drawings DD-3 and DS-2”. |

3.3 MASTER MUNICIPAL CONSTRUCTION DOCUMENTS STANDARD DETAIL DRAWINGS

The “Master Municipal Construction Document Detail Drawings”, dated 2009 (or latest edition thereof) save and except the following drawings identified in Table 3.3 below, which are not applicable or have been amended, will reflect those standards to be applied within the City of Chilliwack.

Table 3.3 - MMCD Standard Detail Drawing Amendments

| Drawing | Description |
|----------------------------------|---|
| Storm and Sanitary Sewers | |
| S6 | Not accepted. |
| S7 | Not accepted. |
| S8 | Not accepted. |
| S9 | Not accepted. |
| S15 | Not accepted. |
| Waterworks | |
| W2a | Not accepted. |
| W2b | Not accepted. |
| W2c | Not accepted. |
| W2d | Not accepted. |
| W4 | Center of hose outlet shall not be less than 575 mm above final grade. Top of hydrant barrel flange to be minimum of 100 mm and maximum 150 mm above finished ground line adjacent to hydrant. |
| W6 | Delete “Double Acting Air Valve” and replace with “Air Valve”. |
| W7 | Delete “Double Acting Air Valve” and replace with “Air Valve”. |
| W8 | Not accepted. |
| Electrical | |
| E1.4 | R.PVC conduit is to extend 200 mm above the concrete base. The void between the R.PVC conduit and the concrete base is to be filled with approved duct seal material. |
| E1.5 | R.PVC conduit is to extend 200 mm above the concrete base. The void between the R.PVC conduit and the concrete base is to be filled with approved duct seal material. |

4.0 CITY OF CHILLIWACK STANDARD DRAWINGS

Table 4.0 - City of Chilliwack Standard Drawings

| Drawing | Description |
|----------------|---|
| Common | |
| DC-1 | Typical Lot Service Connections for Road Grades Less Than 2% |
| DC-2 | Typical Lot Service Connections for Road Grades Greater Than 2% |
| DC-3 | Sample Service Record Card |
| DC-4 | Temporary Lot Siltation Control |
| DC-5 | Temporary Construction Access |
| DC-6 | Temporary Access Pad (Single Family Residential) |
| DC-7 | Wheel Wash Facility |
| DC-8 | Catch Basin Sediment Bag Insert |
| DC-9 | GPS Monitoring Hub Installation |
| DC-10 | Steel Bollard Filled With Concrete |
| Water | |
| DW-1 | Rural Fire Hydrant Assembly |
| DW-2 | Blow-Off |
| DW-3 | Air and Vacuum Valve Chamber |
| DW-4A | Pressure Reducing Station – Typical PRV Station Layout (250 mm and Larger) |
| DW-4B | Pressure Reducing Station – Typical PRV Station Layout (200 mm and Smaller) |
| DW-5 | Typical Groundwater Monitoring Well Surface Design |
| DW-6 | Test Point Installation |
| DW-7A | 19 mm/25 mm Water Pre-Service Connection |
| DW-7B | 38 mm/50 mm Water Pre-Service Connection |
| DW-8 | Water Service Connection |
| DW-9 | 100 mm, 150 mm and 200 mm Water Meter Vault |
| DW-10 | 250 mm Water Meter Vault |
| DW-11 | Detector Check Vault |
| DW-12 | Water Flow Meter Vault |
| DW-13 | Yard Hydrant |

| Storm Sewer | |
|-----------------------|---|
| DD-1 | Manhole Frame and Cover |
| DD-2 | Inspection Chamber for 100 mm Storm Sewer Connection |
| DD-3 | Storm Sewer Cleanout (Temporary) |
| DD-4 | Storm Sewer Service Connection |
| DD-5 | Outlet Structure |
| DD-6 | Driveway Culvert with Bulkheads |
| DD-7 | French Drain |
| DD-8 | Swale |
| DD-9 | Soak-Away Well 0.5 C.F.S. |
| DD-10 | Soak-Away Well 1.0 C.F.S. |
| DD-11 | Sardis-Vedder (South of Trans-Canada Highway) Rainfall Duration – Intensity Curve |
| DD-12 | Agassiz (North of Trans-Canada Highway) Rainfall Duration – Intensity Curve |
| DD-13 | Trash Rack – Type “A” |
| DD-14 | Trash Rack – Type “B” |
| DD-15 | Drainage Drywell |
| DD-16 | Flow Control Manhole |
| Sanitary Sewer | |
| DS-1 | Manhole Frame and Cover |
| DS-2 | Sanitary Sewer Cleanout (Temporary) |
| DS-3 | Sanitary Sewer Service Connection |
| DS-4 | Inspection Chamber for 100 mm Sanitary Sewer Connection |
| DS-5 | Control Manhole |
| DS-6 | Sani-Dump |
| DS-7 | Typical Sanitary Force Main Service Connection |
| DS-8 | Typical Residential Sanitary Pump Station for Gravity Sewer Connection |
| DS-9 | Sewage Lift Station |
| DS-10A | Typical Three-Phase (208 V) Sewage Lift Station – Electrical Distribution |
| DS-10B | Typical Single-Phase Sewage Lift Station – Electrical Distribution |
| DS-11A | Typical Three-Phase (208V) Sewage Lift Station – Electrical Distribution |
| DS-11B | Typical Single-Phase Sewage Lift Station – Electrical Distribution |
| DS-12A | Typical Three-Phase (208 V) Sewage Lift Station – Electrical Elementary |
| DS-12B | Typical Single-Phase Sewage Lift Station – Electrical Elementary |
| DS-13A | Typical Three-Phase (208 V) Sewage Lift Station – Electrical Control Wiring |
| DS-13B | Typical Single-Phase Sewage Lift Station – Electrical Control Wiring |
| DS-14 | Force Main Flush-Out |
| DS-15 | Bypass and Optional Flow Meter Detail |

| | |
|------------------------|--|
| DS-16 | Sanitary Flow Meter Vault |
| DS-17 | Valve Chamber for Sanitary Pump Station |
| DS-18 | Air and Vacuum Valve Chamber for Sanitary Force Main |
| Roads | |
| DR-1 | 6.0 m Lane |
| DR-2 | Rural Half-Road – 12 m Right of Way |
| DR-3 | Rural Road – 20 m Right of Way |
| DR-4 | Rural Arterial and Collector – 25 m Right of Way |
| DR-5 | Urban – 8.5 m Pavement – 15 m Right of Way |
| DR-6 | Urban – 8.5 m Pavement – 17.5 m Right of Way |
| DR-7 | Urban – 11 m Pavement – 17.5 m Right of Way |
| DR-8 | Urban – 11 m Pavement – 20 m Right of Way |
| DR-9 | Urban – 13.5 m Pavement – 20 m Right of Way |
| DR-10 | Urban – 19.5 m Pavement – 25 m Right of Way |
| DR-11 | Urban – 21 m Pavement – 30 m Right of Way |
| DR-12 | Urban Half-Road – 17.5 m and 20 m Right of Way |
| DR-13 | Rural Hammerhead Turnaround |
| DR-14 | Rural Cul-de-Sac |
| DR-15 | Road End Barricades |
| DR-16 | Driveway Crossing for Barrier Curbs Reduced Cross-Slope/Increased Radius |
| DR-17 | Sign Pole Wedge |
| DR-18 | Dyke Gate |
| Street Lighting | |
| DE-1 | Street Light Luminaires |
| DE-2 | Heritage Light – Double |
| DE-3 | Heritage Light – Single |

5.0 APPLICATION ATTACHMENTS

Table 5.0 - Application Attachments

| Application Type | Attachment |
|---------------------------------|----------------------------|
| Bare-Land Strata (Preliminary) | B |
| Bare-Land Strata (Final) | C |
| Development Permit | A |
| Development Variance Permit | A |
| Form E | 2 Copies of Form E* |
| OCP Re-Designation | Letter |
| OCP Text Amendment | Letter |
| Phased Strata | C |
| Rezoning | Letter |
| Strata Conversion (Preliminary) | B |
| Strata Conversion (Final) | C |
| Subdivision (Preliminary) | B |
| Subdivision (Final) | C |
| Zoning Text Amendment | Letter (as appropriate) |

- (1) As applicable, one copy of the site, elevation and landscape plans detailing the Development (more may be requested if needed);
- (2) Eight paper prints of the Subdivision plan;
- (3) One Mylar, two dylar and ten paper prints of the Subdivision plan.
- * Form E (Declaration to create a strata plan by Phased Development)

6.0 FORMS

| | |
|--|------|
| Permission to Construct | F-1 |
| Certificate of Inspection | F-2 |
| Certificate of Substantial Completion and List of Deficiencies | F-3 |
| Certificate of Acceptance..... | F-4 |
| Private Well Certificate..... | F-5 |
| Well Pump Test - Field Test | F-6 |
| Time Drawdown Graph for Pump Test | F-7 |
| Pump Test Summary..... | F-8 |
| Agreement to Pay Non-Refundable Deposit (Private)..... | F-9 |
| Agreement to Pay Non-Refundable Deposit (Corporate)..... | F-9 |
| Cost Sharing Agreement (Corporate) | F-10 |
| Cost Sharing Agreement (Private) | F-10 |
| Insurance Certification | F-11 |
| Drainage Certification | F-12 |
| Notice of Release | F-13 |
| Subdivision Application Form..... | F-14 |
| Confirmation of Commitment..... | F-15 |
| Substantial Completion Pre-Inspection Checklist | F-16 |

FORM F-1

PERMISSION TO CONSTRUCT

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

Authorization to proceed with construction is hereby granted to:

NAME OF DEVELOPER _____

ADDRESS _____

For the works described generally as:

Authorized Start Date _____ Completion Date _____

Authorized Hours of Work: From _____ hrs. to _____ hrs.
Monday to Saturday Inclusive.

Check the following: (All must be completed)

Approved plans covering the works are attached.

Certificates of insurance are attached.

Administration fee has been paid.

Security Deposit has been paid.

A Servicing Agreement has been completed - No. _____

Project Engineer: _____

Contact: _____

Phone No.: _____ bus. _____ res. _____

Special Conditions:

pc: Contractor

MANAGER OF LAND DEVELOPMENT

FORM F-2

CERTIFICATE OF INSPECTION

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

I hereby certify that all engineering and construction services, required under the Land Development Bylaw, in force from time to time of the City of Chilliwack for the Subdivision/Development of:

LEGAL DESCRIPTION: _____

PROJECT NO: _____

which services were designed by:

NAME OF FIRM: _____

ADDRESS: _____

and approved for construction on drawing numbers:

drawing number _____ date _____ drawing number _____ date

have been installed and inspected by or under the direction of:

I further certify that the “As-Built” drawings hereby submitted represent the Works and Services as installed for the aforementioned Subdivision/Development.

(Signature and name of the
Professional Engineer responsible
for Project)

REGISTERED PROFESSIONAL'S SEAL
SIGNED AND SEALED

FORM F-3

**CERTIFICATE OF SUBSTANTIAL
COMPLETION**

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

DEVELOPER: _____

CONTRACTOR: _____

PROJECT NO: _____

SERVICING AGREEMENT NO: _____

DATE: _____

This certificate is issued pursuant to Section 1.8.4 of Schedule 'B' to the “Land Development Bylaw 2014, No. 3055”.

The MAINTENANCE PERIOD for the Works will begin on _____

The MAINTENANCE PERIOD for the Works will end on _____

The attached is a LIST OF DEFICIENCIES related to the Works.

The Certificate of Acceptance will be issued when all deficiencies have been cleared, including “legal postings”, as certified by original BCLS, the maintenance period has expired, and the Manager of Land Development has been satisfied all conditions of the Servicing Agreement have been fulfilled.

This Certificate has been made to the best of the Engineer's knowledge, information and belief. It does not constitute acceptance of any Work not in accordance with the requirements of the Land Development Bylaw, in force from time to time, and not listed as a deficiency herein, whether or not such defect(s) could have been observed or discovered during construction.

MANAGER OF LAND DEVELOPMENT

pc: Contractor

FORM F-4

CERTIFICATE OF ACCEPTANCE

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

DEVELOPER: _____

CONTRACTOR: _____

PROJECT NO: _____

SERVICING AGREEMENT NO: _____

DATE: _____

All deficiencies, defects or faults in the Works observed or discovered within the period preceding the date of this Certificate having been rectified, this Certificate is issued pursuant to the Referenced Servicing Agreement.

This Certificate has been made to the best of the Manager of Land Development's knowledge, information and belief. It does not constitute acceptance of any Works not in accordance with the requirements of the Servicing Agreement, whether or not such defect(s) could have been observed or discovered during construction.

MANAGER OF LAND DEVELOPMENT

pc: Contractor

FORM F-5

PRIVATE WELL CERTIFICATION

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

PURSUANT TO the City of Chilliwack Land Development Bylaw, in force from time to time, which requires that each lot to be created and/or each existing lot forming part of the proposed Development can be serviced with potable water in accordance with the requirements of the Bylaw for the Development of:

LEGAL DESCRIPTION:

PROJECT NO.: _____

I certify that a quantity of not less than 2,200 litres per day has been proven for each existing or proposed lot in the Development.

I certify that each well within the Subdivision has been tested and is capable of continuously providing water at a rate of 9 litres/min. for a four hour period.

I certify that water quality tests have been conducted and that the B.C. Safe Drinking Water Regulation and Guidelines for Canadian Drinking Water Quality latest edition can be met for each existing or proposed lot in the Development.

The following information is to be provided by a Professional Engineer.

- 1) Company name of well driller
- 2) Location of Work
- 3) Date Installed
- 4) Geodetic Elevations of the top of Pipe (meters)
- 5) Depth to the bottom of well (cm)
- 6) Depth to the top of well screen (cm)
- 7) Length of well screen (cm)
- 8) Diameter of well (mm)

Certified By (Name of Professional Engineer)

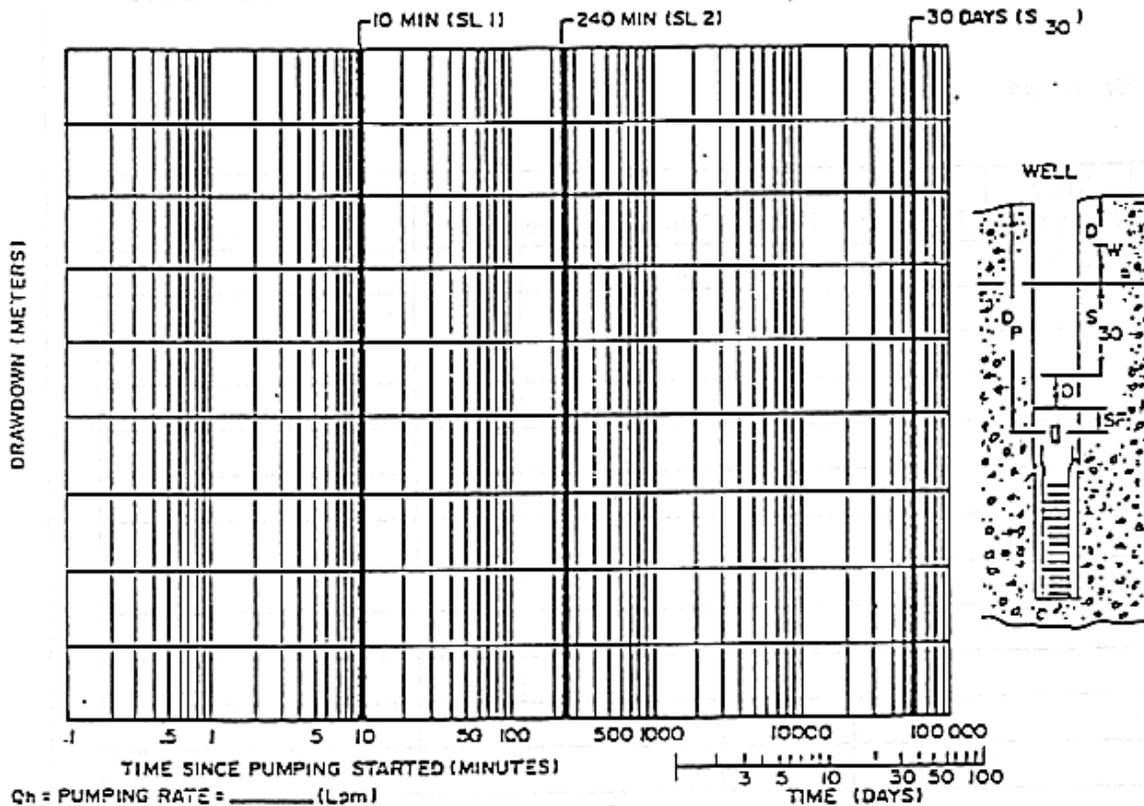
Address

Registered
Professional
Seal
(Signed & Dated)

Form F-7

TIME-DRAWDOWN GRAPH FOR PUMP TEST

OWNER'S NAME: _____ WELL No. _____
 APPLICATION No: _____ DATE: _____
 LOCATION: _____ SHEET _____ OF _____
 DEPTH TO STATIC WATER LEVEL: _____ (m) TEST No. _____



Q_h = PUMPING RATE = _____ (Lpm)
 S_{h1} = DRAWDOWN AT 10 MIN. = _____ m.
 S_{h2} = DRAWDOWN AT 240 MIN. = _____ m.
 CALCULATED DRAWDOWN VALUES: $SL 1 = \frac{Q_h}{Q_i} \times S_{h1} =$ _____ m
 $SL 2 = \frac{Q_h}{Q_i} \times S_{h2} =$ _____ m
 DRAWDOWN AT 30 DAYS (S_{30}) = _____ m

ESTIMATED MINIMUM ADJUSTMENT FOR SEASONAL DECLINE (D): USE FOLLOWING FIGURES IF OTHER LOCAL DATA OR HYDROGEOLOGIST'S OPINION IS NOT AVAILABLE.

- TESTS RUN IN AUG., SEPT. & OCT.: 2 m
- TESTS RUN IN NOV., DEC., JAN., MAY, JUNE & JULY: 4 m
- TESTS RUN IN FEB., MAR. & APRIL: 6 m

SAFETY FACTOR = SF = 1m

DEPTH TO PROPOSED PUMP SUCTION (D_p) _____ m

CALCULATE MINIMUM AVAILABLE DRAWDOWN: $D_p - (D_{TW} + S_{30} + D + SF) =$

_____ - _____ + _____ + _____ + _____ = _____

IF ANSWER TO ABOVE CALCULATION IS NEGATIVE, THEN EITHER THE PUMP HAS TO BE SET LOWER OR THE WELL IS NOT CAPABLE OF SUPPLYING WATER FOR A HOUSE.

FORM F-9

**(PRIVATE)
AGREEMENT TO PAY
NON-REFUNDABLE DEPOSIT
NO. _____**

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

THIS AGREEMENT made this _____ day of _____, _____;

BETWEEN:

CITY OF CHILLIWACK, a Municipality incorporated under the “Local Government Act” of the Province of British Columbia, and having its Offices at 8550 Young Road, Chilliwack, British Columbia, V2P 8A4.

(hereinafter called the “CITY”)

OF THE FIRST PART

AND:

(hereinafter called the ““Owner/Developer””)

OF THE SECOND PART

WHEREAS:

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

(hereinafter called the “Lands”)

- B. The Owner/Developer desires to develop on the Land.

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:

The Owner/Developer agrees to pay the amount of \$ _____ as a non-refundable deposit towards the installation described as:

Initial

Initial

FORM F-9
(Page 2)

(PRIVATE)
AGREEMENT TO PAY NON-REFUNDABLE DEPOSIT

This payment is made pursuant to **Section 11.4** of “Land Development Bylaw 2014, No. 3055”, in force from time to time, and is made in lieu of construction of the Works and Services.

This payment is made as full compensation for the itemized Works and Services and fulfills all requirements of the “Land Development Bylaw 2014, No. 3055”, in force from time to time.

IN WITNESS WHEREOF the parties hereto have executed this contract the day and year first above written.

SIGNED AND DELIVERED in the)
presence of:)

Name: _____)

OWNER

Address: _____)

Occupation: _____)

The Corporate Seal of the)
CITY OF CHILLIWACK was)
hereunto affixed in the presence of:)

_____)
Mayor)

_____)
Clerk)

FORM F-9

**(CORPORATE)
AGREEMENT TO PAY
NON-REFUNDABLE DEPOSIT
NO. _____**

| |
|----------------------|
| DATE: _____ |
| CIVIC ADDRESS: _____ |
| FOLDER NO. _____ |

THIS AGREEMENT made this _____ day of _____, _____;

BETWEEN:

CITYOF CHILLIWACK, a Municipality incorporated under the *Local Government Act* of the Province of British Columbia, and having its City Offices at 8550 Young Road, Chilliwack, British Columbia, V2P 8A4.

(hereinafter called the “City”)

OF THE FIRST PART

AND:

_____, a company duly incorporated under the laws of British Columbia (Incorporation Number _____) having an office at _____, British Columbia,

(hereinafter called the ““Owner/Developer””)

OF THE SECOND PART

WHEREAS:

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

(hereinafter called the “Lands”)

B. The Owner/Developer desires to develop on the Land.

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:

The Owner/Developer agrees to pay the amount of \$ _____ as a non-refundable deposit towards the installation described as:

Initial Initial

FORM F-9
(Page 2)

(CORPORATE)
AGREEMENT TO PAY NON-REFUNDABLE DEPOSIT

This payment is made pursuant to Section 11.04 of “Land Development Bylaw 2014, No. 3055”, in force from time to time, and is made in lieu of construction of the Works and Services.

This payment is made as full compensation for the itemized Works and Services and fulfills all requirements of the “Land Development Bylaw 2014, No. 3055”, in force from time to time.

IN WITNESS WHEREOF the parties hereto have executed this contract the day and year first above written.

THE CORPORATE SEAL OF)
)
)
)
_____)
Authorized Signatory) OWNER
)
)
_____)
Authorized Signatory)
)
)
)
)
)
)
The Corporate Seal of the)
CITY OF CHILLIWACK was)
hereunto affixed in the presence of:)
)
)
_____)
Mayor)
)
)
_____)
Clerk)

FORM F-10

**COST SHARING AGREEMENT
(CORPORATE)**

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

Between:

CITY OF CHILLIWACK (Municipality)

and

NAME: _____

ADDRESS: _____

(Developer)

The Municipality agrees to pay the amount of \$ _____ towards the installation described as:

1. It is agreed between the parties to this agreement that the above amount paid shall be full compensation for the excess capacity required by the Municipality and that all costs associated in any way whatsoever with this installation which are in excess of the above amount shall be the full responsibility of the Developer to pay.
2. It is further agreed that the above amount will be paid as follows:
 - (a) Upon issuance of substantial completion \$ _____
 - (b) Upon receipt of all “As-Built Drawings” \$ _____
3. It is agreed that it is the sole responsibility of the Developer to arrange for the design and installation of the works according to City requirements.

The Corporate Seal of the
(Company) was hereunto affixed
in the presence of:

The Corporate Seal of the
City of Chilliwack was
hereunto affixed in the presence of:

Authorized Signatory

Mayor

FORM F-10

**COST SHARING AGREEMENT
(PRIVATE)**

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

Between:

CITY OF CHILLIWACK (Municipality)
and

NAME: _____

ADDRESS: _____
(Developer)

The Municipality agrees to pay the amount of \$ _____ towards the installation described as:

1. It is agreed between the parties to this agreement that the above amount paid shall be full compensation for the excess capacity required by the Municipality and that all costs associated in any way whatsoever with this installation which are in excess of the above amount shall be the full responsibility of the Developer to pay.
2. It is further agreed that the above amount will be paid as follows:
 - (a) Upon issuance of substantial completion \$ _____
 - (b) Upon receipt of all “As-Built Drawings” \$ _____
3. It is agreed that it is the sole responsibility of the Developer to arrange for the design and installation of the works according to City requirements.

The Corporate Seal of the
(Company) was hereunto affixed
in the presence of:

The Corporate Seal of the
City of Chilliwack was
hereunto affixed in the presence of:

Owner's Signature

Name of Witness

Address of Witness

Mayor

Clerk

FORM F-11

INSURANCE CERTIFICATION

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

RE: DEVELOPER: _____

PROJECT NO.: _____

INSURANCE POLICY NO.: _____

PURSUANT TO SCHEDULE “A” of the Land Development Bylaw 2014, No. 3055”, in force from time to time, the Developer is required to obtain and maintain in force during the term of the Servicing Agreement an insurance policy acceptable to the Municipality.

I hereby certify that the attached insurance policy provides insurance coverage as required pursuant to clauses 19 and 20 of the Servicing Agreement between the Corporation of the City of Chilliwack and the Developer and that the attached insurance policy is valid for the period of the Servicing Agreement (one year).

Certified By (Authorized Insurance Agent)

Company

Address

FORM F-12

DRAINAGE CERTIFICATION

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

RE: PROJECT NO: _____

DEVELOPER: _____

DATE: _____

Pursuant to “Land Development Bylaw 2014, No. 3055”, in force from time to time;

I hereby certify that downstream drainage facilities for a distance of 1.5 km have been checked with respect to line, grade and size, and that downstream facilities are capable of handling the projected increase in drainage created by this project, without causing any adverse effect to City or Private property.

Certified by DESIGN ENGINEER

Company & Address

PROFESSIONAL SEAL
(Signed & Dated)

FORM F-13

NOTICE OF RELEASE

DATE: _____

CIVIC ADDRESS: _____

FOLDER NO. _____

RE: Developer: _____

Project No: _____

Contractor: _____

Civic Address of Property: _____

The owner of the above property hereby acknowledges by way of signing this form that any landscaping, lot grading or plantings, etc., affected by the Developer/Contractor's works have been reinstated to the Property Owner's satisfaction.

Signature of Property Owner

Notwithstanding the Property Owner having signed this release form, where ground settlement occurs or plantings are affected, the Property Owner is to contact the Developer/Contractor to resolve the matter. Where a dispute arises between the Developer/Contractor and the Property Owner, the Manager of Land Development of the City will endeavor to act as mediator to resolve the matter.

FORM F-15 - CONFIRMATION OF COMMITMENT

DATE: _____ FOLDER NUMBER:

CIVIC ADDRESS:

To:

The City of Chilliwack

Re:

Name of Project (Print)

Description of Project (Print)

The undersigned has been retained as a Coordinating Registered Professional to coordinate the design work and City submissions of the Registered Professionals required for this project in order to ascertain that the design and construction of the project will substantially comply with this Bylaw.

The Owner and the Coordinating Registered Professional understand that where the Coordinating Registered Professional or a Registered Professional ceases to be retained at any time during construction, the work on the above project will cease until such time as a new Coordinating Registered Professional or Registered Professional, as the case may be, is retained in that profession/discipline relevant.

The undersigned Coordinating Registered Professional certifies that they are a Registered Professional and agrees to coordinate the design work and City submissions of the Registered Professionals required for the project.

Coordinating Registered
Professional's Seal and Signature

Name (Print)

Address (Print)

Owner's Signature

Name (Print)

Address (Print)

Date

Date

FORM F-16 - SUBSTANTIAL COMPLETION PRE-INSPECTION CHECKLIST

DATE: _____ FOLDER NUMBER: _____

CIVIC ADDRESS: _____

INSPECTOR: _____

CONTRACTOR: _____

To be completed prior to Substantial Completion inspection:

DOCUMENTATION

| YES | NO | N/A | N/R |
|-----|----|-----|-----|
| | | | |
| | | | |
| | | | |

- Has the Form F-2 - Certificate of Inspection been submitted to the City?
- Have the record drawings been submitted to the City (hardcopy and CAD)?
- Have the Service Record Cards been submitted to the City?

SANITARY AND STORM SEWERS

| YES | NO | N/A | N/R |
|-----|----|-----|-----|
| | | | |
| | | | |
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- Have the air test reports been submitted to the City?
- Have the video inspection reports been submitted to the City?
- Have the systems been flushed and cleaned?
- Are the service locations stamped at the curb?
- Have the manholes been grouted smooth?
- Are the manhole ladders to MMCD and WCB specifications?
- Are the correct manhole lids installed?
- Have bolts been installed in sanitary manhole lids?
- Do all catch basins have trapping hoods?

WATER MAINS

| YES | NO | N/A | N/R |
|-----|----|-----|-----|
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- Are the service locations stamped at the curb?
- Have all the valves been installed?
- Have air release valves been installed and tested?
- Are the correct manhole lids installed?
- Have the correct valve covers been installed?
- Are valve boxes clean and accessible?
- Have asphalt aprons been installed and staked?
- Have all the hydrants been painted to City specifications?
- Is bottom of hydrant 150 mm to 200 mm above final grade?
- Have the plumbing approvals been received?

Are all swales and lawn basins installed?
Has general site cleanup been done?
Are all silt control systems in place and functioning?
Are safety fences in place around silt pond?
Is vegetation planted as specified?
Are boulevards landscaped as required?
Are existing boulevards repaired as required?

CITY OF CHILLIWACK

“Land Development Bylaw, 2014, No. 3055”

Schedule “B”

**City of Chilliwack
Servicing Agreement**

Available from the Development and Regulatory Enforcement Services Department

CITY OF CHILLIWACK

SERVICING AGREEMENT

NO. _____

between

CITY OF CHILLIWACK

and

Schedule “B”

“Land Development Bylaw 2014, No. 3055”

Folder No.: _____

City of Chilliwack Servicing Agreement No.: _____

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SERVICING AGREEMENT

THIS AGREEMENT made this _____.

BETWEEN:

CITY OF CHILLIWACK, a municipality duly incorporated under the “Local Government Act” of the Province of British Columbia, and having its Municipal Offices at 8550 Young Road, Chilliwack, British Columbia, V2P 8A4

(hereinafter called the “City”)

OF THE FIRST PART

AND:

_____, a company duly incorporated under the laws of British Columbia

(Incorporation Number _____) having an office at _____

(hereinafter called the “Owner”)

OF THE SECOND PART

WHEREAS:

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

Civic Address: _____

Legal Description: _____

Parcel Identifier: _____

(hereinafter called the “Lands”)

B. the Owner desires to develop on the Land.

C. The Chief Building Inspector of the City has agreed to issue a building permit for a building(s) subject to the terms and conditions contained in this Contract, and the posting with the City of the Security Deposit described herein.

Initial Initial

City of Chilliwack Servicing Agreement No.: _____

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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:

1. APPENDICES:

The following Appendices will be read with and form part of this Agreement:

- Appendix “A” – A copy of the site Development plan of the Lands;
- Appendix “B” – 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.

2. OWNER TO DO WORK:

The Owner covenants and agrees to construct and provide all the Works and Services listed and shown on Appendices “B” and “C” attached hereto, as approved by the City, as per the standards contained in Schedule “A” of the City’s Land Development Bylaw, in force from time to time.

3. TRANSFER OF INTEREST IN WORKS:

The Owner covenants and agrees with the City to assign, transfer and convey to the City all of its right, title and interest in the works 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 Substantial Completion.) The Owner will from time to time and at all times so long as it exercises any rights of Ownership in the said lands upon the request of the City, make, do and execute or cause or procure to be made, done and executed, all such further acts, deeds, rights of way, easements and assurances for the more effectual carrying out of this Agreement.

4. PERMISSION TO DO WORK:

The City covenants and agrees to permit the Owner to construct the works, including that portion of the works to be constructed on dedicated Highways controlled by the City; on the terms and conditions herein, and in the manner required by and at the places specified in the Plans and Specifications; provided that nothing in this Agreement shall be construed as an undertaking, promise or covenant on the part of the City to make available the use of or access to the works for any purpose, and without limiting the foregoing, for the purpose of serving the Lands or any other real property whatsoever either owned or controlled by the Owner or it associates otherwise, but rather the City 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 its Council from time to time deems fit.

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5. CHANGES TO BYLAWS:

The Owner covenants and agrees to comply with any changes in Subdivision requirement or standards enacted by Bylaw prior to the actual commencement upon the lands of the works contemplated by this Agreement.

6. LOT GRADING:

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 Plans prepared by the Professional Engineering and/or Engineering Company indicated in Clause 11 hereof, and which are attached as Appendix “C” to this Agreement.

7. START OF WORK:

The Owner covenants and agrees not to commence work until the City’s Manager of Land Development provides the Owner with a signed Form F-1 - Permission to Construct provided in Schedule “A” of the City’s Land Development Bylaw, in force from time to time.

8. COMPLETION OF WORK:

The Owner shall complete the construction of the works, specified in Appendix “C” as Folder Number: _____ of the City, to the satisfaction of the City by _____.

9. OWNER TO GRANT RIGHTS OF WAY:

The Owner to grant to the City all necessary road dedications, statutory rights of way and easements over the said lands to accommodate the said works and, where the said works are located upon or under privately owned lands other than the said lands, to obtain at the Owner’s expense, all necessary road dedications, statutory rights of way and easements over such lands, in favour of the City where applicable to accommodate the said works.

10. DESIGN BY PROFESSIONAL ENGINEER:

(1) 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 of British Columbia and retained by the Owner. Plans and specifications for the said works shall be prepared by or under the direct supervision of the said Professional Engineer and all plans shall bear his profession seal and signature.

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- (2) The Owner covenants and agrees to ensure that his Engineer (as specified in Section 11) maintains professional liability, and errors and omissions insurance to a value of \$250,000.00 per occurrence during the term of his engagement.
- (3) The Owner covenants and agrees to retain the Professional Engineer during the construction period for the purposes of inspection to ensure compliance with the approved design and to provide Form F-2 - Certificate of Inspection as per Schedule “A” of the City’s Land Development Bylaw, in force from time to time.

11. ENGINEERING DRAWINGS:

The Owner covenants and agrees that the intent of this Agreement is that the Owner shall construct fully completed works, and grant all necessary easements as shown in the plans and specifications prepared by _____ under Project Number _____, Drawing Numbers _____ to _____, and as received for the purposes of this Agreement by the Development and Regulatory Enforcement Services Department of the City on _____.

12. CHANGES TO DESIGN BY THE CITY:

The City’s Engineering Director may alter the plans, because of conditions at the site, so that the works function and operate in a manner satisfactory to the City’s Engineering Director. Should the works, as provided herein, prove to be in any way defective or should they not operate to the satisfaction of the City’s Engineering Director, then the Owner shall, at his own expense modify and reconstruct the works so that the works shall be fully operational and function to the satisfaction of the City’s Manager of Land Development.

13. SUBSTANTIAL COMPLETION:

The Manager of Land Development shall provide a signed Form F-3 - Certificate of Substantial Completion, as per Schedule “A” of the City’s Land Development Bylaw, in force from time to time, listing all the deficiencies upon completion of the construction. Form F-3 - Certificate of Substantial Completion shall not be construed as acceptance of the works.

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14. RECORD DRAWING SUBMISSION:

The Owner covenants and agrees to submit to the City the final record drawings, and any test results, as accepted by the City’s Manager of Land Development, pursuant to Schedule “A” of the City’s Land Development Bylaw, in force from time to time, prior to the Manager of Land Development issuing Form F-3 - Certificate of Substantial Completion.

15. MAINTENANCE PERIOD AND RESPONSIBILITY:

- (1) The Owner covenants and agrees to maintain every part of the works in perfect order and in complete repair for a period of one year from the date shown on Form F-3 - Certificate of Substantial Completion as per the requirements of the City’s Land Development Bylaw, in force from time to time.
- (2) Should the Owner, for any reason, fail to maintain when ordered, then the City’s Manager of Land Development, at his option, after giving the Owner seven days written notice (emergencies excepted), may do so, and the whole costs, charges and expenses so incurred by the City will be payable by the Owner, as provided for herein. The decision of the City’s Manager of Land Development will be final with respect to the necessity for repairs, or the adequacy of any work done.

16. CERTIFICATE OF ACCEPTANCE:

The City 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 a period of one year, the City’s Manager of Land Development shall provide the Owner with a signed Form F-4 - Certificate of Acceptance, as per Schedule “A” of the City’s Land Development Bylaw, in force from time to time. Notice of acceptance of the work will be issued by the City’s Manager of Land Development, when all deficiencies have been corrected, record drawings and service record cards received, and the maintenance period outlined herein has expired. All such Works and Services remain at the risk of the Owner until the Form F-4 - Certificate of Acceptance for the work has been issued.

17. FINAL BUILDING INSPECTION WITHHELD:

The Owner covenants and agrees that the City 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’s Manager of Land Development.

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18. OWNER INDEMNIFIES CITY:

The Owner covenants and agrees to save harmless and effectually indemnify the City against:

- (1) All actions and proceedings, costs, damages, expenses, claims, and demands whatsoever and whosoever brought by reason of the execution of the works required by this Agreement. All such claims recoverable from the City, or the property by duty or custom is obliged, directly or indirectly, in any way or to any degree, to construct, repair, or maintain during the term of the Owner’s work, shall be paid by the Owner, and if recoverable from the City shall, together with any costs and expenses incurred in connection therewith, be charged and paid forthwith by the Owner.
- (2) All expenses and costs which may be incurred by reason of the execution of the required works by the City’s Land Development Bylaw, in force from time to time, resulting in damage to any property owned in whole or in part by the City for which the City by custom or duty is obliged, directly or indirectly, in any way or to any degree, to construct, repair or maintain, shall be paid by the Owner, and if paid by the City shall together with any costs and expenses incurred in connection herewith be charged to and paid forthwith by the Owner.
- (3) All expenses and costs which may be incurred by reason of liens for non-payment of labour or materials, Workmen’s Compensation assessments, unemployment insurance, federal or provincial tax, and for encroachments due to mistakes in survey, and all such claims recoverable from the City, or the property of the City, or any property which the City by duty or custom is duly obliged directly or indirectly, in any way or to any degree, to construct, repair, or maintain shall be paid by the Owner, and if recovered from the City shall, together with any costs and expenses incurred in connection therewith, be charge to and paid forthwith by the Owner.
- (4) All expenses and costs which may be incurred by the City as a result of faulty workmanship and defective material in any of the works installed by the Owner.

The above clauses shall not be constructed as to extinguish any rights which the City would have were it not for the inclusion of this Section 18 in this Agreement.

19. INSURANCE BY OWNER:

The Owner will at his sole expense throughout the current of the work carry Comprehensive Liability Insurance acceptable to the City in the amount of at least \$5,000,000.00 with insurance companies licensed to carry on business in the Province of British Columbia in partial discharge of its obligation under Section 18.

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20. SECURITY DEPOSIT:

As security for the due performance of all of the covenants and promises contained in this Agreement the Owner has forthwith deposited with the City a Security Deposit in the amount of \$_____ (\$_____ x 125%), in the form of cash or an irrevocable Letter of Credit acceptable to the City (herein called the “Security Deposit”).

21. FORFEIT OF SECURITY DEPOSIT:

In the event that the Owner fails to construct and install the Works and Services prescribed herein within the time specified in Section 8, the said Security Deposit of \$_____ will be forfeited to the City.

22. USE OF SECURITY:

The Owner agrees that if all the works or obligations are not completed, installed or performed pursuant to this Agreement, the City may complete or fulfill the works or obligations at the cost of the Owner and deduct from the Security Deposit held by the City the cost of such completion, and the balance of the deposit shall be returned to the Owner, less any additional administration fees or costs incurred. If there is insufficient money on deposit with the City then the Owner will pay such deficiency to the City immediately upon receipt of the City’s bill for completion. It is understood that the City may do such work either by itself or by contractors employed by the City. If the works are completed as herein provided, then the deposit shall be returned to the Depositor.

23. RELEASE OF SECURITY:

If the City’s Manager of Land Development 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 City as a result of, or arising from, the construction of the works, the City’s Manager of Land Development may return all, or any portion of the Security Deposit to the Owner at such times and in such amounts as he may deem proper, provided only that he will retain an amount equal to 10% of the estimated cost of total works or \$5,000.00 whichever is greater, as certified by the Project Engineer, to secure the performance of the maintenance required of the Owner (hereinafter called the “Maintenance Deposit”).

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24. RETURN OF MAINTENANCE DEPOSIT:

If the City’s Manager of Land Development is satisfied that the Owner has complied with the covenants contained in this Agreement and if there is no litigation pending or threatened by any third party against the City as a result of, or arising from, the construction of the works, the City’s Manager of Land Development may direct that the Maintenance Deposit be returned to the Owner and thereafter the Owner’s responsibility for the works shall cease.

25. ADMINISTRATION FEE:

The Owner covenants and agrees to pay to the City a non-refundable fee in the amount of \$ _____ (\$ _____ x 1.5%) to cover City Administration and processing costs. These fees are payable prior to the signing of this Agreement or the commencement of construction of the works.

26. NO OTHER REPRESENTATIONS:

It is understood and agreed that the City has made no representations, covenants, warranties, guarantees, promises or agreements (verbal or otherwise) with the developer other than those in this Agreement and except those required by the Approving Officer.

27. COMPLIANCE WITH BYLAWS:

Subject to this Agreement, the within works and the Development herein shall comply with all of the Bylaws of the City of Chilliwack.

28. NO WAIVER:

The Owner covenants and agrees that nothing contained or implied herein shall prejudice or affect the rights and powers of the City in the exercise of its functions under any public and private statutes, bylaws, orders and regulations, all of which may be fully and effectively exercised in relation to the said lands as if the Agreement had not been executed and delivered by the Owner.

29. THIS CONTRACT SHALL ENURE TO THE benefit of and be binding upon the parties hereto, their respective successors and assigns.

Initial

Initial

City of Chilliwack Servicing Agreement No.: _____

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IN WITNESS WHEREOF the parties hereto have executed this contract the day and year first above written.

Execution(s):

| | Y | M | D | |
|---------|---|---|---|--------------------------------------|
| _____ | | | | by its Authorized signatory (ies) |
| | | | | _____ |
| | | | | _____ |
| _____ | | | | |
| Witness | | | | |
| | | | | |
| | | | | |
| | | | | CITY OF CHILLIWACK |
| | | | | by its authorized signatories |
| | | | | _____ |
| | | | | Mayor |
| | | | | _____ |
| | | | | Clerk |

Initial

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APPENDIX “A”

A copy of the site Development plan of the Lands.

See the property file for construction drawings to be used for construction of the works”.

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APPENDIX “B”

A list of the works and an estimate of their respective construction costs.

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APPENDIX “C”

Construction drawings to be used for the construction of the works”

See the property file for construction drawings to be used for construction of the works

Initial

Initial