

***DEVELOPMENT STANDARDS & PROCEDURES***

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**1. INTRODUCTION TO STANDARDS**

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## 1. INTRODUCTION TO STANDARDS

### 1.1 FORWARD

The Town of Slave Lake's *Development Standards and Procedures* are intended to provide a uniform and consistent foundation of design for those parties interested in developing land within the Town of Slave Lake. These Standards are referenced within development agreements between the Town and individual Developers and all development must conform to these guidelines. Departure from these Standards will only be permitted with the written approval from Town Council.

These Development Standards refer to this community's basic minimum development requirements. Using this guide, the Developer's Consulting Engineer must apply sound engineering principles and judgement in preparing the design for new development. The Town Engineer must be advised of any complication or special conditions involved with development proposals so that approvals can be based on a clear understanding of same.

These Development Standards will provide enough flexibility to explore reasonable alternatives while maintaining good engineering and construction practices. However, they shall take precedence and govern in case of any inconsistency or conflict between the various Town Departments. The input from interested parties is always encouraged and the Standards will be updated from time to time. These revisions will be available on request from the Town's Operations Department.

### 1.2 SLAVE LAKE HISTORY AND BACKGROUND

The Town of Slave Lake was relocated from the Lesser Slave River to its present location following rising lake levels and flooding that occurred in 1935. It became a village in 1961 with a population of about 500 people. The oil boom in the 1960's resulted in rapid growth for the Town with major housing shortages causing many challenges for Town administration. Nevertheless, the Town managed this boom and local development has evolved with a more stable platform of growth. Presently, forestry, oil & gas, and tourism are the region's main industries with the local economy remaining strong despite the cyclical nature typical of resource-based industries.

The community's population has become more permanent in nature with much of the formerly transient population taking roots and settling in the area. The Town's population has an above average percentage of young and school age children with a relatively small number of seniors.

A substantial amount of information is available from various existing Town reports, studies, and planning documents including the Municipal Development Plan, Land Use

Bylaw, Transportation Study, Downtown Area Plan, Sewer and Water Studies, and the South Expansion Area Structure Plan.

Soil conditions in the Slave Lake area are predominantly silty and sandy and are located within the frost susceptible range. Water tables are high and sanitary sewers require *special attention* to avoid infiltration. Sub-grade improvements for local road pavement construction usually require special considerations. Granular materials for asphaltic wearing surface courses are not abundant and care must be taken to ensure proper quality mixes.

### 1.3 TOWN AND DEVELOPER RELATIONSHIP

The Town of Slave Lake encourages the private development of residential, commercial and industrial properties. The Town endeavors to maintain a cooperative relationship with private developers. The Development Agreement sets out the normal responsibilities between the individual parties and how municipal improvements will be accepted and maintained.

### 1.4 DEFINITIONS

"*Consulting Engineer*" shall mean the consulting professional engineer registered to practice engineering in the Province of Alberta, retained by the Developer, at the Developer's expense.

"*Developer*" shall mean the party with whom the Town enters into a Development Agreement for development of a subdivision area described therein.

"*Development Agreement*" shall mean the agreement entered into between the Town of Slave Lake and the Developer setting out the terms, conditions and requirements for development of the subdivision area described therein.

"*Development Area*" shall mean the total area acknowledged in the Development Agreement to be the developer lands which are proposed to be developed by the developer over a period of time based on terms, conditions and requirements which may be agreed upon from time to time for each subsequent phase of development.

"*Director of Community Development*" shall mean the person or the authorized representative employed or retained by the Town at the Town's expense to administer its parks, recreational and cultural facilities and programs.

"*Director of Operations*" shall mean the person or the authorized representative employed or retained by the Town at the Town's expense to administer the municipal improvements.

"*Land Use Bylaw*" shall mean the Town's Land Use Bylaw enacted under the provisions of the Municipal Government Act.

"*Maintenance Period*" shall mean the two-year guarantee period with respect to municipal improvements following acceptance of the municipal improvements by the Town as set out in the Development Agreement.

"*Municipal Improvements*" shall mean the services and facilities to be provided by the Developer for acceptance by the Town as set out in the Development Agreement and subject to the maintenance period.

"*Municipal Planning Commission*" shall mean the Town's Municipal Planning Commission appointed by the Town in accordance with the Municipal Government Act.

"*Off-site Levies*" shall mean those levies required to be paid by the Developer to the Town in accordance with the Town's Bylaws and the terms of the Development Agreement for the prorated share of water and sewage facilities constructed or to be constructed by the Town.

"*Planning & Development Officer*" shall mean the Planning & Development Officer or authorized representative employed or retained by the Town, at the Town's expense, to administer the Land Use Bylaw or the land use regulations as set out in the Municipal Government Act.

"*Security*" shall mean the security to be provided by the Developer to the Town to ensure the construction and installation of the municipal improvements by the Developer are in accordance with the terms, conditions and requirements set out in the Development Agreement.

"*Subdivision Area*" shall mean the portion of the development area that the Developer proposes to develop in accordance with the terms, conditions and requirements of a Development Agreement to be entered into between the Town and the Developer.

"*Town*" shall mean the Town of Slave Lake.

"*Town Council*" shall mean the duly elected Town Council of the Town of Slave Lake.

"*Town Engineer*" shall mean the professional engineer or engineers employed or retained by the Town at the Town's expense.

"*Utility Foreman*" shall mean the Town employee or his representative appointed by the Town to specifically operate and maintain the Town's sewer and water utility systems.

## 1.5 ABBREVIATIONS

A.W.W.A.	American Water Works Association
B.C.	Beginning of Curve
B.V.C.	Beginning of Vertical Curve
C.S.A.	Canadian Standards Association
D.R.	Dimension Ratio - pipe diameter divided by the thickness of the pipe wall
E.C.	End of Curve
E.V.C.	End of Vertical Curve
G.I.S.	Geographic Information System
ha	hectare
igcd	imperial gallons per capita per day
k Pa	kilo Pascal
L	Litre
L/s	Litres per second
L.U.B.	Land Use Bylaw
m	metres
ML	Million Litres
mm	Millimetre
M.P.C.	Municipal Planning Commission
m/s	metres per second
P.I.	Point of Interest
P.L.	Property Line
p.p.a.	persons per acre
p.s.i.	pounds per square inch
P.V.I.	Point of Vertical Interest
s	second
TAC	Transportation Association of Canada
UAD	Urban Arterial Divided
UAU	Urban Arterial Undivided
UCD	Urban Collector Divided
UCU	Urban Collector Undivided
u/g	underground
ULU	Urban Local Undivided

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## 2. PROCEDURES FOR DEVELOPMENT

### 2.1 DEVELOPMENT PROCESS

#### 2.1.1 Preliminary Discussions

Developers must familiarize themselves with the development requirements and standards of the Town of Slave Lake. Initial discussions should take place with the Planning & Development Officer *and* the Director of Operations in order to obtain background information, details of any outstanding commitments relating to the land, development concepts and related items.

The Developer will be required to present the Town with a preliminary development proposal. Such proposal must be in accordance with the Municipal Development Plan and any other approved plans such as Area Structure Plans, Parks Master Plan, Engineering Studies and other approved reports.

Where changes are proposed to existing plans, the Developer must follow the necessary procedures to obtain the required approvals.

The Developer may be required to undertake studies to supplement available information required in support of the development proposal or in the review of alternatives.

A Professional Engineer registered in the Province of Alberta, or another qualified professional in this field, must prepare submissions, drawings, studies and reports.

Additional information required may include but is not limited to:

- design briefs
- conceptual designs
- alternative designs
- pre-design reports
- geotechnical reports
- design calculations
- traffic impact analyses
- water distribution network analyses
- environmental impact assessment

It is advised that the Developer, during the early stages of development planning, initiate a public information and relations program to keep the general public and abutting property owners informed of the proposed development in order to address the impact it might have on the Community.

#### 2.1.2 Municipal Development Plan

The Town's Municipal Development Plan is the senior level planning document and functions as the overall Community Plan that has been approved by Council Bylaw.

The Municipal Development Plan gives direction for the Town concerning anticipated growth and types and patterns of development. The Plan addresses specific issues and sets out the goals and objectives regarding same.

Development proposals must conform with the intent of this planning document as they relate to proposed uses and development guidelines.

### 2.1.3 Area Structure Plan

Area structure plans are the Town's second level planning documents, which address development within specific areas in much greater detail than the Municipal Development Plan. The scope of the document depends on the development requirements and can vary from a rather comprehensive planning document to a cursory overview of planning principles.

All development proposals must take into consideration the planning principles and guidelines set out in the Area Structure Plan once adopted by Bylaw. Additional information may have to be provided by the Developer to supplement available information.

Where no such plan is in place, the Developer may be required to prepare an Area Structure Plan for approval by the Town. The Planning & Development Officer, and/or the Municipal Planning Commission, concerning items or issues that must be addressed within any proposed Area Structure Plan, may provide specific direction. The cost of preparation of the Plan may be shared on an acreage basis with other landowners. A recovery mechanism would be provided for in the Development Agreement as a shared cost recoverable when other landowners propose development within the area.

### 2.1.4 Outline Plans

An Outline Plan may or may not be required, depending on the location and extent of the development proposal. An Outline Plan defines an area within an Area Structure Plan that is proposed for development and requires further detail of land use, municipal servicing and infrastructure.

If an Outline Plan is required, it should include the following:

- local street lay out with right-of-way widths
- pedestrian walkway circulation system
- required parks and block parks, open space and buffer areas
- servicing layout for all utilities including water distribution, sanitary sewage collection, storm drainage, power, gas, telephone and cable system
- any special constraints or facilities that have an impact on development of the area under consideration
- calculations for design loading for the various infrastructure requirements
- proposed lot sizing

#### 2.1.5 Development Agreement

A Development Agreement may be required from the Town prior to the approval of a development permit application or subdivision application. The Development Agreement is a contract that the Developer and the Town of Slave Lake enter into to ensure that the completion of municipal servicing and infrastructure occurs with all works being performed in compliance with all Municipal, Provincial and Federal Codes and Regulations.

The Developer (and/or his representative) will work with the Town's Operations Department to prepare a Development Agreement. Once the Developer has signed the Agreement, it must be approved by Town Council before final adoption.

The Town's Planning & Development Officer will prepare the Development Agreement based on a standard formula used for all developers, but can include specific clauses as required. The Development Agreement will, as much as possible, establish uniform requirements for all developers. A sample index of items includes the following:

*STANDARD DEVELOPMENT AGREEMENT - TABLE OF CONTENTS*

1. Interpretation
2. Plan of Subdivision
3. Plans
4. Construction and Installation of Municipal Improvements
5. Installation of Power, Gas, Telephone and Cable T.V.
6. Contracts for Installation of the Municipal Improvements
7. Construction and Installation of the Landscaping Required
8. Compliance with All Plans and Specifications
9. Acceptance of Municipal Improvements - Transfer of Municipal Improvements to Town
10. Maintenance of Municipal Improvements by Developer
11. Use of Public Ways in the Performance of the Work
12. Utility Easements
13. Municipal Services
14. Fencing
15. Maintenance of Boulevards and Other Public Areas and Site Control
16. Developers Share of Municipal Improvements by the Town and Others, Shared Costs of Municipal Improvements Installed by Developer
17. Off-Site Levies
18. Interest on Monies Owed to Town
19. Amounts Payable Under this Agreement
20. Default by the Developer
21. Arbitration
22. Indemnity and Security
23. Conditions for Development for Specific Items
24. Municipal Improvements for Certain Dedicated Municipal Reserves
25. Delivery of Documents to Town
26. Compliance with Law
27. Law of Alberta Applicable
28. Further Assurances
29. Waiver
30. Notices
31. Non-Assignability of Agreement
32. Time of the Essence
33. Future Development Within the Development Area

Schedule "A" - Plan of Development Area and Subdivision Area

Schedule "B" - Agreed Standards

Schedule "C" - Other Municipal Improvements

Schedule "D" - Municipal Improvements by Others

### Schedule "E" - Shared Costs of Municipal Improvements

The Developer will be required to deliver, and deposit with the Town, security in the form of an Irrevocable Letter of Credit that guarantees the performance of all the terms and conditions of the Development Agreement. The amount of security is determined by the Town's Director of Operations in accordance with the following general guidelines:

- The initial amount of security shall be 50% of the total estimated costs of all Municipal Improvements to be installed by the Developer plus 100% of the total off-site levies.
- Security shall be provided in the form of an Irrevocable Letter of Credit.
- Reduction of security will be considered following acceptance of portions of the Municipal Improvements providing that the total amount remaining shall not be less than 100% of the total estimated cost of the Municipal Improvements not yet accepted, plus 20% of all accepted Municipal Improvements still subject to the provisions of the required guarantee period, plus 100% of the total off-site cost levies remaining outstanding.
- An increase in security may be required *at any time* by the Town Engineer if conditions develop during the course of the development or construction of the Municipal Improvements that indicate that the Developer does not apply himself to the development requirements or when the risk by the Town increases beyond the initial amount of risk. This may be due to increased construction costs, poor soil conditions, market conditions or any other factor that was not considered at the time of establishing the original security amount. Increases will not be considered for minor matters and the Town will entertain reasonable requests by the Developer to modify the Development Agreement requirements providing that the overall Town's interests are not jeopardized.

The Development Agreement will include the construction of all Municipal Improvements within the defined "Subdivision Area". This may require the Developer to front-end construction that may benefit future adjacent development lands. The Town will, in these cases, allow in the Development Agreement a recovery mechanism for these shared costs from future developers as a precondition to the Town entering into a Development Agreement with such future developers. Similarly, the Town will require the Developer to pay outstanding development costs by other developers prior to entering into the Development Agreement. Off-site levies will be payable by the Developer when

selling a lot or at the time of a Development Permit Application, whichever occurs first.

#### 2.1.6. Rezoning

Generally, Council attaches undeveloped lands scheduled for development with an Urban Reserve land use designation. This designation implies that prior to establishing a specific land use, all requirements set out in the Municipal Development Plan, Area Structure Plan and/or the Outline Plan for which the development is proposed must be met.

The rezoning application can be made *after* the Municipal Planning Commission has approved the preliminary subdivision plan in principle and a clear understanding has been established regarding the limits of the proposed lands contemplated by the Development Agreement. The Land Use Bylaw amendment will be given first reading and a date for a public hearing set by Town Council. Abutting property owners will be notified in writing of the proposed Land Use Bylaw Amendment in addition to the advertising in the local newspaper for two consecutive weeks. After the Public Hearing, the Town Council may give second and/or third reading to the Bylaw in its original form or as amended. As part of the Developer's public information and public relations program, it is suggested that the Developer make as much information available as soon as possible to inform adjacent landowners and the general public. Preliminary joint Municipal Planning Commission and Developer's public meetings can be scheduled within the rezoning process.

#### 2.1.7 Subdivision Plan, Right-of-Way Plan, and Easements

The Municipal Planning Commission is the Subdivision Approving Authority for the Town of Slave Lake. The Municipal Government Act; The Subdivision and Development Regulations; relevant statutory plans; and the Land Use Bylaw shall govern all decisions made by this body. The Commission will also consider administrative recommendations in regards to relevant planning considerations.

There is a sixty-day time limit in which the subdivision approval authority must make a decision. The Town must advise that the lands are properly zoned and that a development agreement is in place for the servicing of the property. Therefore, it is important to make sure that the zoning and development agreement matters have been reviewed and discussed prior to making a subdivision application (*see Appendix I*).

Once the development agreement has been executed, the Town will advise the Subdivision Approving Authority so that the subdivision can be registered. The Developer must, at the same time as he submits a registrable subdivision plan to

Alberta Land Titles, submit a Right-of-Way Plan showing required utility rights-of-way together with acceptable easement documents in the name of the Town of Slave Lake for concurrent registration with the subdivision plan. The utility easements must meet the approval of the Town. The Town will also require the approval in writing from the various utility companies indicating that all the rights-of-way requirements have been met.

#### 2.1.8 Design Approval by the Town

1. The Developer shall retain a Consulting Engineer who shall be responsible for the design and construction of the municipal improvements and the coordination of installation of power, gas, phone, lighting and cable TV utilities.
2. The Consulting Engineer shall initiate preliminary discussions with the Director of Operations and the Planning & Development Officer about the proposed development concepts that may be considered by the Developer. Such concepts shall be in accordance with the various land use planning documents that have been adopted by the Town. Where other alternatives are suggested by the Developer, the Consulting Engineer will be required to supply the necessary design reports, which will support the request for a change in concept. The Director of Operations may require additional design briefs, alternate designs, pre-design report or geotechnical reports in support of a development proposal.

The Director of Operations will make available information, plans, reports or other details that might have been previously prepared and which may be relevant to the proposed development.

3. All municipal services shall be designed and constructed in accordance with these Development Standards and Procedures and shall be in accordance with accepted engineering design and practices.
4. In areas where the Municipal Development Plan (M.D.P.) requires further study or where Area Structure Plans and/or Outline Plans are not available, the Consulting Engineer must proceed with the required documentation, submission of plans and obtain the necessary approvals through requests for amending Bylaws, public hearings, Municipal Planning Commission review and obtain formal adoption of the necessary planning documents prior to submission of preliminary subdivision development plans. Cost recovery for the preparation of such mandatory planning documents can be provided for in the proposed Development Agreement, if the benefiting area exceeds the Developer's lands.



5. The Consulting Engineer shall, in his design work, take full consideration of existing conditions and services and base high design on a thorough understanding of soil and groundwater conditions, existing services, climatic exposures, and any special environmental concerns. Where considered necessary by the Director of Operations, special surveys, investigations or reports may be required in support of the proposed design.
6. The quality of existing as-built information supplied by the Town is not in all cases reliable and must be verified in the field by the Consulting Engineer. The Developer will be required to extend the network of Alberta Survey Control Monuments in the Subdivision Area to the standard density for urban subdivisions.
7. During the design process the construction requirements for the subdivision area will be discussed between the Consulting Engineer and the Director of Operations. Terms for cost sharing and construction requirements left for future Development Agreements will be determined for inclusion in the proposed Development Agreement.
8. The design process parallels the rezoning process and the design information must be available for public review and the Municipal Planning Commission in order to be able to properly evaluate the proposed rezoning and to advise the general public of the proposed terms of the Development Agreement. The public input process may also bring to light additional matters to be included in the proposed Development Agreement.

### 2.1.9 Approval of Detailed Plans by Town

1. The Town of Slave Lake shall not review any submissions of servicing arrangements from a Developer's Consulting Engineer without the Developer having entered into a Development Agreement with the Town.
2. The Consulting Engineer shall submit two (2) complete sets of detailed plans and specifications for approval by the Town Engineer. A Consulting Engineer registered in the Province of Alberta must seal the plans and specifications.

A "Development Meeting" shall be scheduled by the Consulting Engineer during which preliminary drawings can be reviewed by all affected parties and all comments by the Director of Operations and/or the Town Engineer, and franchised utility companies, can be provided to the Consulting Engineer prior to submission of detailed drawings for approval.

3. The review of drawings by the Town Engineer will be expedited as much as conveniently possible. Should it be determined that special reports, such as network analysis, geotechnical reports, specialty designs reports including pavement design, structural design reports, etc. are required, these reports will be submitted by the Consulting Engineer with the detailed Plan and Specifications for approval.
4. The Director of Operations will, within three (3) weeks, either approve the detailed plans and Specifications (with or without required revisions) or advise the Consulting Engineer of required changes or additions. All costs associated with the Town Engineer's review of any more than one (1) required revision to the detailed servicing plans and specifications shall be borne solely by the Developer.
5. The detailed drawings and specifications shall be complete and shall adequately detail all the municipal services to be constructed by the Developer.

They shall include at least the following drawings:

- a) Coversheet
- b) Location Plan, Index Plan, List of Drawings
- c) Overall plan showing topography, Land Use and Lot dimensions
- d) Overall plan showing surface improvements

- e) Overall plan showing storm sewers, sanitary sewers and water mains and services. This plan must show invert elevations and locations of individual service connections
- f) Overall lot grading plan with proposed building grades
- g) Overall plans for franchised utilities
- h) Overall landscaping and walkway grading plan
- i) Plan and profile drawings
- j) Standard and special detail drawings
- k) Specialty facility design drawings including structural, mechanical and electrical drawings and specifications
- l) Contract Specifications Book

All drawings shall meet the standards set out in these Development Standards and Procedures.

#### 2.1.10 Approval and Permits by Other Agencies

1. The Consulting Engineer shall make application and obtain approval for all required permits from the various Government Agencies.

The Consulting Engineer shall apply for installation of all franchised utilities and obtain complete plans for installation of all franchised utilities within the Subdivision Area. *The Consulting Engineer shall insure that there are no conflicts between the various alignments of utilities and prepare that necessary overall drawing showing the franchised utilities.* The approval of the utility companies shall be shown on the drawing that will be submitted for approval to the Town Engineer.

2. Copies of applications, correspondence and approvals shall be forwarded to the Director of Operations complete with detailed plans and specifications.
3. The Developer shall pay all necessary permit fees, capital contributions or levies charged by other agencies or utility companies.

#### 2.1.11 Construction of Municipal Improvements

1. Construction of the Municipal Improvements shall only be commenced after the following conditions have been met:
  - Signing of the Development Agreement
  - Submission of the specified security
  - Approval of plans and specifications by the Town Engineer
  - All permits and licenses have been obtained

2. A copy of all approved drawings and specifications shall be maintained at the construction site during the installation of services.
3. Construction shall be carried out in accordance with the requirements of all regulatory agencies. Construction sites shall be maintained in a safe, clean and organized manner. Adequate access shall be maintained to existing facilities and services. Service and/or traffic interruptions shall be scheduled in advance with the approval from the Director of Operations. Notification of same shall be forwarded by the Consulting Engineer to (780) 849 - 4475 (Local 911 Dispatch)

#### 2.1.12 Acceptance of Municipal Improvements

1. When the Municipal Improvements, or any of them, have been installed, the Developer may request acceptance in accordance with the procedures for acceptance set out in the Development Agreement.
2. The Municipal Improvements become the property of the Town, after acceptance of them by the Town, subject to a “Guarantee Period” and issuance of a Final Acceptance Certificate from the Town as identified in the Development Agreement.
3. Normal routine operation and maintenance of such Municipal Improvements shall become the responsibility of the Town after Final Acceptance of the Municipal Improvements.

#### 2.1.13 Maintenance of Municipal Improvements

1. Other than the normal routine operation and maintenance, the Developer shall maintain the Municipal Improvements in good condition and repair during the *two-year* maintenance period following acceptance by the Town.
2. This maintenance shall be a continuous operation by the Developer, regardless of the maintenance provisions the Developer may have with the Contractor for the installation of the Municipal Improvements.

#### 2.1.14 Changes and Special Requirements

1. Changes in any of the works, after approval of the drawings and specifications by the Town Engineer, shall only be carried out after submission of revised drawings and specifications and approval by the Town Engineer.
2. The Developer shall at all times maintain the Development Area in a clean and safe condition and clean up any debris, soil or other material which may be carried from the Development Area or any of the building sites outside the Development Area.

#### 2.1.15 Offsite Levies

1. The Town of Slave Lake requires the payment of an offsite levy for the development of lands within the Town boundaries. These levies, and the method of payment, will be set out in the Development Agreement.

In general, offsite levies recover the costs of increasing the capacity of water supply, sewage treatment and disposal facilities.

Offsite levies for certain specific areas, such as sewage lift station contributing areas, drainage areas or water pressure zones may be applicable depending on the area to be developed.

2. A summary of the current Town of Slave Lake Offsite Levy Bylaw is described in *Appendix II*.

## 2.2 DESIGN REPORTS AND STUDIES

### 2.2.1 Design and Planning Reports

1. Subdivision planning and engineering design shall be based on the adopted Town planning reports and engineering studies. These reports and studies include the Municipal Development Plan 1997, South Expansion Area Structure Plan 1989, Downtown and Main Street Area Plan 1989, Transportation Study 1986, Water System Study 2000 and Sanitary Sewer Master Plan 2000. These reports may be subject to amendment. Other studies and reports may be consulted.

2. In some cases information must be updated or re-evaluated due to subsequent design changes and developments. The Town may require the Developer to submit further Design and Planning reports in support of the development application. In particular, this may be the case where the developer's development proposal varies from the accepted development direction.
3. Studies and reports shall be carried out by registered professional or approved acknowledged experts in their field.

#### 2.2.2 Geotechnical Reports

1. Geotechnical reports, prepared by registered Professional Engineers in the applicable field, are required in support of the design recommendations for the installation of Municipal Improvements.
2. The Geotechnical report shall include:
  - physical properties of soil
  - mechanical properties of soil
  - design parameters including water tables and frost susceptible soils
  - recommendations for excavations, utility installation, foundation
  - design, pavement design and construction procedures

#### 2.2.3 Survey Monumentation

1. The Town has been designated as a Survey Control Area. Developers will be required to increase the density of survey control markers in areas of new development to between 300 m and 500 m by installing additional markers and engaging an Alberta Land Surveyor to take survey measurements as required by the Town Engineer to determine the coordinate positions thereof.
2. The Developer shall be responsible to replace any survey control markers, which have been disturbed or destroyed within the Developed Area, and to engage an Alberta Land Surveyor to take survey measurements as may be necessary for the Town Engineer to determine the coordinates of the survey control markers thus replaced.

#### 2.2.4 Other Information

1. The Developer may be required to supply such additional information, plans, reports or surveys as may be considered necessary to properly evaluate the proposed development or its impact on existing development or services.

## 2.3 STANDARDS FOR DESIGN AND DRAWINGS

### 2.3.1 Design Information

1. The Consulting Engineer shall submit to the Town Engineer, as part of the drawings and specification Approval package, the following design information:
  - a) Calculations of sanitary and storm sewer capacity, external pipe loading design
  - b) Water distribution network analyses using Town accepted model
  - c) A geotechnical report set out in Section 2.2.2
  - d) Such reports as considered necessary in consideration of the development
2. The Consulting Engineer shall discuss the required format, study method and personnel with the Town Engineer prior to proceeding and the findings shall be discussed with the Town Engineer prior to submissions of the final plans and specifications for approval.

### 2.3.2 Drawing Format

All drawings of proposed Municipal Improvements to be submitted to the Town Engineer for approval should follow the basic format described herein.

#### 1. Plan Size

ISO-A1 plan size shall be used.

#### 2. Material

Originals shall be prepared on a 3 mm Mylar base with matte both sides. As well, a digital copy of all plans shall be provided in DWG (AutoCad) format to be incorporated with the Town's Geographic Information System.

#### 3. Title Blocks

Title blocks shall contain the information noted below:

- Town of Slave Lake with Slave Lake Logo
- Project Name or Name of Development
- Description of Drawing



- Legal Description
- Name of the Consultant
- Consultants Permit Stamp
- Engineers Stamp
- Identification of Draftsperson and Designer
- List of Checks and Approvals
- List of Revisions
- Legend (if not on separate plan)
- Scales
- Dates
- Drawing Numbers

#### 4. Scales

Dimensions shall be expressed in Metric units with Imperial units in brackets, where conversions are necessary.

Unless otherwise approved, the scale of the drawings shall be:

- Overall plan 1:1000
- Plan/Profiles Horizontal 1:500 / Vertical 1:50
- Cross Section Horizontal 1:100 / Vertical 1:50

#### 5. Orientation

It is preferred that continuous chainage be used wherever possible. Generally, drawings shall be orientated such that north arrows point to the top or left hand side of a page. Lettering read from the bottom or right hand side of the sheet.

#### 6. Elevations

Elevations shall be relative to the Geotechnical datum. Benchmark numbers, location and elevations shall be shown on design drawings.

#### 7. Layout

Allow a minimum of 50 mm binding edge along the left side. Nothing shall be drawn in this area.

The plan portion of a drawing shall not extend into the profile section and vice versa.

### 2.3.3 Drawing Requirements

## 1. Cover Sheets

Cover sheets should show the following information:

- Town of Slave Lake
- Name of subdivision or project
- Stage of Development
- Nature of Drawings
- Name of the Developer
- Year
- Name of the Engineering Firm

## 2. Location Plan, Index Plan and List of Drawings

The location plan, the index plan and a list of drawings may be contained on one drawing or on separate drawings depending on the size of the project and on individual preference.

- The index plan shall be a copy (1:1000) or a reduced copy of the legal plan indicating that portion of a street relating to a particular plan/profile sheet.
- A complete listing of drawings in the set is to be given.
- A location plan showing the development as it relates to the surrounding lands and its orientation shall be provided.
- Street names to be shown.

## 3. Overall Plans

Overall plans shall show but not be limited to the following information:

- Topography and Land Use Plan
- Scale as per Index Plan
- Existing contours 1 m intervals (maximum)
- Proposed Land Use
- Existing features (i.e. buildings, trees, temporary access roads, etc.)
- Street names, lot and block numbers
- Legal dimensions

Surface Improvement Plans:

- Scale as per Index Plan
- Carriage way and sidewalk widths and alignments
- Catch basin and drainage swales
- Pertinent topographical features (i.e. ditches)
- Limits of contract
- Right-of-Way easements
- Adjacent roadways, existing and proposed
- Street names, lot and block numbers

#### Lot Grading Plans:

- Scale as per Index Plan
- Design elevation at lot corners and at buildings
- Direction of surface drainage flow for design
- Contours of original ground
- Sewer inverts at property line
- Uniform fencing requirements
- Important surface features (i.e. light standard, hydrants, pedestals and transformers)
- Specific building restriction where applicable
- Street names, lot and block numbers

#### Storm, Sanitary and Water Main Plans:

- Scale as per Index Plan
- Sizes, alignment and direction of flow of all deep underground municipal improvements
- Local drainage areas which contribute to storm sewers
- Sanitary sewer area
- Manholes
- Catch basins and leads
- Hydrants, valves and other appurtenances
- Locations of all Individual Services
- Street names, lot and block numbers

#### Franchised Utilities Plans:

- Scale as per Index Plan
- Alignments and pertinent information for all shallow utilities (gas, power, telephone, Cable TV)
- Easements and utility lots
- Street lights, transformers, pedestals and switching cubicles
- Lot services
- Street names, lot and block numbers
- Approval by Utility companies

#### Walkway Grading and Landscaping Plans:

- Scale 1:500
- Legal Subdivision
- Alignments and dimensions
- Existing and proposed utility installations
- Proposed grading (contours not to exceed 0.5 m intervals)
- Sizes and numbers of trees (to be removed and/or remain)
- Location of light standards
- Location, number and type of furniture
- Titles to specify exact area covered by drawings
- Typical cross sections showing walk and utility alignments as well as a soil profile specifications
- Street names, lot and block numbers
- Signing and Pavement Markings Plan

The following may be combined with the overall surface improvement plan:

- Traffic signs
- Street name signs
- Information signs
- Details of sign types, installation, construction, etc.
- Pavement markings
- Street names, lot and block numbers

#### 4. Detail Plan/Profile Drawings

Generally, all underground services and surface improvement profiles are shown on the same drawings. The plan portion of the drawing will be positioned at the top and the profile portion at the bottom.

Information shown on plan profiles shall include, but not be limited to, the information on the following table:

*TABLE 1  
PLAN/PROFILE DRAWINGS*

The Drawings Shall Show in Plan

The Drawings Shall Show in Profile

General Information

Scale 1:500 horizontal	Scale 1:50 vertical
Chainages and property line ties to correlate with profile section	Chainages and property line ties
Legal subdivision information	Legal subdivision information
Cross-sectional references to detail drawings	Existing ground profile
Street and walkway names and numbers	Cross-sectional references to detail drawings
True centerline chainages of carriage-ways	True centerline chainages of carriage-ways
Accuracy of grade information to three decimal points	Accuracy of grade information to three decimal points

*Road Information*

Horizontal alignments of all roadways, curb & gutters, sidewalks and lanes	Vertical alignments (grades of the crownline or top of curb of all roadways)
Dimensions of all roadways, carriageways, sidewalks and lanes	Grades of all sidewalk, swales, lanes, etc.
Chainages of the PI, BC and EC of horizontal curves, together with delta angles, radius, tangent length and arc lengths for each curve	Vertical curve information: - chainage to BVC, EVC & PVI - elevations of BVC, EVC & PVI - lengths of curves - elevations and chainages - sags and crests of curves external valve - K. crest, K. sag - curb and center-line gradient
Pavement elevations at intersection	
Curb elevations for catch basins and the BC & EC of corner radii	

The Drawings Shall Show in Plan

The Drawings Shall Show in Profile

*Water Main Information*

Tie the location of hydrants, valves and other appurtenances to the nearest iron pin	Indicate size, type, class of pipe and class of bedding
Show offsets of main to property line	Show hydrants, valves and fittings
Indicate details of connection to existing Water Mains	Show required depth of bury and top of pipe elevations at all grade changes, valves and fittings
Show size of Water Mains and all valves and appurtenances	Type of trench backfill
	Pipe material

*Sanitary and Storm Sewer Information*

Alignments of all sewers	Sewer profiles shall be drawn showing the length and percent grades between manholes
Tie locations of manholes, cleanouts and other appurtenances to property lines	Size, type, class of pipe and class of bedding
Locate catch basins using road chainages and show leads between catch basin and the main and/or manhole	Rim elevations of all manholes
Manholes shall be numbered (sanitary with the prefix "S")	Invert elevations at both inlet and outlet of manholes
	Manholes shall be numbered (sanitary with the prefix "S") in the convention adopted by the Town
	Type of trench backfill
	Common trench installation shall be referenced to a cross-section showing separation, class of pipe, class of bedding and trench widths

The Drawings Shall Show in Plan

The Drawings Shall Show in Profile

*Water and Sanitary Service Connections*

The service connection provided to each lot shall be shown on the plan and the location referenced to the property lot boundary	Invert at property line to be shown where risers are used
Plan sections shall show gas, power, telephone and cable vision alignments	

2.3.4 Coordinates and G.I.S. Files

1. Coordinate information by Total Station for as built services shall be submitted in DWG format (AutoCAD) for use in the Town's Geographic Information System.

### 2.3.5 As-Built Drawings

1. As-built drawings of accepted Municipal Improvements shall be submitted as soon as practical after acceptance of the Municipal Improvements. The as-built drawings shall be submitted on high quality 3 mil Mylar Sepia sheets, taken from the original approval drawings updated to reflect all as-built information.

Two extra sets of blueprints shall be submitted along with the Sepia sheets for use by the Public Works and Engineering Department.

2. Each as-built drawing shall show accurately the Municipal Improvements as constructed and the following information shall be included on each drawing:
  - a) Date of completion and acceptance by the Town
  - b) Time of maintenance period applicable
  - c) Name of Contractor
  - d) Date of adding of as-built information
  - e) List of materials by manufacturer, make and catalogue number
  - f) Reference to as-built field notes
3. The Plan and Profile drawings shall show in table form for each service connection the following information:
  - a) Lot and Block number
  - b) Distance of service saddle from the downstream manhole
  - c) Invert elevation at end of the sanitary service

The service connection provided to each lot shall be shown on the plan and location referenced to the property lot corner.

### 2.3.6 Tests Results and Inspection Reports

1. As part of the Acceptance of Municipal Improvements the Developer's Consulting Engineer shall submit all copies of test results and inspection reports. These shall include:
  - a) Sieve analysis for soils, base course and asphalt materials
  - b) Density test for soils, base and asphalt surface courses
  - c) Mix designs for base and asphaltic pavements
  - d) Tests for base and asphalt quality control
  - e) Concrete strength tests
  - f) Water pressure and leakage tests



- g) Sewer infiltration and/or exfiltration tests
- h) CCTV sewer inspection reports consisting of VHS extra high grade T-120 video cassette tapes, log, identifications of any defects by photographs, final written report
- i) Cathodic protection survey reports
- j) Any other tests or reports as considered necessary for acceptance of the Municipal Improvements

### 2.3.7 Operation & Maintenance Manuals

1. The Developer shall submit two (2) copies of Operation and Maintenance manuals for any pump, motor, lift station or other equipment or facility that is part of the Municipal Improvements. Additionally, a digital copy acceptable to the Town shall be submitted.
2. Such manuals shall be complete with operating and maintenance instructions, parts lists, supplier's lists, warranty and guarantee certificates, service schedules, service locations and other pertinent information. An operating philosophy with operating criteria together with a complete set of plans shall be provided. The manual shall be divided in sections by discipline.

## 2.4 CONSTRUCTION PROCEDURES

### 2.4.1 Developer's Representatives

1. The Developer shall retain, at his own expense, a Consulting Engineer, registered to practice engineering in the Province of Alberta, who will be responsible for the design, construction and supervision of all Municipal Improvements to be installed on behalf of the Developer.

The Consulting Engineer shall engage the necessary qualified sub-Consultants for areas outside the Consulting Engineer's expertise.

2. The Consulting Engineer shall assume full control for the installation of the Municipal Improvements from the preliminary design stages to the expiration of the guarantee period. He shall assure that at all times during the construction adequate competent staff shall be assigned to the project.

#### 2.4.2 Town's Representatives

1. The Town Engineer shall be the Town's representative in matter relating to the design, construction or supervision of the Municipal Improvements. The Town Engineer may assign representatives to act for him or to advise him on the work in progress.
2. The Town Engineer or his representatives shall, at all times, have access to any part of the work. He shall have the authority to stop the work whenever such stoppage may be necessary, in his opinion, to ensure the proper execution of the work in accordance with the provisions of the Development Agreement of the approved plans or specifications.
3. The Town shall cooperate with the Developer in the performance of the Developer's requirements. The Consulting Engineer or his representative or any contractor working on behalf of the Developer shall give adequate notice where the Town's assistance or cooperation is required.
4. The Consulting Engineer shall give the Town Engineer adequate notice and opportunity to carry out any inspection and provide the necessary labour, materials and equipment required for such inspection.

#### 2.4.3 Construction Supervision and Labour

The Consulting Engineer shall assure that any work carried out for the installation of the Municipal Improvements shall be supervised by the competent construction superintendents who shall at all times employ skilful workers acting in a orderly and proper manner.

#### 2.4.4 Inspection

1. The Consulting Engineer shall at all times provide adequate inspection of the work in progress. Daily reports and special inspection reports shall be kept.

These reports shall clearly indicate the work carried out, the conditions encountered, the production quantities, any instructions and notices to the contractor, deficiencies and test results.

2. A copy of daily reports, test results and special inspection reports shall be forwarded to the Town Engineer, as progress is being made.

3. The Town Engineer or his representatives may carry out any inspection on behalf of the Town, which will under no circumstances, take the place of the inspections required to be carried out by the Consulting Engineer to assure the proper performance of the works.
4. Any approval, inspection or lack of comment on the part of the Town Engineer, of methods of construction employed or the results of the work shall not relieve the Consulting Engineer of his duties or responsibilities.

#### 2.4.5 Use of Town's Streets

1. Where during the performance of the work the Developer, Consulting Engineer or any person or contractor on behalf of them is required to use of the Town's streets or rights-of-way, such streets or rights-of-way shall be used in accordance with the normal rules and regulations applicable to the general public.
2. Where such use requires the closure or restriction of the use to the general public, application for the closure or restriction shall be made a minimum of 48 hours in advance. Such application shall state the reason, the length of time and any special conditions or requirements for the closure or restriction.
3. The Developer shall pay any costs, which may be incurred as a result of the Closure or restriction.
4. If any use of Town's streets or rights-of-way on behalf of the Developer results in damage, litter or debris being deposited or any other condition which requires to be corrected, the Developer shall make all corrections to the satisfaction of the Town Engineer. The Town Engineer may alternatively carry out such repair or clean up and charge the cost of same to the Developer, who shall pay such charges within thirty (30) days.

#### 2.4.6 Connecting to Town's Utilities

1. Municipal Improvements which are to be connected to existing Town utilities shall only be connected after approval has been received from the Utilities Foreman for the proposed method, procedure and timing of the connection.
2. A minimum of 48 hours notice shall be given to the Director of Operations for any connection to be made. Where such connection requires the disruption of the utility service to any of the utility

customers, the connection may be required to be carried out within certain time frames to minimize the disruption.

3. The Developer will be required to notify the local Emergency Dispatch and customers whose service will be disrupted. The Director of Operations must approve the proposed procedure for notification of customers and the Developer shall only use competent and reputable personnel to advise the utility customers of the service disruption.

The Developer shall be responsible to provide a reasonable temporary service where the service interruption will create undue hardship to the utility customer.

#### 2.4.7 Control of Traffic

1. Any work shall be done in a manner that will cause the least interruption to traffic. Where part of a street is used for construction or where construction equipment must use the street in contravention of normal traffic regulations, barricades, signs and flagmen shall be used. The Town Engineer may restrict such work to approved days or times. Procedures and signage shall be in accordance with the Manual for Uniform Traffic Control Devices for Canada.
2. Prior to any road closure, the Developer must submit a detour plan for approval by the Town Engineer. The Developer is responsible for supplying, placing and maintaining detour signing for the duration of the road closure. Emergency access must be maintained at all times.

#### 2.4.8 Control of Dust and Mud

The Developer shall be responsible to control dust, mud or other nuisances resulting from his work both within the rights-of-way and elsewhere. He shall use whatever method may be required by the Director of Operations to control the dust, mud or other nuisance.

#### 2.4.9 Stockpiles and Plant Locations

Plant and stockpile locations within the Town boundaries require a development permit as part of the approval process.

#### 2.4.10 Construction Safety and Barricades

1. Construction sites shall be adequately barricaded and signed to prevent injury to persons and to avoid property damage. Guards, lights, warning lights, temporary bridges, walks, hoarding or fencing shall be used around open excavations or building sites. Emergency access to properties, hydrants and other facilities must be maintained at all times. Valve boxes, curb stop boxes, manholes and other utility controls shall remain accessible and unobstructed during construction.
2. All construction shall be carried out in accordance with the procedures and requirements of the Occupational Health & Safety Board.

#### 2.4.11 Construction Schedules

The Developer shall submit construction schedules for approval by the Town Engineer. Construction schedules shall take into consideration special community events, no noise during normal nighttime hours and, in general, limiting construction nuisances.

#### 2.4.12 Materials

1. Materials used in the construction of Municipal Improvements shall be designed for the intended purpose in accordance with the accepted standards and approved plans and specifications. Manufactured goods shall be new, not damaged or defective.
2. Storage, handling and protection shall be in accordance with the manufacturers' instructions and in such a manner as to avoid damage or deterioration.
3. Rejected materials shall be marked and immediately removed from site.

#### 2.4.13 Survey Control Monuments

1. Survey Control Monuments within the Subdivision Area and any construction area shall be conspicuously marked and protected from possible damage by construction in the vicinity.
2. Any damaged survey control monument shall be replaced by the Developer at his own cost in accordance with Section 2.2.3.1 of these Development Standards.

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### 3. ROADWAYS AND WALKS

#### 3.1 GENERAL

This section identifies the Town of Slave Lake's standard requirements for roads, walks, lanes, walkways, bicycle paths, buffer-strips, street lighting, traffic control and access to properties. The Standards and Guidelines of the Transportation Association of Canada (TAC) may be applied in those situations where the Town's Development Standards & Procedures do not provide the necessary direction or where variances to the Standards are warranted. In all cases, sound engineering design and practices must be applied. Where a staged construction is considered appropriate, the design shall be based on the ultimate development with specific staging to be agreed upon.

#### 3.2 GEOMETRIC DESIGN STANDARDS

The three basic road classifications that have been adopted by the Town of Slave Lake consist of arterial roads; collector roads; and local roads. They conform generally with the Municipal Development Plan and the various Area Structure Plans.

Table 3.2-1 outlines the minimum geometric design standards for the functional classifications. Additional requirements are set out in the following sections:

##### 3.2.1 Rights-of-Way Widths

Rights-of-Way shall follow the geometric design requirements as much as possible and take into consideration additional requirements such as utility alignments and special access requirements such as acceleration, deceleration and turning lanes. Adequate rights-of-way shall be provided at all corner cut-off and turn around locations.

Arterial roads shall have limited direct accesses. All lots backing onto arterial roads shall have a minimum 6 m landscaped buffer strip and shall be included as a utility lot or legal access limiting parcel. Such parcels shall not be designated from the normal 10% park dedication. Additional rights-of-way widths may be required to assure proper sight lines.

##### 3.2.2 Road Widths

Street widths shall be modified as required to provide for turning lanes, acceleration or deceleration lanes and special provisions in curves to accommodate design vehicles.

##### 3.2.3 Service Roads

Where properties front onto arterial roads, a service road will be required for access and traffic. Service roads shall have parking on at least one side and be separated from the arterial road by a minimum 10 m boulevard. Access to service roads shall be at least 40

m from the arterial road. Deceleration and acceleration lanes may be required for access to the service road.

### 3.2.4 Cul-de-sacs

Maximum cul-de-sacs lengths shall be no longer than 200 m. Road widths in residential cul-de-sacs may be reduced from 11.0 m face of curb widths to a 9.0 m face of curb width. The minimum curb radius in the bulb shall be 12 m. Cul-de-sac design shall provide for the continuous forward movement of all vehicles including road maintenance and fire fighting equipment.

A 15 metre rights-of-way width shall be permitted when provisions for sidewalks *are not* required. A 16 metre rights-of-way width shall be required when sidewalks *are to* be provided. The maximum length of a cul-de-sac *with no sidewalk requirement* shall be 100 meters. Sidewalks will be required for walkway connections (in accordance with Table 3.2-1).

### 3.2.5 Lanes

1. The minimum width of lanes shall be 6.0 m.
2. The maximum length of lanes between streets shall be 350m. The layout of lanes shall not encourage short cutting between streets.
3. Corner cut-offs shall be provided to allow the clear movement of large trucks and emergency equipment.
4. Residential lanes shall have a adequate base structure with a 20 mm crushed gravel surface course. Lanes in commercial areas shall be paved.
5. Paved lanes shall be dished (reverse crowned) for center drainage. Gravelled lanes shall be crowned with the base structure provided for future paving with center drainage.
6. Maximum lane grades shall be 8%.  
Minimum lane grades shall be 0.5%.

Vertical curves are to be provided where the algebraic difference of the intersecting grades is greater than 3%. Lane grades at the street or sidewalks for crowned lanes shall be high enough to change to center drainage when paving in the future.



7. Lane crossings shall be lowered to facilitate access to the roads.
8. Property line lot elevations shall be set 50 mm above the final paved grades based on center drainage.

### 3.2.6 Sidewalks

1. The Standard sidewalk width is 1.5 m. The slope across sidewalks shall be 2.5%.
2. Sidewalks shall be required in accordance with Table 3.2-1.
3. On local residential streets sidewalks may be combined into a monolithic curb, gutter and sidewalk.
4. Paraplegic ramps shall be constructed at all street intersections, community mailboxes, and at locations designated by the Town Engineer.
5. Sidewalks shall be constructed of concrete - sulphate resistant 25 MPA.

### 3.2.7 Vertical Alignment

In addition to the vertical alignment limits set out in Table 3.2-1, the minimum gutter grades around curb returns, cul-de-sacs, bulbs and gutters with a curb radius less than 20 m shall be 1.0%. Catch basin inlets shall be recessed 35 mm below gutter grades.

### 3.2.8 Road Crowns

Road crowns shall be parabolic sections with the center crown 2.5% above gutter grade. Straight cross slopes between the quarter crown points *may* be accepted by the Director of Operations.

### 3.2.9 Off-Street Parking - General Requirements

1. Every off-street parking, loading, and unloading space, and access thereto, provided or required in any *Residential District*, shall be hard surfaced if its access is from a public rights-of-way that is also hard surfaced.
2. Every off-street parking, loading, and unloading space, and access thereto, provided or required in any *Industrial or Commercial District* shall be hard surfaced if its access is from a public rights-of-way that is also hard surfaced. Any area at the *rear* of the principal building provided or required for an off-street parking, loading, or unloading space need not be hard surfaced, but shall be constructed with such a surface that will minimize the carrying of dirt or foreign matter into a public rights-of-way.

3. Where hard surfacing is provided or required, it shall mean the provision of a durable, hard surfaced material constructed of concrete, asphalt or a similar pavement, and the same shall properly direct all surface drainage towards the municipal rights-of-way without encroaching onto adjacent lands.
4. All driveways shall have a minimum clearance of 1.5 m from structures such as hydrants, catch basins, streetlights or service pedestals.
5. Driveways shall be constructed a minimum distance of 6 m from intersecting streets. The maximum width of driveways is 8.5 m for residential driveways located in front & side yards (full parcel width in rear yards) and 9.1 m for commercial or industrial driveways. Mountable curbs shall be lowered for commercial driveways and lane crossings.
6. In parking areas and similarly congested locations, curbs and other protective measures shall be used to protect adjacent fences, walls, boulevards, landscaped areas or buildings on the site or an adjacent site.
7. Barriers are to be installed and maintained on the periphery of parking lots and access aisles to physically restrict vehicle encroachment or overhang onto adjacent roadways.

#### 3.2.10 Handicapped Access

Handicapped access shall be provided at all intersections and at public facilities such as parks, walkway connections, community mailboxes, and unloading areas.

Paraplegic ramps shall be constructed in accordance with the standard details and shall have a maximum curb height of 10 mm, a width of 1.5 m and a maximum slope of 8%.

#### 3.2.11 Culverts and Drainage for Country Residential Subdivisions

1. The minimum allowable ditch grade shall be 0.5%. Ditch grades in excess of 2.0% shall be protected against erosion through rock ditch checks, silt fences, enviro-berm fences and/or erosion control blankets.
2. Ditch slopes and back slopes shall not exceed or be steeper than 3:1.
3. The minimum ditch bottom width shall be 3.0 metres sloping away from the roadway at a minimum of 5.0%.
4. Culvert size requirements shall be determined through storm water drainage analysis; however, the minimum size of culverts shall be as follows:

- roadway cross culvert 500 mm
  - residential approach culvert 400 mm
5. Culverts shall be new galvanized C.S.P. (corrugated steel pipe) with a minimum wall thickness of 1.6 mm, or as required by the loading criteria.
  6. All culverts shall be installed in accordance with the manufacturer's recommendations. In high-density residential areas, all culverts shall be installed complete with beveled end sections on both the inlet and outlet sides with the invert extended to the toe of the side slope.
  7. Culverts shall be installed to provide a minimum depth of cover of 500 mm or one half (1/2) the culvert diameter, whichever is greater, as measured from the finished shoulder grade of the roadway to the top of the culvert.
  8. Rip rap shall be placed around the inlet and outlet of each culvert with the rip rap extending a minimum of 1.0 metre beyond the end of the culvert. Rip rap material shall consist of rock ranging from size from 150 mm to 350 mm with 50% of the rock material being larger than 200 mm.

### 3.3 WALKWAYS

Walkways are to be provided in accordance with Area Structure Plans, Outline Plans, Parks Master Plan and Community Trail Plan as adopted by the Town's Community Development Department, and as determined by the Town Engineer. They will provide pedestrian linkages between streets, parks and public facilities.

#### 3.3.1 Rights-of-Way

Walkways may be included in park areas or special walkway rights-of-way, which will not be considered as reserve parcels. The minimum rights-of-way width of 6m is required where the rights-of-way is also used as a utility lot for sewer or water mains, which shall have a separate alignment within the rights-of-way.

#### 3.3.2 Walks

Walks in walkways shall have a minimum width of 1.5 m. Walks shall be concrete similar to sidewalks. The walk surface shall be crowned 25 mm in the center to shed drainage to the side.

Hard surfaces, designed to be incorporated into the Community Trail System, shall have a minimum width of 2.5 meters.

Drainage shall be provided in the boulevard area on either side. The minimum vertical slope of walkways shall be 0.5%. Walk grades shall meet the overall drainage requirements.

### 3.3.3 Landscaping

Walkway rights-of-ways shall be landscaped from the walk to each side of the rights-of-way. The grading shall provide for the discharge of lot drainage in accordance with the overall drainage plan. The drainage shall be carried in swales on either side of the concrete walk. The swales shall discharge across sidewalks into the street gutters or into catch basins connected to the storm sewer system.

### 3.3.4 Lighting

Walkway lighting shall be provided by the Developer in accordance with acceptable lighting levels and procedures as follows:

General Lighting Guidelines:

- Walkways not immediately adjacent to homes and where light trespass is not of concern are to utilize 100 W HPS post top luminaries spaced at 40-50 meters.
- Walkways immediately adjacent to and between homes should utilize a 70 W HPS post top luminary.
- Walkways through a large open high use area such as a park or pond should utilize a 150 W HPS post top luminary space at 45 - 50 meters.
- Lighting adjacent to any road within the Town of Slave Lake shall be provided in accordance with the requirements of Table 3.5.

### 3.3.5 Fencing

Uniform fencing shall be provided abutting walkways and the Community Trail System. Maximum height regulations of the Town's Land Use Bylaw shall be followed.

## 3.4 BICYCLE PATHS AND TRAILS

Bicycle paths shall be provided in accordance with the Parks Master Plan and the Community Trail System as adopted by the Town.

Developers will be required to provide suitable links with existing bicycle paths and trails and to incorporate the development of bicycle paths and trails in accordance with the Town's requirements for the Developer's Subdivision Area.

Standards for bicycle paths and trails shall be set by the Town for each individual section considering the intended uses.

In general, bicycle paths shall be 2.5 m wide constructed with an asphaltic paved surface course with adequate lighting similar to walkways. Trails vary from cleared and brushed areas to graded and gravelled trails.

### 3.5 ROADWAY ILLUMINATION

Street lighting shall be provided by ATCO Electric Ltd. in accordance with the Standards and Procedures provided by the Illuminating Engineering Society's publication "Guide for Design of Roadway Illumination". For details concerning this guide, contact the local office of ATCO Electric Ltd.

The Developer's plans for approval shall include the street lighting as approved by ATCO Electric Ltd. based on the following requirements:

*Table 3.5*  
*MINIMUM AVERAGE MAINTAINED HORIZONTAL ILLUMINANCE*

Street Classification	Commercial and Business Districts	Residential Districts	Industrial Districts
	Lux (Lumen/m <sup>2</sup> )	Lux (Lumen/m <sup>2</sup> )	Lux (Lumen/m <sup>2</sup> )
Arterials	17	12	9
Collectors	13	10	6
Local Streets	10	6	6

NOTE: Downtown and Main Street will be developed in accordance with the Downtown and Main Street Urban Design Handbook.

Streetlight cables shall be installed underground with acceptable type of steel post streetlights complete with fixtures.

The Developer shall pay for any capital contribution that the utility company may charge for the installation of underground street lighting. The Town will pay the monthly utility company charges for the operation of streetlights after the acceptance of the street lighting as a Municipal Improvement.

Varying on type of park area development, illumination shall be provided at the Town's discretion.

Streetlights shall be placed at the extension of common property lines between lots.

The face of the streetlight posts shall be at least 1.0 m clear of the face of the curb or behind the sidewalk.

### 3.6 TRAFFIC CONTROL DEVICES, STREET SIGNS AND PAVEMENT MARKINGS

The Developer shall install traffic control devices, street signs and pavement markings in accordance with the approved plans. These plans shall be based on the latest edition of the "Manual of Uniform Traffic Control Devices for Canada", issued by the Transportation Association of Canada.

Street name signs of high intensity reflecting material of the type and colour acceptable to the Director of Operations, shall be included in the plans for approval and installed by the Developer.

All signs shall be placed on galvanized "TELESPAR" signposts as approved by the Town Engineer.

Pavement markings, including lane markings, stop lines and pedestrian crossing shall be provided by the Developer at his own expense in accordance with the standards and as approved by the Town Engineer. Pavement markings shall be of a permanent type, inlaid into the asphaltic concrete surface course at the time of construction.

### 3.7 ASPHALTIC REQUIREMENTS FOR ROADWAYS AND WALKS

Asphalt densities for all roadways and walks shall be no less than 98%. Asphalt thickness will vary with roadway and walk specifications of construction. For deficiencies in asphalt densities and thickness, asphalt deficiencies will be subject to the following payment schedule:

HOT MIX ASPHALT PAVING  
ASPHALT DENSITY PAY FACTORS  
TABLE 3.7.1

<u>98% REQUIRED</u>		<u>97% REQUIRED</u>		<u>96% REQUIRED</u>	
Actual Density %	Pay Factor %	Actual Density %	Pay Factor %	Actual Density %	Pay Factor %
98.0	100.0	97.0	100.0	96.0	100.0
97.9	99.9	96.9	99.9	95.9	99.7
97.8	99.8	96.8	99.7	95.8	99.3
97.7	99.6	96.7	99.4	95.7	98.9
97.6	99.4	96.6	99.1	95.6	98.4
97.5	99.1	96.5	98.7	95.5	97.8
97.4	98.7	96.4	98.2	95.4	97.1
97.3	98.3	96.3	97.7	95.3	96.4
97.2	97.8	96.2	97.1	95.2	95.6
97.1	97.2	96.1	96.3	95.1	94.6
97.0	96.5	96.0	95.5	95.0	93.4
96.9	96.8	95.9	94.6	94.9	92.2
96.8	95.0	95.8	93.6	94.8	90.7
96.7	94.2	95.7	92.5	94.7	89.1
96.6	93.3	95.6	91.3	94.6	87.3
96.5	92.3	95.5	89.9	94.5	85.1
96.4	91.1	95.4	88.4	94.4	82.6
96.3	89.8	95.3	86.7	94.3	79.5
96.2	88.5	95.2	84.8	94.2	75.5
96.1	87.1	95.1	82.7	94.1	69.7
96.0	85.5	95.0	80.3	94.0	60.0
				Under 94.0	REJECT
95.9	83.8	94.9	77.6		
95.8	82.0	94.8	74.3		
95.7	80.0	94.7	74.3		
95.6	77.7	94.6	74.3		
95.5	75.4	94.5	74.3		
95.4	73.0	Under 94.5	REJECT		
95.3	70.3				
95.2	67.2				
95.1	63.7				
95.0	60.0				
Under 95.0	REJECT				

Actual Density - % of Marshall Density  
Pay Factor - % of Contract Price



HOT MIX ASPHALT PAVING

1. **Representative Cores:** A single core is initially taken representing the quantity of hot-mix in not more than 1,000 m<sup>2</sup> of mat, with a minimum of one core taken from a day's production. If the initial core density is below specified, that initial density may be discarded and the Contractor must provide new core or cores from the same area. The new core or average of new cores represent to that area.
2. **Deficient Density:** If the average core density is below the specified levels, the represented area of mat may be accepted subject to a pay factor according to table 3.7.1 to be applied to the price of the quantity of hot-mix in that mat area.
3. **Deficient Thickness:** If the core thickness is below the specified level, the represented area of mat may be accepted subject to a pay factor according to Table 3.7.2 to be applied to the price of the quantity of hot-mix in that mat area.
4. **Opening to Traffic:** Open new pavement to traffic when surface has cooled to ambient temperature and when authorized by the Director of Operations.

TABLE 3.7.2 – ASPHALT THICKNESS PAY FACTORS

THICKNESS DEFICIENCY (mm)	PAY FACTOR (% of Price)
6	100.0
7	97.0
8	93.7
9	90.0
10	85.9
11	80.5
12	75.0
13	68.0
14	60.0
15	50.0
Over 15	Grind & Resurface

## **WATER DISTRIBUTION SYSTEM**

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## 4. WATER DISTRIBUTION SYSTEM

### 4.1 GENERAL

The Water Treatment Plant's high lift pumps supply treated lake water into the water distribution system at a pressure range from 276kPa (40 psi) to 672 kPa (98 psi). The existing 4.5 ML (1.0 mig) water storage reservoir on the south side of Highway #2 floats on the system with the normal water level at geodetic elevation of 635.8 m (2,086 ft.). A second pressure zone will be established in the south expansion area for the areas above the 600 m contour.

Extensions to the water distribution system will be required to maintain proper network pressure and the Town Engineer will designate the network layout based on his/her judgement for the overall system benefit.

The following standards shall apply for all proposed extensions to the water distribution system.

### 4.2 DESIGN CRITERIA

#### 4.2.1 Design Populations

The minimum design population density for residential neighborhoods is 45 person per ha. The minimum equivalent design population density for light industrial and commercial areas is 25 equivalent persons/ha on a neighborhood basis. For individual areas, the above densities may have to be increased for specific higher land use applications. In such cases, the maximum land use Bylaw densities will govern the calculations.

#### 4.2.2 Water Demands

The per capita water consumption is 450 L per capita per day (100 igcd).

Peak factors to be used are as follows:

Peak 5 day week = 1.5 x average day

Peak day = 1.8 x average day

Peak hour = 1.5 x peak day

Fire flow rates and duration of fire to be used are as follows:

Residential area	76 L/s (1,000 igpm)
Institutional area	114 L/s (1,500 igpm)
Multi-family area	167 L/s 167 L/s (2,200 igpm)
Commercial area	200 L/s (2,600 igpm)
Industrial area	233 L/s (3,100 igpm)

Duration of fire flows in accordance with the recommended standards of the Insurer's Advisory Organization.

<u>Fire Flow Rates</u>	<u>Duration in Hours</u>
167 L/s (2,200 igpm) or less	2.0
200 L/s (2,600 igpm)	2.5
233 L/s (3,100 igpm)	3.0

The network shall be analyzed for the condition of peak day flows plus applicable fire flows and for the condition of peak hour flows. The minimum pressure during these flows shall not drop below 280 kPa (40 psi) while in the immediate vicinity of a fire pressure shall not drop below 140 kPa (20 psi).

#### 4.2.3 Design Flows

The Hazen Williams Formula:  $V = 0.355 D^{0.63} S^{0.54}$  where "V" is the velocity in m/sec, "D" is the pipe diameter in meters and "S" is the slope of the energy grade line in m/m. This formula shall be used for pipe sizing. The roughness coefficient for all mains shall be taken as 120.

Minimum pressures at peak demands are 280kPa (40 psi). Network analyses shall be carried out after the consultations with the Town Engineer to determine a suitable computer program, compatible with the Town's available and required network information. The maximum velocity of water through any water main is 1.5 m/s.

#### 4.2.4 Minimum Distribution System Requirements

##### 1. Minimum water main sizing:

- Water main loops less than 200 m length - 200 mm
- Dead end branches with hydrants near end - 200 mm
- Feeder mains - 300 mm
- Water mains in industrial districts - 250 mm
- Hydrant leads - 150 mm

2. Maximum length of dead end water main - 150 m (500 ft)
3. Maximum spacing of feeder mains - 600 m (2,000 ft)
4. Maximum number of services isolated in valved-off sections = 20 services.
5. Maximum number of hydrants isolated in valved-off sections = 1 hydrant
6. Maximum number of valves required to isolate a section of distribution system:
  - 4 valves with cross fitting
  - 3 valves with T fitting
7. Size of valves same as water main
8. Hydrant leads shall be valved.
9. Water mains in utility lots, easements and confined areas shall be able to be isolated without affecting remainder of the network.
10. The maximum spacing of valves shall be 150 m.
11. The maximum spacing of hydrants shall be 120 m (Industrial & Residential) and 100 m (Commercial).
12. Hydrants shall be placed on or near the ends of dead end branches.

#### 4.3 WATER MAIN MATERIALS AND INSTALLATION STANDARDS

##### 4.3.1 Water Mains

- Poly-Vinyl Chloride (PVC) CSA B137.3 - AWWA C900-DR18
- Minimum depth of cover over Water Mains 2.75 m below finished grade.
- Minimum bedding shall be Class "B" bedding.
- Trench backfill shall be granular compacted backfill under existing or proposed pavements or walks and compacted native landfill in boulevards.

##### 4.3.2 Valves

- Valves shall be resilient seal valves meeting the requirements of AWWA C-509.
- "O" Ring stem seals.

- Opening of valve in counter clockwise direction.
- Valve boxes and extensions shall be cast iron Type A Norwood Foundry with PVC bottom section.
- Valves shall be blocked with poured in place concrete blocking.
- Valves shall be placed at property line extensions.
- Cathodic Protection shall be provided on all valves.

#### 4.3.3 Fire Hydrants

- Fire hydrants shall be dry-barrel Fire hydrants meeting the requirement of AWWA C-502 (CANADA VALVE CENTURY or McAVITY M67).
- Bury length shall be 2.9 m with at least a 300 mm barrel and stem extension immediately below the grade line flange.
- Two 63 mm hose nozzles with Alberta Mutual Aid Thread.
- Pumper nozzle to be 4 55/64" O.D. with 6 threads/inch; McAvity "JF", Canada Valve "36A".
- Operating nut shall be #6 with 3 curved sides.
- Four section breakaway flange
- Minimum distance from flange to bonnet shall be 600 mm.
- Plugged drain.
- All hydrants shall be painted Tremclad Red.
- Hydrants shall be located at the projection of property lines or at intersections at the cut-off corners of lots.
- Where hydrants are installed in a cul-de-sac, they shall not be installed within the turning circle but shall be located at the tangent point.
- The face of hydrants shall be 300 mm from the back of monolithic walks or in boulevards 1 m from face of curbs.
- Hydrant locations shall not conflict with streetlight, transformer or other pedestal locations.
- Cathodic Protection shall be provided on all hydrants.

#### 4.3.4 Fittings

- Fittings shall be cast iron AWWA - C110 Class 250 or Poly Vinyl Chloride (PVC) 150 mm -200 mm AWWA C907.
- Fittings shall be blocked with poured in place concrete blocking.
- Fitting joints shall be the same as pipe joints.
- Cathodic protection shall be provided on all fittings.

#### 4.3.5 Thrust Blocks

- Thrust blocks shall be cast-in-place concrete 15 MPa strength.
- Thrust block sizing shall be designed for the actual soil conditions encountered as verified by the Engineer.

- The thrust blocking soil support areas shall be of undisturbed firm soil.

#### 4.3.6 Water Service Connections

Service connections shall be constructed using the following materials:

- Bronze double strap service saddles with stainless steel straps. Smith-Blair 323 or approved equal.
- Copper flanged or compression to AWWA thread bronze main stop. Mueller A 220 or approved equal.
- Type K soft copper tubing.
- Standard brass compression type couplings.
- Copper flanged or compression type brass curb stop without drain. Mueller Oriseal H 15214 or approved equal.
- Spindle shall be stainless steel c/w bronze clevis for 25 mm and smaller.
- Service boxes shall be extension type for maximum extension to 3 m Muller A 714 or approved equal.
- Minimum size water service connection for single-family dwellings is 19 mm and 25 mm for industrial properties.
- Multiple family dwellings (i.e. duplexes, etc.) require a separate service and curb stop to each unit.
- All main connections shall be with service saddles and carried out under pressure.
- Sewer and Water services shall be installed in a common trench. The water service shall be on the *left* of the sanitary service, when facing the property from the main.
- The depth of cover over the water service shall be between 2.6 m and 2.9 m from the finished grade at property line.
- A gooseneck bend in the copper piping shall be provided near the main stop.
- Curb stops shall be installed on the Town right-of-way or in the utility easement on private property within 150 mm of the property line or the inside edge of the utility easement.
- Services shall be laid on 10 mm granular bedding and the granular bedding material shall be placed up to 300 mm above the crown of the highest service in the trench.
- A temporary wooden marker 50 mm x 100 mm shall be extended from the end of the sewer and water service to a minimum of 1.0 m above ground level and shall be painted fluorescent red for the top 0.5 m.
- Water services shall be located in the center of a lot.
- A 4" crimped off piece of copper tubing shall be installed as a plug on the property side of the curb stop.
- Service trench backfill shall be compacted granular material under proposed or existing pavements and compacted native backfill in boulevards.
- Water services larger than 51 mm shall be installed as Water Mains. The minimum size is 150 mm.



#### 4.4 DISINFECTION AND TESTING

Water Mains shall be disinfected in accordance with AWWA-C651. Pressure and leakage testing for PVC Water Mains shall be in accordance with the procedures and requirements set out in AWWA Manual M23. PVC pipe - Design and Installation. Test pressure shall be 1050 kPa (150 psi) for minimum of one (1) hour. Allowable leakage will be determined on the basis of 3 mL/day/m/mm diameter. Leakage will be determined on the basis of individual test sections for each valved section.

#### 4.5 WATER METERS

The following require water meters at the water supply:

- a) All Trailer Courts
- b) All lines supplying water to Municipal Reserve or other *out of* Town lands served by the Town of Slave Lake's water supply system
- c) All commercial businesses
- d) All apartment buildings and rental units
- e) All residential properties

##### 4.5.1 Water Meter Specifications

The water meter specified by the Town is a Sensus SR11 ECR with a Check Valve on the downstream side. The meter is to be connected by way of a three pair CSA type ZSW 22 gauge UV rated wire to the power meter. All readings shall be in metric.

##### 4.5.2 Water Meter Sizing

- a) Residential Properties: 5/8" x 3/4"
- b) Residential with buried lawn sprinkler 3/4" x 3/4"
- c) Commercial and others Sized in accordance with supply line

##### 4.5.3 Water Meter Installation

All water meters must be installed by a licensed plumber and inspected as part of the plumbing system. Meters are available for sale at the Town Office. No meter shall be sold without providing the Town's administration with a copy of a valid plumbing permit for the installation of the meter at the desired location. Additionally, water services will not be turned on without copy of said plumbing permit.

Application for connection to existing Town Services shall be made to the Town's Planning & Development Department. Prior to having services turned on, a representative from the Town's Utilities Departments is required to inspect the

installed meters and connect the wire to the power supply. This process is coordinated through the Planning & Development Department @ (780) 849 - 8005.

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## 5. SANITARY SEWAGE COLLECTION SYSTEM

### 5.1 GENERAL

The sanitary sewage collection system discharges into the Sawridge Lift Station located east of Highway #88 immediately north of the CNR rail line. This lift station lifts all of the Town's sewage into an aerated lagoon system with continuous discharge into the Sawridge Creek. Within the collection system there are four areas requiring a lift station. These lift stations are located as follows:

- ⇒ Lift station C at 6th Ave. NW and 8th St. NW serving portions of the Northwest and Southwest neighborhood.
- ⇒ Lift station D at Main Street immediately south of the CNR rail line serving parts of Main Street south and the Southwest neighborhood.
- ⇒ Lift station E at Birch Road N.E. and Balsam Road N.E. serving part of the N.E. Industrial neighborhood.
- ⇒ Lift station F on the south side of Highway #2 between Main Street and Caribou Trail serving part of the S.W. neighborhood, Alberta Vocational College, and the south development area.

The following standards shall apply for all proposed extensions to the Sanitary Sewage Collection System.

### 5.2 DESIGN CRITERIA

#### 5.2.1 Design Population

The design population densities are the same as those set out in Section 4.2.1 for the Water Distribution System.

#### 5.2.2 Sewage Contributions

The per capita sewage contribution is 450L per capita per day (10 igcd). Peak hourly flows for the contributing area shall be calculated using the Harmon Formula for the appropriate peaking factor as follows:

$$PEAK FACTOR = 1 + \frac{14}{4 + P}$$

Where P = square root of the population in thousands.

An allowance for extraneous flows in the amount of 0.28 L/s/ha shall be added to the peak flow in determining total contributions. While these design flows include an

allowance for extraneous flows the sewage collection system shall be designed and constructed to be watertight with weeping tile to be discharged over land.

### 5.2.3 Design Flows

Gravity sewer flows shall be based on the Manning Formula:

$$V = \frac{r^{0.6667} \times S^{0.5}}{n}$$

Where V is the velocity in m/s; r is the hydraulic radius in m; S is the slope of the energy grade in m/m.

The roughness co-efficient n shall be 0.013 for all pipes.

Force main flows shall be based on the Hazen-Williams formula:

$$V = 0.355 CD^{0.63} (S)^{0.54}$$

Where v is the velocity in m/s; D is pipe diameter in meters; s is the slope of the energy grade line in m/m.

The roughness co-efficient C shall be 120 for all pipes.

The minimum velocity in pipes shall be 0.76 m/s. Sewage velocities in pipes shall not exceed 3.05 m/s.

### 5.2.4 Minimum Collection System Requirements

1. Minimum Sewer Main size is 200 mm.
2. The minimum slopes of sewer mains in meter per meter shall be as follows:

<u>Sewer main diameter (m)</u>	<u>Slope (m/m)</u>
200	0.0040
250	0.0028
300	0.0022
375	0.0015
450	0.0012

3. Manholes shall be placed at changes in size, grade or alignment and at all ends of sewer mains.

4. The minimum radius of curved sewers is 75 m minimum sewer main grades in curved sewers shall be twice the minimum grades for straight sewers.
5. The minimum depth of cover for sewer mains shall be 2.5 m.
6. The maximum distance between manholes shall be as follows:

<u>Pipe size (mm)</u>	<u>Maximum Distance (m)</u>
<i>375 and smaller</i>	<i>110</i>
<i>450-750</i>	<i>125</i>
<i>900 and larger</i>	<i>155</i>

Maximum spacing of manholes on curved sewers is 60 m.

7. Minimum internal manhole diameter shall be 1,200 mm.
8. Manholes shall have pre-constructed Sewer Main openings.
9. Manhole barrel diameters shall be 60 mm larger than the largest Sewer Main entering or leaving.
10. Exterior vertical drop structures shall be used for Sewer Main inverts entering manholes 300 mm or more above the invert of the downstream Sewer Main.
11. The minimum drop of invert across a manhole shall be 30 mm. The inside crown of the downstream Sewer Main shall not be higher than the inside crown of the upstream Sewer Mains or alternatively at least the 0.8 depth flow line of the downstream sewer shall be lower than the 0.8 depths flow lines of the upstream sewers.
12. Manhole benching shall provide smooth flow channels through the manhole with the minimum height of benching to the inside crown of the Sewer Mains and the bottom half to be shaped semi-circular. The benching platforms shall have a slope of 8%.
13. Sewer services shall not enter into manholes unless approved via servicing plans by the Town Engineer.
14. The minimum size of sewer services is 100 mm.
15. The minimum slope of sewer services is 2%.
16. The maximum slope of sewer services shall be 5%.

17. The minimum separation between Sewer Mains and Water Mains shall be 3.0 m.
18. All concrete for the sanitary sewer system shall be a minimum 25 MPa sulphate resistant concrete.

### 5.3 SEWER MAIN MATERIALS AND INSTALLATION STANDARDS

#### 5.3.1 Sewer Mains

- Poly Vinyl Chloride (PVC) CSA B1882.1 - DR 28.
- Minimum depth of cover over Sewer Mains 2.5 m.
- Minimum bedding shall be Class "B" bedding.
- Trench backfill shall be granular compact backfill under existing or proposed pavements or walks and compacted native backfill in boulevards and park areas.
- Force mains shall meet the requirement of Water Mains.

#### 5.3.2 Manholes

- Manholes shall be constructed using waterproofed concrete barrel sections with confined O rings.
- Manhole bases shall be pre-cast concrete basis.
- Sewer Main entries into manholes shall be pre-manufactured with rubber seals and stainless steel bands.
- Manhole steps shall be safety drop steps of galvanized steel or coated aluminum permanently cast into the barrel sections with spacing between 300 mm and 400 mm.
- Sewer Mains entering manholes shall be supported on undisturbed soil. Backfill below the Sewer Main shall be concrete from undisturbed soil to the bedding 100 mm below the Sewer Main. Proper bedding shall be provided between the main and the concrete pipe support.
- Manhole frames and covers shall be NF 80 floating type cast iron.

### 5.3.3 Sewer Services Connections

- Sewer service connections shall be constructed using the following materials:
- Service saddles of Poly Vinyl Chloride (PVC) with double straps of stainless steel.
- 22 1/2<sup>0</sup> fitting of Poly Vinyl Chloride (PVC) similar to sewer service pipe.
- Sewer service of Poly vinyl Chloride (PVC) CSA Standards B1882.1-DR28.
- Minimum size sewer service is 100 mm for single-family dwellings and 150 mm for multi-family dwellings and industrial properties.
- Multiple family dwellings (i.e. duplexes, etc.) require a separate sewer service for each unit.
- All sewer services shall be installed into the Sewer Mains at the 2 o'clock or 10 o'clock locations using service saddles and 22.5<sup>0</sup> bends.
- Sewer and Water services shall be installed in a common trench. The water service shall be on the *left* of the sanitary service, when facing the property from the main.
- The depth of cover over the sewer service shall be between 2.6 m and 2.9 m from the finished grade at the property line.
- Services shall be laid on 100 mm granular bedding and the granular bedding material shall be placed up to 300 mm above the crown of the highest service in the trench.
- A temporary wooden marker 50 mm x 100 mm shall be extended from the end of the sewer service to a minimum of 1.0 m above ground level and shall be painted fluorescent red for the top 0.5 m.
- Sewer services shall be located in the center of a lot.
- The end of a sewer service shall be watertight, sealed with plug or cap supplied by the pipe supplier.
- Service trench backfill shall be compacted granular material under proposed or existing pavements and compacted native backfill in boulevards.
- The minimum grade of sewer services is 2%.



- The maximum grade of sewer services is 5%.
- Where the sewer services are to be connected to a Sewer Main in excess of 4.50 m deep, risers shall be installed along the undisturbed trench wall with proper bends, anchors and the service terminating at the standard sewer service depth.

## 5.4 TESTING

The height of the existing groundwater level determines whether an infiltration or exfiltration test is required.

### 5.4.1 Infiltration Test

An infiltration test shall be carried out where the existing groundwater level is 1.0 m (3 ft.) or more above top of the pipe. The volume of infiltration shall be measured by means of a weir or meter placed at the low end. The test duration need not exceed 8 hours.

### 5.4.2 Allowable leakage for Gravity Sewers

Leakage shall not exceed the amount calculated by the following formula:

$$\text{Allowable leakage (liters)} = \frac{HDL}{900}$$

Where H = duration of the test in hours; D = inside diameter in mm; L = length in test in m.

### 5.4.3 Testing of Force mains

Force mains shall be tested as described for the Water Mains.

### 5.4.4 Video Inspection Test

A televised inspection of the sewer system shall be carried out by the Developer at the end of the construction process. The Developer at his own expense shall promptly remedy any deficiencies found during this test. The Town Engineer shall supply videotapes in VHS format, and of acceptable clarity and quality, along with inspection reports and summaries of the televised inspection at the time of application for acceptance.

Prior to final acceptance of the municipal improvements by the Town, a second video inspection shall be performed and submitted to the Town for approval.

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## 6. STORM DRAINAGE SYSTEM

### 6.1 General

Storm runoff from the Town is discharged into Lesser Slave Lake, the Lesser Slave River or the tributaries thereto. The 1:100 year lake level, at the outlet control structure in the Lesser Slave River east of Highway #88, is 578.05 m. The Sawridge Creek flows in June of 1988 exceeded the 1:100 estimated flows causing *substantial flooding*. Construction of a trash rack upstream and floodway channel improvements from the Sawridge Creek immediately north of Highway #2 easterly to the Lesser Slave River have reduced the potential of flooding of the Sawridge Creek.

Flood risk mapping has been carried out by Alberta Environment, which indicates areas within the floodway and flood fringe with special requirements for construction.

The lands north of Highway #2 are very flat with limited opportunity to install a closed pipe minor drainage system. As a result overland drainage and open drainage ways will be considered where applicable.

Town Council has adopted an Area Structure Plan for the south expansion area south of Highway #2. This plan sets out an overall drainage plan for the area.

The storm drainage system for the South Expansion Area must meet the Area Structure Plan requirements and the general municipal standards that apply throughout the Town.

### 6.2 DESIGN CRITERIA

#### 6.2.1 Storm water Management

Storm water management principles shall apply to the development of land within Slave Lake. Provisions for upstream drainage facilities must be accommodated in any design for the Subdivision Area. The drainage requirements for the Subdivision Area must be addressed in a comprehensive manner including the needs for the Major and Minor System.

#### 6.2.2 Minor System

The Minor System shall convey runoff from snowmelt and rainfall events to an adequate receiving stream without sustaining any surface ponding or excessive surface flows for events up to a 1 in 10 year return period.

#### 6.2.3 Major System

The Major System comprises of the street system, detention facilities, parkland and any other land required to convey runoff from events up to a 100 year return

period to the receiving stream. The major system shall be evaluated in a manner sufficient to determine that no flooding that may cause significant property damage (i.e. flooding of buildings) occurs during the 100-year event. The system shall include culverts crossing roadways.

#### 6.2.4 Storm water Contributions

##### 1. Rainfall Intensity - Duration - Frequency Curves

The I.D.F. curves developed by Atmospheric Environment Services of Environment Canada shall be used. The results of their most recent analysis shall be used.

##### 2. Rational Method

The rational method of analysis shall be used to determine design flows for piped storm sewer system of predominately residential, commercial or industrial land use to 50 ha (125 acres) in area. Alternatively, computer modeling may be used. The rational formula shall be used for the design peak runoff rate in accordance with:

$$Q = 2.78 CiA$$

Where Q = the design peak flow rate (L/s); C = the runoff co-efficient;  
i = the rainfall intensity (mm/hr) corresponding to the time of concentration; A = the area of contributing runoff surface (ha).

##### 3. Runoff Co-efficient

The runoff co-efficient for various land uses is given in Table 6.1.

*TABLE 6.1*  
*RUNOFF CO-EFFICIENTS*

<i>Land Use</i>	<i>Runoff Co-efficient</i>
Parks	0.10
Playgrounds	0.25
Schools	0.50
Single Family Residential Areas	0.45
Multi Unit attached Residential Areas	0.65
Apartments	0.70
Commercial	0.80
Industrial	0.70
Pervious Areas (agricultural)	0.10
Impervious Areas (asphalt, concrete)	0.95

The weighted average of runoff coefficients for composite areas shall be estimated from the following equation:

$$C_{ave} = \frac{\sum C_s A_s}{A}$$

Where  $C_{Ave}$  = the average runoff co-efficient for the composite area under consideration;  $n$  = the number of sub catchment areas;  $C_s$  = the runoff co-efficient for each sub catchment area within the composite area under consideration;  $A_s$  = the area in ha for each sub catchment area within the composite area under consideration.

#### 4. Time of Concentration

The duration of rainfall used to determine the intensity is equal to the time of concentration. The time of concentration is comprised of the overland flow time to the storm sewer inlet and the time of travel in the conduit. The overland flow time to curbside in residential and commercial areas shall not exceed 10 minutes in duration. Gutter flow time shall not exceed 5 minutes. The maximum time of concentration to an upstream inlet for a residential or commercial development shall therefore be 15 minutes. The time of travel in the conduit shall be based on the pipe full velocity.

#### 5. Computer Models

Computer models shall be used to determine flow design flow conditions in sewer systems with drainage areas larger than 50 ha. They may be used for smaller systems as an alternative to the Rational Method.

Computer models shall be used to determine design flows and the sizing of systems that contain non-pipe storm water management facilities (i.e. detention ponds) or systems that include a significant amount of undeveloped land.

The selection of an appropriate computer model shall be based on an understanding of the principles, assumptions and limitations in relation to the system being designed. Acceptable computer models are ILLUDAS, USEPA, SWMM, OTTSWM, HVM, HYMO and OTTHYMO.

Wherever possible, the computer model shall be calibrated. In all analyses, the parameters used, the drainage boundaries, the pipe network and its connectivity shall be clearly identified on an overall drawing, computer printouts and a design summary report.

The design storm hyetograph shall be the 30% distribution for the Prairie Provinces developed by Hogg of Atmospheric Environment Services of Environment Canada. Alternatively, the Chicago method may be used to generate a synthetic design storm.

The duration of event that is critical for systems comprised of pipes only shall be one hour. The duration of the design rainfall event for systems with storage shall be at least 12 hours. Longer durations shall be used, if necessary, to properly assess the post-event drainage of the detention facility.

#### 6.2.5 Master Drainage Plans

Master Drainage Plans, which detail the overall drainage concepts for the area within the drainage boundaries are required to be prepared where such plans have not already been adequately defined in Area Structure Plans.

It may be required to provide additional information and detailed calculations to support the existing concepts in place in Area Structure Plans or to propose changes to these concepts.

The Master Drainage Plan must make provision in sufficient detail for the Major system for the 100-year return period events as well as the provision for the Minor system for the 10-year period events.

Design flows shall be shown together with capacities for the various facilities and minimum development elevations to protect properties from the 100-year return period events.

The Master Drainage Plan shall be coordinated with the Flood risk mapping requirements in place and set out any proposed action to meet the requirement.

Adequate details for proposed drainage parkways or any detention facility must be provided. Minimum erosion control requirements must be spelled out.

### 6.2.6 Design Flows

1. Flows in pipes for storm sewers shall be the same as per sanitary sewers set out in *Section 5.2.3*.
2. The capacity of catch basin inlets is set out in *Table 6.2*.

**TABLE 6.2**  
Catch Basin Capacities (L/s)

Catch Basin Type	Continuous Slope	Sump Condition
F33	11	20
F36	10	23
F38, F39	20	38
F51 (Two Piece)	40	80
K2	25	45

**NOTES:**

- Capacities for F33 and F36 are based on hydraulic studies conducted by the City of Edmonton (Townsend and Moss 1980). Sump capacity is based on 5 cm (2") head. Continuous slope capacity based on gutter flow of 40 L/s (1.4 cfs).
- Capacities for others are based on the work of Wilson (1983). Sump capacity based on 65% of theoretical capacity for 5 cm (2") head. Continuous slope capacity based on ratios for F33 and F36 tests.
- Capacities can be considered to be double those shown in the table when assessing the 100-year event.

3. Open channel flows shall be based on the Manning Formula:

$$V = (1/n) R^{2/3} S^{0.5}$$

Where  $V$  = the velocity in m/s;  $R$  = the hydraulic radius in m;  $S$  = the slope of the energy grade line in m/m;  $n$  = 0.02 from gravel lined channels, 0.013 for concrete or asphalt lined channels and 0.05 for natural streams and grassed channels.

4. Flows through culverts shall be determined on the basis of inlet control or outlet control methods referred to in:
  - Handbook of Steel Drainage and Highway Construction Products, by American Iron and Steel Institute
  - Handbook of Concrete Culvert Pipe Hydraulics, by Portland Cement Association



5. Flows through detention or retention facilities shall be determined in accordance with the Storm water Management Guidelines for the Province of Alberta, March 1987 from Alberta Environment.

#### 6.2.7 Minimum Drainage System Requirements

1. Minimum storm sewer size is 300 mm.
2. Storm sewer pipe shall be designed to convey the design flow when flowing full with the hydraulic grade-line at the pipe crown. All pipe crown elevations shall match at manhole junctions.
3. Changes in flow direction at a manhole shall not exceed 45° in pipe greater than 600 mm diameter.
4. Curved sewers shall match the curvature of the roadway by means of deflection at the joints only. Joint deflections shall be less than the allowable specified for the pipe.
5. The maximum spacing of manholes shall be 120 m on straight sewers and 60 m on curved sewers. Manholes shall be located at the upstream end of each line, at changes in size or alignment and at all junctions. The Downstream invert in a manhole at a change in direction shall be a minimum of 30 mm lower than the lowest upstream invert.
6. Manholes shall be a minimum of 1,200 mm in diameter.
7. Manholes on 600 mm Sewer Mains or larger shall be perched on the main or have pre-constructed Sewer Main openings.
8. Manhole barrel diameters shall be 600 mm larger than the largest Sewer Main entering or leaving.
9. Manhole benching shall provide smooth flow channels through the manhole with a minimum height of benching to the inside crown of the Sewer Mains and the bottom half to be shaped semicircular. Benching platforms shall have a slope of 8%.
10. Where drops in storm sewer are considered and at outfalls special energy dissipation structures may be required.
11. All concrete for the storm drainage system shall be a minimum 25 MPa sulphate resistant concrete.

12. Obverts of outfall pipes shall be at least 150 mm above the five-year flood level in the receiving stream. Inverts of outfall pipes shall be above winter ice level. In addition, outfalls shall be located to avoid damage from moving ice during breakup.
13. Drop structures and energy dissipaters shall be used where necessary to prevent erosion.
14. Facilities shall be provided to prevent entry or access by children.
15. Drainage parkways, if approved by the Town Engineer, may be utilized to convey large volumes of storm water under controlled conditions through or past the subdivision.
16. The minimum drainage parkway cross section shall be as follows:
  - 6.0 m bottom sloped to drain to trickle channel to be installed in the bottom,
  - Maximum side slopes of 4 horizontal to 1 vertical,
  - Provide 3 m wide terraces for every 3 m of depth of side slope,
  - No terraces are required if side slopes are 6:1
17. Minimum culvert sizing shall be 300 mm.
18. Catch basins shall be a minimum 900 mm diameter with pre-cast top and bottom and a minimum 600 mm sump.

#### 6.2.8 Foundation Drains

Foundation drains shall not be connected to storm sewers to avoid backup when the minor system is surcharged. Foundation drains may be connected to the sanitary sewer system by means of Fiovalve FR-4 backwater valves or equal, as approved by the Town Engineer. Foundation drains shall be discharged in a sump and pumped to a splash pad on the surface, located at the rear of the building, in such a manner that the runoff is directed away from the building.

Roof drains or other surface water accumulating on the property or within the weeping tile shall not be discharged into the sanitary sewer system.

### 6.2.9 Roof Drains

Roof drains shall be discharged to the ground and dispersed via splash pads at the down spouts.

On flat roofs (Commercial and Industrial land use) controlled-flow roof devices shall be installed to provide temporary storage and retard the discharge to the ground or storm sewer. Where the building density makes it impractical (i.e. central business districts, etc.) roof drains may be connected to the storm sewer system if available.

### 6.2.10 Site and Lot Grading (*see Appendix III*)

Site and lot grading shall be based on overall drainage plans to be prepared by the Consulting Engineer and approved by the Town Engineer. In established areas where no overall drainage plan has been prepared, site and lot drainage shall be established on design elevations to be determined by the Consulting Engineer in consultation with the Town Engineer.

Applications for development for individual properties will require the submission of site plans which show the lot grading, based on the design elevations of the overall drainage plans.

Minimum grades along the rear of the lot or abutting lanes or streets are 0.5 %. Minimum surface grades on lots shall be 2% with a maximum of 6% for driveways and 10% for slopes of landscaped areas.

Lots may drain from the building to both the rear and front or across the lot, providing the minimum grade between the rear and front is 1%. In all cases, the finished grade at the building shall slope away from the building for at least a distance 3.0 m, or to the side property boundary, whichever is less. The minimum slope away from the building in this area is 5%.

The Town will require drainage easements where drainage from one property is directed across other private properties. The overall drainage plans shall show the drainage easement and a certified copy of the registered drainage easement, in the name of the Town of Slave Lake, must be submitted to the Town.

Drainage grades across boulevards from the property line of the private property to the curb on the street shall be 3%.

Positive drainage shall be maintained on all large parcels of land including parks, school sites and open space areas. The Town Engineer shall approve such plans. Where this is not possible or where required by the Town Engineer, a storm sewer system subject to the approval of the Town Engineer shall be installed and maintained by the property owner, in accordance with the requirements of the Town Engineer.

In areas where flood risk mapping has been established and the property is located in a "Flood Fringe Area", the grade at the exterior of the foundation wall shall be at least up to the design flood level.

All lots created by subdivision shall be pre-graded prior to transfer of property from the developer to private interests.

### 6.3 STORM DRAINAGE MATERIALS AND INSTALLATION STANDARDS

#### 6.3.1. Storm Sewer Mains

- Concrete or reinforced concrete adequate for the design Class considering earth loads, trench conditions, traffic and other surcharges.
- Minimum bedding shall be Class B bedding.
- Trench backfill shall be granular compacted backfill under existing or proposed pavements or walks and compacted native backfill in boulevards and park areas.
- Storm sewer pipe joints shall have confined O rings.

### 6.3.2 Manholes

- Manholes shall be constructed using concrete barrel sections with confined O rings.
- Manhole bases shall be pre-cast concrete bases.
- Sewer Main entries into manholes shall be pre-manufactured with rubber seals and stainless steel bands.
- Manhole steps shall be safety drop steps of galvanized steel or coated aluminum permanently cast into the barrel section with spacing between 300 mm and 400 mm.
- Sewer Mains entering manholes shall be supported on undisturbed soil. Backfill below the Sewer Main shall be concrete from undisturbed soil to the bedding 100 mm below the Sewer Main. Proper bedding shall be provided between the main and the concrete pipe support.
- The Town Engineer must approve energy dissipaters in manhole structures.
- Manhole frames and covers shall be NF 80 floating type cast iron and marked "TOWN OF SLAVE LAKE".

### 6.3.3 Catch Basins

- Catch basin barrels, bottoms and flattop shall be constructed using pre-manufactured materials that must be approved by the Town Engineer.
- Catch basin leads entering catch basin barrels shall be sealed with rubber seals and stainless steel bands.
- Catch basin backfill below the catch basin lead shall be concrete with 100 mm bedding between the concrete and the lead.
- Catch basin frames and covers shall be standard cast iron type properly placed on the flat top section in concrete and/or mortar to final grade.

### 6.3.4 Culverts

- Culverts shall be constructed using galvanized steel, PVC, or aluminized heavy gauge steel.

- The pipe zone and bedding material shall be 19 mm crushed gravel with a 1 m clay plug at inlet and outlet ends.
- Culvert inlets and outlets shall have manufactured end sections or concrete inlet and outlet structure, with splash pads.
- Inlets and outlets shall be protected with a minimum 100 mm diameter steel pipe on either side of the pipe projecting a minimum of 1.0 m above the final grade.
- Culvert inverts shall be a minimum 100 mm below ditch grades.
- Culverts for driveways shall be a minimum of 4 m longer than the designated driveway width.
- Manufacturer's couplers shall be used to connect pipe lengths.

#### 6.3.5 Drainage Parkways

- Drainage parkways shall be constructed with a minimum 125 mm topsoil.
- Special attention must be given to the trickle channel, which must be concrete lined or an alternative to be approved by the Town Engineer.
- Grass shall be selected on the basis of required quality and applied in a proper mulch or sodded and pegged.
- Rip rap shall be placed in sizes required for protection at the maximum anticipated velocity for those areas in bends and at inlet and outlet structures where grass will not be considered adequate protection.

## 6.4 TESTING

Testing of storm sewers shall be in accordance with the tests for sanitary sewers in Section 5.4.

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## 7.1 GENERAL

The complete installation of all franchised utilities, including gas, power, street lighting, telephone and cable television shall be the responsibility of the Developer. The Developer must initiate and coordinate the design, approval and construction of all franchised utilities. He shall make all necessary applications, pay any required contributions, fees and charges, and upon approval of all plans by the Town Engineer, assure that all services are installed in accordance with these Development Standards and the approved plans.

The franchised utilities shall be designed to accommodate future developments in adjacent areas in the most efficient manner, taking into consideration the orderly expansion of the Town in accordance with the Municipal Development Plan, Area Structure Plans, Outline Plans, and any other plans or direction the Town may require of the franchised utility companies. The actual installation shall be carried out in accordance with the approved plans and any deficiencies, omissions, errors or damages to other works shall be corrected at the Developer's sole cost.

This section provides some of the basic procedures and requirements for the installation of the franchised utilities.

## 7.2 UTILITY COMPANIES

The following companies hold franchises for utility installation in the Town of Slave Lake:

### Gas

#### *ATCO Gas*

Local Office: Box 720  
Slave Lake, AB  
T0G 2A0  
Phone: (780) 849-7676

Engineering Office: 10035 -105 Street  
Edmonton, AB  
T5J 2V6  
Phone: (780) 420-7577



<u>Power &amp; Lighting</u>	<i>ATCO Power</i> Slave Lake District:	104 Birch Road, N.E. Slave Lake, AB T0G 2A2 Phone: (780) 849-7600 Fax: (780) 849-2336
<u>Telephone</u>	<i>Telus Communications Ltd.</i> Outside Plant Engineering:	11039 -78 Avenue Grande Prairie, AB T8V 3A8 Phone: (780) 853-8680
<u>Cable TV</u>	<i>Cable TV Slave Lake Ltd.</i>	802 Main Street North Slave Lake, AB T0G 2A1 Phone: (780) 849-5188

### 7.3 PROCEDURES

The procedures for development are set out in Section 2 of these Development Standards.

It is crucial for the Developer to consult with the utility companies during the preliminary discussions to determine the feasibility and any constraints on development proposals in regards to franchised utilities. The provision of sufficient feeder and trunk lines to service the Development Area and the adjacent areas and its implications must be discussed.

The Town Engineer must be made part of these discussions and shall be kept informed by copying all correspondence between the Developer and the utility company to the Director of Operation's attention.

Special alignment and easement requirements must be determined for inclusion in the preliminary subdivision plan. Assignment of general alignments for shallow utilities as well as the deep utilities street cross section should be agreed on between all parties prior to preparation of design drawings by each of the utility companies.

The submission of final plans for approval must show the approval of each of the utility companies based on their review of all utility alignments of all utility companies.

Any variation from the alignments that have been approved by the Town Engineer must be resubmitted in writing by the Developer's Consulting Engineer together with the approval

for the proposed change by all the utility companies. The Developer's Consulting Engineer will be required to coordinate and supervise the installation of all utilities. The Consulting Engineer must submit as-built drawings of all utilities certified as being correct.

#### 7.4 DESIGN GUIDELINES

##### 7.4.1 Gas

Gas mains will normally be installed in lanes or on the front of private lots in 2 m gas easements. Where easements are provided, the sewer and water services must be extended to the edge of the easement and the water service curb stop must be installed in the easement within 150 mm of the property side of the easement. Gas mains shall be a minimum of 750 mm below the finished grade elevation in boulevards or 300 mm below the sub-grade elevations of the pavement structure.

##### 7.4.2 Power

Power lines in residential and commercial areas shall be placed underground. Existing overhead lines shall be changed over to underground lines as part of the power installation at the time of subdivision or redevelopment. Transformers, pedestals, switching cubicles, etc. shall be located at the extension of common lot lines. The minimum distance from face of curb to face of the fixture shall be 1.0 m. The minimum distance from sidewalks is 0.3 m. Power lines shall be a minimum of 750 mm below the finished grade elevation in boulevards or 300 mm below the sub-grade elevations of the pavement structure.

Main Town feeder lines that are overhead, the changeover to underground will be elevated at the time of subdivision or redevelopment.

Power line shall be installed in ducts under road crossings - ducts shall be augured under existing roadways.

##### 7.4.3 Street Lighting

Street lighting shall be provided to the lighting level and Standards set out in Section 3.5.

The design shall be submitted to the Town Engineer for approval.

##### 7.4.4 Telephone

Telephone lines are normally installed in common trench with power lines. The standards for power lines will also apply to telephone lines and fixtures.

#### 7.4.5 Cable TV

Similarly, to the telephone lines, the standards for power lines will also apply to Cable TV lines and fixtures.

### 7.5 CONSTRUCTION STANDARDS

Construction of franchised utilities shall be supervised by the Developer's Consulting Engineer to assure that damage to other utilities or Municipal Improvements will not occur.

The Developer will be responsible at his own cost to repair any damage and inadequate installation such as settled trenches up to the end of the maintenance period for the various Municipal Improvements.

Trench backfill under roads and sidewalks shall be with compacted granular backfill. Trench backfill in boulevards and grassed areas shall be compacted native backfill. Existing pavements, walks and boulevards that have been damaged or disturbed shall be restored to the satisfaction of the Director of Operations. All excess materials and debris shall be promptly removed from the site. Boulevards shall be restored with a 125 mm layer of topsoil and seeded with a parks mixture of grass seed.

Pavements shall be replaced with a minimum 200 mm of 20 mm crushed gravel base course and 100 mm asphaltic concrete over the compacted granular trench backfill.

Trench compaction shall be to 97% Standard Proctor Density for native materials and 95% Standard Proctor Density for approved imported granular fill. Base compaction shall be to 100 % Standard Proctor Density. Asphaltic concrete shall be compacted to 98% of the 75 Blow Marshall Density.

### 7.6 EASEMENTS

Easements required for all franchised utilities shall be provided by the Developer in the name of the Town with the right to use the easement for any utility installation by any of its franchised utility companies. *Should any franchised utility share an easement with a water & sewer main, a minimum of a three (3) meter separation shall be maintained.*

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## 8.1 GENERAL

The complete landscaping of all parks, boulevards, walkways, trails, utility lots, buffer strips, median strips, traffic islands and drainage parkways within the Subdivision Area to be developed shall be the responsibility of the Developer.

Landscaping includes the excavating, filling, grading, placing of topsoil, seeding or sodding, planting, fencing, service installation and generally the completion of all of the above areas in accordance with approved landscaping plans and specifications.

It does not include recreation facilities such as playground equipment, changing rooms, hockey rinks or clubrooms unless such are specifically set out in the Development Agreement.

While special drainage facilities, such as detention ponds, may not be envisioned as part of development requirements, if such facilities are agreed to as alternative drainage concepts, special landscaping and development requirements may have to be developed and agreed to for these facilities.

## 8.2 LANDSCAPING DESIGN AND PLANS

The design of landscaping shall be consistent with the overall planning documents such as Municipal Development Plan, Area Structure Plans and the Parks, Recreation and Culture Master Plan. The Developer's Landscaping consultants should have early discussions with the Town's Community Development Department to determine the parks concepts applicable and the required locations, sizing and linkages between parks and park access.

It may be necessary to submit concepts to the Town's Community Development Department for approval in principle. While the Area Structure Plan may have provided some overall guidance in parks requirements, the proposed subdivision may require special considerations to suit the detailed requirements for the parks system. The detailed landscaping design shall be directed to developing an attractive subdivision.

Natural features should be preserved and enhanced where possible. Plantings should be of hardy varieties suitable for the local conditions. Ease of long-term maintenance should be taken into consideration in the landscaping layout.

Special attention must be given to street and area lighting and Section 3.5 Roadway Illumination should be consulted.

Landscaping plans shall be complete, including specifications, and must be part of the overall set of plans for approval by the Town's Director of Community Development.

Drainage of walkways and park areas must be in accordance with the overall lot grading and must be shown on the landscaping plan together with cross sections of drainage swales.

Landscaping plans must show, in detail, roads and walks, retaining walls, fences and screens, underground services, site furnishings, future buildings and facilities.

Details shall be shown for final grading elevations, proposed contours, location of trees and shrubs, areas to be seeded, sodded or required special treatment.

A list of plant materials shall include the following:

- keys to planting plan
- quantity of individual species
- botanical name and common name
- size of material and height and caliper
- method of transport, i.e. balled and burlap, container stock, bare root, etc.
- Canadian Plant Hardiness Zone

### 8.3 MINIMUM LANDSCAPING REQUIREMENTS

#### 8.3.1 Boulevards

Boulevards shall be seeded or sodded to a developed “turf” standard by the Developer prior to acceptance of same by the Town.

Boulevard trees shall be located in all boulevards between curbs and sidewalks at a maximum spacing of 10 m. Boulevards shall be graded with a 3% slope towards the road.

No landscaping other than grass shall be permitted within 4 meters of a hydrant.

#### 8.3.2 Walkways

Private lots abutting walkways shall have a uniform fencing. Bollards shall be installed 6 m back from the front lot lines in walkways where slopes to the street are less than 8%. Staggered walk and fencing shall be used for walks with grades 8% and steeper. Drainage swales 1.0 m in width shall be located adjacent to concrete walks.

#### 8.3.3 Buffer Strips

Private lots abutting buffer strips shall have uniform fencing. The buffer strip shall be planted with trees using the uniform fencing as a back-drop while providing a minimum 3 m access in front of the tree planting.

The tree planting shall be a dense planting that will provide solid screening. Tree spacing shall be a maximum of 3 m taking into consideration the type of species used.

#### 8.3.4 Park Areas

Where car parking is to be provided, the parking area shall be adequately fenced to prevent cars from entering the remainder of the park. Parking areas shall be gravelled to the same standard as lanes.

Tree planting shall be provided against the uniform fencing for private lots similar to buffer trips. Additional tree planting will be required to complement the various uses of the park. Shade trees shall be planted around tot lot areas and picnic areas. Trees for protection from wind should be considered for appropriate use areas.

Designated sport field use areas shall be graded and grassed meeting the specific sports association's field standards and criteria.

All parks shall be provided with a 150 mm sewer and a 38 mm water service.

Private lots abutting park areas shall have uniform fencing.

#### 8.3.5 Trails

The standard of trail development depends on the projected use of the trail i.e. hiking and X-country skiing, bicycling, walking and access.

1. *Level I: Hiking and Skiing*  
Minimum clearing width 6 m grading and drainage culvert installation as required. Seeding to acceptable vegetation level.
2. *Level II: Biking, Nature Walks*  
Provide a 2.5 m raised gravelled surface with seeded sides and drainage swales as required. Benches and bike racks at strategic locations. Lighting as considered necessary.
3. *Level III: High Use Access Trails*  
Requirements as per Level II plus asphaltic wearing surface and full standard of lighting. Benches and garbage receptacles shall be provided.

## 8.4 PARKS MATERIALS AND INSTALLATION STANDARDS

### 8.4.1 Site Preparation

Site preparation shall be done in a manner to protect natural features to be preserved. Roots, stumps and debris shall be removed to a depth of 0.6 m (2 ft.) below rough grade. Trees and areas to be preserved shall be marked, flagged and protected. The soil shall be protected from pollution of oil, gasoline, solvents or other chemicals.

### 8.4.2 Sub-grade

Sub-grades shall be prepared to grade by removal of unsuitable materials and filling and cutting existing grades. Imported fill shall meet requirement of the intended use areas. Sub-grades shall be within 50 mm (2") of their design grades before placing topsoil. Where disturbed areas meet natural grades the transitions shall be gradual and completed with a minimum 4:1 slope. Where different slopes meet, and at toes and banks, the slopes shall be rounded to allow for proper mowing with 2.5 m mowing equipment. Sub-grades in fill shall be prepared using the equipment to compact the materials during placing. Minimum densities may be required depending on circumstances.

### 8.4.3 Topsoil

1. The source of topsoil shall be approved by the Town's Director of Community Development. All topsoil shall be free of stones larger than 25 mm, debris, quack grass, perennial weeds, and any other plants, organic or inorganic matter that may render the topsoil unsatisfactory in the opinion of the Director of Community Development.
2. Tests at the Developer's cost may be required to determine the chemical content and pH value.
3. Chemical deficiencies indicated by the soil analysis report shall be rectified by the application of the appropriate fertilizers and additives.
4. Topsoil shall consist of fertile natural loam containing a maximum of 10% organic matter by dry weight. Topsoil shall have a hydrogen ion concentration ranging from pH 6.0 to pH 7.5, shall contain no toxic materials and shall be capable of sustaining vigorous plant growth in the Town of Slave Lake.



5. If organic material is required to meet the organic matter specification for topsoil listed above, peat moss shall be added in the field and mixed with cultivation equipment.

The peat moss shall meet the following specifications:

- a) shall be free of toxic material, live plants, live roots and seeds
  - b) shall be delivered in a pulverized condition
  - c) the source shall be approved prior to mixing with the topsoil
6. Topsoil shall be spread in a workmanlike fashion over the entire area to be seeded or sodded and shall be applied to a compressed depth of no less than 100 mm.
  7. Areas for planting beds shall be excavated and filled with topsoil to a depth of 600 mm below finished grade and topsoil shall be applied to a minimum compressed depth of 100 mm above finished grade.

#### 8.4.4 Seeding

1. Areas to be seeded shall be approved by the Town's Director of Community Development subject to the intensity of use and the size of the area.
2. Grass seed shall be certified Canada #1 Grade Seed that meets the requirements of the Seed Act of Canada. The seed is to be delivered in the original containers giving the following information:
  - a) analysis of seed mixture - 60% Kentucky Blue Grass/40% Creeping Red Fescue
  - b) percentage of pure seed production
  - c) year of seed production
  - d) net weight
  - e) date when bagged and location
  - f) name of supplier
  - g) seed must be capable of producing a minimum germination rate of 75% in a germination test

All areas to be seeded shall be given a layer of topsoil as specified in 8.4.3 "Topsoil". Before seeding, the topsoil surface shall be brought to a firm, even but fine graded condition, without local depressions or elevations by dragging, raking, rolling or other suitable means.

The degree of firmness shall be such that footprints in the prepared surface shall penetrate not less than 6 mm and not more than 12 mm.

All pebbles, stones, roots and debris shall be removed from the finished soil surfaces.

3. The topsoil seedbed is to be inspected and approved by the Town's Director of Community Development.
4. The seed shall be evenly applied at the rate of 25 g/m<sup>2</sup>.
5. Seeding shall not be carried out in wind velocities that may cause the seed to be blown (above 8 km per hour).
6. After the application of the seed, the seed shall be incorporated into the soil with wire rakes or some other suitable means. After the seeded area has been raked, the seeded area is to be rolled with a light turf roller.
7. After seeding, the Developer shall give the seeded area a light watering with a fine spray to a depth of not less than 25 mm to avoid washing.
8. The seeded areas shall be appropriately maintained by the Developer, i.e. watering, rolling, fertilizing, until the time of final inspection and acceptance by the Town. A maintenance schedule is to be submitted for approval by the Town Engineer.
9. At the time of final inspection and acceptance the grass shall be:
  - a) mowed to a minimum height of 50 mm after a minimum of two prior mowings
  - b) shall cover 100% of the seeded area
  - c) shall be completely weed free
  - d) shall be completely free of thin, bare and dead spots
  - e) and shall be in an overall healthy growing condition, satisfactory to the Town Engineer
10. The developer shall be responsible for providing and maintaining adequate barricades and signs until the time of final inspection and acceptance by the Town.
11. For areas on steep slopes and hard to reach areas, the Town Engineer may approve hydraulic seeding. Preparation shall be the same as setout above. The method of hydraulic seeding shall be specified in details when applying for approval of this method. The Town Engineer shall approve the hydraulic seeding equipment. Maintenance and acceptance requirements of hydro-seeded areas shall be the same as set out in this Section 8.4.4.

#### 8.4.5 Sodding

1. Sodding will be required in areas of high use, for patchwork areas in established turf and in areas of steep slopes and possible erosion.
2. Preparation, including topsoil placement shall be in accordance with this Section 8.4.
3. Sod to be installed for general use shall consist of No. 1 Nursery sod consisting of a uniform mixture in the following proportions:

Kentucky Blue Grass - 75% by weight  
 Creeping Red Fescue - 25% by weight

Sod shall be:

- a) minimum of eighteen (18) months old
  - b) free of noxious weeds and debris
  - c) 25 mm - 30 mm in thickness
  - d) cut in strips of uniform width
  - e) shall be sufficiently moist so that no burning of the edges has occurred
  - f) shall have a vigorous healthy growth
4. Sod shall be laid evenly and in staggered rows.
  5. Sod shall be laid at right angles to all slopes. On slopes sod shall be secured with pegs. Pegs shall not protrude above the surface of the sod.
  6. Maintenance and acceptance shall be in accordance with the requirements set out for seeded area.

#### 8.4.6 Plant Material

All plant material shall be in accordance with Appendix IV.

#### 8.4.7 Uniform Fencing

1. Uniform fencing, in accordance with the fencing requirements of Land Use Bylaw, shall be constructed 50 mm inside private property on lots adjacent to and at the following locations:
  - a) arterial roads
  - b) parks and play fields
  - c) public walkways and utility lots
  - d) school sites
  - e) Town owned lands i.e. community facility sites

- f) multiple family sites
  - g) neighbourhood commercial sites
  - h) institutional sites
  - i) other areas as required by the Town
2. Uniform wood fencing gates shall be installed on all residential lots, which back onto a public park. 1 m gates shall be located approximately at the mid-point of each lot and shall be constructed to open inwards onto private property.
  3. Design of uniform fencing may vary for each specific Development Area. Materials used generally shall be rough sawn lumber with vertical 25 mm x 150 mm posts 2.4 m apart with 50 mm x 100 mm top and bottom stringers.

The posts and stringers shall face the inside of the lot and the flush outside vertical boards shall face the park, buffer or public property.

Posts shall be placed firmly in the ground with a minimum depth to a final design grade of 1 m.

Uniform fencing shall be pressure treated wood, stained with an approved color stain.

Detailed design and the manufactures stain type and color number shall be shown on the drawings submitted for approval.

#### 8.4.8 Maintenance

The maintenance requirements by the Developer during the 2 year maintenance period includes but is not limited to the following items:

- a) Protective and preventative spraying when required
- b) resetting to proper grade of settle plants and planting saucer repair
- c) resetting plantings which are leaning and maintaining proper staking and guying
- d) pruning, fertilizing and tending to planting to assure their vigorous growth
- e) replacing damaged, diseased, unhealthy or infested plantings
- f) reseeding, resodding and replacing grassed areas which have settled or which show an inadequate condition
- g) correcting defective quality materials and workmanship

For other maintenance requirements, reference shall be made to the Terms set out in the Development Agreement.

Following acceptance of the landscaping the Town assumes responsibility for the normal maintenance such as mowing of grass, and watering of grass and planting.

## 9. SPECIFICATIONS

### 9.1 GENERAL

The Development Standards and Procedures set out the basic development requirements within the Town. Specifications must be developed around these requirements. Standard specifications in use by the various Consulting Engineers in most cases are acceptable provided that they are tailored to fit the requirements set out in these Standards.

The Town will endeavor to make its construction specifications available to Consulting Engineers as required and these may be used where appropriate for work to be performed by Developers. Specifications form an integral part of the plans and must be submitted with the drawings for approval. Manufacturers specifications for items to be included in the Municipal Improvements, where appropriate, must be submitted with the plans.

Where reference is made to standards and specifications from trade and product associations or standards associations, the latest version shall generally be consulted unless specifically indicated.

These Development Standards and Procedures may be updated from time to time with specific specification for standardized facilities and equipment in use in the Town.

1. APPENDICES

REFERRING SECTIONS

APPENDIX I - SUBDIVISIONS	2.1.7
APPENDIX II - LEVIES	2.1.15
APPENDIX III - SITE & LOT GRADING	6.2.10
APPENDIX IV - PLANT MATERIALS	8.4.6

## **APPENDIX I**

### **SUBDIVISION APPLICATION PROCEDURE GUIDE**

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This Subdivision Procedure Guide is designed to help the applicant understand the process of Subdivision and the necessary steps required by the Application Process.

Steps of the Subdivision Application Process:

- Step 1.** Discuss the Subdivision Proposal with the Town Administration and Municipal Planning Commission prior to application. These discussions may avoid unnecessary costs or delays to the applicant. Depending on the circumstances of the proposal, the Applicant may then decide whether or not to proceed with an application for subdivision.
- Step 2.** Submit a Subdivision Application to the Subdivision Approval Authority. The Planning & Development Officer will review the Application for completeness.

Information typically required for a subdivision application includes:

1. Completed copy of the application form
2. Payment of the required subdivision application fees as per Council Bylaw #30-1995
3. A sketch plan (proposed plan of subdivision) showing the following information (twelve copies)
4. Legal description, boundaries, dimensions, and area of the property described on the existing certificate of title
5. Location, dimensions, boundaries, and area of the proposed parcel
6. Location of any buildings or structures, water wells, and sewage disposal facilities
7. Location, registered plan number, and dimensions of any road widening, rights-of-way, easements or exceptions from the titled area
8. Location of existing and proposed roadway approaches serving the proposed parcel and remainder of the titled area
9. Location of all drainage channels, streams, lakes, or large sloughs located within the titled area



10. A key plan showing the relationship between the proposed parcel and neighbouring lands
11. A photocopy of the duplicate certificate of title validated within 30 days of the submission of the subdivision application (the name of the title must match the name on the application form, if names do not match, a letter of authorisation from the title owner must accompany
12. A stereo pair of aerial photographs, which show the proposed subdivision, (if deemed necessary)

NOTE: Depending on the type and location of subdivision proposal, further information may be required. Costs associated with obtaining the required information will be borne by the subdivision applicant.

**Step 3.** A copy of the subdivision application is referred to the Government Departments, persons and local authorities required by the Subdivision and Development Regulations and abutting landowners are given notice. Comments of those persons to whom an application for subdivision approval is referred to will be considered by the Town of Slave Lake.

**Step 4.** When considering an application, the Subdivision Authority must consider the written submissions of those persons and authorities, which received a referral for subdivision approval or notice of application. A Planning Report is prepared by that documents and evaluates all pertinent information regarding the application. This report is submitted to the Municipal Planning Commission, the Subdivision Authority for the Town, with recommendations concerning the subdivision application.

**Step 5.** The Subdivision Authority will render a decision on the application. The application may be unconditionally approved, approved with conditions, or refused by the authority.

**Step 6.** The decision of the subdivision approving authority shall be given in writing to the applicant and to the Government departments, persons and local authorities to which the Subdivision Authority is required by the subdivision and development regulations to give a copy of the application.

The time prescribed within which the Town of Slave Lake will make a decision on an application for subdivision approval is 60 days from the date of receipt of a completed application.

- Step 7.** The applicant for subdivision approval shall submit to the Town the plan of subdivision (or other instrument) to be endorsed within one year after the date in which the subdivision approval is given to the application. On being satisfied that the plan of subdivision complies with the subdivision approval and all conditions imposed have been met, the plan shall be endorsed by the Subdivision Authority (or person designated).
- Step 8.** The final step of the subdivision process is the registration of the instrument at Alberta Registries (Land Titles). This government department ensures that the instrument has been properly endorsed by the Authority prior to registering the instrument. Registration of the instrument results in titles being issued for the newly created lots.

*NOTE: Endorsement fees are payable at this time.*

If the plan of subdivision or other instrument is not submitted to the subdivision authority for endorsement within the time prescribed or any longer period authorised by the Subdivision Authority, the subdivision approval is void.

If the plan of subdivision is not registered in a Land Titles office within one year after the date on which it is endorsed or within the extended period authorised by the Subdivision Authority, the subdivision approval of the plan or instrument and the endorsement are void and the plan or instrument shall not be accepted by a Registrar for registration.

An appeal from the decision of a Subdivision Authority, or any condition imposed by it, may be commenced by filing written notice of appeal with the Town of Slave Lake, Subdivision and Development Appeal Board within 19 days of the date of receipt of the written decision of the Subdivision Authority. The reasons for appeal shall identify the issues in the decision of the Subdivision Authority, or any conditions imposed by it, as they relate to the act of subdivision, against which the appeal is lodged.

The Subdivision and Development Appeal Board shall hold a hearing into the appeal and shall give at least five days written notice of the hearing to the required persons.

The Board hearing an appeal must hold the hearing within 30 days of receiving notice of appeal and give a written decision, together with the reasons for the decision, within 15 days of concluding the hearing.

**APPENDIX II**  
**OFFSITE LEVY BYLAW #16-1994**

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BEING A BY-LAW OF THE TOWN OF SLAVE LAKE IN THE PROVINCE OF ALBERTA TO PROVIDE FOR THE IMPOSITION OF OFF-SITE LEVIES.

WHEREAS, under the provisions of Section 76 of the Planning Act, being Chapter P-9 of the Revised Statutes of Alberta, 1980, and amendments thereto, the Council of the Town of Slave Lake, in the Province of Alberta is authorized by By-Law to provide for the imposition of an off-site levy in respect of land to be developed or subdivided;

AND WHEREAS, an off-site levy may be used only to pay for all or part of the capital cost of all or any of the following:

1. New or expanded facilities for the storage, transmission, treatment or supply of water
2. New or expanded facilities for the treatment, movement or disposal of sanitary sewage
3. New or expanded storm sewer drainage facilities and
4. Land required for or in connection with any facilities described in clauses 1 to 3

NOW THEREFORE, the Council of the Town of Slave Lake in the Province of Alberta, duly assembled, hereby enacts as follows:

1. An off-site levy shall be imposed on all lands to be developed or subdivided within the corporate limits of the Town of Slave Lake and shall be levied on the following basis:
  - (a) Residential
    - (i) For each detached, semi-detached, or duplex dwelling, including mobile homes, the sum of \$1,300.00,
    - (ii) For each unit of multi/high density residential housing, triplex and up, the sum of \$600.00 per unit and should the number of units exceed 10, the sum of \$300.00 for each unit in excess of 10, or
    - (iii) For each Mobile Home Park, the sum of \$600.00 for each parcel of single unit development.
  - (b) Commercial

- (i) For each commercial development an off-site levy of \$2,100.00 per acre.
  - (c) Institutional
    - (i) For each institutional development an off-site levy of \$2,100.00 per acre.
  - (d) Industrial
    - (i) For each industrial development off-site levy of \$1,400.00 per acre.
  - (e) In addition to levies charged in 1 (a), (b), (c) and (d) an area specific levy will be charged for the areas as outlined in Schedule (C). Areas (A), (B) and (C).
    - (i) For area (A) an off-site levy of \$981.20 per acre increased annually commencing on the 1st of April 1993 by the Consumer Price Index for the previous year.
    - (ii) For area (B) an off-site levy of \$1,204.80 per acre increased annually commencing on the 1st of April 1993 by the Consumer Price Index for the previous year.
    - (iii) For area (C) an off-site levy of \$1, 736.54 per acre increased annually commencing on the 1st of April 1993 by the Consumer Price Index for the previous year.
2. The off-site levies described in section 1 of this By-Law are determined in accordance with Schedule "A", "B" and "C" attached to this By-Law and the off-site levies collected under this By-Law shall be utilized only for all or any of the purposes authorized under subsection 76(2) of the Planning Act (Alberta), R.S.A. 1980, c. P-9.
  3. The Council of the Town of Slave Lake may enter into an agreement in respect to payment of an off-site levy.
  4. In the absence of an Agreement for the payment of an off-site levy, where an owner of land proposes to construct a development and the payment of an off-site levy shall be required under this By-Law, the payment of the off-site levy shall be made prior to the issuance of a development permit or where a development permit is not required or is deemed approved, before the issuance of a building permit in respect of such development.
  5. In the event that any of the levies imposed herein are not paid at the times specified, the Secretary-Treasurer is hereby authorized to apportion the unpaid sums of money on a pro-rate basis against each lot within the development and charge said levy against the

Tax Roll for each such lot in the same manner as municipal taxes with the same priority as to lien and to payment thereof in accordance with the provisions of the Municipal Government Act, the Municipal Taxation Act and the Tax Recovery Act.

6. Any off-site levy imposed under this Bylaw or any previous Bylaw, may be collected once only in respect of land that is the subject of a development or a subdivision.
7. In the event that land is to be redeveloped or re-subdivided and no previous off-site levies have been collected under this Bylaw or under any previous Bylaw, the off-site levies shall be due and payable if there is an increase in the intensity of use, such payment to be made in accordance with Section 1 of this By-Law and at the discretion of the Development Officer.
8. This Bylaw hereby repeals Bylaw #15-1994.
9. This Bylaw shall come into full effect upon the date of its Third Reading.

**SCHEDULE "A"**

ITEM/FUNCTION	Residential Debenture - (Comm. + Industrial)	Comm./ Institutional Debenture x 20% x 50%*	Industrial Debenture x 20% x 33%*
Water Treatment \$1,700,000. Debenture	\$ 1,417,800.00	\$ 170,000.00	\$ 112,200.00
Water Transmission \$1,288,380. Debenture	\$ 1,074,509.00	\$ 128,838.00	\$ 85,033.00
Water Storage & Pumping \$1,500,000. Debenture	\$ 1,251,000.00	\$ 150,000.00	\$ 99,000.00
Sewage Treatment & Disposal \$2,500,000. Debenture	\$ 2,085,000.00	\$ 250,000.00	\$ 165,000.00
Lift Station "C" \$160,000. Debenture	\$ 133,440.00	\$ 16,000.00	\$ 10,560.00
S.W. Drainage Basin \$157,000. Debenture	\$ 131,263.00	\$ 15,740.00	\$ 10,388.00
<b><u>TOTALS</u></b>	<b><u>\$ 6,093,012.00</u></b>	<b><u>\$ 730,578.00</u></b>	<b><u>\$ 482,181.00</u></b>

Remaining Developable Lands	- 1,760 Acres - 60% Residential - 20% Comm/Instit. - 20% Industrial	- 1,056 Acres - 352 " - 352 "
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$\frac{\$6,093,012.00}{1,056 \text{ Acres}} = \frac{\$5,769.90}{4.5} = \$1,282.20 \text{ (Averaged to } \$1,300.00/\text{dwelling)}$ $= \frac{\$5,770.00}{10} = \$577.00 \text{ (Averaged to } \$600.00/\text{unit)}$
$\frac{\$730,578.00}{352 \text{ Acres}} = \$2,075.51 \text{ (Averaged to } \$2,100.00/\text{Acre)}$
$\frac{\$482,181.00}{352 \text{ Acres}} = \$1,369.83 \text{ (Averaged to } \$1,400.00/\text{Acre)}$

\* Commercial/Institutional - Intensity of use, in relationship to one acre of land, is 50%

Industrial - Intensity of use, in relationship to one acre of land, is 33%

**SCHEDULE "B"**

The South Sanitary Trunk Sewer primarily serves the area for development south of Highway #2 referred to as the "Catchment Area".

The catchment area is required to repay a prorated portion of the \$2,000,000 loan from APWSS. Also to be recovered is the town portion of funding for the main, excluding grants and the S.E. relief sewer portion of the project. There are 3 sub catchment areas that will have different rates, depending on size of area and length of trunk sewer needed to serve each area.

South Expansion Area Structure Plan report covers areas contributing for each segment. The cost of the trunk sewer must be split up in the following sections. (Refer to APWSS agreement revised Schedule "A")

- Section (1) Main Outfall (manhole 1 to 16)	\$1,742,397.
- Section (2) Subdivision Lateral	\$ 142,927.
- Section (3) South-east Lateral (manhole 16 to 24)	\$ 350,017.
- Section (4) South-west Lateral east of Sawridge Creek (manhole 16 to 37)	\$1,006,864.
- Section (5) South-west Lateral east side of Sawridge Creek to Lift station including link sewer to the southwest.	<u>\$745,440.</u>

TOTAL PROJECT COST = \$3,987,645.

Section costs were determined by applying the cost of securing easements for each section, adding the cost of construction for each section and then distributing the costs of Engineering and miscellaneous project costs to each section, in proportion to construction costs. See Table 2.

Areas served by each section are as follows: (Refer to APWSS agreement revised Schedule "C")

- East area (A)	255.6 ha.
- Central area (B)	90.6 ha.
- West area (C)	357.8 ha.
Total Area = 704.0 ha.	



The \$2,000,000 APWSS contribution must be allocated on a prorated basis to the 4 sections (1), (3), (4) and (5). Area levies per hectare must be determined for each area (A), (B) and (C) to recover the \$2,000,000 over the three areas.

An area specific off site levy is required to recover the town cost from the benefiting area.

Total Project Cost	\$3,987,645
Less APWSS Funding	- 2,000,000
Grants	-1,420,000
Less relief sewer section	- 142,927
Town cost to be recovered =	\$424,718

Financing costs should be added to this cost. The recovery of the levy will be slow as it covers a development area to serve a population of 23,000. This would take longer than any projected time to reach.

SECTION	COST	APWSS * (Note 1)	TOWN COST including grant - APWSS share	AT&U GRANT ** (Note 2)	TOWN COST for levy
1	\$1,742,397	\$ 906,385	\$ 836,012	\$ 643,533	\$192,479
2	\$142,927***	-----	-----	-----	-----
3	\$ 350,017	\$ 182,077	\$ 167,940	\$ 129,274	\$ 38,666
4	\$1,006,864	\$ 523,765	\$ 483,099	\$ 371,873	\$111,226
5	\$ 745,440	\$ 387,773	\$ 357,667	\$ 275,320	\$ 82,347
<b>TOTAL</b>	<b>\$3,987,645</b>	<b>\$2,000,000</b>	<b>\$1,844,718</b>	<b>\$1,420,000</b>	<b>\$424,718</b>

\* (Note 1) Total cost main trunk only sections 1, 3, 4 and 5.

Sec. 1	\$1,742,397
Sec. 3	350,017
Sec. 4	1,006,864
Sec. 5	<u>745,440</u>
	\$3,844,718

Percentage of 2,000,000 of this total:

$$2,000,000/3,844,718 = 0.520194$$

\*\* (Note 2) Grant revenue of 1,420,000 applied on prorated basis to total cost less APWSS share less section #2 cost.

\$3,987,645
-2,000,000
<u>- 142,927</u>
\$1,844,718

$$1,420,000 / 1,844,718 = 0.7697653$$

\*\*\* (Note 3) To be funded by Utility system debenture payments.

## LEVIES FOR APWSS \$2,000,000 REPAYMENT

SECTION	APWSS SHARE	BENEFITTING AREA	RATE (A)	RATE (B)	RATE (C)
1	\$ 906,385	(ABC) 704.0 ha	\$1,287.48	\$1,287.48	\$1,287.48
3	\$ 182,077	(A) 255.6 ha	\$ 712.35	-----	-----
4	\$ 523,765	(BC) 448.4 ha	-----	\$1,168.08	\$1,168.08
5	\$ 387,773	(C) 357.8 ha	-----	-----	\$1,083.77
TOTAL	\$2,000,000	-----	\$1,999.83	\$2,455.56	\$3,539.33

NOTE: Section 5 has been changed to Forcemain and Lift Station and some gravity main north of Highway #2. The concept is still the same for levy determination.

The APWSS levies are to be increased annually commencing on the 1st of April 1993 by the Consumer Price Index for the previous year. No other financing costs are added.

## LEVIES TO RECOVER TOWN'S PORTION OF TRUNK SEWER COSTS

SECTION	TOWN SHARE	BENEFITTING AREA	RATE (A)	RATE (B)	RATE (C)
1	\$192,479	(ABC)704 ha	\$273.41	\$273.41	\$273.41
3	\$ 38,666	(A) 255.6 ha	\$151.28	-----	-----
4	\$111,226	(BC) 448.4 ha	-----	\$248.05	\$248.05
5	\$ 82,347	(C) 357.8 ha	-----	-----	\$230.15
TOTAL	\$424,718	-----	\$424.69	\$521.46	\$751.61

NOTE: These levies do not include financing costs.

Total levies for each area:

Area (A)                    \$1,999.83 + \$424.69 = \$2,424.52 per ha = \$981.20 per acre  
Area (B)                    \$2,455.56 + \$521.46 = \$2,977.02 per ha = \$1,204.80 per acre  
Area (C)                    \$3,539.33 + \$751.61 = \$4,290.94 per ha = \$1,736.54 per acre

**APPENDIX III  
SITE & LOT GRADING**

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**BYLAW #07-1992**

A BYLAW OF THE TOWN OF SLAVE LAKE, IN THE PROVINCE OF ALBERTA TO ESTABLISH AND ENFORCE MINIMUM STANDARDS FOR THE MAINTENANCE OF PROPERTY DRAINAGE OF EXISTING PROPERTY WITHIN THE TOWN OF SLAVE LAKE.

WHEREAS, the Municipal Government Act, being Chapter M-26 of the Revised Statutes of Alberta, 1980, provides that a Council may, by Bylaw, establish and enforce minimum standards for existing property in the municipality;

WHEREAS the Council of the Town of Slave Lake deems it just and proper to establish minimum standards with respect to the drainage of existing properties within the Town of Slave Lake;

WHEREAS the Council of the Town of Slave Lake desires to reduce infiltration of ground water into the sanitary sewer through weeping tile connected to existing buildings located on property within the Town of Slave Lake;

NOW THEREFORE, the Council of the Town of Slave Lake in the Province of Alberta, duly assembled, enacts as follows:

**SECTION 1 - NAME OF BYLAW**

1. This Bylaw may be cited as the PROPERTY DRAINAGE BYLAW.

**SECTION 2 - DEFINITIONS**

1. Building includes anything constructed or placed on, in, over, or under land, but does not include a highway, or a public roadway, or a bridge forming part of a highway, or a public roadway;
2. Council means the Council of the Town of Slave Lake;
3. Development Appeal Board means the Development Appeal Board of the Town of Slave Lake;
4. Director of Engineering or Town Engineer means the Chief Engineer of the Town of Slave Lake or his designate;
5. Minimum Drainage Standards means the standards for the maintenance and improvement of the drainage away from existing buildings on property located within

the Town of Slave Lake, as from time to time established or revised by the Director of Engineering; an excerpt from the Town's "Development Standards and Procedures" setting out the current minimum drainage standards.

6. Owner means the person shown as the owner of the land on the assessment roll of the Town Council prepared under the Municipal Taxation Act, Revised Statutes of Alberta, 1980, Chapter M-31;
7. Person includes an individual and a corporation, firm, partnership, society, association, or another unincorporated entity, including its heirs, executors, administrators, or other legal representatives.
8. Property means any land located within the Town with a building requiring a Development Permit.
9. Town shall mean the Town of Slave Lake.

### **SECTION 3**

The Owner, of any Property shall establish and maintain drainage patterns on the Property, in accordance with Minimum Drainage Standards and ensure that the drainage is away from any Building located on the Property and that water shall not accumulate at or near any Building on the Property.

### **SECTION 4 - ENFORCEMENT**

1. A person who fails to perform the duties or requirements imposed upon him under the provisions of the Bylaw is guilty of an offence.
2. To enforce the provisions of the Bylaw, the Director of Engineering may send a written notice by registered mail to serve upon the Owner of the Property and all persons shown by the records of the Northern Alberta land Titles Registration Office to have an interest in the Property, and on the occupant, if any;
  - (a) stating that the Property does not comply with the Minimum Drainage Standards prescribed in this Bylaw or the regulations prescribed thereto and that repairs are required to be made to it, giving reasonable particulars of the repairs required to be made;
  - (b) stating the time within which the repairs are to be made which shall be a minimum of two (2) months; and
  - (c) stating that if these repairs are not so done within the terms specified, the Town through its agents, employees or contractors may carry out the repairs and the cost of the work done may be levied against the Property as a debt due

to the Town or charged against the land concerned as taxes due and owing in respect of the land and to recover the costs as such.

3. A person entitled to notice under Subsection 2 herein may, within fourteen (14) days of receipt of notice, appeal in writing to the Development Appeal Board.
4. The Development Appeal Board shall hold a hearing of each appeal and in determining the appeal it may;
  - (a) confirm, reverse, or vary the decision appealed from; and
  - (b) grant an extension of not more than one (1) year from the end of the time specified in the notice given under Subsection 2 within which the repairs are to be made;but no extension shall be granted unless the Development Appeal Board is of the opinion that a refusal of the appeal would result in undue hardship and not more than two (2) extensions may be granted in respect to any property.
5. That this Bylaw comes into effect upon the date of its Third Reading.

## **APPENDIX IV PLANT MATERIAL**

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### 8.4.6 PLANT MATERIAL

1. All plant material shall be of first grade quality, free from insects, disease and physical injury, shall have a strong fibrous root system and must be structurally sound. All plant material shall have straight stems, well and characteristically branched for the species. All plant material shall conform to the Horticultural Standards for nursery stock of the Alberta Nursery Trades Association. Nomenclature or plant names used shall conform to the rules of the international code of nomenclature for cultivated plants.
2. All plants shall be nursery grown unless specifically authorized in writing by the Town Engineer to be collected from native stands or established wood lots.
3. Substitutions will not be permitted, unless written proof is submitted that specific plants or sizes are unobtainable and such substitutions are acceptable to the Town Engineer.
4. Bare root (B.R.) shrubs shall be dug with adequate fibrous roots retained. The roots of these plants shall be covered with a uniformly thick coating of mud being puddled immediately after they are dug, or packed in moist straw, shingletow or moss.
5. Balled and Burlapped (B & B) plant shall be dug with firm natural balls of earth of sufficient diameter and depth to include most of the fibrous roots.
6. Container growth stock shall have grown in a container long enough for the root system to develop sufficiently to hold its soil together firm and whole. No plants shall be loose in the container.
7. Undersized root systems will be rejected. All plant matter is subject to the approval of the Town Engineer. Plant material shall be delivered to the job site and stored, handled and planted with the producer's label intact. Damaged, sick or diseased plants must be removed from the site immediately and be replaced by the Developer at his own cost.
8. Roots or balls of all plants shall be adequately protected at all times from the sun and from drying winds and frost. All balled and burlapped plants which cannot be planted immediately upon delivery shall be set on the ground and shall be well protected with soil, wet moss or other acceptable material. Bare root plants, which cannot be planted immediately, shall be planted or heeled in trenches, immediately on delivery. Bundles of plants shall be opened and the

plants separated before the roots are covered. Care shall be taken to prevent voids among the roots.

During the planting operation, bare roots shall be covered with canvas, hay or other suitable material. No plant shall be bound by wire or rope at any time to avoid damage or break the branches.

9. Fertilizer shall be 8-24-24 and shall be delivered mixed as specified, in standard size, unopened containers, showing weight, analysis and name of manufacturer. They shall be stored in a weatherproof place in such a manner that the fertilizer will be kept dry so that its effectiveness is not impaired.
10. Tree stakes shall be 2.1 m in length and of the steel U-bar or T-bar type, with a minimum thickness of 4 mm. Tree ties shall be a number ten (10) gauge galvanized wire and shall be inserted into a 200 mm length of 10 mm diameter polyethylene plastic tubing. The color of this tubing is to be designated by the Town Engineer. Wire for the tree guying shall be a double strand of number nine (9) gauge galvanized wire.
11. Mulch shall be wood chips, ground bark, bark peelings, peat, hay or straw, stone chips in variety, or equal.
12. Arrangements for suitable water shall be the Developer's responsibility at his own expense. The Developer shall, at his own cost, furnish his own hose and hose connections, water tank and/or water truck.
13. All plantings shall be at the correct grade and alignment. Tree pits shall be excavated with vertical sides and in accordance with the following outline:

Tree pits shall be excavated 300 mm greater in diameter than the ball of earth or spread of roots of the tree and sufficiently deep to allow for 1 - 150 mm layer of the planting mixture beneath the ball or roots. Shrubs shall be planted in pits 300 mm greater than the spread of the roots and 450 mm deep below the finished grade. The depth of planting beds and pits shall be adjusted to permit a minimum of 150 mm of the planting mixture under balls or roots of all plants.

If pits are prepared and backfilled with a planting mixture to grade, prior to planting, their location shall be marked by 25 mm x 50 mm stakes sticking above grade by 100 mm so that when planting proceeds they can easily be found.

Plants shall be set in the center of pits, plumb and straight, and at such a level that after settlement the crown of the plant will be 25 mm lower than the surrounding finished grade. No planting, except ground covers, vines and herbaceous plant material, shall be placed closer than 600 mm to the edge of shrub beds, hard surfaces or building foundations.



When approximately two-thirds of the plant pit has been backfilled with soil mix, 8-24-24 fertilizers shall be applied at the following rates:

Shade Trees	0.5 kg per 25 mm of caliper	1 lb. per 1" of caliper
Small Trees	0.25 kg. per 25 mm of caliper	0.5 lb. per 1" of caliper
Shrubs	0.06 kg per 300 mm of height	0.15 lb. per ft. of height
Evergreens	0.03 kg per 300 mm of height	0.07 lbs. per ft. of height or spread
Vines, ground cover, herbaceous plant	0.03 kg. per plant	0.07 lbs. per plant

The fertilizer shall be distributed evenly over the pit area. The pit shall then be filled with water and the soil allowed to settle around the roots.

When balled or burlapped trees are set, the soil mixture shall be compacted around the base of balls to fill all voids. All burlap, ropes and wires shall then be removed from the tops of the balls.

Roots of bare roots shall be properly spread out and the topsoil mixture carefully worked in among them. Any broken or frayed roots shall be cut off cleanly. After the water has been absorbed the plant pit shall be filled with soil mix.

Immediately after the plant mix is backfilled, a shallow basin (approximately 100 mm deep), slightly larger than the pit, shall be formed with a ridge of soil to facilitate watering and water retention. After the surface is sufficiently dried, the top of the pit shall be spaded to a depth of approximately 25 mm to avoid evaporation.

14. Staking and guying shall be in accordance with the following procedure:

Deciduous trees (B.R.) shall be supported with a tree stake driven into the ground 450 mm to 600 mm below grade with the tree stake 150 m northwest of the tree. The tie shall be placed as high as possible on the stake and below rather than above a branch.

Evergreens and deciduous trees (B & B) shall be supported with 2 stakes and 2 ties.

All deciduous trees over 75 mm caliper and all evergreens exceeding 2.45 m in height shall be guyed with three (3) guys spaced equally about each tree. The guys shall be attached to the tree trunk at an angle of 60° at about 3/5 of the height of the tree and anchored with 50 mm x 50 mm x 450 mm driven securely into the ground.

Wooden 50 mm x 100 mm x 76 mm stakes or reinforcing steel 15 mm rods, 760 mm long shall be used for trees 4.3 m in height or greater or 100 mm caliper or larger.

15. For all trees with the trunk exposed to lawn mowing operations, a 150 mm length of weeping tile pipe shall be split and placed around the base of the tree.
16. All plants shall be pruned after planting. The amount of pruning shall be limited to the minimum necessary to remove dead or injured branches and to compensate for the loss of roots as a result of the transplanting operations. Pruning shall be done in such a manner as to preserve the natural character of the plants. All cuts shall be clean and flush, leaving no stubs.

Cuts, bruises or scars on the bark shall be traced back to living tissue and removed. The affected areas shall be shaped so as not to retain water, and all treated areas shall be painted with approved tree paint.

17. All plants and trees shall be dug and delivered to site in good condition without having been allowed to dry out or balls of earth surrounding the roots cracked or broken preparatory to or during the process of planting. The sizes of roots balls for trees shall be as specified below. Ball sizes are minimum and shall be adjusted according to growth habits of plants. At any rate ball sizes shall be sufficiently large to contain at least 75% of the fibrous root system.

Deciduous Trees

Caliper Diameter		Root Ball Diameter		Machine Ball	
mm	inches	mm	inches	mm	inches
25 - 45	1 - 1 3/4	610	24		
50	2	760	30	1110	44
75	3	915	36	1420	56
100	4	1065	42	1675	66
125	5	1370	54	1675	66
150	6	1470	58	2336	92
200	8	1825	72	2336	92
250	10	2285	90	2336	92

NOTE: Deciduous trees larger than 75 mm caliper shall be moved by machine (spade).

## Coniferous Trees

Machine Ball Diameter		Height		Root Ball	
m	ft.	mm	inches	mm	inches
1.50 - 1.75	5.0 - 5.7	760	30	1110	44
1.75 - 2.00	5.7 - 6.5	915	36	1110	44
2.00 - .25	6.5 - 7.4	1065	42	1420	56
2.25 - 2.5	7.4 - 8.2	1220	48	1420	56
2.50 - 2.75	8.2 -9.0	1370	54	1675	66

NOTE: *Coniferous trees larger than 2.75 m in height shall be machine moved with a 2 m or larger spade.*

*For deciduous trees with a caliper of more than 250 mm and for coniferous trees over 2.75 m in height, root ball diameter shall be increased 150 mm for every additional 25 mm in caliper, or every 300 m in height.*

18. All plants shall be measured when the branches are in their normal position. Height and spread dimensions specified refer to the main body of the plant and not from branch tip to root base or from branch tip to branch tip. Where trees are measured by caliper reference is made to the diameter of the trunk measured 300 mm above ground as the tree stands in the nursery.

**10. STANDARD DRAWINGS**

10.1 General 96

10.2 Index of Drawings

## 10.1 GENERAL

Standard Town of Slave Lake drawings and details have been made part of these Development Standards & Procedures to detail the requirements as they may apply. They are not intended to be a rigid requirement in most cases, but rather a guideline to Developers and Consulting Engineers. Standard detail drawings will be developed on an ongoing basis as the need arises. Suggestions for improvements to any of these drawings are welcomed.

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