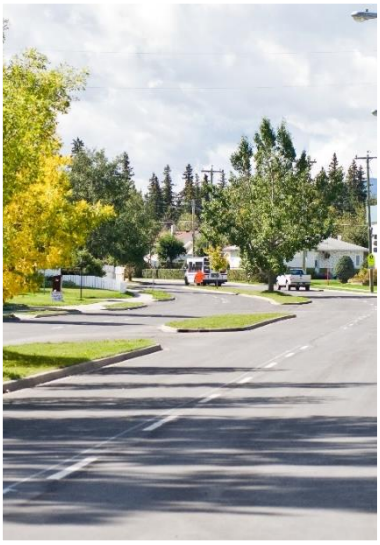
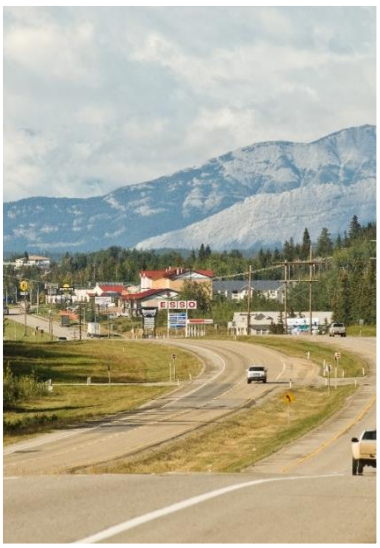
Gateway to the Rockies
HINTON

Town of Hinton

MINIMUM DEVELOPMENT ENGINEERING DESIGN AND SERVICING STANDARDS



JANUARY 2021

CONFIDENTIALITY AND © COPYRIGHT

This document is for the sole use of the addressee and Associated Engineering Alberta Ltd. The document contains proprietary and confidential information that shall not be reproduced in any manner or disclosed to or discussed with any other parties without the express written permission of Associated Engineering Alberta Ltd. Information in this document is to be considered the intellectual property of Associated Engineering Alberta Ltd. in accordance with Canadian copyright law.

This report was prepared by Associated Engineering Alberta Ltd. for the account of Town of Hinton. The material in it reflects Associated Engineering Alberta Ltd.'s best judgement, in the light of the information available to it, at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Associated Engineering Alberta Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

TABLE OF CONTENTS

1 INTRODUCTION TO STANDARDS

1.1 Forward

The following "Town of Hinton - Minimum Development Engineering Design and Servicing Standards" (MDEDSS) have been prepared to provide information and define minimum acceptable standards to Developers and other interested parties requiring knowledge of the principles governing the development of land within the Town. These standards encourage good engineering and construction practices. Any deviation from these standards requires a written request to the Municipal Engineer for acceptance prior to implementation.

This document is available on the Town's website and will be updated on an as-required basis. Revised documents will be uploaded on the Town's website. Users of the MDEDSS are urged to refer to the Town's website periodically to ensure they have the latest edition.

If any standards set forth in this document contradict other applicable industry standards, the more stringent standards shall apply. Where these standards refer to bylaws, policies, acts, regulations, or standards, this shall mean the most recent edition or amendments of the referenced document.

1.2 Scope

1.2.1 Minimum Development Engineering Design and Servicing Standards

These standards and procedures apply to the preparation and submission of engineering drawings for Municipal Improvements in both Rural and Urban residential, Commercial, and Industrial developments and include:

- Water distribution systems, fire protection systems, and lot service connections.
- Sanitary sewage systems and lot service connections.
- Stormwater collection systems and related appurtenances, lot grading, and lot service connections.
- Facilities including sewage lift stations and stormwater management facilities.
- Roadways, sidewalks, curb and gutter, and lane improvements.
- Shallow (franchise) utilities (i.e. gas, power, telephone, cable, fiber optics).
- Landscape requirements, including hard and soft elements and walkway systems.

1.2.2 Redevelopment

These standards also apply to the redevelopment of residential and Industrial/Commercial lands.

1.3 Relationship: Town and Developer

The Town provides Municipal Services (snow clearing, garbage collection) to all new developments upon construction completion acceptance. Upon final acceptance by the Town, all Municipal Improvements, and the responsibilities thereof, are taken over by the Town. For that reason, the Town is charged with the responsibility of ensuring that all Municipal Improvements provided in developing lands meet minimum acceptable standards, so that the Municipal Improvements can be properly operated and maintained for the benefit of the end users of the new development.

Town involvement, periodic inspections, and acceptance are therefore required in all aspects of servicing and land development.

1.4 Definitions

In this document the following words shall have the meaning hereinafter assigned to them:

Term	Definition
Alberta Environment	The provincial ministry responsible for environmental policy and sustainable resource development. Known as Alberta Environment and Parks (2020). This general term is intended to encompass any future changes in department naming.
Applicant	See definition for "Developer".
Area Structure Plan (ASP)	ASPs provide the framework for developing and servicing new areas of the Town. ASPs must include the sequence of development proposed for the area, proposed land uses, proposed population density, the general location of major transportation routes and public utilities, and all other matters considered necessary by Council. Refer to the Town's website for active ASPs.
Commercial	A lot used for the buying and selling of commodities and services.
Construction Completion Certificate (CCC)	A certificate issued by the Developer's Consultant and executed by the Town confirming that the work is complete and operational, that all deficiencies have been resolved to the satisfaction of the Town, and that the Warranty Period for the work can commence.
Contractor	Any person, persons, or corporation which shall undertake installation of municipal infrastructure and services on behalf of either the Developer or the Town.
Developer	A person, persons, or corporation which has applied to subdivide and/or develop, or to service an existing parcel of land, whether as the owner or an agent for the owner of the land.
Developer's Consultant	An Engineer, Landscape Architect, or Alberta Land Surveyor hired by the Developer to assist with the design and oversee construction of the proposed development.
Developer's Representative	An Engineer, Landscape Architect, or Alberta Land Surveyor hired by the Developer to act on the Developer's behalf.
Easement	An agreement, usually registered on the certificate of title to the property, that gives the Town the right to use a landowner's property in some way (such as to access a utility). Easements can also partially restrict a landowner's use of the affected portions of land.
Engineer	The Professional Engineer, in good standing with the Association of Professional Engineers and Geoscientists of Alberta (APEGA), responsible for the design drawings and design specifications of public infrastructure, the supervision of the work, the certification that the materials and installation are in accordance with these MDEDSS, recording and reporting of as-constructed information, and performing those duties with the standard of care prescribed by APEGA.
Environmental Reserve (ER)	Land owned by the Town to be preserved in its natural state. Environmental Reserve swamps, gullies, ravines, natural drainage courses, flood plains, and shorelines are defined in Section 664(1) of the Municipal Government Act.
Final Acceptance Certificate (FAC)	A certificate issued by the Developer's Consultant and accepted by the Town confirming that the work is complete and acceptable to the Town, that all deficiencies and Maintenance work have been resolved to the satisfaction of the Town, and that the Warranty Period for the work has expired.

Term	Definition
Geographic Information System (GIS)	A tool for collecting, managing, analyzing, and presenting geographic data. GIS organizes layers of information into maps and analyzes spatial location. The Town uses GIS data to keep a record of their assets.
High Density Residential	Buildings containing three or more dwelling units which may have a common entrance from street level, not including row housing.
Industrial	Land used in the manufacturing, processing, assembling, cleaning, repairing, servicing, testing, storage, warehousing, distribution or trans-shipment of materials, finished goods, products, or equipment, which does not include artisan shops but may include an accessory use like storage, display, sale, and technical or administrative support areas where there are impacts to adjacent lots.
Landscape Architect	A qualified landscape designer, in good standing with the Alberta Association of Landscape Architects (AALA), that is responsible for the design, layout, and supervision of installation of landscape and related work, recording as-constructed information, certifying the material and installation is in accordance with the standards, design drawings, and design specifications, and performing those duties with the standard of care prescribed by AALA.
Low Density Residential	Single and semi-detached dwellings.
Maintenance	All repairs and/or replacements of any Municipal Improvements which may, at the Town's discretion, be necessary during the Warranty Period. The Developer is responsible for all Maintenance during the Warranty Period.
Master Plan	A document that outlines existing and future trends for the Town. Examples include utilities (Water, Sanitary, Stormwater) and Transportation Master Plans. These reports describe the status of the existing systems and plan for future expansion areas. Any required upgrades to the existing systems to support future expansion areas are also described.
Medium Density Residential	Buildings with three or more dwelling units, such as row housing, three-plexes, or four-plexes.
Multi-Family	Medium Density Residential and High Density Residential areas. Examples include buildings with three or more dwelling units (row housing, three-plexes, four-plexes) and walk-up apartments.
Municipal Engineer	An individual appointed by the Town that represents the Town in any engineering or related functions.
Municipal Improvements	A proposed development (such as a new subdivision) or off-site upgrades required to support a proposed development. Municipal Improvements are the responsibility of the Developer; examples of Municipal Improvements include: deep utilities, shallow (franchise) utilities, roadways, lanes, street lighting, landscaping, and earthworks.
Municipal Reserve (MR)	Land owned by the Town for the development of parks and school grounds pursuant to Section 666 and Section 667 of the Municipal Government Act.
Municipal Services	Services provided by the Town upon construction completion acceptance; i.e., snow clearing and garbage collection.
Open Space/Public Open Space	Any parcel of land or body of water which is dedicated and reserved for public use, including Municipal and Environmental Reserves.

Term	Definition
Prime Contractor	A company that, through a written, contractual agreement with the Owner (the Developer or the Town as the case may be), is responsible for coordination of all activities conducted on a worksite and ensuring OHS legislation is followed. Without written assignment of Prime Contractor, the person with the highest degree of control over a worksite is deemed the Prime Contractor.
Public Utility	Utilities owned and maintained by the Town, including the water distribution system, sanitary collection system, stormwater collection management system, roadways, and Open Spaces.
Public Utility Lot (PUL)	Land required to be given under Division 8 of the Municipal Government Act for roads and/or Public Utilities.
Record Drawings	A revised set of drawings submitted by the Developer to the Town upon completion of construction. Record Drawings reflect all changes made to the specifications and drawings during construction and include updated dimensions, lengths, elevations, geometry, etc. of the work.
Rural	An area within the Town with Rural Services.
Rural Services	A level of service that entails individually-owned and operated water and sewage systems. Transportation level of service includes roadways with ditches (i.e., no curb and gutter).
Seasonal Deficiency	A Municipal Improvement which cannot be completed due to the time of year (for example: landscaping, concrete, paving, etc.) and which is deferred until the following construction season. Seasonal deficiencies will not be included in the issuance of a CCC for completed work; seasonal deficiencies shall have a separate CCC, Warranty Period, and FAC.
Tangible Capital Assets (TCA)	An economic resource managed by the Town and can include: roads, buildings, equipment, land, utilities, stormwater management facilities, etc.
Town	Town of Hinton.
Traffic Impact Assessment (TIA)	A report, prepared by the Developer's Consultant, which investigates the impact a proposed development may have on traffic operations and recommends any mitigation measures that may be required as a result of the proposed development.
Urban	An area within the Town with Urban Services.
Urban Services	A level of service that includes a municipally-owned water distribution system, sanitary collection system, and stormwater collection and management system. Transportation level of service includes roads with curb and gutter.
Warranty Period	A minimum two year period of time commencing with the execution of a Construction Completion Certificate and ending with the execution of a Final Acceptance Certificate. Refer to Section 2.12.
Water Network Analysis (WNA)	A report, prepared by the Developer's Consultant, which demonstrates that the proposed water system is capable of meeting these MDEDSS based on system pressures, flow velocities, head losses, and flow rates and does not negatively impact adjacent areas or infrastructure.

1.5 Reference Materials

Throughout the MDEDSS, references may be made to other standards and regulations including the following. Additional applicable standards and regulations, not noted below, may also be referenced. Where these standards refer to bylaws, policies, acts, regulations, or standards, this shall mean the most recent edition or amendments of the referenced document.

- Alberta Environment Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems:
    - Standards for Municipal Waterworks
    - Guidelines for Municipal Waterworks
    - Wastewater Systems Standards for Performance and Design
    - Wastewater Systems Guidelines for Design, Operating and Monitoring
    - Stormwater Management Guidelines
- Safety Codes Council: Alberta Private Sewage Systems – Standard of Practice
- Transportation Association of Canada (TAC):
    - Geometric Design Guide for Canadian Roads
    - Manual of Uniform Traffic Control Devices for Canada
- Alberta Transportation: Highway Geometric Design Guide
- Occupational Health and Safety (OHS) Legislation, including the OHS Act, OHS Regulation, and OHS Code
- FireSmart: Protecting Your Community from Wildfire
- Fire Department Access Standards

1.6 Freedom of Information and Protection of Privacy Act

The Freedom of Information and Protection of Privacy Act is in effect for the Town and it gives any person a right of access to the records in our custody or control, subject to limited and specific exceptions. All documents and information, including correspondence, agreements, plans, and specifications that are written, photographed, recorded, or stored in any manner by the Town may be subject to the access and privacy provisions of the Act.

Developers and their agents, consultants, and Contractors shall identify all information that they consider confidential, and the basis for confidentiality, (including those parts of their submission that relate to trade secrets, commercial, financial, labour relations, scientific and technical information).

While the Town will endeavour to use Sections 15 and 16 of the Freedom of Information and Protection of Privacy Act to protect the confidentiality of the information identified by the Developer or their representatives as confidential, other sections of the Act may apply and the information may have to be disclosed to members of the public who request access to records in the Town's custody and control.

2 PROCEDURES FOR DEVELOPMENT

2.1 General

In addition to these Minimum Development Engineering Design and Servicing Standards (MDEDSS), the Town has a number of other documents that Developers and/or their agents should be fully aware of in advance of undertaking the design of a specific subdivision or project. Examples include:

- **Municipal Development Plan** – describes general policies and guidelines with respect to land development within the Town.
- **Area Structure Plans** – accepted Area Structure Plans are available on the Town's website.
- **Land Use Bylaw** – describes permitted and discretionary uses for each land use district and defines numerous design parameters.
- **Master Plans** – examples include: water; wastewater; stormwater; transportation; parks, open spaces and trails; etc.

Communication is key and the Town encourages early preliminary meetings with Development Services staff to discuss land development proposals and options.

2.2 Pre-Application Meetings

The primary purpose of a pre-application meeting is to provide the Developer with specific information on application process requirements; pre-application meetings are expected to expedite the processing of applications. A pre-application meeting is intended to provide an opportunity for the Developer to receive preliminary feedback from municipal departments and stakeholders.

A pre-application meeting is required for any of the following types of developments:

- Multi-lot subdivisions;
- Multi-family residential;
- Commercial / Industrial;
- Institutional;
- Projects requiring a Traffic Impact Assessment;
- Projects requiring an off-site laydown area;
- Projects requiring a geotechnical investigation or Environmental Site Assessment; and
- Developments within areas identified by the Province of Alberta as being in the Floodway or Flood Fringe zones.

The Developer shall contact Development Services for the scheduling and coordination of the pre-application meeting.

Regular consultation with the Development Services department throughout the acceptance process may also expedite the time for acceptance.

2.3 Submission and Acceptance

2.3.1 Conceptual Engineering Design

The Developer is required to submit a conceptual engineering design report to Development Services for the purpose of discussing the project prior to the pre-application meeting.

The conceptual engineering design report shall serve as the basis of the project between the Developer and the Town and may avoid expenditure by the Developer and/or their agents of time, effort, and money on concepts and plans that are unacceptable to the Town.

At a minimum, the conceptual engineering design report shall describe and provide a concept of the proposed development and explain how it will relate to applicable existing planning documentation (such as the Land Use Bylaw and relevant Area Structure Plan) at time of subdivision.

2.3.2 Preliminary Engineering Design and Supporting Documents

After finalization of the engineering design brief, the Developer shall prepare, for submission to Development Services, preliminary plans of the road network, site servicing layouts, and landscape improvements. The plans are to show all proposed rights-of-way, Easements, and PULs and shall be accompanied with preliminary calculations supporting the means by which the development will be serviced.

Preliminary design drawings shall indicate the proposed layout of the development and the layout shall consider overall development of the Town and future expansions. Proposed Municipal Improvements shall not overload existing systems and, should there be future development upstream of the proposed development, the Developer shall oversize the deep utilities accordingly to provide sufficient capacity for the future upstream developments.

The conceptual layout shall indicate the size of lots, widths of road rights-of-way, road classifications, typical road cross-sections, size and location of parks, population densities, districting, and other planning requirements of the Town. The conceptual layout shall be accepted in principle prior to submission of the detailed design drawings, to allow necessary or desirable revisions to be incorporated without requiring major changes to the detailed design drawings.

Preliminary engineering plans are to include a servicing layout (water, sanitary, storm) with preliminary pipe sizing indicated, are to indicate the volume of stormwater to be stored and the method of storage and are to include a preliminary road network with road classifications identified.

Preliminary landscape plans are to provide an overview of the development indicating community themes, reserve areas, open play areas, pedestrian linkage, and facilities including spray parks, playgrounds, gazebos, rest areas, and other park amenities.

The preliminary design package is to be accompanied by a preliminary geotechnical investigation, prepared by a qualified geotechnical Engineer, highlighting any design constraints which may need to be considered during detailed design.

Other supporting documents required to be submitted with the preliminary design package may include:

- Preliminary design calculations;
- Preliminary clearing, stripping, and rough grading plans;*
- Wildfire Risk Assessment;*
- Environmental Impact Assessment;* and
- Historical Resources review.*

***Consideration for Small Scale Developments**

Proposed developments less than 4 ha in size shall be considered small scale development. The Town of Hinton, on a case-by-case basis, **may** relax the requirement for the level of detail provided with some of the required technical studies. If the requirements are relaxed for a small scale development, it is not intended to set precedence for future small scale developments. Development Services must be consulted to confirm the supporting documentation requirements for the proposed development prior to submission of the preliminary design package.

2.3.3 Detailed Engineering Drawings, Landscape Plans, and Specifications

Upon acceptance of the preliminary engineering and landscape plans, the Developer shall submit the following to the Municipal Engineer for review:

- One (1) full-sized (22”x34”) set of design drawings and specifications;
- Three (3) half-size (11”x17”) sets of design drawings;
- One (1) digital (PDF) set of design drawings and specifications; and
- Geotechnical report(s) sealed by a qualified Engineer.

The review by the Town is for the sole purpose of ascertaining conformance to the MDEDSS, the Municipal Development Plan, Land Use By-Law, and other municipal plans, standards, and guidelines. Acceptance of the submission does not relieve the Developer of their responsibility for errors or omissions or of their responsibility of meeting all requirements of the MDEDSS and other Federal and Provincial rules and regulations.

Other information may be required to be submitted during the acceptance process, including:

- Design calculations;
- Copy(ies) of any environmental approval(s);
- Intersection designs, with consideration of emergency response vehicle movements; *
- Traffic Impact Analysis*;
- Water Network Analysis*;
- Sanitary sewer analysis;
- Stormwater management plan;
- Detailed clearing, stripping, and grading plans;
- Snow storage considerations*;
- Copy(ies) of any Crossing / Proximity Agreements issued by third party pipeline companies; and
- Cost estimates for over-sized and/or cost-shared infrastructure*.

***Consideration for Small Scale Developments**

Proposed developments less than 4 ha in size shall be considered small scale development. The Town of Hinton, on a case-by-case basis, **may** relax the requirement for the level of detail provided with some of the required technical studies. If the requirements are relaxed for a small scale development, it is not intended to set precedence for future small scale developments. Development Services must be consulted to confirm the supporting documentation requirements for the proposed development prior to submission of the detailed design package.

Technical reports / calculations (such as: traffic impact analyses, water network analyses, sanitary sewer analyses, stormwater management calculations, geotechnical reports, and any other technical reports) shall be valid for a maximum of 5 years, provided that the site conditions and intended use of the proposed development have not changed. The use of a technical report more than 5 years after the technical report was issued will require a letter stamped by an engineer indicating that the information and recommendations within the technical report are still valid.

Following the Town's review of the submitted drawings and documents, review comments will be forwarded to the Developer's Consultant. Prior to resubmission of any drawings and documents, the Developer's Consultant is to prepare a response letter outlining the comments received from the Town and how each comment has been addressed. The Developer's Consultant shall submit the response letter to the Town in support of the revised drawings and documents.

Final engineering drawings, diagrams, and reports must be sealed by a qualified Engineer. Landscape plans are to be submitted with the engineering drawings; final landscape plans are to be sealed by a qualified Landscape Architect, or signed by a professional acceptable to the Town.

2.3.4 Acceptance by the Town

The Municipal Engineer shall inform the Developer, in writing, within 6 weeks after receipt of the detailed design submission, whether the Developer's submission has been accepted. Should the Town not accept a part of the Developer's plans or proposals, they will be returned to the Developer for revision to the satisfaction of the Town. The 6-week acceptance period will begin again on the receipt of any resubmission.

No construction shall commence until the detailed design drawings have been accepted, in writing, by the Town.

2.3.5 Review Costs

The Developer will be responsible for any review costs deemed appropriate by the Town. Costs may be incurred for the following:

- When specialized consulting expertise is required by the Town to review development proposals, concept plans, and drawings;
- When additional staffing is required to review developments;
- For the review of complex resubmissions and deviations from the MDEDSS;
- When excessive errors and omissions are encountered;
- When insufficient information is provided; and/or
- When improper procedures are followed.

The cost of review may take several forms, including:

- A lump sum fee charged to the Developer; or
- An invoiced cost by specialized consultant, plus mark-up for handling and administration.

Each and every submittal by the Developer will be reviewed by the Town and the Developer will be informed of the anticipated review costs. The Developer shall reimburse the Town prior to review of resubmissions.

2.3.6 Development Agreement

The Development Services department has guidelines for the preparation of Development Agreements. The Developer shall coordinate with the Development Services department for the requirements of and the preparation and execution of the document.

2.3.7 Bare Land Condominiums / Mobile Home Parks

Lot grading, deep services, roads intended for municipal transit routes, drainage easements, and landscape improvements within Municipal Reserves will comply with the requirements of these MDEDSS.

2.3.8 Red-line Submissions

Whenever it is necessary, for any reason, to make changes to the design drawings after they have been accepted, two prints of each original drawing affected shall be submitted with the proposed changes shown in red, accompanied by a letter outlining the reasons for the required changes. The Municipal Engineer will inform the Developer, in writing, within 10 working days after receipt if the proposed changes are acceptable to the Town. One copy of the requested change will be signed and returned, accompanied by a letter authorizing the changes to be made on the original accepted detailed design drawings. No changes are to be made to any original accepted drawings without following this procedure.

2.3.9 All Minimum Development Engineering Design and Servicing Standards Deviation Process

The Developer's Consultant shall identify and provide justification for any deviations or nonconformances from the MDEDSS as part of the submission of the detailed design drawings. Otherwise, the submittal of detailed design drawings will be assumed to be in accordance with the MDEDSS.

All applications for deviation shall be supported with a stamped letter of recommendation from an Engineer and all applications shall be accompanied by a completed Engineering Standards Deviation Form, a blank copy of which is provided at the end of this section.

The Town has the ultimate authority with regards to setting minimum standards and not accepting deviations from the MDEDSS.

Note that under no circumstances will a deviation from the MDEDSS be considered by the Town without the submission of detailed documentation demonstrating the justification for the deviation. The added benefit (to the Town) of the deviation must be equal to or better than that described in the MDEDSS.

The costs incurred by the Town for review of submissions and resubmissions, or third-party reviews as required, are the responsibility of the Developer (refer to Section 2.3.5 Review Costs).

2.3.10 Environmental Approvals

The Developer's Consultant shall submit the detailed plans and specifications to applicable Provincial and/or Federal regulatory body(ies) for approval. A copy of the submission, together with the approval(s), shall be supplied to the Municipal Engineer. The applicable environmental approvals are required prior to execution of the development agreement.

Examples of acts requiring approval may include:

- *Fisheries Act* (R.S.C. 1985, c. F-14);
- *Canadian Navigable Waters Act* (R.S.C. 1985, c. N-22);
- *Environmental Protection and Enhancement Act* (R.S.A. 2000, c. E-12);
- *Water Act* (R.S.A. 2000, c. W-3);
- *Historical Resources Act* (R.S.A. 2000, c. H-9); and
- *Public Lands Act* (R.S.A. 2000, c. P-40).

Obtaining environmental approval in no way removes the responsibility of the Developer to comply with the MDEDSS and to receive the Town's acceptance of the detailed plans and specifications.

2.3.11 Requirements for Environmental Impact Assessments

Subject to the scope, scale, and location of the proposed work, the Town may require that an Environmental Impact Assessment (sometimes referred to as a Biophysical Impact Assessment) be completed to identify the environmental sensitivities of the site and provide recommendations to avoid, protect, and/or mitigate potential impacts to the environment. This may be requested during the development of an Area Structure Plan and/or for Development Permit applications.

The assessment must be completed by a qualified professional (P.Biol., P.Ag., R.P.F., or an equivalent standard acceptable to the Town) and will be at the cost of the Developer.

The Environmental Impact Assessment shall include the following:

- **Project Description:** the scope of magnitude of the project.
- **Baseline Conditions:** including existing or historical environmental features.
- **Description of Environmental Features:** a description, including maps, of the environmental features within the property; including: natural sub-regions, terrain, surface water resources (floodplains, creeks, wetlands, etc.), groundwater, terrestrial resources (wildlife [i.e., sensitive owl habitat], vegetation), rare or endangered species, soil characteristics, and historical resources.
- **Methodology:** a discussion about the methodology used to determine and evaluate environmental features.
- **Short- and Long-Term Impacts**: a discussion about the potential short- and long-term impacts, including cumulative effects of developing the land.
- **Mitigation Measures:** the identification of appropriate and feasible mitigation measures to reduce the impacts to important environmental features.
- **Recommendations:** recommendations to avoid, protect, and/or mitigate impacts to the natural environment with respect to the property, and adjacent properties, for all phases of development, including clearing and grubbing, construction, reclamation, and operation.

- **Environmental Restriction Periods:** considerations of specific environmental restriction periods (i.e., nesting periods for non-migratory / migratory birds or sensitive owls, restricted activity periods for fish, tree clearing restrictions for ungulates [Key Wildlife Biodiversity Zone]) relating to the construction schedule.
- **Regulatory Framework:** with respect to the environmental aspects of the project that should be considered during all phases of the project.

The assessment must also establish requirements of the Environmental Construction Operation (ECO) Plan, as per the Government of Alberta ECO Plan Framework, that:

- Will guide specific aspects of environmental protection for the work
- Is prepared by and at the cost of the Contractor
- Includes erosion and sedimentation control, soil and water management, and emergency spill response
- Sets out the remediation and reclamation plan for disturbed areas

The Environmental Impact Assessment shall also consider conservation recommendations, where appropriate, for the property through Environmental Reserves, conservation easements, and setback areas (i.e., riparian areas). The Environmental Impact Assessment should clearly identify what lands are considered as Environmental Reserve and the quantitative or qualitative criteria used to establish this.

Environmental assessments shall be valid for a maximum of 5 years, provided that site conditions, regulatory requirements, permitting requirements, and intended use of the proposed development have not changed. The use of an environmental assessment more than 5 years after the report was issued will require a letter signed by a qualified environmental professional indicating that the information and recommendations within the assessment are still valid.

2.3.12 Canada Post – Community Mailboxes

If applicable to the subdivision, the Developer's Consultant shall submit an overall subdivision layout plan (Area Structure Plan) to the local Canada Post Delivery Planning office to establish the location, size, and details of community mailboxes. For further information and requirements consult Canada Post's "Delivery Planning Standards Manual for Builders and Developers." Upon approval of location and details by Canada Post, community mailboxes are to be shown on all applicable drawings and brochures.

2.3.13 Approval by Other Agencies

The Developer shall submit documentary evidence to the Municipal Engineer that permission has been received from appropriate authorities for crossing of pipelines, railways, highways, or other facilities, if such crossings are intended. These supporting documents shall be submitted in conjunction with submission of the detailed drawings and specifications or soon thereafter - but, in any event, prior to construction.

2.4 Preparation of Detailed Engineering and Landscape Drawings

2.4.1 Engineering Design

The Developer shall retain an Engineer and Landscape Architect (or landscape professional acceptable to the Town) who will be responsible for the design and preparation of drawings and specifications for all services as required. All services will be designed in accordance with the MDEDSS.

The design drawings shall show all existing and proposed services. The Developer's Representative shall be responsible for coordinating with the utility companies to establish the location of their existing and proposed services. Final engineering drawings must be signed and stamped by the Engineer; final landscape plans must be signed and stamped by the Landscape Architect.

2.4.2 Responsibility for Existing Structures and Utilities

The presence and location of underground utilities indicated on the plans which have been determined from existing records are not guaranteed and shall be investigated and verified in the field by the Developer's Consultant. The Town takes no financial responsibility for errors or omissions represented on record information. The Developer shall contact Alberta One-Call for utility locates prior to proceeding with any ground disturbance.

The Developer will be held responsible for any damage to, and for Maintenance and protection of, existing structures and utilities during construction. Existing utilities are to be protected from damage or unauthorized use by means of boundary valves for watermains and plugs for sanitary and storm sewers.

Boundary valves are to be operated by Town staff. The Town must be given at least 72 hours notice prior to cracking boundary valves to fill new watermains for testing and chlorination purposes. Boundary valves are to be fully opened and sewer plugs removed only after Construction Completion Certification and clean up.

2.4.3 Format for Engineering and Landscape Drawings

All engineering and landscape drawings which are submitted to the Town for acceptance should follow the basic format described as follows:

General Requirements	
Plan Size	ANSI-D 22"x34"
Material	Originals shall be printed on bond paper
Orientation	Continuous chainage shall be used whenever possible. Generally, drawings shall be orientated such that north arrows point to the top or left-hand side of a page and lettering should be read from the bottom-to-top or left-to-right.
Elevations	Elevations shall be relative to the Geodetic datum. Bench mark numbers, locations, and elevations used shall be shown on the design drawings.
Layout	• Allow a minimum of 75 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.
Digital Format	Digital submissions of record information shall be in AutoCAD (.dwg) format and in a format compatible with the Town's GIS database (shapefiles).
Lettering Size	All lettering must be 2.5 mm or larger in height and 0.18 mm or thicker in line thickness.

Title Block Requirements
Title blocks shall contain the following information:
• Town of Hinton logo
• Project name or name of development
• Description of drawing
• Legal description
• Name of consultant and consultant's Permit to Practice stamp
• Engineer's or Landscape Architect's stamp, as applicable
• Draftsperson and designer identification
• List of checks and approvals
• List of revisions
• Legend (if not on a separate plan)
• Scale(s)
• Date
• Drawing number

Scale Requirements - Urban	
Overall Plans	1:1000
Plan/Profiles	Horizontal: 1:500 Vertical: 1:50
Cross-sections	Horizontal: 1:100 Vertical: 1:50
Overall System Network Analysis	1:2000
Landscape Plans	1:200
Details	1:100

Scale Requirement - Rural	
Regional Overview	1:5000
Overall Plans	1:2000
Plan/Profiles	Horizontal: 1:1000 Vertical: 1:100
Cross-sections	Horizontal: 1:100 Vertical: 1:50
Overall System Network Analysis	1:5000
Landscape Plans	1:200
Details	1:100

Additionally, points of drawing technique that are significant to the drawings are:

- Care is taken to ensure a balanced distribution of detail throughout the drawing.
- Letters and figures are clearly legible, well spaced, and properly formed and proportioned.
- Lines are uniform in weight and density.
- New and existing features are readily distinguishable.

- Dimensioning of a drawing is extremely important and should be such that it will not be misinterpreted. Dimensions should be given from an iron pin, lot line, chainage station, centreline, curb line, or other accepted reference that can be readily established. All dimensions shall be in SI (System International) units.

2.4.4 Drawing Requirements Checklist

The following checklist has been provided to help Developer's Consultant's ensure detailed design drawings include the required information. A completed checklist does not have to be submitted as part of the detailed design submission.

Cover Sheets

- □ Town of Hinton logo.
- □ Project name or name of development.
- □ Stage of development.
- □ Drawing issue (i.e., Issued for Review, Issued for Tender, Issued for Construction, Issued for Record, etc.).
- □ Name of the Developer.
- □ Date.
- □ Name of the engineering firm.
- □ Name of the landscape firm.

Key Plan, Index Plan, and List of Drawings

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

- □ Legal information is shown.
- □ The portion of a street relating to a particular plan/profile sheet is indicated.
- □ A complete list of drawings is included (may be included on a separate drawing, such as the Cover Sheet).
- □ A key plan showing the development as it relates to the surrounding lands is included (may be included on a separate drawing, such as the Cover Sheet).
- □ Street names are labelled.
- □ A Phase/Stage Boundary is shown.

OVERALL PLANS

The following overall plans are to be included:

Topography and Land Use Plan

- □ Existing contours at 1 m intervals (maximum) or 0.5 m (preferred) are shown.
- □ Proposed land use is identified.
- □ Existing features (i.e. buildings, trees, temporary access roads, etc.) are identified.
- □ Street names, lot, and block numbers are labelled.
- □ Easements and rights-of-way, including widths and alignments, are labelled.

Erosion and Sedimentation Control (ESC) Plan

- □ Existing contours at 1 m intervals (maximum) or 0.5 m (preferred). Must be sufficient for distinguishing runoff patterns before disturbance.
- □ Existing vegetation, such as grassy areas or vegetative buffers, that may reduce erosion or off-site sedimentation.

- □ Limits of clearing and grading.
- □ Critical areas within or near the project area, such as streams, lakes, wetlands, highly erodible soils, public streets, and residences.
- □ Locations and types of ESC measures, with dimensions.
- □ A legend, if necessary.
- □ Details of ESC structures and measures, showing dimensions, materials, and other important details.

Road and Sidewalk Plans

- □ Road and sidewalk widths and alignments.
- □ Cross-section design by road classification.
- □ Road structure design elements and details.
- □ Catch basins and drainage swales.
- □ Pertinent topographical features (i.e. ditches).
- □ Limits of disturbance.
- □ Rights-of-way and Easements.
- □ Existing roadways, street names, and lot and block numbers.
- □ Proposed street names, and lot and block numbers.
- □ Proposed traffic markings and signage information.

Lot Grading Plan

- □ Design elevations at lot corners, split points, and finished floor elevation (FFE).
- □ Drainage arrows to indicate direction of proposed surface drainage flow.
- □ Contours of original ground.
- □ Sewer inverts at property line.
- □ Uniform fencing requirements.
- □ Important surface features (i.e. light standards, hydrants, pedestals, transformers).
- □ Individual lot types and detailed drawings.
- □ Drainage Easements and swales.
- □ Driveway locations, if known.
- □ Street names and lot and block numbers.

Storm, Sanitary, and Watermain Plans

- □ Sizes, alignment, depths, spacing, dimensions from property lines, and direction of flow (sanitary, storm, and foundation drain sewers only) of all underground municipal improvements.
- □ Local drainage areas which contribute to storm sewers.
- □ Sanitary sewer areas.
- □ Manholes.
- □ Catch basins and leads.
- □ Hydrants, valves, and other appurtenances.
- □ Services.
- □ Foundation drain sewer.
- □ Street names and lot and block numbers.
- □ Easements, rights-of-way, and PULs.

Shallow Utilities Plan

- □ Alignments and all pertinent information (i.e., pedestals, transformers, etc.) for all shallow (franchise) utilities (gas, power, telephone, cable).

- □ Easements, rights-of-way, and PULs.
- □ Driveway locations, if known.
- □ Street lights.
- □ Services.
- □ Street names and lot and block numbers.
- □ Community mailbox locations, if known.
- □ Other surface features such as valves, manholes, hydrants, curbs, etc., to identify conflicts.

Signage and Pavement Markings Plan

- □ Traffic signs (types and locations).
- □ Street name sign locations.
- □ Information sign locations.
- □ Details of sign installation.
- □ Pavement markings.
- □ Street names and lot and block numbers.

PLAN/PROFILE DRAWINGS

Generally, all underground and surface improvements are to be shown on the same drawings. Although some of the following information may not necessarily be required for construction drawings, the following information will be required for Record Drawings.

General Information

Plan

- □ Positioned at the top of the drawing.
- □ Chainages to correlate with profile section.
- □ Legal subdivision information.
- □ References to cross-sections.
- □ Street and walkway names and numbers.
- □ Centreline chainages of roadways.
- □ Accuracy of grade information to two decimal places.

Profile

- □ Positioned at the bottom of the drawing.
- □ Chainages to correlate with plan section.
- □ Existing ground profile.
- □ Centreline chainages of roadways.
- □ Grade information to two decimal places.

Roadway Information

Plan

- □ Horizontal alignments of roadway(s), curb and gutter, sidewalks, and lane(s).
- □ Dimensions of roadway(s), sidewalks, and lane(s).
- □ Cross-section design by roadway classification.
- □ Chainages of the PI, BC, and EC of horizontal curves, together with delta angles, radius, tangent length, and arc lengths for each curve.
- □ Pavement elevations at intersection.

- □ Curb elevations for each basin and the BC and EC of corner radii.
- □ Road structure design elements.

Profile

- □ Vertical alignment (roadway crown or lip of gutter) of roadway(s).
- □ Grades of sidewalks, swales, lanes, etc.
- □ Vertical curve information:
  - □ Chainage to BVC, EVC, and PVI.
  - □ Elevations of BVC, EVC, and PVI.
  - □ Lengths of curves.
  - □ Elevations and chainages at sags and crests of curves.
  - □ External value, e.
  - □ K-value of crest and sag curves.
  - □ Curb and centreline grades.

Watermain Information

Plan

- □ Alignment of watermain(s).
- □ Location of hydrants, valves, and other appurtenances tied to property line.
- □ Dimension offsets of watermain to property line.
- □ Indicate details of connection to existing watermains.
- □ Degrees of bends, if other than 90°.
- □ Label size of watermains, valves, and appurtenances.

Profile

- □ Label size, pipe material, and class of pipe for watermains, and class of bedding.
- □ Label location of hydrants; show and label valves and fittings.
- □ Show required depth of bury and top of pipe elevations at all grade changes, valves, and fittings.
- □ Indicate requirements for backfill compaction.
- □ Indicate areas requiring insulation, if applicable.

Sanitary and Storm Sewer Information

Plan

- □ Alignment of sanitary sewer(s) and storm sewer(s).
- □ Location of sewers, manholes, clean outs, and other appurtenances tied to property line.
- □ Location of catch basins based on road chainages.
- □ Show leads between catch basins and manholes.
- □ Manholes shall be numbered (sanitary with the prefix “SA”; storm with the prefix “ST”).
- □ Catch basins shall be numbered.
- □ Indicate details of connection to existing manholes.
- □ Label size of sewers, manholes (if larger than 1200 mm in diameter), and appurtenances.

Profile

- □ Indicate length and slope (in percent) between manholes.
- □ Label size, pipe material, and class of pipe for sewers, and class of bedding.
- □ Rim elevation and diameter of manholes.
- □ Invert elevations at all inlet(s) and outlet(s) of manholes.

- □ Indicate requirements for backfill compaction.
- □ Indicate minimum cover requirements.
- □ Indicate areas requiring insulation, if applicable.

Service Connection Information

Plan

- □ Show location of all services, with references to property lot corner.
- □ Indicate the invert at property line for each service.

Shallow Utility Information

Plan

- □ Show location of gas, power, telephone, and cable infrastructure.

Special Requirements for Design Drawings

The design drawings shall be supplemented with the following information, when applicable.

- □ Details of special protection for pipe sections which are exposed to high velocities or which require corrosion protection or insulation.
- □ Drawings required for obtaining permits for crossing oil, gas, power transmission lines, railroads, or highways.
- □ Details of placement in areas of fill.
- □ Details pertaining to trenchless installations.
- □ Thrust block details.

Requirements for Design Calculations

Design calculations for the sanitary and storm sewer systems shall be included in the drawing package and shall include the following information:

- □ All manholes and sewer sizes.
- □ Length of sewer sections, between manholes, in metres.
- □ Grade of sewer sections, between manholes, in percent.
- □ Total area of tributary sewers for each sewer section, between manholes, in hectares or square metres.
- □ Tributary area in hectares and runoff coefficient (C value) for each storm sewer section, between manholes; tributary areas to be cross-referenced to any summary tables.
- □ Estimated peak loading based on tributary area and infiltration in litres per second.
- □ Part-full velocity in metres per second.
- □ Pipe capacity in litres per second.
- □ Invert elevations at manholes and catch basins.

Where the size of a development warrants, or is required by the Municipal Engineer, a Water Network Analysis shall be carried out by the Developer's Consultant and all relevant information shall be submitted with the design documents.

Requirements for Landscape Plans

Landscape plans are to integrate with detailed engineering drawings and should include:

- □ Existing and proposed contours at 0.5 m intervals within the site and extending 3 m beyond, as well as all other grading details.
- □ Site boundaries.
- □ Temporary site access(es), laydown area(s), parking.
- □ Stockpile location(s).
- □ Existing and proposed utility information.
- □ Existing vegetation and/or other natural features to remain.
- □ Existing trees to be relocated.
- □ Proposed plant material illustrated at the mature spread or diameter, as noted in the Alberta Horticulture Guide (shown in plan view, as well as in a table with the following indicated: quantity of individual species, botanical name and common name, size of material – height and calliper, method of transport – balled and burlap, container stock, bare root, etc., Canadian Plant Hardiness Zone).
- □ Plant schedules, including overall quantities.
- □ Areas to be sodded or seeded, with seed mix specified.
- □ Details of hard and soft landscape installation.
- □ Type and depth of mulch for shrub beds and tree wells.
- □ Location of proposed site furnishings and related construction.
- □ Areas of concrete, asphalt, or special paving.
- □ Irrigation systems, where applicable.
- □ Fencing locations and construction details.
- □ Locations of bollards along PULs, walkways, or trails.
- □ Lighting details (including street lights and park lighting, where applicable).
- □ Trail locations, details, signage, and proposed drainage.
- □ Adjacent land use information.
- □ Total measurements (square metres) of shrubs beds, islands, buffers, PULs, Municipal Reserves, Environmental Reserves, and parks.
- □ Total measurements (square metres) of sodded and seeded areas.
- □ Any other details that relate to the landscape design.

The above items shall be presented on the following plans, as required:

- □ Existing Site Conditions.
- □ Site Preparation/Clearing.
- □ Erosion and Sedimentation Control Plan.
- □ Layout Plan.
- □ Grading Plan.
- □ Planting Plan.
- □ Construction Details and Specifications.

These plans are to be submitted with the engineering drawings for each phase; refer to Section 10 for additional information.

2.4.5 Requirements for Geotechnical Investigations

Geotechnical reports, signed and sealed by a Geotechnical Engineer, are required at two stages:

- Preliminary engineering design; and
- Detailed engineering design.

Geotechnical investigations shall be undertaken by a qualified engineering firm and specifically prepared for the development/project according to the respective scope and magnitude. As a minimum, geotechnical investigations and reports shall include the following characteristics and content:

- Data collection;
- Geotechnical investigative program;
- Field investigation and sampling, including hydrogeotechnical investigation and considerations;
- Laboratory testing;
- Evaluation of soil conditions, soil parameters, and groundwater;
- Conclusions and recommendations; and
- Appendices.

In the event that the geotechnical investigation reveals areas of high water table and/or unstable subsurface soil conditions, the report shall recommend special techniques required to ensure the stability of the proposed Municipal Improvements. The geotechnical report shall include recommendations for how to deal with any identified springs in the vicinity of the proposed Municipal Improvements.

The Geotechnical Engineer shall coordinate with Protective Services to ensure pavement design takes into consideration loading from the Town's fire trucks.

Geotechnical reports shall be valid for a maximum of 5 years, provided that the site conditions and intended use of the proposed development have not changed. The use of a geotechnical report more than 5 years after the report was issued will require a letter stamped by an engineer indicating that the information and recommendations within the report are still valid.

2.4.6 Requirements for Water Network Analyses

2.4.6.1 General Requirements

A Water Network Analysis (WNA) is required to support proposed land use bylaws, area structure plans, subdivision applications, and detailed engineering drawings.

A WNA report should include the following elements:

- **Introduction** – describe the proposed development and include a figure illustrating the project area.
- **Topography** – describe the topography, notable features; include a map of the topography.
- **Proposed Staging** – describe the proposed construction staging and estimated timelines.
- **Existing Water Network** – describe the existing water network.
- **Boundary Conditions** – summarize the boundary conditions used in the analysis. Boundary conditions are to be requested from the Town.

- **Districting** – include a districting (land use) map with the required fire flows indicated.
- **Demands** – state the assumptions used to estimate the demands for each scenario and summarize the demands in a table; include a figure with the demand nodes and consumption boundaries.
- **Proposed Pipe Network** – describe the proposed pipe network and include a map of the proposed pipe network with model facility names and pipe sizes.
- **Design Criteria** – describe the modelling software used for the design, state the assumptions used in the design (pipe material, Hazen-Williams C-factor, etc.), state the requirements in the area (fire flows, velocities, pressures, head losses).
- **Results** – describe the simulations that were run and compare the results to required values, explain why specific nodes were chosen for analysis, identify any deficiencies and necessary corrections.
- **Appendices** – show appropriate tables for the model simulations.

A WNA report must be prepared by the Developer's Consultant and submitted to the Town for acceptance at each stage of the planning process. The WNA report must include all relevant text, tables, and figures outlined above, must be in conformance with the current Water Master Plan, and the report must be signed and sealed by the Developer's Consultant.

2.4.6.2 Area Structure Plan WNA

The scope of an Area Structure Plan (ASP) WNA includes the entire ASP area and the WNA report must be submitted concurrently with the submission of the ASP to the Town. The purpose of an ASP WNA is to:

- Guide all future development in the area;
- Identify major watermains in the area;
- Consider the development of the looped distribution system as stages are constructed;
- Recognize areas of extreme or deficient pressures and high fire flows; and
- Identify requirements to service adjacent areas.

The Developer's Consultant must clearly state design assumptions required to create the model in the WNA report and shall ensure that all pipes are sized to meet velocity criteria during peak flows. The analysis must include the following simulations:

- Peak Hour Demand (PHD); and
- Peak Day plus Fire Flow.

Main feeds within a neighbourhood section of the ASP, mains servicing areas of extreme elevation, and mains required to satisfy the above simulations must be included in the ASP WNA.

2.4.6.3 Subdivision Stage WNA

The scope of a Subdivision Stage WNA includes the proposed stage of development. The purpose of a Subdivision Stage WNA is to ensure that a proposed stage of development will meet all servicing and fire flow requirements in the interim. If the proposed stage is not the first stage of development, it shall consider the water distribution system(s) of the previous stage(s).

The Developer's Consultant must clearly state design assumptions required to create the model in the WNA report and shall ensure that all pipes are sized to meet velocity criteria during peak flows. The analysis must include the following simulations:

- Peak Hour Demand (PHD); and
- Peak Day plus Fire Flow.

The Developer's Consultant must include all pipes to service the proposed stage of development and must ensure that looping is provided such that no more than 21 single family residential lots (ultimate) or 150 single family residential lots (interim) are isolated in the event of a watermain break, or watermain shut-off for Maintenance purposes.

2.4.7 Requirements for Traffic Impact Assessments

At a minimum, Traffic Impact Assessments (TIAs) shall include the following sections:

- Traffic Analysis;
- Traffic Demand Analysis Steps;
- Capacity Analysis;
- Traffic Signal Warrant Analysis and Traffic Signal Design;
- Intersection and Roadway Illumination Warrant Analysis;
- Proposed Geometry of Study Intersections and Roadways Sections;
- Safety Analysis; and
- Other Issues.

Traffic Impact Assessments shall be reviewed by Protective Services; notification of acceptance of the Traffic Impact Assessment will be provided, in writing, by the Municipal Engineer to the Developer's Consultant.

2.4.8 Requirements for Facility/Mechanical Plant Pre-design Reports

A pre-design report must be prepared by the Developer's Consultant and submitted to the Town for acceptance prior to undertaking the detailed design of new facilities/mechanical plants. The pre-design report must include all relevant text, tables, and figures outlined below and the pre-design report must be signed and sealed by the Developer's Consultant.

A pre-design report for a new facility/mechanical plant should include the following elements:

- **Introduction** – describe the proposed development and include a figure illustrating the project area. Include a description of land ownership and identify if land acquisition is required for the proposed development.
- **Topography** – describe the topography, notable features; include a map of the topography.
- **Existing Infrastructure** – describe the existing infrastructure adjacent to the proposed development.
- **Boundary Conditions** – summarize the boundary conditions used in the analysis. Boundary conditions are to be requested from the Town.
- **Description of Proposed Facility/Mechanical Plant** – describe the proposed facility/mechanical plant and site-specific considerations which will impact the design of the facility/mechanical plant.
- **Design Criteria** – describe modelling software to be used for the design (if applicable) and state any assumptions to be used in the design.
- **Environmental Considerations** – describe any environmental permits or approvals that may be required for the proposed development.

2.4.9 Reference Standards

All references to specifications, standards, or methods of technical associations are to refer to the latest adopted revision, including all amendments, in effect on the date of submission of bids, except where a date or issue is specifically noted.

2.5 Engineering and Municipal Permits

The Town issues permits /authorizations for construction works for development projects as well as capital projects; these may include:

- Clearing and Grading
- Temporary Road Closure Permit
- Service Connections

Other permits administered by the Town, related to public infrastructure, include Development Permits and Building Permits.

In general, all works performed under these permits shall be required to conform to the MDEDSS. Specific requirements are described in the following sections.

2.5.1 Clearing and Grading

Applicants are required to apply for and receive acceptance, in writing, for clearing and grading under the following conditions:

- Cuts / fills greater than 400 m^3
- Slopes greater than 20% on subject property or adjacent properties
- Sites near water bodies, streams, rivers, or wetlands
- Clearing greater than 1,000 m^2
- Work that will result in publicly-owned and operated infrastructure.

Information to be provided for review by the Town includes the following:

- Erosion and sedimentation control plan
- Cut / fill plan, showing existing and proposed contours
- Locations of all stockpiles on a site plan overview of the area
- Stockpile sizes (width, length, height) and estimated quantity
- Duration the stockpile will occupy the space.

Stockpiles will only be allowed on proposed (undeveloped) school sites, Environmental Reserves, or Municipal Reserves if prior approval has been granted by the Town.

Legislative and due diligence requirements pertaining to tree clearing must be determined on a case-by-case basis and is influenced by the time of year the clearing is proposed, whether the tree clearing is proposed on Crown Land, and whether the trees provide habitat for sensitive owls or migratory birds. Surveys for due diligence purposes under the

Migratory Birds Convention Act and the *Wildlife Act* (for sensitive owls) may be undertaken where necessary; consult with an environmental professional for project-specific details.

The general migratory birds nesting period in the Town of Hinton is between mid-April and late August; this period is a general guideline of the likelihood of encountering migratory birds. More specific annual dates can be obtained from Environment Canada, Canadian Wildlife Service. Sensitive owls may nest in the Town of Hinton area between mid-February and late August.

The federal *Migratory Birds Convention Act* and the provincial *Wildlife Act* regulate disturbance to birds, their nests, and their eggs; neither of these Acts regulates tree clearing. Due diligence requirements under these Acts should be evaluated on a case-by-case basis to determine whether bird surveys are needed.

Both migratory bird and sensitive owl nest surveys require a research and collection license / permit under the *Wildlife Act*. In order to confirm or deny the presence of owl species, call-playback surveys are typically required; however, call-playback surveys may be unnecessarily disruptive and should only be carried out when there is a high likelihood of impacting sensitive owl nests.

Clearing and grading submissions are to be included as part of the Development Permit application.

2.5.2 Temporary Road Closure Permit

All construction projects that will occupy or block access to municipal lands are required to apply for and receive an approved Temporary Road Closure Permit at least 5 days prior to starting any construction. All work performed under this permit shall conform to the MDEDSS.

Prior to any work being carried out within the Town, existing right-of-way or duct bank, the Developer and/or the franchise utility companies, and the Contractors must apply for and obtain a Temporary Road Closure Permit from Development Services at least 3 business days prior to partial road closures and at least 5 business days prior to full road closures before commencement of any work can begin.

Excavations under roadways and lanes may require backfill with fillcrete, at the Municipal Engineer's discretion. Larger excavations may use granular or approved native fill, provided that geotechnical testing and documentation demonstrating 97% SPD compaction has been achieved.

Contact Development Services for the Temporary Road Closure Permit Application Form.

2.5.3 Service Connections

A Service Connection in this context refers to installing, altering, or relocating sewer and water infrastructure belonging to the Town, such as:

- Watermains;
- Storm or sanitary sewer mains;
- Service connections to mains; and
- Foundation drains.

Contact Development Services for required documentation for proposed service connections.

2.6 Crossings / Proximity

2.6.1 Third Party Crossings of Utility Rights-of-Way and Government Road Allowances

The following requirements shall apply to third party (oil and gas) pipelines crossing municipal utilities or Government Road Allowances.

2.6.1.1 Typical Pipeline Crossing of Municipal Underground Utilities

1. Utility Installation and Street Occupation Permit is required prior to construction.
2. Crossing shall be constructed in accordance with CSA Z662 and as per the requirements of the Authorities Having Jurisdiction.
3. Pipeline shall be constructed with the following minimum clearances to other utilities: 1 m vertical and 3 m horizontal.
4. Pipeline shall be constructed along a straight alignment, extended 8 m beyond the limits of the road right-of-way. If utilities are within an easement, straight pipe shall be extended 4 m beyond the limits of the utility right-of-way.
5. Pipeline marker tape shall be placed over the pipeline.
6. Backfilling shall maintain the original compaction around the municipal utilities, or as specified by an Engineer.
7. The Town shall be notified at least 48 hours prior to commencement of excavation to allow for municipal inspection.
8. The Town shall be notified for municipal inspection upon construction completion.
9. Record Drawings shall be provided to the Town upon construction completion.

2.6.1.2 Typical Pipeline Crossing of Government Road Allowance

1. Utility Installation and Street Occupation Permit is required prior to construction.
2. Crossing shall be constructed in accordance with CSA Z662 and as per the requirements of the Authorities Having Jurisdiction.
3. Pipeline marker tape shall be placed over the pipeline.
4. Municipal utilities, if any, shall be located on-site, prior to commencing construction.
5. All crossings shall be constructed in accordance with all requirements of the Transportation Safety Board of Canada, the Energy Resources Conservation Board (ERCB), and any other Authority Having Jurisdiction.
6. The pipeline alignment shall be straight, with no vertical or horizontal bends within 8 m minimum from the Government Road Allowance boundary.
7. Crossing deflection angle shall be in the range of 70 to 110 degrees.
8. The Town shall be notified at least 48 hours prior to commencement of excavation to allow for municipal inspection.
9. The Town shall be notified for municipal inspection upon construction completion.
10. Record Drawings shall be provided to the Town upon construction completion.
11. Backfill details shall be as follows:

Road Allowance	Minimum Cover	Compaction	Recommended Construction Method
Undeveloped (with no future development planned)	1.20 m	Maintain Original	May use Open Cut
Undeveloped (with future development contemplated)	2.0 m	95%	May use Open Cut
Developed	1.50 m from lowest bottom of ditch	95% or greater, per direction from Municipal Engineer	Trenchless

2.6.2 Shallow Utility Permit

Authorization of franchise utility, monitoring wells, or any third-party infrastructure installations within public road rights-of-way by external agencies and private utility companies must first enter into an agreement with the Town of Hinton.

The agreement usually takes the form of a Right-of-Way Consent & Access Agreement or a Franchise Agreement. A standard condition of the agreement is that all utility installations require Town approval in the form of a Shallow Utility Permit.

Applications for Shallow Utility Permits shall include utility alignment plans showing where new underground or aerial utility lines will be built, or where environmental testing will occur within the municipal road right-of-way. The applicant that is proposing the installation, the Town, other utility departments and agencies, and other departments all play a role in reviewing, approving, constructing, inspecting, and/or recording information on these installations. Contact Development Services regarding Shallow Utility Permits.

2.6.3 Underground Infrastructure in the Vicinity of Highway 16

Proposed Municipal Improvements which require work within 800 m of the Highway 16 right-of-way will require coordination with Alberta Transportation. The Developer's Consultant shall coordinate with Alberta Transportation to determine permit requirements on a case-by-case basis.

Authorization from Alberta Transportation is required prior to any work within the Highway 16 right-of-way. Any disturbance within the Highway 16 right-of-way shall be reinstated to Alberta Transportation standards.

2.6.4 Crossing Agreements

The Developer shall submit documentary evidence to Development Services that permission has been received from appropriate authorities for crossing of pipelines, railways, highways, or other facilities. If such crossings are intended, submit the evidence at the time of submission of detailed plans and specifications or soon thereafter; but, in any event, prior to construction. All costs related to preparation of crossing applications, application fees, and third-party inspections during crossing (if required) shall be borne by the applicant.

2.7 Security Calculations

The Developer is required to submit the estimated cost of all underground deep utilities and surface improvements, including roads, sidewalks, pipelines, lift stations, water booster stations / reservoirs, stormwater management facilities, etc. required for the calculation of the Security. The costs should also include the estimates for the total cost of consulting services through construction, including construction inspection, contract administration, quality assurance, and record drawing production. If the Developer or the Developer's Consultant has not provided estimates, the Town may establish costs in its sole discretion for the purpose of establishing the required Security.

The Security is calculated as 100% of the estimated construction cost of the described infrastructure, plus 100% of the landscaping costs.

The Security must be deposited, by the Developer or the Developer's Consultant, with the Town upon or before the execution of the Development Agreement and, in any event, prior to endorsement of the Plan of Subdivision or commencement of construction of the development area. Security must be in the form of an Irrevocable Letter of Credit from a Charter Bank or Treasury Branch or as a cash security deposit or combination thereof.

2.8 General Construction Requirements

All work for construction of Municipal Improvements carried out by the Developer shall be in accordance with all Federal, Provincial, and Local Statutes, acts, bylaws, and regulations and shall meet the following general requirements.

2.8.1 Occupational Health and Safety

The Developer, Developer's Representative, Developer's Consultant, and Contractor shall comply with current Occupational Health and Safety Legislation and the Town of Hinton's health and safety management system.

2.8.2 Project Supervision

The Developer's Representative shall be responsible for the layout, field surveys, inspection, and approval of materials and the supervision of all Municipal Improvement installations which are the responsibility of the Developer. The Developer's Representative shall be **on-site at all times** during the installation of services to certify that all Municipal Improvements are in conformance with the MDEDSS, accepted drawings, and specifications. The Developer will be held responsible to the Town for Contractor nonconformance, construction errors, and/or omissions.

In addition to supervision carried out by the Developer's Representative, the Town may periodically inspect the work and assist in coordinating the Municipal Improvements with any related municipal work. The Town will bring the use of any unacceptable materials or practices to the attention of the Developer's Representative. If remedial action is not taken to the satisfaction of the Town, a Stop Work Order may be issued and all work will cease. The unacceptable work will be corrected and/or replaced with direction given from the Developer's Representative to the Contractor.

2.8.3 Right-of-Way Documents

When Easement or right-of-way documents are deemed necessary, they shall be prepared by a registered Alberta Land Surveyor (ALS) at the Developer's expense. Easements or rights-of-way shall be of sufficient size to allow access for Maintenance purposes. It is the sole responsibility of the Developer's Consultant to prepare and submit such documents to the satisfaction of the Town.

2.8.4 Design Acceptance

Upon receipt and acceptance of certified drawings and specifications, and on the Satisfactory Execution of the Development Agreement and payment of security deposit(s), the Developer may proceed to install the Municipal Improvements.

A copy of all accepted drawings and specifications shall be maintained at the construction site during the installation of Municipal Improvements.

2.8.5 Construction Commencement Notice

The Developer shall give the Municipal Engineer at least two weeks notice prior to commencing construction to allow for time to arrange for inspection staff.

2.8.6 Site Protection, Preparation, and Restoration

The Developer is responsible for the protection of existing infrastructure, municipal assets, survey monuments, and natural areas which are to remain.

The Developer is responsible to locate all utilities prior to commencing construction.

Any disturbed areas within a municipal right-of-way are to be restored, by the Developer, to existing or better condition.

2.8.7 Staged Construction

The Town understands that staged construction is an acceptable business approach, either between development phases and stages or over the course of the seasonal cycles within a single phase or stage.

The Developer shall prepare a Site Management Plan for any staged construction activities and shall be responsible for Maintenance of partially completed works that have been opened for use. The Site Management Plan shall address:

- The intended functionality of the site (i.e., whether the site is open to the general public, or third-party tradespeople working on the site, or the Developer's own staff, Contractors, and agents, or closed-off completely).
- Access for:
    - Emergency vehicles;
    - Residents and/or local businesses (if applicable);
    - Construction equipment (if applicable); and
    - Maintenance equipment.
- Access control requirements, including signage, barricades, and fencing.
- Maintenance requirements, including frequency or Level of Service to be maintained by the Developer.
- Any interim measures required to be undertaken by the Developer to safeguard the public and the environment as a result of the interim conditions.

All partially completed works shall be properly restored prior to commencing with the next stage of construction.

2.8.8 Stockpile Locations

The location of all stockpiles shall be subject to acceptance by the Town. The Town's acceptance of a stockpile location does not alleviate the Developer's responsibility to ensure safety, dust control, and weed control. Stockpile locations are to be temporarily fenced. Silt fencing placed around the perimeter of the stockpile is required for stockpiles adjacent to a stormwater management facility, ditch, or road.

2.8.9 Dust Control

The Developer shall be solely responsible for controlling dust nuisance resulting from the installation of Municipal Improvements, both within the right-of-way and elsewhere, be it with calcium chloride, water, or by other means available and acceptable to the Town.

2.8.10 Street and Sidewalk Cleaning

During the construction and Warranty Period and until issuance of the Final Acceptance Certificate, the Developer shall be solely responsible for the removal and disposal of mud and debris from streets and sidewalks within the project boundary and outside the project boundary when mud tracking from the development occurs. Any mud/debris entering the public right-of-way shall be removed and disposed immediately; there will be zero tolerance for mud tracking onto public roadways. All applicable bylaws pertaining to this work must be followed.

2.8.11 Barricades, Temporary Fencing, and Safety Provisions

The Developer is responsible to protect persons from injury and to avoid property damage. The Developer shall place and maintain adequate barricades, construction signs, warning lights, and temporary fencing at all times until the work is safe for traffic or pedestrian use.

2.8.12 Erosion and Sedimentation Control (ESC)

The Developer shall have ESC measures in place to prevent erosion and the transport of sediment from the development.

The Developer's Consultant shall prepare an ESC plan, which shall address the following items:

- Phasing of construction to limit soil exposure;
- Minimizing needless stripping and grading;
- Stabilization of exposed soils;
- Protection of waterways and stabilization of drainage ways;
- Protection of steep slopes and cuts;
- Perimeter controls;
- Sediment settling controls;
- Implementation, inspection, and maintenance / repairs of ESC controls;
- Adjustment of ESC Plan on-site as conditions change; and
- Post-storm assessments.

The ESC plan and strategy shall be implemented prior to development and shall be maintained throughout construction and the Warranty Period, until issuance of the Final Acceptance Certificate. Additionally, an ESC report may be required, at the discretion of the Municipal Engineer. The requirement for an ESC report will be considered on a case-by-case basis. When an ESC report is required, it shall include:

- A brief description of the proposed land-disturbing activities, existing site conditions, and adjacent areas that might be affected by the land disturbance
- A description of critical areas on the site which have the potential for serious erosion problems (for example, severe grades, highly erodible soils, areas near wetlands / waterbodies, etc.)
- A construction schedule that includes the date stripping and grading will begin and the expected date of stabilization
- A brief description of the measures that will be used to minimize erosion and control sedimentation on the site, when they will be installed, and where they will be located
- An inspection and maintenance program, including frequency of inspection, reseeding, repair and reconstruction of damaged structures, cleanout and disposal of trapped sediment, duration of maintenance program, and final disposition of the measures when site work is complete
- Shutdown plans when construction activities are delayed for an extended period of time; ESC shutdown plans need to address ongoing maintenance and inspection issues
- An emergency response plan that identifies available short-term resources in terms of personnel, equipment, and ESC measures, and steps to be taken for incident reporting to regulatory authorities where discharge of sediment exceeds regulatory requirements
- Name and signature of person preparing the plan and professional stamp / designation
- Special issues that may need to be addressed (sensitive area protection, inlet protection, etc.)

The Developer shall comply with the Federal, and Provincial acts, regulations, codes of practice, standards, and guidelines that are applicable to development activities that result or could result in erosion, sedimentation, or other adverse impacts to the environment. The Developer shall be held solely accountable to Alberta Environment for noncompliance.

Refer to Section 3 for an ESC Inspection/Maintenance Report. The ESC Inspection/Maintenance Report shall be kept up-to-date at all times during construction and shall be made available for the Town's review upon request.

2.8.13 Traffic Accommodation Plan

2.8.13.1 Temporary Traffic Control Manual

Traffic Accommodation Plans shall meet the requirements of the Town of Hinton's Temporary Traffic Control Manual.

2.8.13.2 Acceptance

Prior to any work being done within the municipal right-of-way, the Developer must obtain acceptance, in writing, from the Municipal Engineer at least five (5) working days prior to work commencing. Traffic Accommodation Plans shall be reviewed by Protective Services; notification of acceptance of the Traffic Accommodation Plan will be provided by the Municipal Engineer, in writing, to the Developer's Consultant.

2.8.13.3 Traffic Disruption

Excavations for pipe laying operations shall be conducted to cause the least interruption to traffic. The Developer shall provide and maintain safe and suitable temporary bridges at street and driveway crossings where traffic must cross open trenches. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, and other utility controls shall be unobstructed and accessible during the construction period.

2.8.13.4 Flagpersons

At locations of traffic disruption, suitably trained and certified flagpersons, able to handle traffic safely and effectively, are required to minimize traffic disruption to the public.

2.8.13.5 Adjacent Property Owner Notification

All property owners affected by the construction of Municipal Improvements shall be informed by the Developer in consultation with the Municipal Engineer before any paving operations and shall be advised of the probable time when access will be restored. Notices will be required to inform residents of paving operations; these notices are required to be distributed to residents 72 hours prior to any paving operations.

2.8.13.6 Detours

Prior to any road closure, the Developer must submit, at the Developer's expense, a detour plan for acceptance by the Municipal Engineer. Public safety is of the utmost importance and an acceptable detour plan must include provisions outlining safe vehicular passage and pedestrian movement.

If the proposed road closure is within an 800 m radius of a Provincial highway, Alberta Transportation must be notified, and Alberta Transportation approval of the detour plan must be obtained and provided to the Town in support of the detour plan. The Town's acceptance of the detour plan does not relieve the Developer of their responsibility for maintaining the provisions outlined on the detour plan during construction.

The Developer shall be solely responsible for supplying, placing, and maintaining detour signage at all times for the duration of construction.

Emergency access must be maintained at all times. It is solely the Developer's responsibility to contact emergency services (Fire Department, RCMP, and Alberta Health Services) within a reasonable timeframe of the planned road closure and to satisfy in full any additional requirements emergency services may have. Prior to the road closure, written confirmation that emergency services have accepted the proposed detour plan is required to be submitted to the Municipal Engineer.

2.8.13.7 Signage

The Developer must, at their expense, provide, erect, and maintain all signs, barricades, flares, etc. to the satisfaction of the Town.

Road closures/detours must be advertised to the public via two (2) electronic message boards at least 72 hours prior to the road closure and commencement of the detour. Any required changes to the date(s) of the road closure/detour indicated on the electronic message board will require a new full 72-hour notification period prior to the road closure and commencement of the detour.

Any damage to or lost signage shall be repaired or replaced immediately, at the Developer's expense.

All signage shall be placed in accordance with the Manual of Uniform Traffic Control Devices. All signage shall be inspected and maintained on a regular basis for legibility and/or damage. All signage shall be mounted on fixtures appropriate for the intended use. Measures shall be taken to ensure that the signage remains erect during inclement weather.

2.8.13.8 Staged Construction

To permit movement of traffic across streets where new pavement is being constructed, the Town may require that the Developer construct intersections one-half at a time. This will allow traffic to cross the road through a gap in the pavement until traffic is allowed to cross on the new pavement at which time the gap in the pavement can be filled in.

2.8.14 Utilities Controls

2.8.14.1 Acceptance

Prior to any work being done within the municipal right-of-way, the Developer must obtain acceptance from the Municipal Engineer, in writing, at least five (5) working days prior to work commencing.

2.8.14.2 Utility Disruption

Adequate provision must be made for the flow of sewers, drains, and water courses encountered during construction. Valves and other controls on the existing utility system shall only be operated by the Town.

2.8.14.3 Adjacent Property Owner Notification

All property owners affected by the construction of Municipal Improvements shall be informed by the Developer in consultation with the Municipal Engineer before any service interruptions and shall be advised of the probable time when service will be restored. Notices will be required to inform residents of service interruptions; these notices are required to be distributed to residents 72 hours prior to any service interruptions.

2.8.15 Boundary Controls

A boundary valve is to be placed at the tie-in to the existing water distribution system. The valve is to remain closed until a CCC is issued. The exception is when the boundary valve is cracked open to fill the new main for testing and chlorination purposes. Valves are to be operated only by Town staff; Town staff must be given a minimum of 72 hours notice when requested to operate valves. Filling and Flushing Plans are required for each project, to be submitted to the Town for acceptance prior to undertaking watermain testing. Copies of all bacteriological tests performed are to be forwarded to Infrastructure Services.

Plugs are to be placed at the downstream end of new pipes at the tie-in manholes to the existing sanitary and storm sewer systems. The plugs are to remain in place until a CCC is issued on the sanitary and storm sewer systems.

2.8.16 Noise and Vibration Control

2.8.16.1 General Requirements

Subject to the nature, scope, and scale of the Municipal Improvements, the Town may require a Noise and Vibration Control Study to protect sensitive land uses from noise and vibration disruptions. Examples may include: residential development next to highways and arterial roadways, railways, or industrial land uses.

The Study shall be prepared by the Developer, at the request of the Town, at the Developer's cost.

The Study may include monitoring of existing noise levels, and/or computer modeling to predict future noise and vibration levels. The Study will determine the applicable jurisdictional and environmental limits and recommended control measures to be implemented as part of the Municipal Improvements. Control measures may include: subdivision layout, dwelling orientation, sound insulting walls and windows, or noise attenuation barriers.

2.8.16.2 Noise Attenuation for New Developments

1. The maximum design outdoor noise level shall be 55 dBA Leq (24 hour).
2. A Noise Impact Assessment, satisfactory to the Town, is required for all new residential developments proposed to be constructed within the vicinity of existing and proposed major (arterial) roadways.
3. The Noise Impact Assessment must address background noise levels, the impact of current traffic levels and the noise attenuation measures necessary to not exceed the design outdoor noise level.
4. Noise attenuation for new residential development shall be provided for rear yard outdoor amenity areas and be achieved through building orientation, privacy walls, and fences.
5. Noise attenuation measures shall be designed and constructed by the Developer at the Developer's expense.

2.8.16.3 Noise Attenuation for Existing Residential Developments

1. Noise attenuation measures are required for residential developments where the measured outdoor noise levels exceed 65 dBA Leq (24 hour) at locations 5 m from the rear façade of a dwelling and 1.5 m above the ground or deck elevation.
2. No noise attenuation measures are required for outdoor spaces at second or subsequent storeys of houses unless such noise attenuation can be achieved by a maximum 2.5 m wall on the existing grades at the road right-of-way limit, and if noise attenuation is warranted as outlined in 2.8.16.3.1.
3. Noise attenuation measures shall be designed and constructed by the Town for capital projects.

2.8.17 Progress Meetings

Prior to commencement of any construction activities, the Developer's Consultant shall administer a pre-construction meeting with representatives of the Contractor and subcontractor(s) in attendance. Subsequent progress meetings are to be held at a frequency to suit the timelines of the project. The frequency of progress meetings is to be determined between the Town and Developer.

Town representatives shall be invited to the pre-construction meeting and all subsequent progress meetings. The Town shall be included in the meeting minutes distribution list.

2.8.18 Stop Work Order

The Town may issue a Stop Work Order to the Contractor due to nonconformance. Nonconformance includes:

- Unsafe work practices;
- Risk of imminent danger;
- Lack of traffic control;
- Construction not in accordance with accepted drawings, specifications, and MDEDSS; and/or
- Damage to existing facilities.

Should a Stop Work Order be issued, the Developer shall immediately cease operation, rectify the nonconformance and obtain the Town's written acceptance prior to proceeding.

2.8.19 Material

The Developer shall only install materials which have been approved in these MDEDSS, or as otherwise approved in writing by the Town. If non-approved materials are being installed, a Stop Work Order will be issued immediately. A formal meeting will take place with the stakeholders involved and when the Stop Work Order is lifted, any and all materials installed without Town consent shall immediately be removed and replaced with Town staff present before other work can commence.

As part of the post-construction submission package, the Developer shall submit certification by an accredited materials testing firm or manufacturer confirming that all materials conform to the MDEDSS or the special letter of acceptance.

2.8.20 Survey Monument Control

The Developer shall be responsible to maintain and, if necessary, replace monuments that are destroyed, damaged or removed by the operation of the Developer in carrying out the construction and installation of Municipal Improvements.

2.9 Record Drawings and Other Documents

2.9.1 General Requirements for Record Drawings

The Developer shall submit to the Municipal Engineer Record Drawings and other related information giving detailed measurements of the Municipal Improvements constructed. Every effort must be made to submit the Record Drawings to the Town within 6 months of execution of the Construction Completion Certificate; however, in no case can a Final Acceptance inspection be requested prior to the Town receiving the Record Drawings. The submission of all other data for record purposes is a condition of the execution of Construction Completion Certificates by the Town.

Within 6 months of completion of construction of the Municipal Improvements, the Developer shall submit to the Municipal Engineer two (2) full-sized sets of as-constructed drawings, one (1) electronic copy (PDF), and one (1) electronic copy (.dwg and shapefiles) stamped "For Record". The date, Prime Contractor, and subcontractors shall be indicated on Record Drawings.

The Developer's Consultant shall certify that all work has been completed in accordance with the plans and specifications, the MDEDSS, and that all work and deficiencies have been completed.

Upon completion of construction of the Municipal Improvements, and in one (1) complete submission, the Developer shall submit the following documentation. The Town's acceptance of the supporting documentation is required prior to issuance of a Construction Completion Certificate.

- Lot service records;
- Valve reports;
- Hydrant reports;
- Compaction test results;
- Pressure and leakage testing results;
- Chlorine residual test results;
- Bacteriological test results;
- CCTV inspection report for sanitary and storm sewers;
- Infiltration or exfiltration test results for sanitary and storm sewers;
- Concrete and asphalt mix designs;
- Density test results;
- Deflection test results;
- Concrete strength test results;
- Materials testing results;
- Asphalt core results;
- Operation and Maintenance manuals (if required); and
- An accurate as-constructed bill of materials (quantities and costs) for the Town's TCA database.

Incomplete or "piecemealed" submissions will be returned to the Developer.

2.9.2 Record Drawing Requirements for Surface Improvements

All data shown on the construction drawings shall be updated to as-constructed information, in red, including:

- Elevations of catch basins, manhole covers, and curb returns on the plan/profile drawings, as well as any grade changes which exceed the design grade by more than 0.1% (or 25 mm);
- Curve radii, distances from back of walk to property line, and sidewalk widths on the plan/profile drawings;
- Type of curb, whether rolled face or straight face, on an overall plan;
- Elevations at either the roadway crown or lip of gutter; and
- Lot corner elevations, swale centreline elevations at beginning and end as well as at property line crossings and any changes in alignment of the swale.

If the cross-section design has changed in width or structure, then this shall be indicated on the typical cross-section(s).

2.9.3 Record Drawing Requirements for Underground Improvements

All data shown on the construction drawings shall be updated to as-constructed information, in red, including:

- Location of drainage facilities; for example, manholes, catch basins, and the end of pipe stubs;
- Size of manholes, inverts of all pipes entering/exiting manholes;
- Horizontal alignments, sizes, and grades of sanitary and storm sewers;
- Horizontal alignments and sizes of watermains;
- Locations of valves, hydrants, curb stops, and horizontal and vertical bends;
- Elevations of pond/wetland bottom, normal water level, high water level, and freeboard;
- Area at pond/wetland bottom, normal water level, high water level, and freeboard;
- Notation indicating the elevation of the lowest allowable building opening for lots abutting the stormwater management facility;
- Measurements to locate submerged inlets, outlets, and sediment traps referenced to identifiable permanent features which are not submerged at normal water level; and
- Location, material, diameter, inverts, and slope of culverts.

Where the water table is located above the fire hydrant drain, the hydrant drain ports may require plugging. Hydrants with plugged drain ports must be clearly identified on the Record Drawings.

2.9.4 Seasonal Conditions

Should seasonal conditions not permit the CCC or FAC inspection, execution of the CCC or FAC by the Town will be delayed until appropriate conditions exist. The Town is not responsible for notifying the Developer when inclement weather will delay the CCC or FAC inspection. Examples of inclement weather which will delay inspections until appropriate conditions exist include: snow, ice, and freezing conditions.

2.10 CCC and FAC Inspections

Prior to any construction completion inspection or final acceptance inspection, the Developer's Consultant shall conduct a pre-inspection. Any deficiencies noted at the pre-inspection are to be documented and the list of deficiencies is to be submitted to the Town at least 72 hours prior to the construction completion or final acceptance inspection. Any deficiencies noted at the pre-inspection are to be rectified and the Developer's Consultant shall complete a Pre-Inspection Checklist that confirms that there are no outstanding deficiencies and certifies the readiness for the construction completion or final acceptance inspection.

The Developer's Consultant shall take the lead role in the construction completion and final acceptance inspections. The Town will observe the inspection and only provide comments whenever necessary. The Developer's Consultant is responsible to confirm that the project has been constructed in general conformance to the accepted drawings and specifications and MDEDSS.

2.11 Construction Completion Certificate (CCC)

Upon satisfactory completion of the project, a satisfactory construction completion inspection, and after all deficiencies have been corrected and submissions received, the Town shall execute the Construction Completion Certificate submitted by the Developer or Developer's Consultant, notifying:

- Acceptance of the work by the Town; and
- The commencement date of the Warranty Period.

A copy of the Construction Completion Certificate is included in this section for execution by the Developer and the Developer's Consultant.

If provided for in the Development Agreement, separate Construction Completion inspections and commencement of Warranty Periods shall be issued for the following:

- Underground utilities; and
- Surface works and landscaping.

2.12 Warranty Period

The Warranty Period shall commence after the last Construction Completion Certificate is issued, except in those instances when the landscape scope of work is deferred as a seasonal deficiency.

The construction cut-off date for underground and surface improvements, with the exception of landscape improvements, shall be as directed by the Town, but generally shall be no later than October 15.

The Developer shall be responsible for any defect, fault, or deficiency in the completed work during a minimum two (2) year Warranty Period and shall remedy it at their own expense. A record of maintenance performed during the Warranty Period shall be provided to the Town at the Final Acceptance Inspection.

Upon commencement of the Warranty Period, the Town will assume responsibility for snow removal and garbage pickup on paved streets within the occupied subdivision. Town take-over is subject to a walk-through inspection jointly conducted with the Developer (or their Representative) and the Town. The purpose of this inspection is to review the safety and cleanliness of the streets for public operations. This inspection will only be scheduled between the period of May 15 and October 15 on an annual basis, subject to seasonal conditions.

The Developer shall remain responsible for all other Maintenance and repair items including third party damages, Maintenance of street signs, flushing of sewer lines, thawing and flushing of watermains, and Maintenance of the landscaping up until the issuance of the Final Acceptance Certificate.

Third party damage occurring during the Warranty Period will be reviewed by the Town on a case-by-case basis; upon review and consideration by the Town, the Developer may be held responsible for the third-party damage.

2.13 Final Acceptance Certificate (FAC)

Prior to the expiration of the Warranty Period, the Developer shall request, in writing, a final inspection and, within fifteen (15) business days of receipt of such request, the Town will carry out an inspection.

Final Acceptance shall include underground improvements, surface improvements, and facilities (where applicable). Upon correction of all deficiencies, one combined Final Acceptance Certificate will be issued encompassing all Municipal Improvements, with the exception of landscape improvements, which will be approved under a separate Final Acceptance Certificate. A copy of the certificate is included in this section for execution by the Developer and the Developer's Consultant. The Warranty Period shall remain in effect until the Final Acceptance Certificate is issued by the Town.

Should seasonal conditions not permit the inspection, execution of the Final Acceptance Certificate by the Town will be delayed until appropriate conditions for inspection exist.

2.14 CCC and FAC Inspection Costs

The Developer will be responsible for any inspection costs deemed appropriate by the Town. Costs may include:

- Consulting expertise required by the Town for specialized inspection needs; or
- When excessive deficiencies are present and re-inspections are required.

Inspection costs may take several forms, including:

- A lump sum fee charged to the Developer; or
- An invoiced cost by specialized consultant, plus mark-up for handling and administration.

2.15 Endorsement

The Town will endorse the Subdivision Plan following the issuance of the CCCs. In the absence of the issuance of the CCC, the Town may endorse a Subdivision Plan if the Developer increases the Security from 100% to 120% for any Municipal Improvements which have not yet been completed and accepted.

2.16 Development Permits

No development permits shall be issued until:

- The subdivision plan, complete with Easements, is registered;
- The Construction Completion Certificate has been executed for the underground utilities;
- All curbs and gutters are installed;
- The roads have a compacted gravel base and are considered all-weather roads; and
- The franchise utilities are installed and energized/activated.

2.17 Building Permits

No building permits shall be issued until:

- The subdivision plan, complete with Easements, is registered;
- Construction Completion Certificate(s) has/have been executed for the underground utilities and surface works (excluding landscaping); and
- The franchise utilities are installed and energized/activated.

2.18 Occupancy Permits

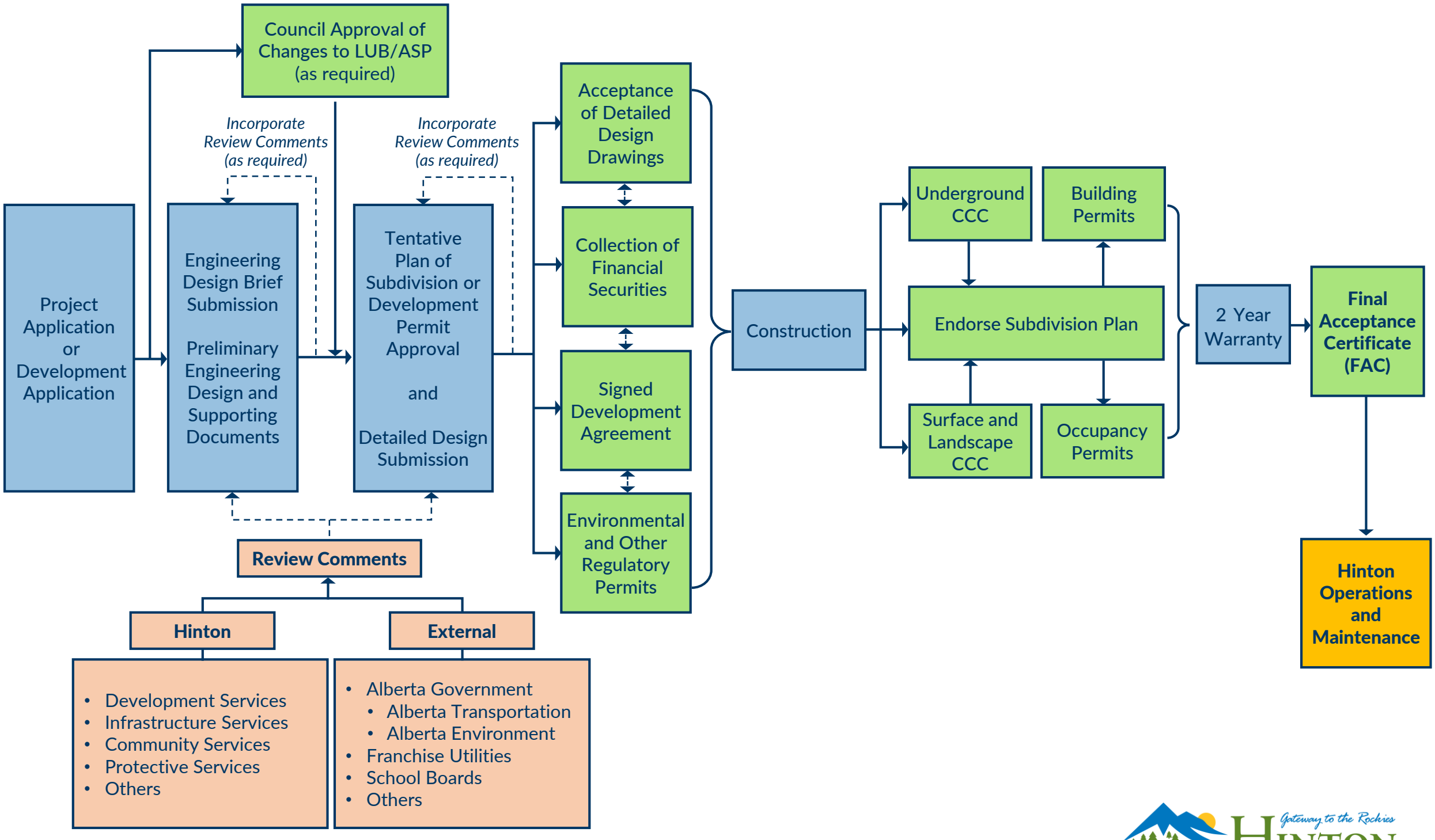
Unless otherwise agreed to by the Town, no occupancy permits shall be issued until:

- The subdivision plan, complete with Easements, is registered;
- Construction Completion Certificate(s) has/have been executed for the underground utilities and surface works (including roads, sidewalks, and street lights); and
- The franchise utilities are installed and energized/activated.

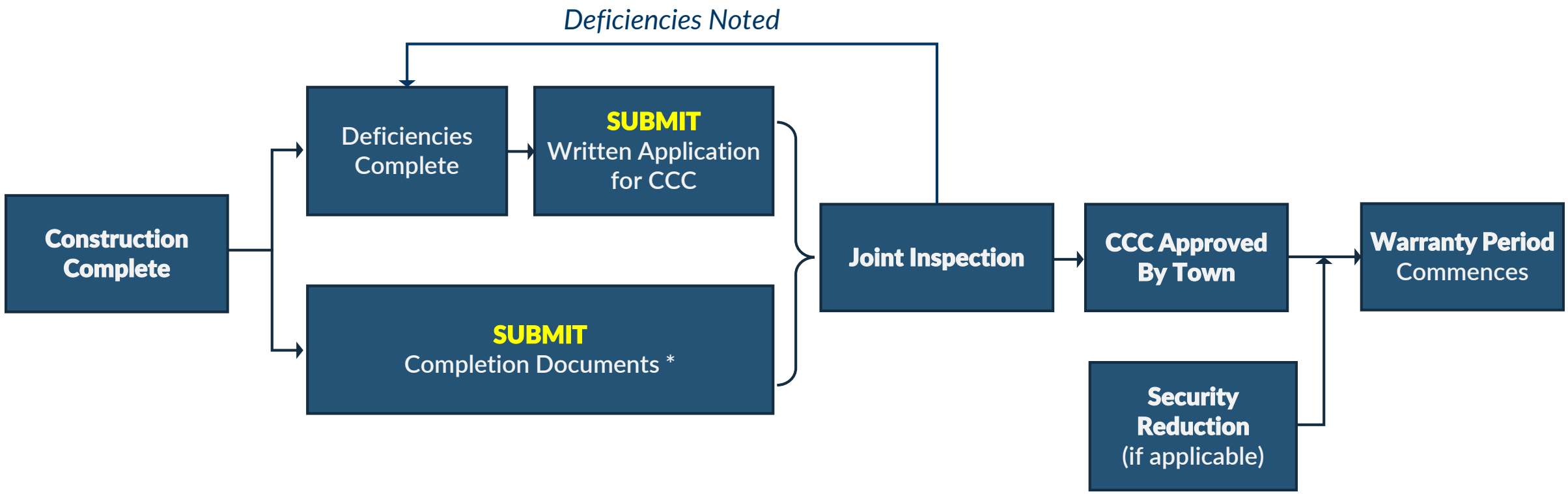
DEVELOPMENT APPROVAL PROCESS

SUBMISSION, REVIEW, AND APPROVAL

CONSTRUCTION, CCC, PERMITS, AND FAC



CONSTRUCTION COMPLETION CERTIFICATE PROCESS



** See Section 2.9.1 for the list of Deliverables at CCC*

ENGINEERING STANDARDS DEVIATION FORM

Deviation No.: _____

Development Project: _____

Capital Project: _____

TO BE COMPLETED BY APPLICANT

To: Director of Development Services
Town of Hinton
131 Civic Centre Road, 2nd Floor
Hinton, AB T7V 2E5

Applicant Name: _____

Company Name: _____

Phone: _____

Email: _____

Mailing Address: _____

_____

_____

Signature: _____ Date: _____

Engineering Standards (MDEDSS) Article: _____ Page No: _____

Deviation Request Description:

TO BE COMPLETED BY THE TOWN OF HINTON

Reviewed by:

☐ Development Services ☐ Community Services
☐ Infrastructure Services ☐ Protective Services

Comments:

Signature: _____ Date: _____

Deviation Request:

☐ Accepted ☐ Rejected

Operations and Maintenance Impact:

☐ Yes ☐ No

If yes, please provide reason:

Reason for Rejection:
(Attach additional pages, if necessary.)

Sigature: _____ **Date:** _____
(Director of Development Services)

Notes:

1) All applications for deviation shall be supported with a stamped letter of recommendation from an Engineer.
2) Any supporting documentation justifying the requested deviation shall be submitted with the letter of recommentation and Engineering Standards Deviation Form.
3) Incomplete submissions will be rejected.

CONSTRUCTION COMPLETION CERTIFICATE

The following certificate shall be prepared and executed by the Developer and Developer's Consultant for submission to the Town of Hinton.

Date: _____

Brief Project Description:

_____

_____

_____

Developer:		Developer's Consultant:	
Name:	_____	Name:	_____
Address:	_____	Address:	_____
	_____		_____
	_____		_____
Phone:	_____	Phone:	_____
Fax:	_____	Fax:	_____

The CCC inspection was performed on _____ and all noted deficiencies have been rectified.

I, _____ of _____
(Consultant's Name) (Consultant's Firm)

hereby certify that the contract for the above described project has been completed in general conformance with the Contract Documents and the Town of Hinton's Minimum Development Engineering Design and Servicing Standards.

Engineer's Seal

Company Permit Stamp

Town of Hinton

Based on the above certification, the Town of Hinton accepts that the project is complete and that the warranty period as it affects the Town will commence on _____

Name: _____ Signature: _____

Date: _____

FINAL ACCEPTANCE CERTIFICATE

The following certificate shall be prepared and executed by the Developer and Developer's Consultant for submission to the Town of Hinton.

Date: _____

Brief Project Description:

_____

_____

_____

Developer:		Developer's Consultant:	
Name:	_____	Name:	_____
Address:	_____	Address:	_____
	_____		_____
	_____		_____
Phone:	_____	Phone:	_____
Fax:	_____	Fax:	_____

The FAC inspection was performed on _____ and all noted deficiencies have been rectified.

I, _____ of _____
(Consultant's Name) (Consultant's Firm)

hereby certify that the contract for the above described project has been completed in general conformance with the Contract Documents and the Town of Hinton's Minimum Development Engineering Design and Servicing Standards and that all deficiencies have been rectified to the Town's satisfaction.

Engineer's Seal

Company Permit Stamp

Town of Hinton

Based on the above certification, the Town of Hinton accepts that the warranty period has expired effective _____ and that the Town assumes responsibility for the development as it concerns the Town.

Name: _____ Signature: _____

Date: _____

3 CHECKLISTS AND FORMS

The following checklists and forms, referenced throughout the Minimum Development Engineering Design and Servicing Standards, are provided in this section for completion by the Developer's Consultant.

- ESC Inspection / Maintenance Checklist;
- Engineering Pre-Inspection Checklist;
- Landscape Pre-Inspection Checklist;
- Fence Pre-Inspection Checklist;
- Service Report;
- Hydrant Report; and
- Valve Report.

ESC INSPECTION / MAINTENANCE REPORT

Project Name	**File No.** **Contract No.**
Inspection Date: Time:	Date of Last Inspection:
Inspected By:	Date:
Current Weather:	Weather Forecast:
mm of rain in last week:	mm of rain in last 24 hrs:
Stage of Construction:	
Contractor(s) on Site:	
Construction Activities on Site:	
Heavy Equipment on Site:	

INSPECTION CHECKLIST	YES / NO	COMMENTS	ACTION REQUIRED
Has stripping and grading been phased where possible?			
Have stripped areas / exposed soils / steep slopes been protected and stabilized?			
Have waterways and drainage ways been protected and stabilized?			
Are perimeter controls in place and functioning adequately?			
Are off-site / downstream properties / waterways protected?			
Are construction entrances stabilized to minimize tracking of soil and mud off-site?			
Are Sedimentation Control BMPs in place and functioning adequately?			
Are Transport Control BMPs in place and functioning adequately?			
Are Erosion Control BMPs in place and functioning adequately?			

Note:
BMP: Best Management Practice.

ENGINEERING PRE-INSPECTION CHECKLIST (CCC/FAC)

SANITARY SEWER

		COMMENTS
Manholes		
Channel	☐	
Base	☐	
Joints	☐	
Cover	☐	
Grade Rings	☐	
Clean	☐	
Main Line		
Compaction Tests	☐	
CCTV Report	☐	
CCTV Review	☐	
Exfiltration / Infiltration Test	☐	
Mandrel Test	☐	

STORM SEWER

		COMMENTS
Manholes		
Channel	☐	
Base	☐	
Joints	☐	
Cover	☐	
Grade Rings	☐	
Clean	☐	
Main Line		
Compaction Tests	☐	
CCTV Report	☐	
CCTV Review	☐	
Exfiltration / Infiltration Test	☐	
Mandrel Test	☐	
Catch Basins		
Sump	☐	
Base	☐	
Joints	☐	
Grate	☐	
Location	☐	
Clean	☐	
SWMFs		
Flared Ends (Inlet)	☐	
Flared Ends (Outlet)	☐	
Trash Rack	☐	
Rip Rap (Class, Size)	☐	
Topsoil	☐	
Seeding	☐	
Control Structure	☐	
General Clean-up	☐	

WATERMAINS

		COMMENTS
Compaction Tests	☐	
Hydrant Operation & Reports	☐	
Valve Operation & Reports	☐	
Pressure / Leakage Test	☐	
Chlorine Residual Test	☐	
Bacteriological Test	☐	

SERVICES

Compaction Tests	☐	
CC Operation	☐	
Sanitary	☐	
Storm	☐	
Water	☐	
Marker Stakes	☐	
Service Reports	☐	

CONCRETE

Curb and Gutter	☐	
Sidewalk	☐	
Expansion Joints	☐	
Concrete Tests	☐	
Mix Design	☐	
CC Stamps	☐	
Backfill	☐	
Clean	☐	

ASPHALT

Asphalt Surface Uniformity	☐	
Subgrade Compaction Tests	☐	
GBC Compaction Tests	☐	
Proofrolls	☐	
Asphalt Core Results	☐	
Mix Design	☐	
Thickness	☐	
Density	☐	
Clean	☐	

SITE GRADING

Ditches	☐	
Culverts	☐	
Swales	☐	
Clean	☐	
Lots Rough-Graded to Ensure Positive Drainage	☐	

I, _____ (Consultant's Name) of _____ (Consultant's Firm) certify that _____ (Project Name) has been preinspected and is ready for a _____ (CCC / FAC) inspection of the _____ (Underground / Surface / Landscape) works.

Signature: _____ Date: _____

LANDSCAPE PRE-INSPECTION REPORT

Project Name	**File No.** **Contract No.**
Inspection Date: Time:	Date of Last Inspection:
Inspected By:	Date:
Current Weather:	Maintenance Logs:
Stage of Construction:	
Contractor(s) on Site:	

INSPECTION CHECKLIST	YES / NO	COMMENTS	ACTION REQUIRED
Has planting been completed? Are the counts correct?			
Are trees staked and tied?			
Are trees straight/ aligned/ and at the proper planting height?			
Are the trees healthy and watered in the last 48 hours?			
Are tree soil/ mulch rings in place?			
Has seeding/ sodding been completed? Has it been maintained recently?			
Are there any bare/ damaged sections of turf which need to be replaced/ overseeded?			
Has the site been weeded/ sprayed?			
Have all site amenities been installed as per plan			
Are there any damages to site amenities which require touch-up or replacement?			
Have construction debris/ stockpiles been removed from site?			

FENCE PRE-INSPECTION REPORT

Project Name	**File No.** **Contract No.**
Inspection Date: Time:	Date of Last Inspection:
Inspected By:	Date:
Current Weather:	
Stage of Construction:	
Contractor(s) on Site:	

INSPECTION CHECKLIST	YES / NO	COMMENTS	ACTION REQUIRED
Has all fencing been completed as per plans?			
Has the fence alignment/ offset been verified?			
Are all posts straight and firmly set in the ground?			
Are all panels securely fastened to posts?			
Are there any damages which require touch-up or replacement?			
Are all gates installed as per plans?			
Do all gates swing into lots without impediment & latch properly?			
Is the bottom of the fence a minimum of 75 mm above final grade? (Not applicable to Noise Fence)			
Have construction debris/ stockpiles been removed from site?			

TOWN OF HINTON

SERVICE REPORT

Gateway to the Rockies HINTON

Street _____

Lot _____ Civic No. _____

Development Permit No: _____

PUBLIC

	Water	Sanitary	Storm
Length:			
Material:			
Diameter:			
Colour:			
Depth @ Main (m):			
Depth @ PL (m):			
T.O.P. Elev. @ Main:			
T.O.P. Elev. @ PL:			
Main Diameter:			
Curb Stop to PL (m):			
PL to Stub (m):			

Contractor: _____

Inspected By: _____

Date: _____

Record Drawing #: _____

Insulation? ☐ Yes ☐ No

Anode? ☐ Yes ☐ No

RURAL DEVELOPMENTS

Driveway Culvert? ☐ Yes ☐ No

Precast Headwalls? ☐ Yes ☐ No

Driveway Culvert Diameter: _____

Material: _____

Additional Notes & Comments:

PRIVATE

	Water	Sanitary	Storm
Length:			
Material:			
Diameter:			
Colour:			
Depth @ Bldg.:			

Contractor: _____

Inspected By: _____

Date: _____

Insulation? ☐ Yes ☐ No

Rock? ☐ Yes ☐ No

Sump Pump Connected to Foundation Drain? ☐ Yes ☐ No

Sanitary Service Type? ☐ Gravity ☐ Pressure

Private Pump Station Info Lift: _____

Distance: _____

Additional Notes & Comments:

SEE REVERSE FOR SKETCH

TOWN OF HINTON

SERVICE REPORT

Gateway to the Rockies HINTON

Street _____

Lot _____ Civic No. _____

PRIVATE

PUBLIC

SEE REVERSE FOR DETAILS

Hydrant Report

HINTON — Gateway to the Rockies

HYDRANT NO. _____

DRAWING NO.: _____

OWNER: _____ OPERATOR: _____

Valve Position from Hydrant: _____

HYDRANT LOCATION

CONTROL VALVE NO.: _____

Nearest Intersection: _____

Alignment Street: _____

X Coordinate: _____ Y Coordinate: _____

Z Coordinate: (Ground Elevation) _____ Z Coordinate: (Hydrant Flange Elevation) _____ Depth: _____

HYDRANT INFORMATION

Manufacturer: _____ Model: _____

Installation Date: _____ Type: _____ Drain Holes: (Plugged? Y/N) _____

Barrel / Cap Colour: _____ No. of Hose Connections: _____ No. of Bollards: _____

Barrel Diameter: _____ Pumper Connection (Y/N): _____ Anode (Y/N): _____

HYDRANT LEAD INFORMATION

Lead Alignment: _____ Diameter: _____ Material: _____

Manufacturer: _____ Model: _____

HYDRANT STATUS - Operator to keep up-to-date

Current Status: _____ Date Status Changed: _____

WATERMAIN INFORMATION

Alignment: _____ Manufacturer: _____

Diameter: _____ Material: _____ Make: _____

PROJECT INFORMATION

Project No.: _____ Year: _____ Work Order: _____ Year: _____

Contractor: _____ Construction Foreman: _____

FIELD SKETCH AND COMMENTS: (NOTE: Provide sketch if detail is not included in the Record Drawings)

VALVE REPORT

Gateway to the Rockies HINTON

VALVE NO. _____

DRAWING NO: _____

OWNER: _____ OPERATOR: _____

VALVE PURPOSE: MAIN CONTROL, HYDRANT CONTROL, SERVICE CONTROL, AIR VENT, BLOW OFF CONTROL, PRESSURE REDUCER, SURGE PROTECTION, FLUSH POINT CONTROL,
ZONE SEPARATION: (Please choose one) _____

VALVE LOCATION

Nearest Intersection: _____

Alignment Street: _____

X Coordinate: _____ Y Coordinate: _____

Z Coordinate: (Ground Elevation) _____ Z Coordinate: (Invert Elevation) _____ Depth: _____

WATERMAIN INFORMATION

Alignment: _____

Diameter: _____ Material: _____

VALVE STATUS - Operator to keep up-to-date

Current Status: (Open, Close-Stop, Other) _____ Date Status Changed: _____ Reason Changed: _____

VALVE INFORMATION

Installation Date: _____ Diameter: _____ Actuator (Y/N): _____ Anode (Y/N): _____

Manufacturer: _____ Model: _____

Type (Gate, Butterfly, Ball, Check, PRV, Ball-CC): _____

Casing (Y/N): _____ Geared (Y/N): _____ Direction to Open (L/R): _____

Installation Method (TVS, In Chamber, Direct Bury): _____

SERVICE MAIN INFORMATION (if Applicable)

Alignment: _____

Diameter: _____ Material: _____ Make: _____

IF VALVE IS FOR SERVICE CONTROL, SELECT THE APPLICABLE SERVICES

Domestic (Y/N): _____ Fire Hose (Y/N): _____ Hydrant (Y/N): _____

Sprinkler (Y/N): _____ Critical Service (Y/N): _____ Commercial (Y/N): _____

PROJECT INFORMATION

Project No.: _____ Year: _____ Work Order: _____ Year: _____

Contractor: _____ Construction Foreman: _____

FIELD SKETCH AND COMMENTS: (NOTE: Provide sketch if detail is not included in the Record Drawings)

4 ROADWAY SYSTEMS

4.1 General

This section covers the general design and construction of roads, lanes, trails, curbs, gutters, sidewalks, boulevards, and accessories to be built or re-built in the Town. Standard Details relating to roadway design and construction are provided at the end of this section.

Specific construction requirements, construction materials, and procedures are not included.

4.2 Traffic and Transportation

This section covers the transportation and traffic engineering aspects of roadway and walkway design in the Town. These standards are the minimum requirements for roadway and walkway facilities. Changes in the design values may be considered, provided that the changes are justified and the added benefits provided by the Developer's Consultant are to the Town's satisfaction.

All designs shall conform to the relevant Area Structure Plan, the Transportation Master Plan, and shall ensure the safe and efficient movement of traffic and pedestrians. Sufficient access points to Rural and Urban collectors shall be provided to the satisfaction of the Town.

Roadway capacity and safety can be affected by the following factors:

- **Roadway Geometrics** - Road right-of-way, road width, lane width, storage turn bay lengths and geometrics, grade and curvature, intersection configuration, etc.
- **Traffic Characteristics** - Traffic volume, speed, traffic composition, traffic fluctuations, saturation flow, etc.
- **Road "Frictions"** - Traffic control measures, parking conditions, access locations and numbers, driver sight distance, street furniture, etc.

4.3 Road Classification and Geometric Standards

The classification and designation of roads and walkways shall be undertaken during the subdivision planning stages. It shall commence with the Area Structure Plan, to ensure road, walkway, utility, and right-of-way requirements can be coordinated, established, and accepted in the design stages of subdivision development.

4.3.1 General

- Roads are classified based on a functional hierarchy. The road classifications are local, collector, and arterial.
- The design standards for Urban and Rural roads shall be in accordance with the geometric design standards outlined in "Geometric Design Guide for Canadian Roads" published by TAC. Alberta Transportation's Highway Geometric Design Guide may also be applicable.
- Typical cross-sections are included with the Standard Details at the end of this section.

Table 4-1 provides a summary of the road classifications and geometric guidelines.

4.3.2 Arterial Roads

Arterial roads generally serve as line-haul facilities carrying traffic between activity centres; i.e., connecting with collectors, other arterials, or freeways, but not local streets. Arterial roads shall be divided and will carry more than 10,000 vehicles per day. On-street parking is not permitted on arterial roads.

4.3.3 Collector Roads

Collector roads provide local access to frontage developments and collect traffic from several local streets or from an Industrial area, and channel it towards the arterial system. A collector street can connect with local streets, other collectors, or with arterial roadways; however, their location should minimize the potential for use as a short-cut between arterial roadways. Parallel parking may be allowed on these streets.

4.3.4 Local Roads

Local roads are intended solely to provide access to individual properties. The level of traffic on a local road is not generally a problem; however, the volume can be controlled if the maximum length is set at 600 m and traffic calming considerations are incorporated into the design. Local roads should only be permitted to connect with other local roads or with collector roads. All sites should provide sufficient on-site parking to meet demands. School buses may be permitted.

4.3.5 Angled Parking

Angled parking is generally not permitted; however, angled parking for local Commercial roads may by acceptable to the Town upon submittal of appropriate design parameters.

Table 4-1
Road Classifications and Geometric Guidelines

Classification	Arterial		Urban Collector			Urban Local		Rural Collector	Rural Local
			Residential		Ind./Comm.[2]	Residential	Ind./Comm.[2]	Ind./Comm.[2]	Industrial[2]
	Urban	Rural	Major	Minor					
Parking	No	No	Permitted	Permitted	Permitted	Permitted	Permitted	No	No
Service	Through Traffic	Through Traffic	Through Traffic & Access		Access Only			Through Traffic & Access	Access Only
Flow Characteristic	Uninterrupted except traffic / pedestrian signals		Interrupted Flow			Interrupted Flow		Interrupted Flow	Interrupted Flow
Design Speed (km/hr)	70	70[3]	60 - 70[12]	60	60	50	50	60	50
Road Width (m)[1]	16.8	15.8 (R); 16.8 (U)	16.0 - 16.8	13.0	14.0	11.0	12.5	12.5	11.0
Travel Lanes (m)	4 @ 3.7	4 @ 3.7	2 @ (4.75 - 4.9)	2 @ 3.85	2 @ 3.5	N/A	N/A	N/A	N/A
Parking Lanes (parallel)	N/A	N/A	2 @ 3.0	2 @ 2.4	2 @ 3.0	N/A	Optional	N/A	N/A
Curb and Gutter (mm)	650		400	400	400	600	400	N/A	N/A
Curb Type	Straight Face		Straight Face with Driveway Cut			Rolled Face	See Note 5	N/A	N/A
Radii (m) for Cul-de-Sac	Restricted		12.5 to FOC[8]		15.5 to FOC[8]	12.5 to FOC[8] (see Note 4)	15.5 to FOC[8] (see Note 4)	15.5 to EOP[10]	
Sidewalk	Separate, Both Sides (U)		Separate, Both Sides			Sep. / Mono, Both Sides		Optional	Optional
Sidewalk Width (m)[14]	3.0 ACP[9]	3.0 ACP[9]	1.8 Conc. and 3.0 ACP[9]	1.8 Conc. and 3.0 ACP[9]	1.8 Conc.	1.8 Conc.	1.8 Conc.	3.0 ACP[9]	3.0 ACP[9]
Right-of-Way Width (m)	54	36 (U); 42 (R)	30 - 35	24	26	19 - 20	22	32	30
Max. / Min. Gradient (%)[6]	6 / 0.6		8 / 0.6	8 / 0.6	8 / 0.6	8 / 0.6	8 / 0.6	8 / 0.6	8 / 0.6
Min. Stop Sight Distance (m)	105	105 (U); 130 (R)	85 - 105	85	85	65	65	85	65
K, Crest (m)	22	22 (U); 26 (R)	15 - 22	15	15	7	7	15	7
K, Sag (m)	23	23 (U); 30 (R)	18 - 23	18	18	13	13	18	13
Max. Superelevation (m/m)	0.06		0.02	0.02	0.04	crowned	crowned	0.08	0.08
Standard Detail No.	4-105	4-108	4-103; 4-104	4-102	4-107	4-100	4-106	4-107	4-106

Notes:

1. Road width dimension is face of curb to face of curb and does not consider medians.
2. Industrial applies to light industrial. For heavy industrial, provide suitable design.
3. 80 km/hr in Rural areas.
4. Parking restrictions shall be applied on all residential cul-de-sacs from 7:30 am to 4:30 pm on the scheduled garbage collection day in the subject area.
5. Straight Face with Driveway Cut.
6. Minimum grade along all linear curb and gutter is to be 0.6%. Minimum grade along all curved curb and gutter, including curb returns and cul-de-sacs, is to be 0.8%.
7. Major collectors connect to arterial roads and minor collectors connect to major collectors. Local roads connect to local roads and minor collectors.
8. FOC = face of curb
9. ACP = asphalt concrete pavement
10. EOP = edge of pavement
11. R = Rural; U = Urban
12. (Undivided) - (Divided).
13. Minimum radii for horizontal curves shall be as per the TAC Geometric Design Guide for Canadian Roads.
14. When shallow utilities are located beneath a multi-use trail, the multi-use trail shall be concrete.

4.4 Pavement Structures

A geotechnical investigation and independent pavement design are required for all developments and shall be based on a 20-year design life for in situ conditions and projected traffic volume. Additional pavement structure strengths and/or materials may be required in areas with poor subgrade materials, for areas with trucked water and sanitary service, and for heavy Industrial applications, pending the results of the geotechnical investigation. Where road use is mixed (i.e. Commercial and residential), the pavement structure shall meet the higher load criteria.

Roadways in all Urban subdivision developments shall be surfaced with asphaltic concrete pavement (hot mix asphalt).

Gravel surfacing may be accepted, through a requested variance to the Minimum Development Engineering Design and Servicing Standards (MDEDSS), in remote Rural locations only.

Irrespective of the accepted roadway surface finish, good roadway industry construction practices and techniques shall be employed. Furthermore, roadway base and subbase construction shall be undertaken with the view that an asphaltic concrete pavement surface will ultimately be the final finished surface.

In the case of a final lift being provided in the second year or later, the first lift shall be designed to withstand the expected loads due to construction activity and the final lift shall be placed after all concrete deficiencies have been rectified. An additional one (1) year of warranty may be required on materials and workmanship for the final lift (after FAC is issued for surface improvements) if the final lift does not comply fully with the MDEDSS.

4.5 Road Construction Requirements

4.5.1 General

Roadway construction shall be in accordance with the detailed design drawings and specifications accepted by the Municipal Engineer. The work shall be carried out in an efficient manner with acceptable equipment and capable personnel. The Municipal Engineer or an appointed representative shall have access to the site at all times and shall promptly be provided with all test results and information necessary to assess the Contractor's performance. The Town must be notified prior to and have the option to be present at any proof rolls (pre- and post-cement-stabilization), large concrete pours, backfilling operations, or paving operations.

4.5.2 Clearing and Grubbing

1. The Developer shall locate all underground utilities and protect all survey control monuments prior to construction.
2. The surface of the ground within the clearing limits shall be cleared of all trees, logs, stumps, roots, undergrowth, rocks, boulders, structures, debris, and rubbish of any nature. Roots and stumps shall be removed to a minimum depth of 0.6 m below rough grade.
3. All usable timber shall be salvaged by the Developer.
4. All material cleared and grubbed shall be disposed off-site at a location acceptable to the Town.
5. Burning of debris on-site is not permitted.
6. The Developer shall ensure positive drainage is maintained throughout all stages of site clearing.

4.5.3 Topsoil Stripping

1. Topsoil shall be stripped to full depth.
2. Topsoil shall not be used as backfill.
3. Topsoil may be stockpiled for use on other parts of the project.

4.5.4 Excavation and Earthwork

1. All excavation shall be carried out within the limits of the proposed work.
2. For road construction, the right-of-way shall be graded to tie into the existing or proposed lot elevations at the property line and shall be left in a neat and tidy condition.
3. The Developer shall ensure positive drainage is maintained throughout all stages of rough grading.

4.5.5 Embankment Construction

1. Native backfill deemed suitable for embankment construction, as per the geotechnical investigation, shall be used; otherwise, imported material shall be used for embankment construction.
2. Material shall be placed in lifts not exceeding 300 mm in uncompacted depth and shall be compacted in accordance with the requirements outlined in the geotechnical investigation.

4.5.6 Temporary Roads and Accesses

Plans for temporary roads, accesses, and detours shall be approved by the Town. All-weather type construction will be required, and the Developer is responsible for all Maintenance of temporary roads, accesses, and detours.

All signage, channelization, detours, closures, etc., shall be in accordance with the Manual of Uniform Traffic Control Devices for Canada as published by TAC.

4.5.7 Snow Removal

The Town shall be responsible for snow removal once the first lift of asphalt has been installed and a Construction Completion Certificate has been executed.

4.5.8 Maintenance of Existing Facilities

The existence and location of underground utilities indicated on the plans that have been determined from the Town's records are not guaranteed.

The Developer is responsible to ensure that existing services, such as sewer mains, watermains, roadways, and landscaped areas, are not disturbed or become inoperable as a result of actions by the Developer, their agents, or Contractors. Existing services shall not be exposed to loadings beyond their design capacities. Existing services shall continuously be maintained and cleaned by the Developer where their actions are cause for additional Maintenance.

4.5.9 Staged Construction

Staged construction shall be to the satisfaction of the Town. The Developer shall meet with the Town, prior to the submission of the detailed engineering drawings, to confirm the approach for staged construction.

The Developer is responsible for all Maintenance of partially completed works which have been opened for use. All partially completed works shall be completed prior to commencing with the next stage of construction.

Temporary turnarounds are required and shall have an adequately designed pavement structure, signage, jersey barriers, and/or other requirements the Town deems necessary for future Maintenance and in the event that the temporary turnaround becomes permanent. Additionally, temporary turnarounds shall satisfy any requirements the Fire Department may have.

4.6 Materials

4.6.1 General

Materials used in roadway construction shall be from sources acceptable to the Municipal Engineer. Manufactured goods shall meet the standard manufacturer's specifications and the accepted roadway specifications. Under no circumstances shall defective, rejected, or substandard materials be used in the construction of roadways.

4.6.2 Subgrade, Fill, and Granular Road Base

4.6.2.1 Subgrade

Subgrades under the roadway structure shall be constructed of suitable soils, free from organic and frost susceptible materials. Subgrade preparation shall typically include scarification to a minimum depth of 300 mm, windrowing material to the side, compaction of exposed surface to 97% Standard Proctor Density (at optimum moisture content), replacement of windrowed material to line/grade and compacted to 100% Standard Proctor Density (at optimum moisture content).

Cement-stabilization of the subgrade may be required; if so, the type of cement, depth of stabilization, and rate of cement to be used shall be as specified in the geotechnical report.

A subgrade drainage system may also be required, pending the results of the geotechnical investigation. Refer to Section 6 for wick drain and transverse drain requirements.

The prepared subgrade shall be proof rolled and witnessed by the Developer's Representative and the Municipal Engineer. The Town of Hinton shall be notified at least 3 business days prior to the proof roll. Under no circumstance shall the subgrade be covered with the granular base course until the Developer's Representative has received test results indicating the requirements for density and moisture content have been met and a successful proof roll has been attained.

4.6.2.2 Fill

Trench backfill under roadways shall be as follows:

- Class I – use of imported granular backfill
- Class II – use of screened native backfill (granular material no greater than 63.5 mm)
- Class III – under landscaped areas within the road right-of-way

Trench backfill for rehabilitation projects under existing roadways shall be approved granular material, compacted to 100% Standard Proctor Density.

Fill areas under the subgrade shall be compacted to a minimum of 97% Standard Proctor Density in Urban applications and 95% Standard Proctor Density in Rural applications. All materials shall be compacted in layers such that a uniform compaction is obtained.

4.6.2.3 Granular Road Base

Granular road base materials shall be compacted to 100% Standard Proctor Density.

Granular base course materials shall be Alberta Transportation Designation 2 and shall adhere to the following gradation:

Metric Sieve µm	Percent %
20 000	100
16 000	84 - 94
10 000	63 - 86
5 000	40 - 67
1 250	20 - 43
630	14 - 34
400	11 - 28
315	9 - 26
160	5 - 18
80	2 - 10

Granular subbase materials shall be Alberta Transportation Designation 6 and shall adhere to the following gradation:

Metric Sieve µm	Percent %
80 000	100
50 000	55 – 100
25 000	38 - 100
16 000	32 - 85
5 000	20 - 65
315	6 - 30
80	2 - 10

Granular base course and granular subbase course materials shall have the following properties:

Property	Granular Base Course	Granular Subbase Course
+5000 µm with ≥ 2 fractured faces (% mass)	60 min.	
Plasticity Index	NP-6	NP-8
LA abrasion wear (% mass)	50 max.	

The Developer shall retain a materials testing firm to establish the following for the aggregate proposed to be used:

- Sieve analysis;
- Crush count;
- Optimum moisture content; and
- Minimum dry density.

The results of the materials testing shall be submitted to the Town for acceptance at least 3 business days prior to the granular material being used. A minimum of one set of tests shall be submitted for each 500 tonnes of aggregate used.

4.6.3 Concrete

Concrete for roadways (including sidewalks, walkways, and structures) shall be Class C and shall have the following properties:

- Minimum 28 day compressive strength — 30 MPa
- Slump (mm) — 60 ± 20
- Entrained air limits (% by volume) — 5.5 – 8.0
- Maximum aggregate size (mm) — 20
- Maximum water to cementing materials ratio (by mass) — 0.45
- Minimum Portland cement content (kg/m^3) – Spring and Fall mixes — 335
- Minimum Portland cement content (kg/m^3) – Summer mixes — 302
- Cement Type — GU

Spring mixes shall be used from the commencement of the construction season to May 15, or as directed by the Municipal Engineer. No replacement of the minimum cement content with fly ash is permitted for Spring mixes.

Summer mixes shall be used from May 16 to September 30. No more than 10% of the specified minimum cement content may be replaced with fly ash for Summer mixes.

Fall mixes shall be used from October 1 to October 15. No replacement of the minimum cement content with fly ash is permitted for Fall mixes and Type HS (sulphate-resistant) may not be used.

The use of calcium chloride in concrete is discouraged. The use of calcium chloride in concrete may be permitted on a case-by-case basis, at the discretion of the Town, provided that the concrete in question will not require reinforcing steel. In the event that calcium chloride is accepted for use in concrete, its use shall conform to ASTM D98, the

maximum amount permitted will be 2% by weight of cement, and Type 10 Normal Portland Cement shall be used. Calcium chloride shall not be used in concrete made using Type 50 Sulphate Resistant Cement.

Concrete mix designs shall be made available to the Town for review upon request.

Place hot and cold weather concrete to CSA-A23.1; for cold weather concrete:

- Protection shall be provided when there is a probability of the air temperature falling below 5°C within 24 h of placing, as forecast by the nearest meteorological office.
- During cold weather, as defined above, adequate protection of the concrete shall be provided that will maintain the concrete temperature at a minimum of 10°C for the duration of the required curing period.
- Protection shall be provided by means of heated enclosures, coverings, insulation, or a suitable combination of these methods.
- To avoid cracking of the concrete due to a sudden temperature change near the end of the curing period, the protection shall not be completely removed until the concrete has cooled to a temperature in accordance with CSA A23.1.

4.6.4 Asphalt

- Hot-mix asphalt concrete shall conform to the Alberta Transportation Highway Geometric Design Guide, latest edition.
- Asphalt mix designs shall be made available to the Town for review upon request.
- Production, placement, compaction, and quality assurance of the hot-mix asphalt should be pursuant to the requirements of TB-1 “Hot Mix Asphalt Materials, Mixture Design and Construction” as prepared by the National Centre for Asphalt Technology (NCAT) and published by the National Asphalt Pavement Association (NAPA), for guidance in good practices of handling materials and hot-mix production.
- Refer to the latest edition of the “Construction of Hot Mix Asphalt Pavements”, Asphalt Institute Manual Series No. 22 (MS-22), for guidance in good paving practice.
- Refer to Figure 4-1 for Air Temperature and Wind Limitations on Paving.
- Refer to Table 4-2 for traffic patterns to be considered for pavement design. Pavement structures shall be as per the geotechnical investigation and shall conform to Alberta Transportation’s H, M, L, and S mixes where practical. The geotechnical report shall outline the recommended pavement structures as well as the design parameters used (e.g., traffic count, percentage of types of vehicles, CBR, etc.).

Figure 4-1
Air Temperature and Wind Limitations on Paving

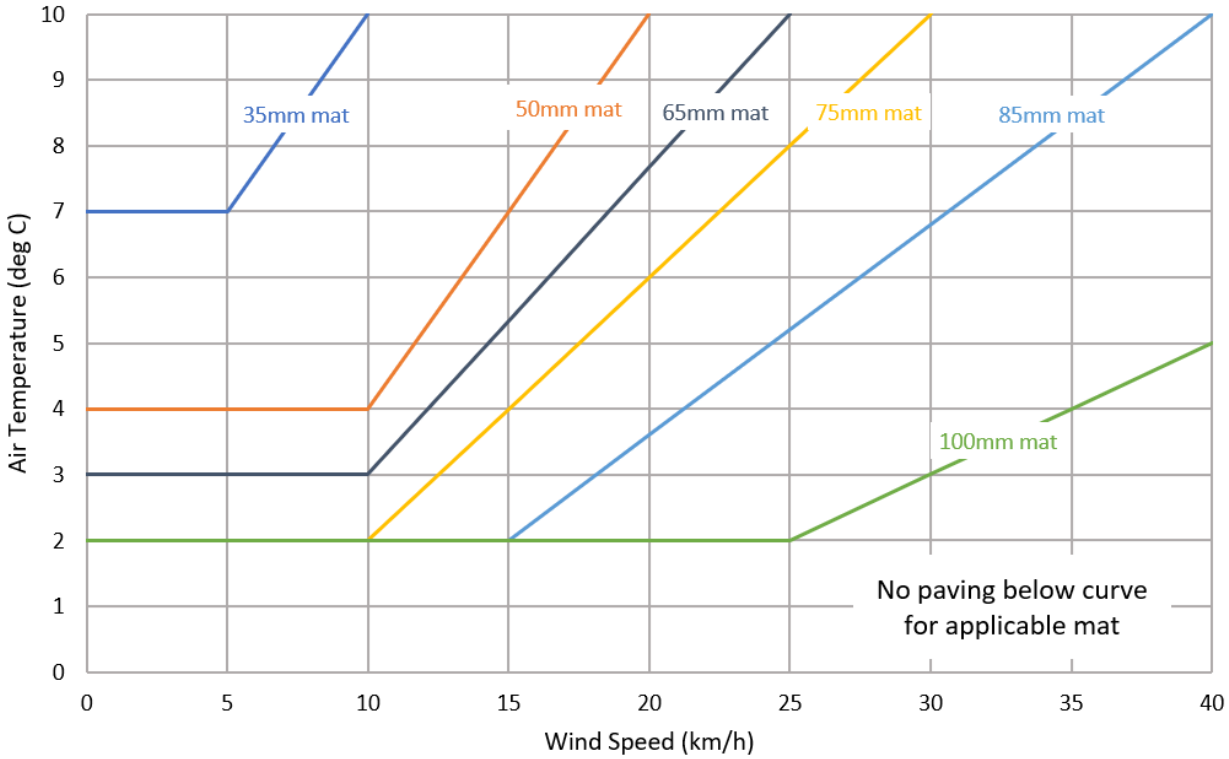


Table 4-2

Traffic Patterns for Pavement Design

Roadway Classification	Design Traffic Number, DTN	Equivalent Single Axle Load, ESAL
Local Residential	4.1	30,000
Industrial / Commercial Local	20.5	150,000
Minor Collector (without buses)	13.7	100,000
Minor Collector (with buses)	41	300,000
Major Collector (without buses)	27.5	200,000
Major Collector (with buses)	82	600,000
Minor Arterial	135	1,000,000
Major Arterial	410	3,000,000

Note:

To convert DTN to ESAL: DTN x 365 days/yr x 20 years (design period) = ESAL

Asphalt shall not be placed if any of the following conditions exist:

- Rain or snow is imminent, or the surface to be paved is wet, icy, snow-covered or frozen.
- Air temperature and wind speed conditions are below the appropriate mat curve shown in Figure 4-1.

Final lift shall not be placed until the base lift has been inspected and accepted by the Town.

4.7 Construction Standards

4.7.1 General

Construction standards used for roadways shall generally be as accepted in the construction industry and as specifically set out in the construction specifications, procedures and methods set out by the Asphalt Institute, and the Portland Cement Association.

4.7.2 Competent Labour

The Developer shall at all times employ skilled and competent labour for all construction operations. The Town shall retain the right to require the removal of incompetent labour.

4.7.3 Equipment

The construction equipment shall be maintained in proper operating conditions. The Town maintains the right to order the removal or repair of improperly maintained equipment.

Equipment shall be used in accordance with the manufacturer's recommendations and within the rated capacities specified.

4.7.4 Asphalt Thickness Pay Factors

If a core thickness is deficient, the affected area of asphalt pavement will be assessed a pay factor according to Table 4-3 which will be applied to the price of the quantity of asphalt in that mat area.

Asphalt pavement with excess thickness may be accepted with no extra payment, if surface and grade tolerances and texture are met.

Table 4-3
Asphalt Thickness Pay Factors

Thickness Deficiency (%)	Pay Factor (%)
10.0	100.0
11.0	97.0
12.0	93.7
13.0	90.0
14.0	85.5
15.0	80.5
16.0	75.0
17.0	68.0
18.0	60.0
19.0	50.0
> 19.0	Grind and Resurface

4.7.5 Asphalt Density Pay Factors

Each mat of asphalt placed shall be compacted to the minimum density (Percent of Marshall Density) for the type of paving, as indicated in Table 4-4.

Table 4-4
Asphalt Density Requirements

Minimum Density	Type of Paving
98%	All stages for staged paving for arterials, Industrial / Commercial roadways, residential collector roadways, and residential local roadways, excluding residential FAC overlays
97%	Overlay greater than 40 mm thick
97%	Lane paving
96%	Residential FAC overlay – maximum 40 mm thick
96%	Rehabilitation overlay (mill and overlay locations)
96%	Asphalt walkway

If a core density is less than specified, the affected area of mat may be accepted, subject to a pay factor according to Table 4-5 which will be applied to the price of the quantity of asphalt in that mat area.

Table 4-5
Asphalt Density Pay Factors

98% Required		97% Required		96% Required	
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	95.8	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
95.9	83.8	94.9	77.6	< 94.0	Reject
95.8	82.0	94.8	74.3		
95.7	80.0	94.7	70.6		
95.6	77.7	94.6	66.0		
95.5	75.4	94.5	60.0		
95.4	73.0	< 94.5	Reject		
95.3	70.3				
95.2	67.2				
95.1	63.7				
95.0	60.0				
< 95.0	Reject				

Note:
Actual Density = % of Marshall Density

4.8 Traffic Control Devices, Street Signs, and Pavement Markings

Traffic control devices, street signs, and pavement markings shall be installed by the Developer and shall be in accordance with the "Manual of Uniform Traffic Control Devices for Canada," issued by TAC; temporary measures shall also meet the requirements of the Town of Hinton's Temporary Traffic Control Manual.

Traffic control devices, street signs, and pavement markings are the primary means of regulating, warning, and guiding all traffic. These devices, signs, and markings should fulfill a need, command attention, convey a clear and simple meaning, command respect, and give adequate time for proper response.

Street name signs and traffic control signs shall be installed as per the TAC "Manual of Uniform Traffic Control Devices for Canada" and as per Standard Details 4-501 and 4-502.

3M™ Diamond Grade™ DG³ reflective sheeting shall be used for street name signs. Street name blades for local streets shall be 150 mm, double-sided, white on green. Street name blades for collector and arterial streets shall be 225 mm, double-sided, white on green. Refer to Standard Detail 4-500. Street signs shall be installed by the Developer as per the accepted Traffic Control Devices and Street Signs plan. The use of dual purpose signs (street name over stop sign, or street name over yield sign) is to be limited, wherever feasible.

Pavement markings, including lane markings, stop lines, and pedestrian crossings, shall be provided by the Developer at their own expense. Pavement markings for local roads shall be oil-based paint placed on the top course of asphaltic concrete at the time of construction, with the exception of crosswalks and line painting within intersections which are to be thermoplastic. Pavement markings for collector and arterial roads shall be thermoplastic, placed on the top course asphaltic concrete surface at the time of construction. Permanent cold pour applications are not permitted.

Traffic control signals and pedestrian crossing signals shall be provided by the Developer at their own expense at all traffic and pedestrian points on arterial roads and as otherwise warranted. All stop lines shall be perpendicular to the curb line.

4.9 Roadway Illumination

4.9.1 General Street Lighting Requirements

Street lighting shall be arranged for and coordinated by the Developer. Streetlight cables shall be installed underground with an acceptable type of steel post streetlights, complete with LED fixtures.

Street lighting shall be installed in all new subdivisions. The Developer shall install all streetlight infrastructure at the time of development at the Developer's cost and as per Fortis requirements.

Street lighting design shall be in accordance with TAC Guide for the Design of Roadway Lighting, Illuminating Engineering Society (IES) standards, and in accordance with Fortis requirements.

No capital costs are to be amortized; the Developer is to pay all capital contribution.

4.9.2 Urban

The street lighting layout and location of the buried lines shall be as shown on the Standard Details and accepted by the Town.

Streetlights shall be provided for each internal park area that does not abut onto a lit street. A streetlight shall be located at the point where each walkway opens out onto the park area.

Streetlights shall be placed at locations not interfering with proposed driveways or water and sewer services and in general shall be located in line with the extension of common property lines between two lots.

4.9.3 Rural

The minimum requirements for Rural street lighting shall be:

- At all access points to arterial roads, secondary highways, and primary highways.
- At all high density country residential subdivisions in accordance with TAC Rural standard and Illuminating Engineering Society (IES) standards.
- At internal park areas that do not abut onto a lighted street.
- At common areas such as mailbox pull-outs, Commercial areas, trail crossings, school grounds, and Industrial areas.

4.10 Sound Abatement

A noise impact assessment may be required for new developments. Berms or elevated contoured embankments shall be used for sound abatement along arterial roadways, highways, and/or railways as required by the regulatory authorities and the Town.

The subdivision side of the embankment shall include gentle slopes of no more than 4H:1V. Rights-of-way may require widening to accommodate sound abatement berms / embankments.

Sound barrier fences may also be accepted by the Town upon submission of an acceptable design.

4.11 Lanes

In general, the following design standards should be followed; refer to Standard Details 4-109 and 4-110.

- Minimum 6.0 m right-of-way.
- Residential lanes must be paved for a minimum width of 4.2 m, with centreline swale and 2% cross fall. Commercial / Industrial lanes must be paved for the full width.
- Where lane traffic is expected to be high, such as for certain Commercial developments, a wider surfaced width and right-of-way may be required, at the Town's discretion.
- Road structure shall match the road structure of the adjoining roadway(s).
- Dead-end lanes must be terminated with a means to turn around.
- Maximum length of a lane between streets shall not exceed 350 m. Lane layouts should not encourage possible short-cutting between streets.

- Maximum length of drainage in lanes shall be 150 m to any one catch basin. Catch basins to be provided prior to tie-ins with adjacent streets.
- Maximum lane grade shall be 6.0%.
- Minimum lane grade shall be 0.9%.
- All lane grades are to be at property line and are to tie to the back of walk / gutter elevation of the intersecting street.
- It may be necessary to remove sidewalk crossings and replace with depressed crossings.
- Property line elevations are to be a minimum of 100 mm above design lane grade for drainage purposes.

Lanes shall be provided for residential lots fronting directly onto collector streets.

4.12 Service Roads

Service roads may be acceptable to the Town for highway Commercial access. Design of service roads shall satisfy all requirements of Alberta Transportation and shall be subject to approval by Alberta Transportation and acceptance by the Town.

4.13 Dead-End Roads

Other than for an interim solution, dead-end roads shall not be allowed in Industrial subdivisions.

In residential subdivisions, all dead-end roads shall be provided with a cul-de-sac or turnaround consistent with the requirements outlined in the Standard Details and TAC requirements. “Hammerhead” turnarounds are not permitted.

Refer to the Fire Department Access Standards document (reviewed and updated annually) for requirements for dead-end roads, including maximum lengths and populations served.

Reflectorized barricades shall be provided at all dead-end roads.

4.14 Urban Approaches and Driveways

Urban approaches and driveways shall be in accordance with the geometric standards of the TAC Geometric Design Guide for Canadian Roads and as modified herein as well as the requirements of the Town’s Land Use Bylaw.

All driveways shall be constructed to the same structure as the adjoining roadway with the same surfacing extending to the property line.

4.14.1 Private Driveways

All driveways shall be constructed to provide a minimum 1.5 m clearance from any structure such as hydrants, light standards, service pedestals, transformers, manholes, and catch basins. Driveways on corner lots shall be located to provide a minimum of 6.0 m clearance from the lot property line adjacent to the intersection and access shall be from the street with lesser traffic.

When the locations of driveways are known, the driveways shall be clearly shown on the design drawings and the driveway aprons shall be installed at the time of sidewalk construction.

4.14.2 Commercial / Industrial Driveways

The edge of a driveway shall be a minimum horizontal distance of 10 m from the end of the curb return of an intersection and shall be designed to accommodate the types of vehicles the business / industry will generate.

4.14.3 Driveway Widths

Driveway widths shall be as follows:

- Residential: 6.0 m
- Commercial: 9.1 m maximum
- Industrial: 9.1 m maximum
- Apartment: 9.1 m maximum
- Residential Laneways: 4.2 m (paved)
- Commercial / Industrial Laneways: Minimum 6.0 m (paved full width)

4.15 Rural Approaches and Driveways

Rural road approaches and driveways shall be in accordance with the geometric standards of the TAC Geometric Design Guide for Canadian Roads and as modified herein as well as the requirements of the Town's Land Use Bylaw.

- Refer to section 4.14.3 for requirements for driveway widths.
- All driveways shall be constructed to the same structure as the adjoining roadway with the same surfacing extending to the property line.
- Where trucked water and sanitary service is required, internal private driveways / accesses shall be designed to accommodate the expected wheel loads and, at a minimum, shall be paved.
- All residential subdivision developments shall require the Developer to construct one driveway to each lot.
- Driveways to Industrial / Commercial lots are not required to be constructed by the Developer unless the locations are known. The Lot Owner / Developer will be responsible for constructing such driveways to the standards outlined herein.

4.16 Medians

Medians less than or equal to 3.0 m in length and/or less than or equal to 2.0 m in width shall be concrete; all other medians shall be landscaped. A ramp shall be constructed to allow lawn mowing equipment to safely move in and out of landscaped medians.

4.17 Curb and Gutter

1. When a street with straight face curb intersects a street with rolled face curb, the Developer's Consultant shall provide details on the transition between curb types to the Town for review and acceptance.
2. The use of concrete swales at intersections is to be limited to residential local streets and shall be avoided where possible. Concrete swales shall be 0.5 m wide and 225 mm thick, with steel reinforcement.

4.18 Pedestrian Pathways

4.18.1 Urban Sidewalks

Concrete sidewalks measuring 1.8 m in width will be required in the following instances:

- On both sides of collector roads.
- On both sides of residential roads.
- Where there is a possibility of a requirement to provide continuity of sidewalks to future development.
- Where linkage is required to maintain continuity of the pedestrian network.

Refer to Standard Details for typical layouts and dimensions.

Curb ramps shall be provided on sidewalks at all roadway intersections and at all pedestrian crossings in accordance with the Standard Details. Curb ramps shall be aligned with one another, with the tooled grooves matching up congruently to facilitate those persons with disabilities to cross the intersection safely.

At the time of sidewalk construction, the letters “CC” shall be stamped into the plastic concrete, in line with each service box (curb stop).

Sidewalks shall have a minimum cross-slope of 2% and a maximum cross-slope of 4%.

4.18.2 Trails

Pedestrian trails shall generally be asphalt or gravel, except in cases where shallow utilities are located beneath a multi-use trail; in these cases, multi-use trail shall be concrete. Refer to Standard Details. The location of pedestrian trails shall conform to the current Parks, Open Spaces and Trails Master Plan and relevant Area Structure Plan.

Trails shall have a minimum cross-slope of 2% and a maximum cross-slope of 4%.

4.18.3 Walkways

Utility rights-of-way provided for walkways shall have a minimum width of 6 m.

4.19 Community Mailboxes

The Developer shall accommodate community mailbox locations when community mailbox locations are identified as being required. In general, community mailbox location criteria and requirements are as follows:

- Along flankage (sideyard) of corner lots, between the front and rear property lines.
- Provide additional 0.5 m x 5.0 m Easement if encroaching on private property.
- Next to an Open Space or playground.
- On the predominantly homecoming side of the street.
- Adjacent to the sidewalk.
- Not along arterial roads.
- Not closer than 10 m to a fire hydrant.
- Not within a utility Easement or above a utility.
- The location shall not impede pedestrian and vehicle sight distances.

Additional requirements for Rural applications include:

- Road widening; and/or;
- Right-of-way widening, where necessary.

Mailboxes shall be placed on a concrete pad of a thickness matching the adjacent sidewalk; bricks / paving stones are not permitted.

4.20 Signalized Intersections

Traffic control signals and pedestrian crossing signals shall be provided at all traffic and pedestrian points on arterial roads and as otherwise warranted. Where traffic control signals are required for future development but are not warranted as part of the current phase of development, the conduits for the future signals must be installed.

Traffic signal kiosks and related street furniture shall have an anti-graffiti coating or decorative vinyl wrap.

4.21 Mid-block Crosswalks and Illumination

1. Based on TAC, and subject to Crosswalk Warrant and Illumination Warrant Analyses, mid-block crossings, including pedestrian-controlled traffic signals, shall be installed on arterial and collector roadways where they form part of the regional pedestrian corridor network and at locations where a high volume of pedestrian traffic is expected to cross. Refer to TAC's Pedestrian Crossing Control Guide.
2. Crosswalk illumination shall be based on TAC's Guide for the Design of Roadway Lighting.
3. Pedestrian crossing signs are to have a white background with black legend, double-mounted back-to-back at crossing locations. Place advanced warning signs for pedestrian crossings as warranted by sight line conditions or traffic characteristics.

4.22 Roadways CCC/FAC and Deficiency Repair Requirements

4.22.1 Inspection Requirements

- The surface improvement being inspected is to be clean and free of debris.
- The Developer's Representative / Contractor has inspected the site and verified that all improvements are in satisfactory condition.
- All roads and gutters to be water flushed immediately prior to inspection.
- Noncompliance with any of the above is sufficient reason to cancel the inspection.
- Deficient areas to be marked with spray paint and cross-referenced to the numbers used on the written deficiency list and index map.

4.22.2 General Repair Requirements

- All Maintenance and repair work is to be carried out in accordance with the MDEDSS, except as herein noted.
- Contractor / Developer's Consultant to obtain applicable permits 1 week prior to commencement of repairs.
- Provide verbal notice to the Municipal Engineer 1 week prior to commencement of repair work.
- Provide written notice to occupants of affected and/or adjoining properties 48 hours prior to commencement of repair work.

- All concrete works, curb, gutter, paved roads, boulevards, landscaped areas, private walks, and driveways shall be cleaned of any repair debris within 24 hours of completion.
- Materials, placement, and testing must conform to the requirements of the MDEDSS and/or as required by the Town.
- All coordination and costs of barricading and materials testing shall be the responsibility of the Developer.

4.22.3 Concrete Deficiencies

Concrete may be replaced, at the discretion of the Municipal Engineer, if one or more of the following exist:

- If a crack is greater than 2 mm in width in curb and gutter or any crack in sidewalk.
- Cracks with chipped or spalled edges.
- Any longitudinal crack.
- Random or multiple cracks of any size or more than one crack between any two contraction joints.
- Loss of surface mortar and/or aggregate.
- Sidewalk with less than 10 mm/m of crossfall (slope toward curb unless specifically noted otherwise).
- Sidewalk with more than 40 mm/m of crossfall (slope toward curb unless specifically noted otherwise).
- Vertical differential displacements greater than 5 mm.
- Joint separation greater than 10 mm.
- Settlements greater than 10 mm over a 3 m length or that cause retention of water.
- Settlements causing retention of water in front of driveways or curb ramps.
- Concrete that has been disfigured by extraneous means.
- Notable ponding is observed. Ponding shall be limited to within the gutter; notable ponding includes ponding extending beyond the lip of gutter.

The use of route and seal will only be permitted at the Town's discretion.

4.22.4 Concrete Repair Requirements

- Concrete sections to be removed at a contraction, expansion, or surface joint. If warranted, a 1.5 m minimum length of curb and gutter section may be replaced.
- Where curb and gutter or sidewalk deficiencies exist, the entire mono curb, gutter, and sidewalk shall be replaced.
- Existing private walkways and driveways must be adjusted to match repaired concrete sidewalks. The Town may require the replacement of existing private walkways and/or driveways to provide a satisfactory tie-in.
- Where there is less than 8 m of concrete sidewalk, monolithic sidewalk or curb and gutter between repairs, the remaining concrete must be replaced.
- When replacing separate sidewalks, positive drainage from the front of sidewalk to the curb must be maintained throughout the boulevard.

4.22.5 Asphalt Deficiencies

- Manholes and valves are to be adjusted to final asphalt grade (+0 mm, -6 mm).
- Asphalt adjacent to curb and gutter must be less than 10 mm above the lip of gutter except in the case of structural overlay or rehabilitation of roads where no new curb and gutter has been placed.
- Localized areas of settlement which cause water ponding shall be repaired at the discretion of the Town.
- A repair is required if the asphalt surface has a coarse and open texture resulting from, for example, clay tracking, segregations, or petroleum spillage.

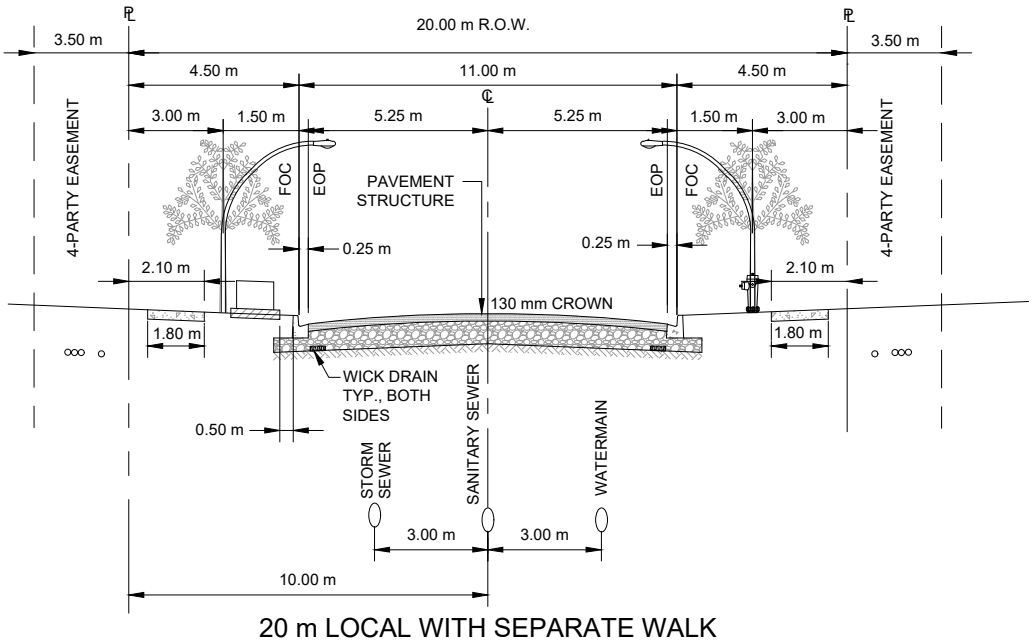
4.22.6 Asphalt Repair Requirements

- Asphalt repairs are to be rectangular or square. Grind existing asphalt adjacent to gutter lines and at butt joints to allow for a minimum of 50 mm of asphalt overlay. Grinding shall extend to the full width of the lane from lip of gutter or lane line. Grind seams shall not be allowed in the wheel path.
- Place a levelling course on all settlements greater than 50 mm.
- Edges of existing asphalt to be ground or cut vertically (minimum 50 mm). No feathering of patches is allowed.
- To repair asphalt surface failure, cut out failed road structure and replace.
- Cracks and joints between 2 mm and 15 mm wide are to be routed and sealed.

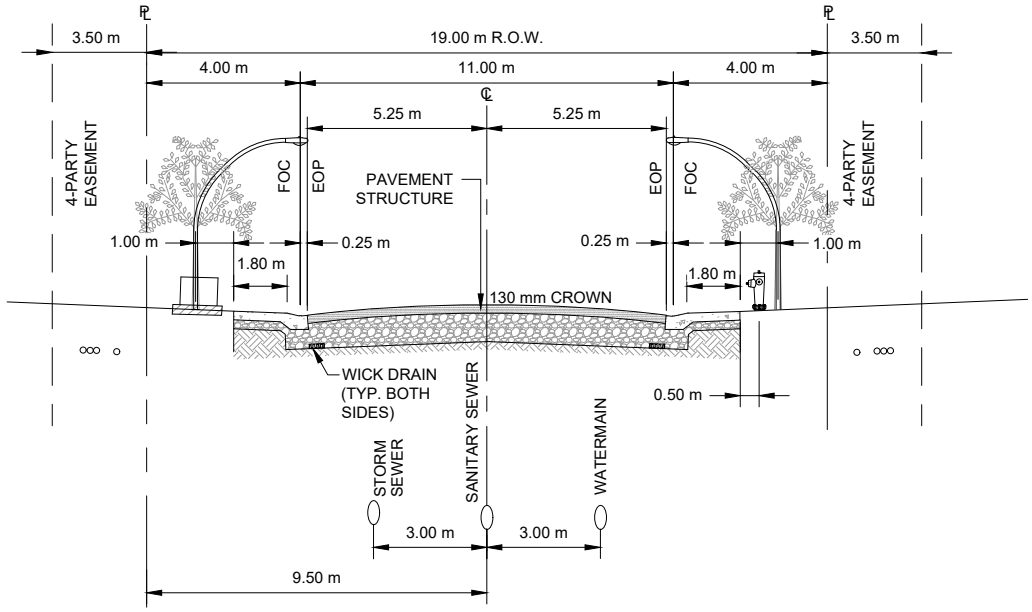
4.23 Standard Details – Roadway Systems

Standard Detail No.	Title
4-100	Residential Local Roadways
4-101	Residential Cul-de-Sac
4-102	Minor Residential Collector Roadway
4-103	Major Residential Collector Roadway – 4-Lane Undivided
4-104	Major Collector Roadway – 4-Lane Divided
4-105	Urban Arterial Roadway
4-106	Local Industrial / Commercial Roadways
4-107	Collector Industrial / Commercial Roadways
4-108	Rural Arterial Roadway
4-109	Lane Cross Section - Typical
4-110	Lane Cross Section (Continuous Cross-Slope)
4-200	Rolled Face Curb and Gutter
4-201	Rolled Face Monolithic Curb, Gutter, and Sidewalk
4-202	Standard Straight Face Curb and Gutter
4-203	Straight Face Curb and 500 mm Gutter
4-204	Straight Face Monolithic Curb, Gutter, and Sidewalk
4-205	Sidewalk Joint and Finishing Details
4-206	Separate Sidewalk
4-300	Residential Driveway Ramp for Straight Face Curb and Gutter
4-301	Commercial or Lane Crossing for Straight Face Curb and Gutter
4-400	Curb Ramp Type “A” (Corner; Monowalk)
4-401	Curb Ramp Type “B” (Corner; Separate Sidewalk)
4-402	Curb Ramp Type “C” (Midblock; Monowalk)
4-403	Curb Ramp Type “D” (Midblock; Separate Sidewalk)
4-404	Urban Intersection Crosswalk and Sidewalk Ramps
4-500	Street Name Signage
4-501	Sign Support
4-502	Sign Installation
4-600	Asphalt Trail
4-601	Gravel Trail
4-700	Rural Residential and Industrial / Commercial Approaches
4-750	Rural Shoulder Widening at Hydrant
4-800	Neighborhood Traffic Circle

STANDARD DETAIL	4-100	
Date:	NOV, 2020	Rev. 0



20 m LOCAL WITH SEPARATE WALK



19m LOCAL WITH MONO WALK

NOTES:

(1) STRAIGHT FACE CURB REQUIRED WHERE LOTS ARE ACCESSED BY REAR LANE.

(2) EOP - EDGE OF PAVEMENT.

(3) FOC - FACE OF CURB.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

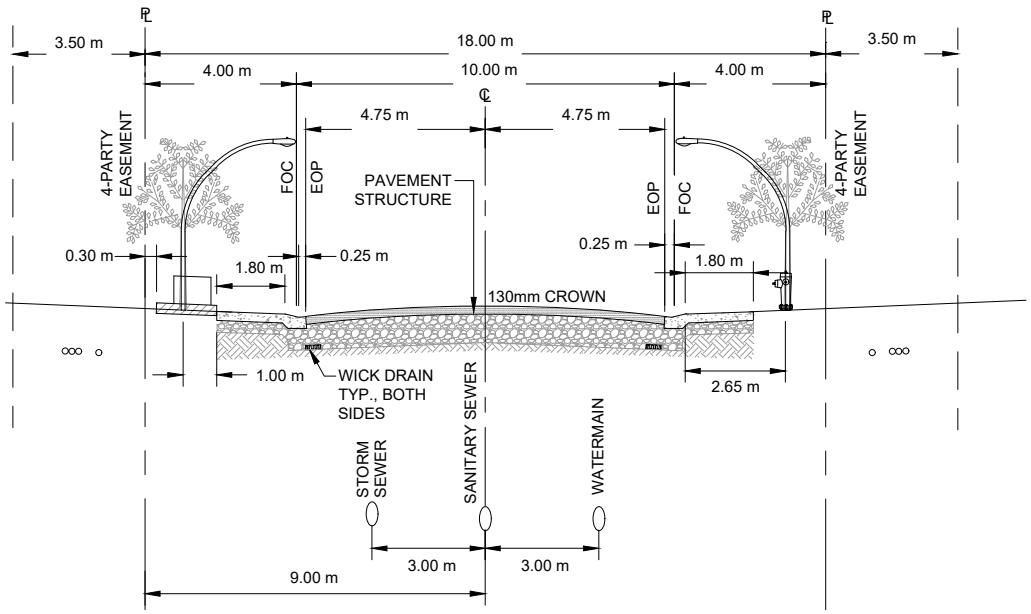
Gateway to the Rockies HINTON

TOWN OF HINTON

Residential Local Roadways

Time: 2:32pm
Date: Nov 10, 2020
File: \\s-edm-fs-01\working\2020-3749-00\civl\Standard Details\3749-00_4-100.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-101	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) STRAIGHT FACE CURB REQUIRED WHERE LOTS ARE ACCESSED BY REAR LANE.

(2) EOP - EDGE OF PAVEMENT.

(3) FOC - FACE OF CURB.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

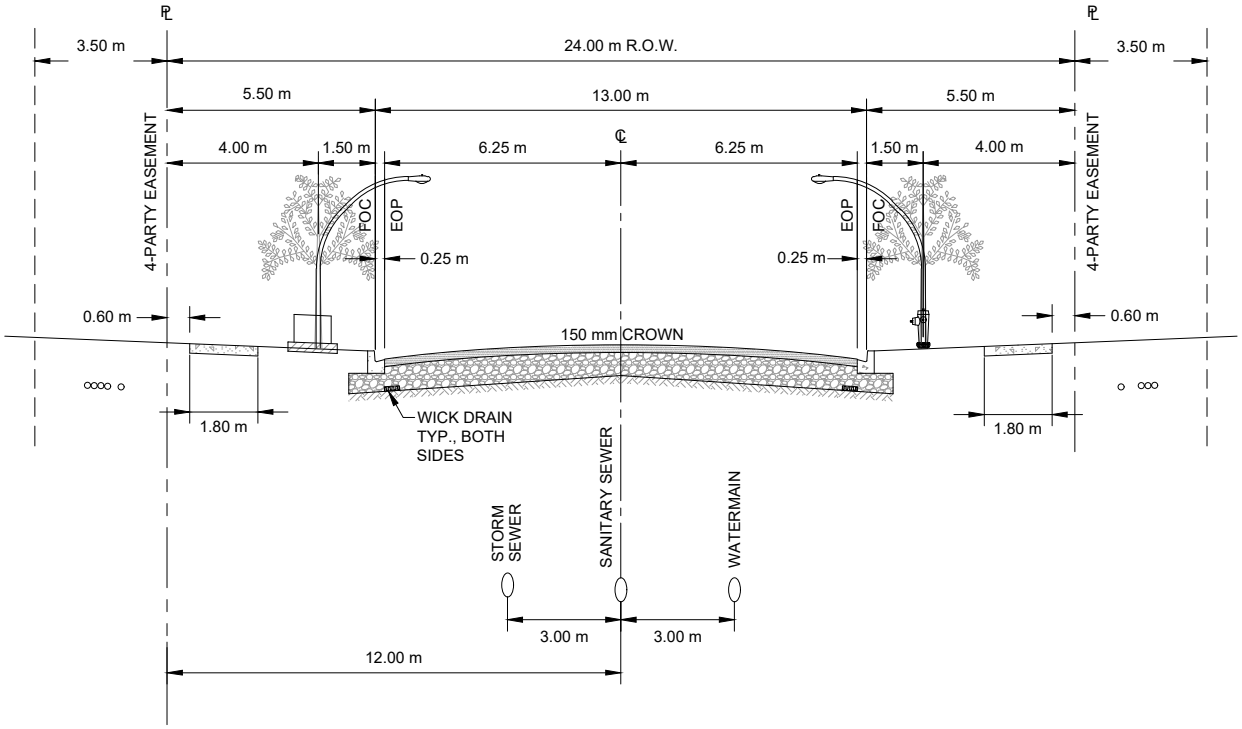
Gateway to the Rockies
HINTON

TOWN OF HINTON

Residential Cul-de-Sac

Time: 1:19pm
Date: Nov 09, 2020
File: \\s-edm-fs-01\working\2020-3749-00\civl\Standard Details\3749-00_4-101.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-102	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) EOP - EDGE OF PAVEMENT.

(2) FOC - FACE OF CURB.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

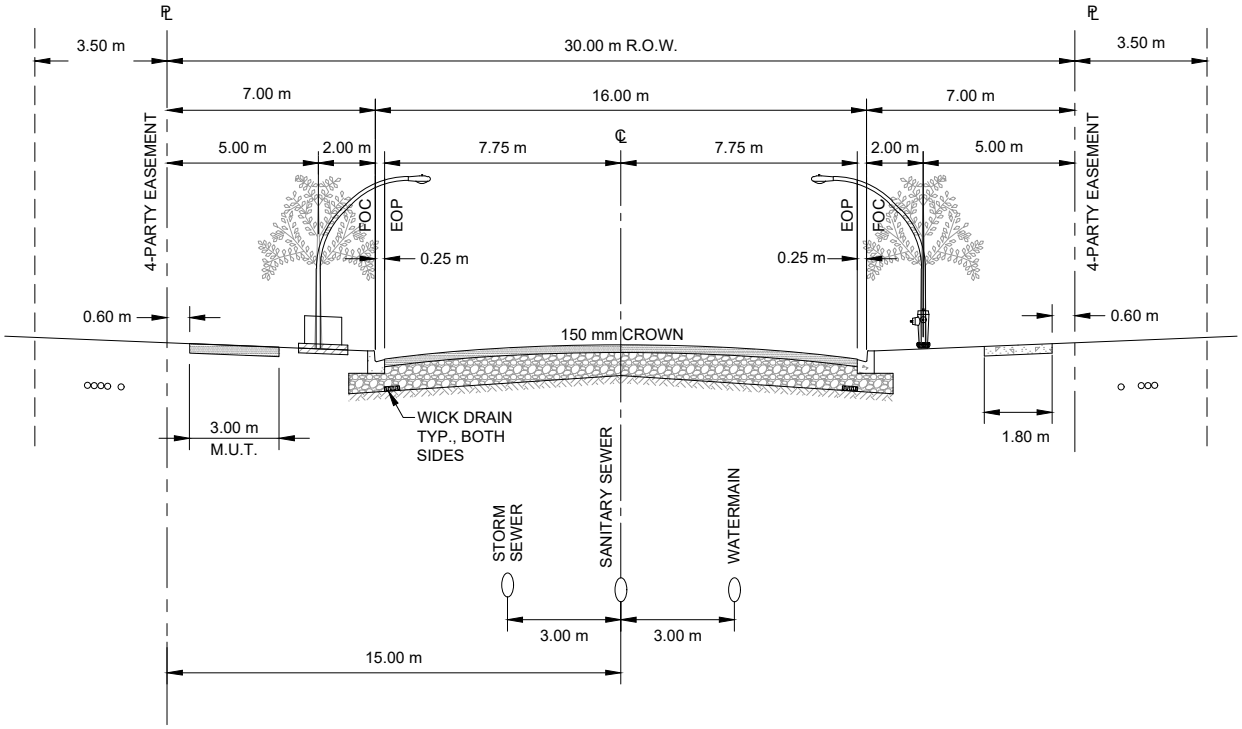
Gateway to the Rockies
HINTON

TOWN OF HINTON

Minor Residential
Collector Roadway

Time: 8:32am
Date: Nov 04, 2020
File: \\s-edm-fs-01\working\2020-3749-00\civl\Standard Details\3749-00_4-102.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-103	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) EOP - EDGE OF PAVEMENT.

(2) FOC - FACE OF CURB.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

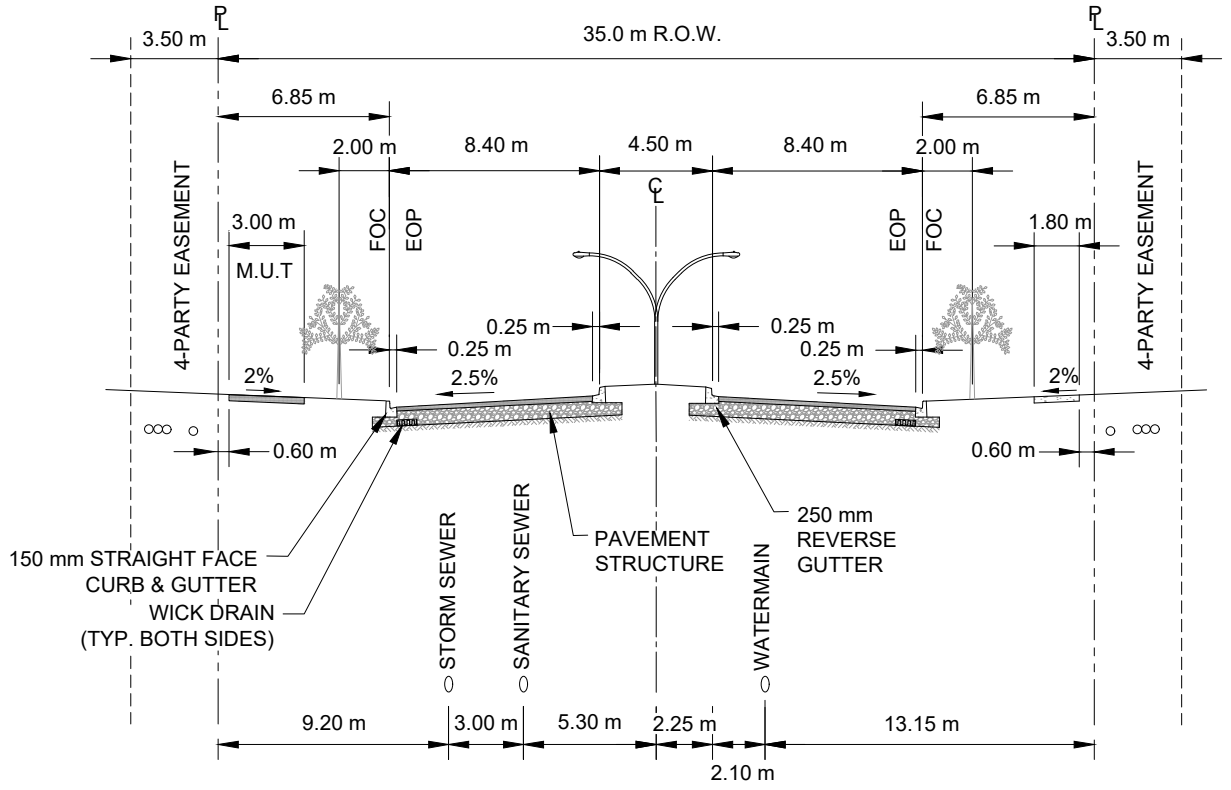
Gateway to the Rockies
HINTON

TOWN OF HINTON

Major Residential Collector
Roadway - 4-Lane Undivided

Time: 8:32am
Date: Nov 04, 2020
File: \\s-edm-fs-01\working\2020-3749-00\civl\Standard Details\3749-00_4-103.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-104	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) FOC - FACE OF CURB.

(2) EOP - EDGE OF PAVEMENT.

(3) ADDITIONAL LIGHTING FOR MULTI-USE TRAIL IS OPTIONAL

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

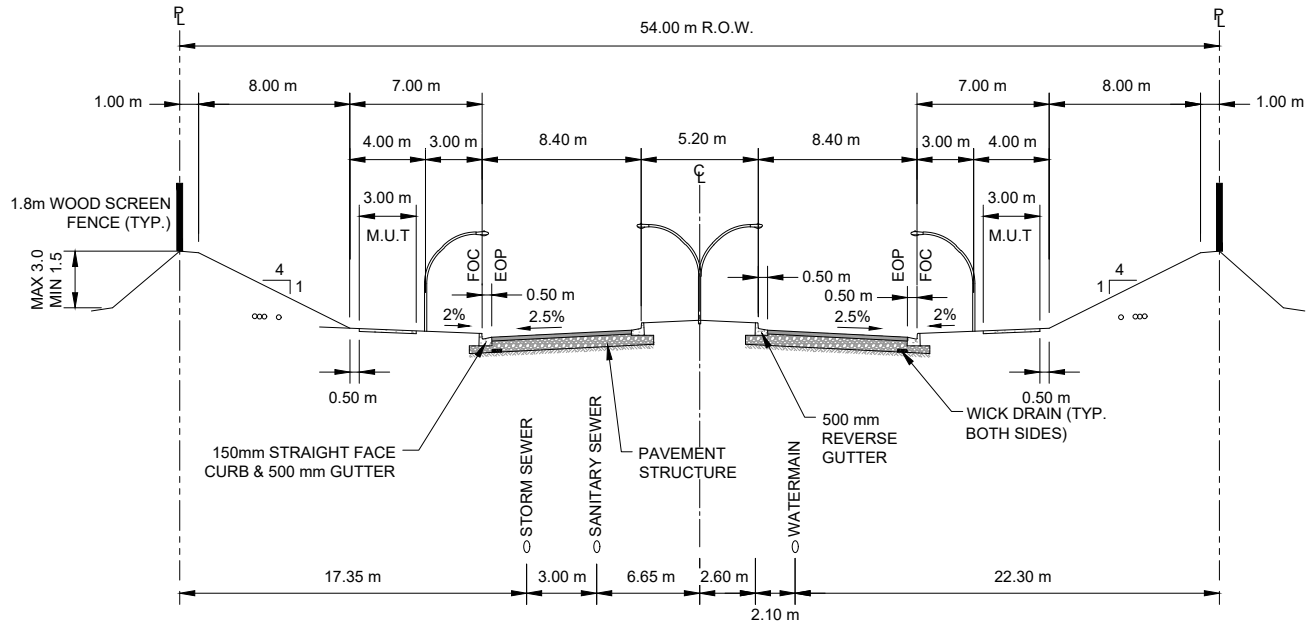
Gateway to the Rockies
HINTON

TOWN OF HINTON

Major Collector Roadway -
4-Lane Divided

Time: 1:18pm
Date: Nov 09, 2020
File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-104.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-105	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) FOC - FACE OF CURB.

(2) EOP - EDGE OF PAVEMENT.

(3) CO-ORDINATE WITH INFRASTRUCTURE SERVICES DEPARTMENT FOR SHALLOW UTILITY ALIGNMENTS

(4) MEDIAN DIMENSIONS SPACE MAY BE NARROWED TO ACCOMMODATE NO-POST BARRIER SEPARATION AT LOCATIONS WITHOUT LEFT TURN MOVEMENTS. REFER TO TAC STANDARDS.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

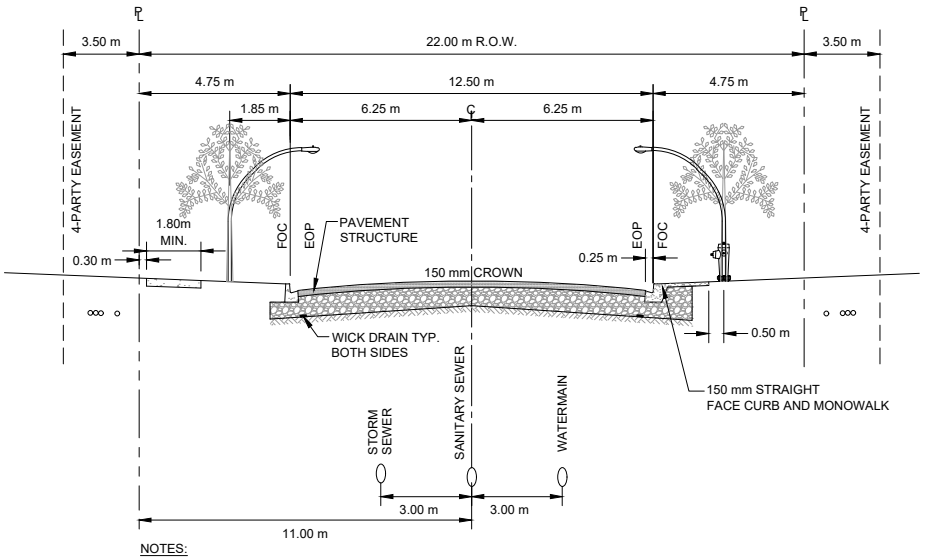
Gateway to the Rockies HINTON

TOWN OF HINTON

Urban Arterial Roadway

Time: 1:18pm
Date: Nov 09, 2020
File: \\s-edm-fs-01\working\2020-3749-00\civl\Standard Details\3749-00_4-105.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-106	
Date: NOV, 2020		Rev. 0



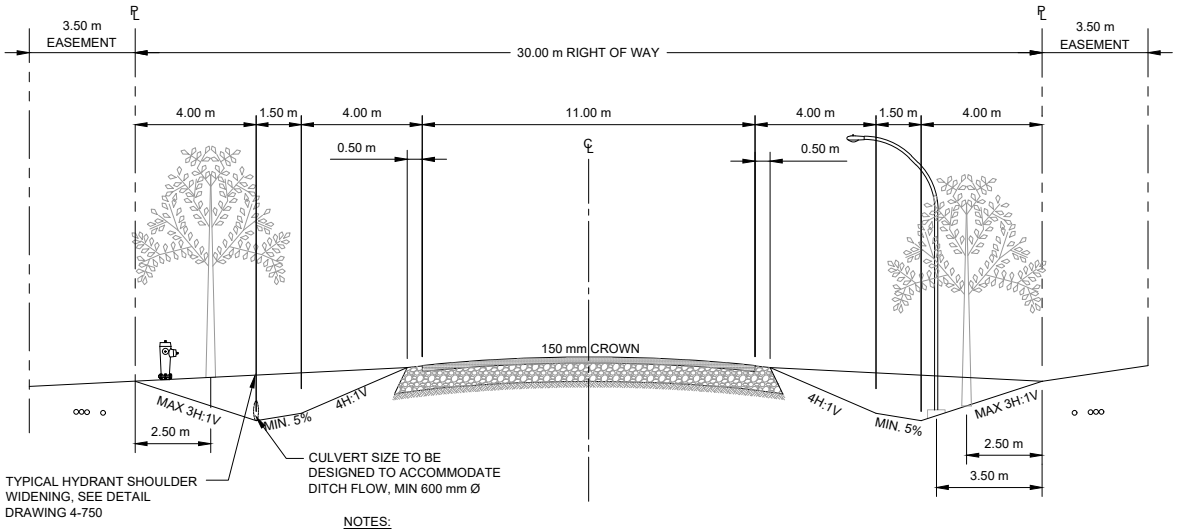
NOTES:

(1) EOP - EDGE OF PAVEMENT.

(2) FOC - FACE OF CURB.

(3) HARD SURFACING ENTIRE BOULEVARD MAY BE REQUIRED FOR COMMERCIAL AREAS WHERE STORE FRONTS FACE THE STREET.

URBAN LOCAL INDUSTRIAL / COMMERCIAL ROADWAY



NOTES:

(1) MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.6%.

(2) POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.

(3) DITCH DEPTH TO BE CONFIRMED BY GEOTECHNICAL REPORT.

(4) MINIMUM ROAD STRUCTURE AS PER GEOTECHNICAL REPORT RECOMMENDATIONS.

(5) ALL TRENCHES IN ROAD OR SIDESLOPE REQUIRE COMPACTION TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY, IN DITCH BOTTOM OR BACKSLOPE, 95% STANDARD PROCTOR MAXIMUM DRY DENSITY IS ACCEPTABLE.

(6) WATERMAIN TO BE LOCATED 2.0 m FROM ROAD SHOULDER

(7) HYDRANT TO BE LOCATED ON THE SAME SIDE AS THE WATERMAIN. POWER TO BE ON OPPOSITE SIDE.

RURAL LOCAL INDUSTRIAL / COMMERCIAL ROADWAY

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

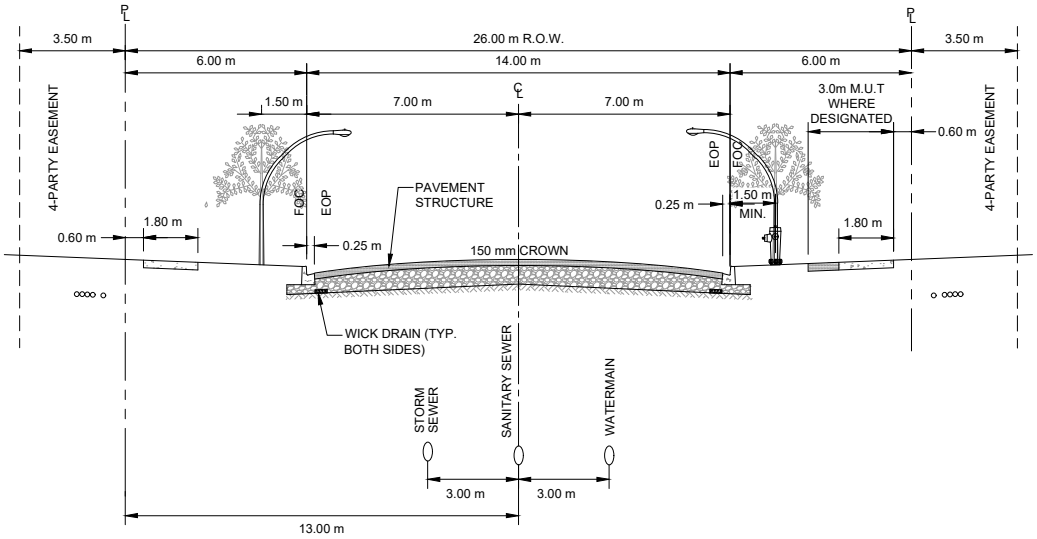
Gateway to the Rockies
HINTON

TOWN OF HINTON

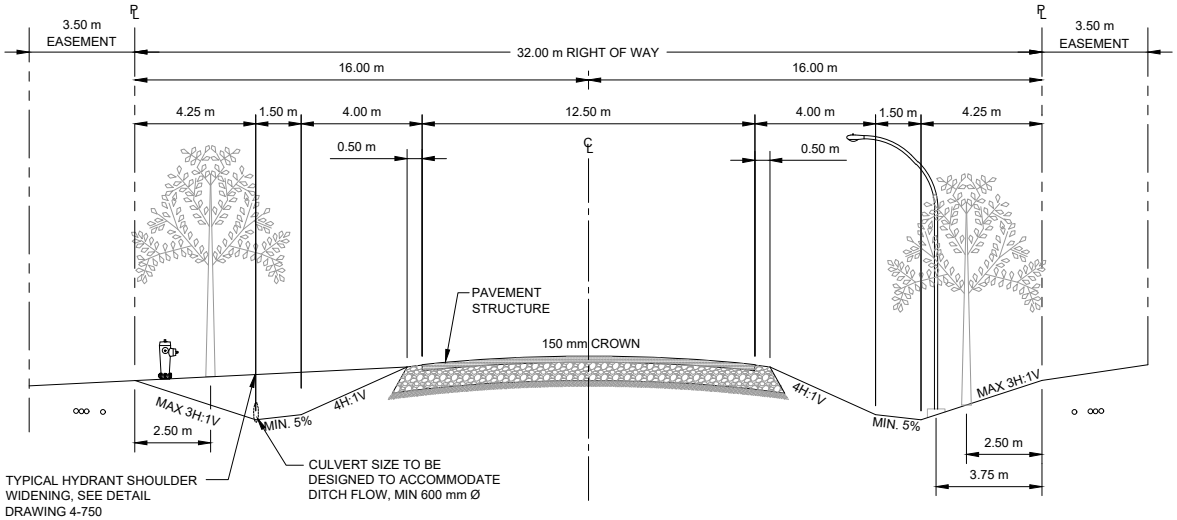
Local Industrial / Commercial Roadways

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-106.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-107	
Date:	NOV, 2020	Rev. 0



URBAN COLLECTOR INDUSTRIAL / COMMERCIAL ROADWAY



NOTES:

(1) MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.6%.

(2) POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.

(3) DITCH DEPTH TO BE CONFIRMED BY GEOTECHNICAL REPORT.

(4) MINIMUM ROAD STRUCTURE AS PER GEOTECHNICAL REPORT RECOMMENDATIONS.

(5) ALL TRENCHES IN ROAD OR SIDESLOPE REQUIRE COMPACTION TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY, IN DITCH BOTTOM OR BACKSLOPE, 95% STANDARD PROCTOR MAXIMUM DRY DENSITY IS ACCEPTABLE.

(6) WATERMAIN TO BE LOCATED 2.0 m FROM ROAD SHOULDER

(7) HYDRANT TO BE LOCATED ON THE SAME SIDE AS THE WATERMAIN. POWER TO BE ON OPPOSITE SIDE.

RURAL COLLECTOR INDUSTRIAL / COMMERCIAL ROADWAY

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

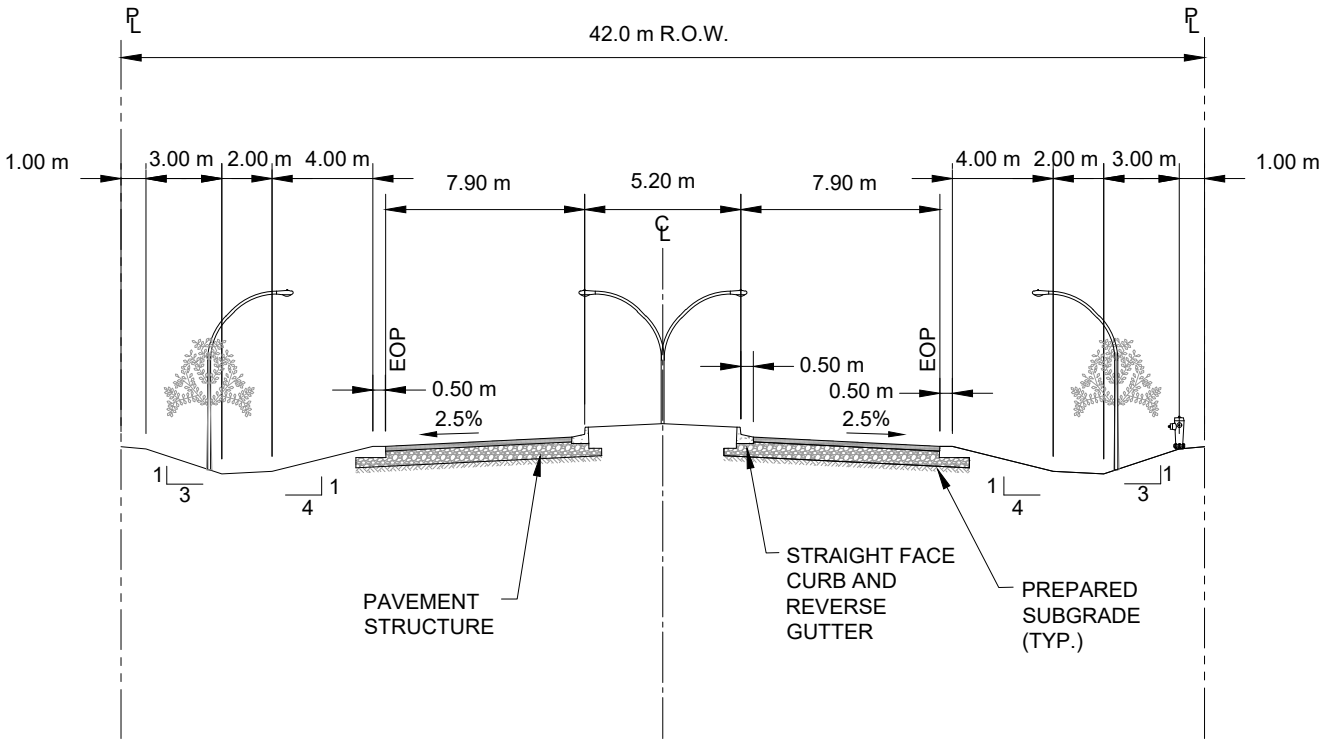
Gateway to the Rockies HINTON

TOWN OF HINTON

Collector Industrial / Commercial Roadways

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-107.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-108	
Date:	NOV, 2020	Rev. 0



NOTES:
(1) WATERMAIN TO BE LOCATED 2.0 m FROM ROAD SHOULDER

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

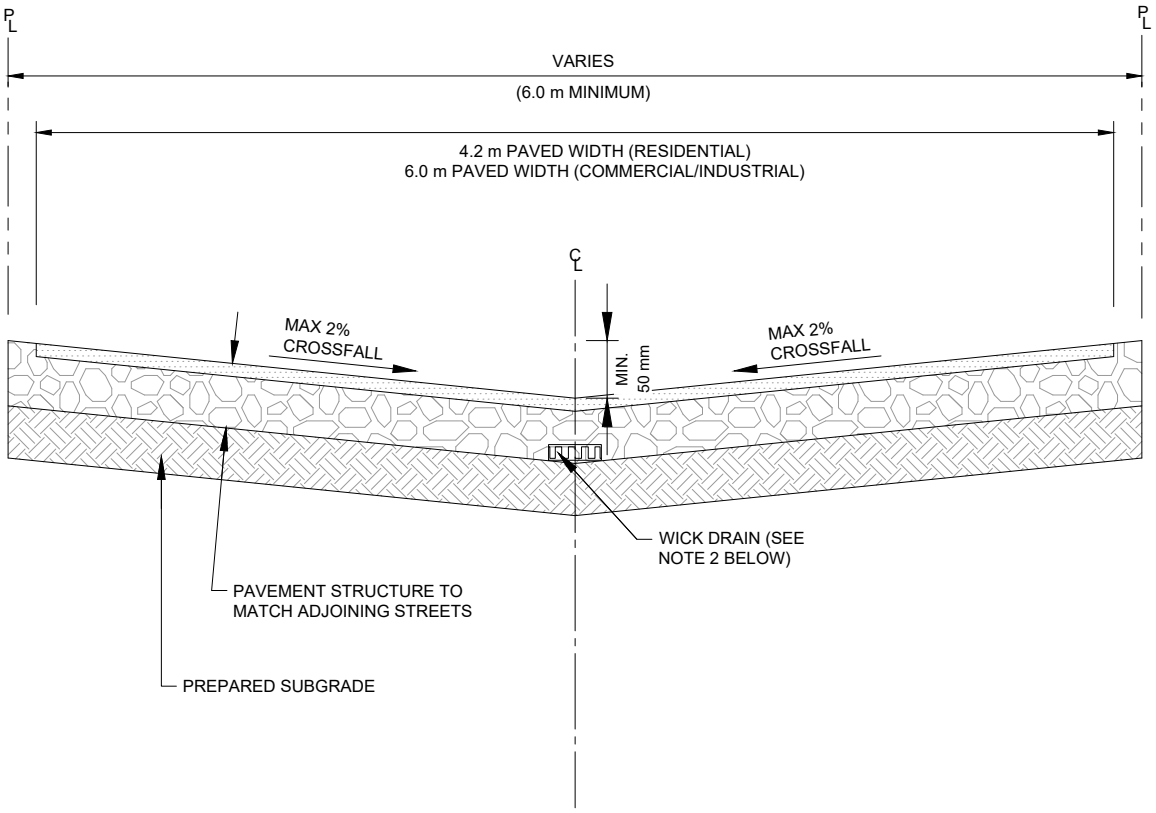
Gateway to the Rockies
HINTON

TOWN OF HINTON

Rural Arterial Roadway

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-108.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-109	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) PROVIDE FULL DEPTH ASPHALT PAVEMENT STRUCTURE TO ADJACENT HARD SURFACED PARKING AREAS.

(2) WICK DRAIN APPLICABLE WHERE STORM SEWER EXISTS ON ADJACENT ROADWAY AND SOIL TYPE IS PREDOMINANTLY CLAY

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

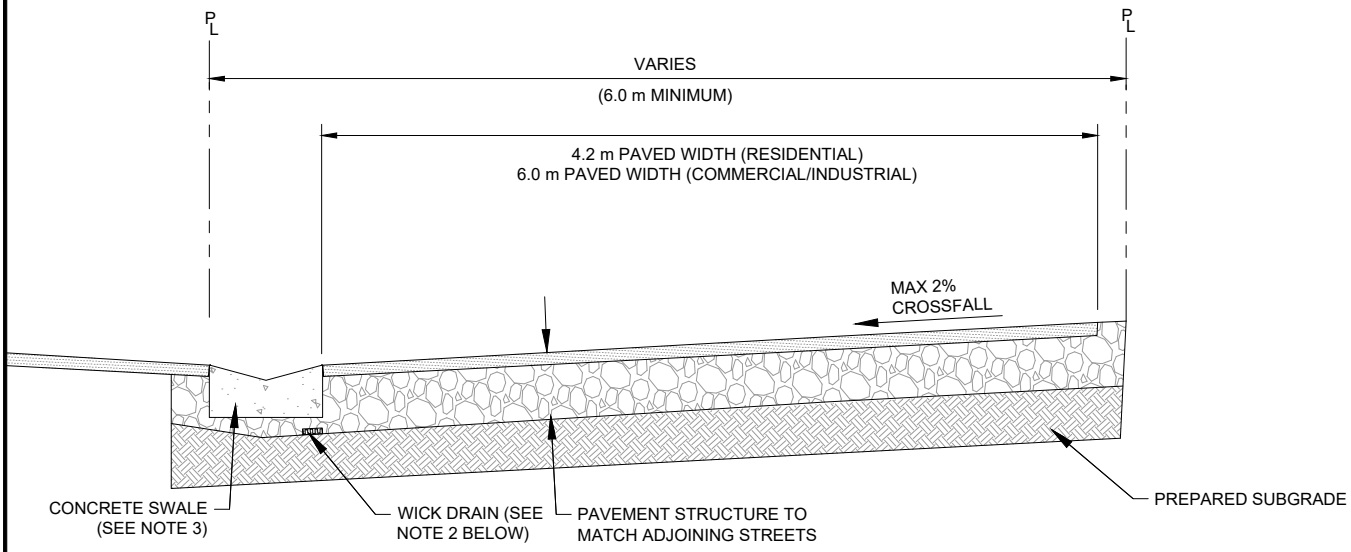
Gateway to the Rockies
HINTON

TOWN OF HINTON

Lane Cross Section - Typical

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-109.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-110	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) PROVIDE FULL DEPTH ASPHALT PAVEMENT STRUCTURE TO ADJACENT HARD SURFACED PARKING AREAS.

(2) WICK DRAIN APPLICABLE WHERE STORM SEWER EXISTS ON ADJACENT ROADWAY AND SOIL TYPE IS PREDOMINANTLY CLAY

(3) A ROLLED FACE CURB AND GUTTER MAY BE USED IN LIEU OF CONCRETE SWALE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

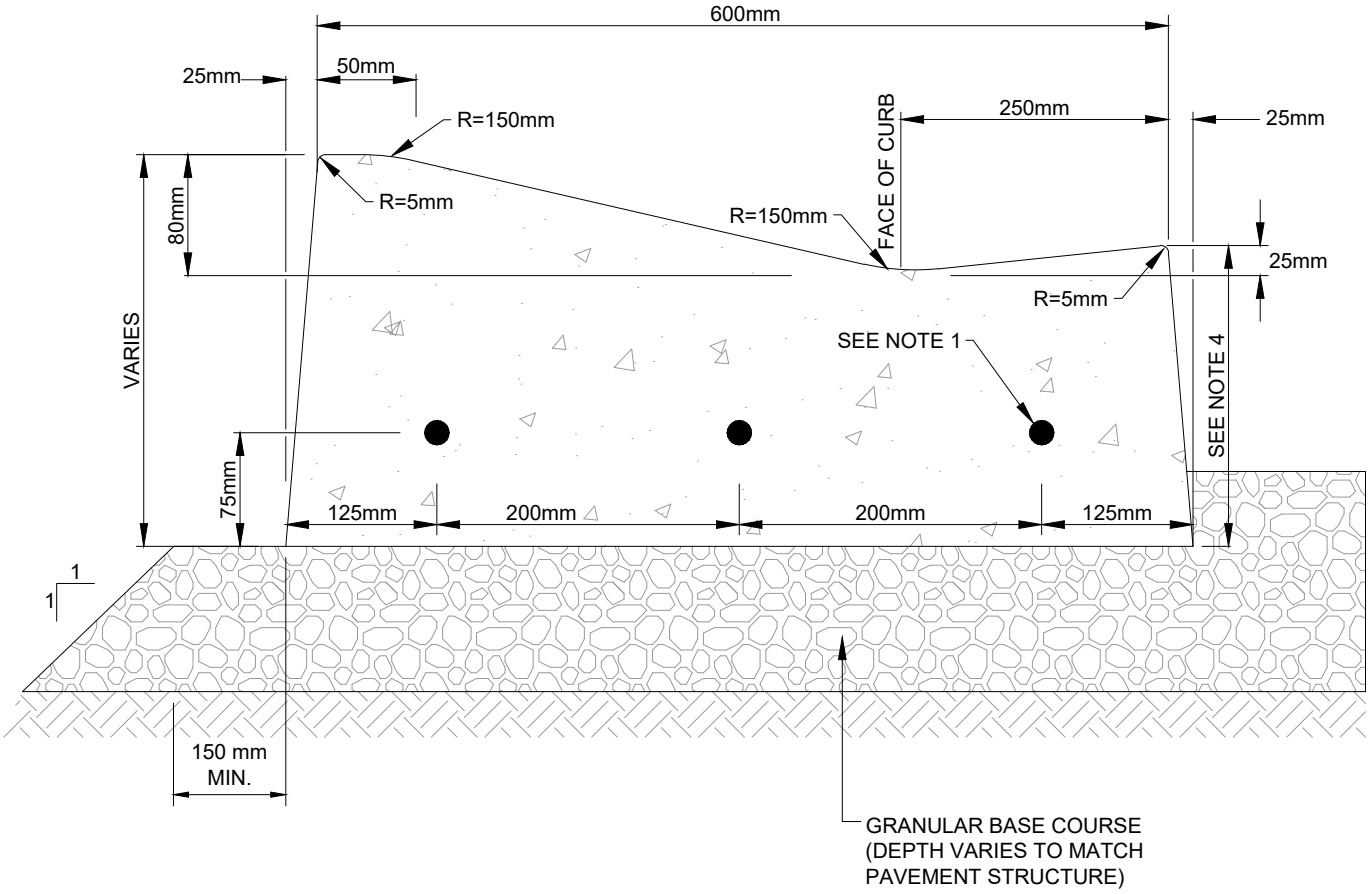
Gateway to the Rockies
HINTON

TOWN OF HINTON

Lane Cross Section
(Continuous Cross - Slope)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-110.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-200	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) 3-10M REINFORCING BARS AT ALL LANES, CURB RAMPS, AND COMMERCIAL, INDUSTRIAL AND APARTMENT DRIVEWAY ENTRANCES

(2) CONCRETE TO BE TYPE HS, 30MPa COMPRESSIVE STRENGTH AT 28 DAYS WITH 5.5% TO 8.0% AIR ENTRAINMENT.

(3) BACKFILL WITH SUITABLE MATERIAL AND COMPACT TO 95% FOR 500 mm FROM BACK OF CURB.

(4) 200 mm (MIN.) OR THICKNESS OF ALL ASPHALT STRUCTURE, WHICHEVER IS GREATER

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

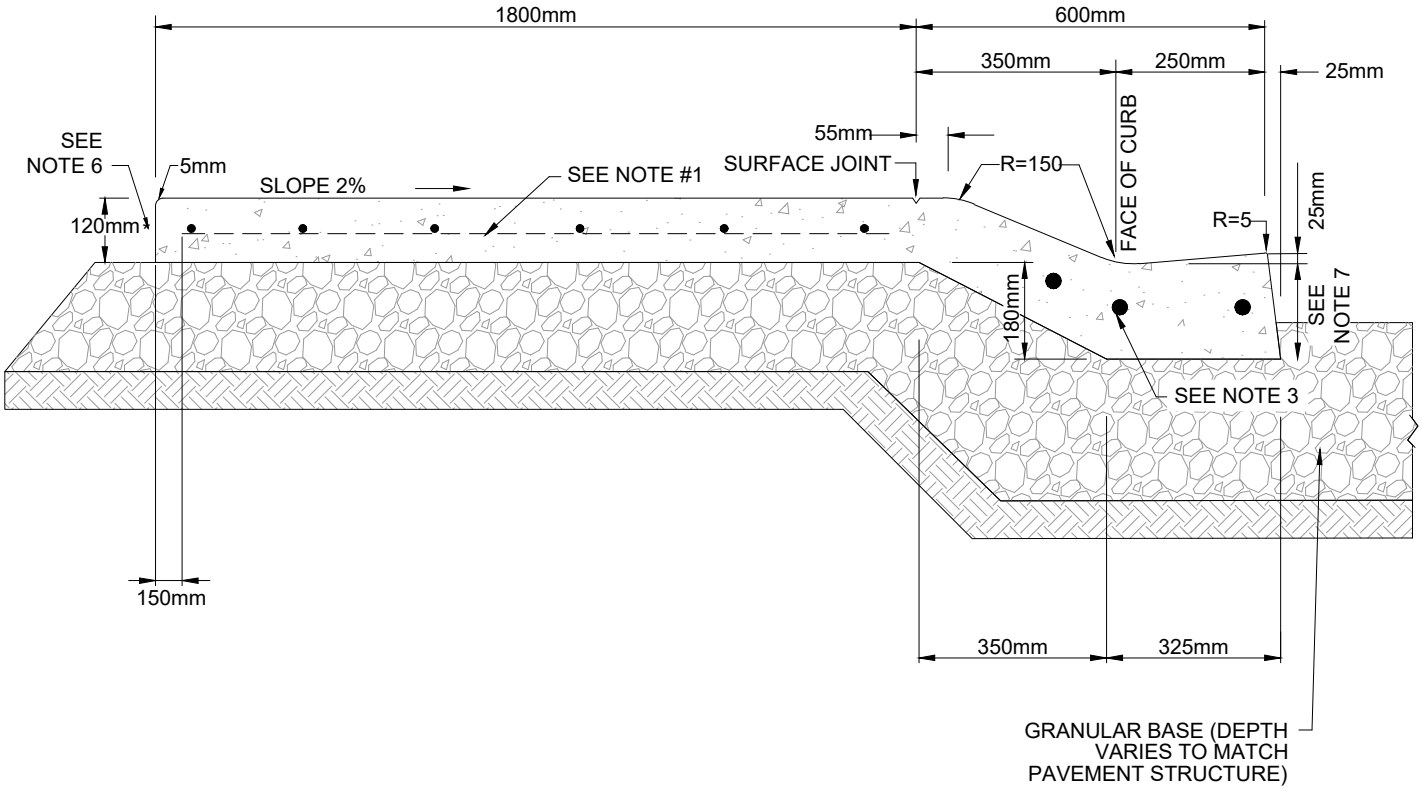
Gateway to the Rockies
HINTON

TOWN OF HINTON

Rolled Face Curb and Gutter

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_4-200.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-201	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) 150X150 PI8/PI8 GAUGE WIRE MESH TO BE PLACED IN SIDEWALK ACROSS ALL LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES.

(2) CONCRETE TO BE TYPE HS, 30MPa. COMPRESSIVE STRENGTH AT 28 DAYS WITH 5.5% TO 8.0% AIR ENTRAINMENT.

(3) 3-10M REINFORCEMENT BARS AT ALL LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES.

(4) SEE STANDARD DWG. NO. 4-200 FOR A MORE DETAILED ROLLED FACE CURB & GUTTER.

(5) SEE STANDARD DWG. NO. 4-205 FOR JOINT DETAILS.

(6) 175 mm AT ALL LANES, CURB RAMPS, AND COMMERCIAL, INDUSTRIAL, AND APARTMENT BUILDING DRIVEWAY ENTRANCES

(7) 200 mm (MIN.) OR THICKNESS OF ASPHALT, WHICHEVER IS GREATER

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

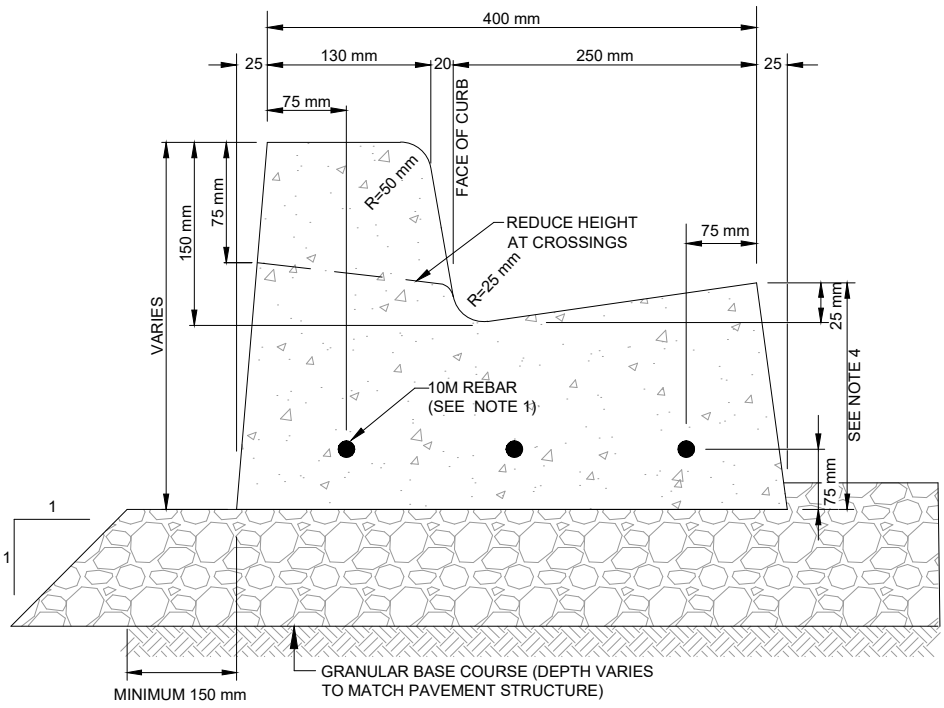
Gateway to the Rockies
HINTON

TOWN OF HINTON

Rolled Face Monolithic Curb, Gutter, and Sidewalk

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_4-201.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-202	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) 3-10M REINFORCING BARS AT ALL LANE, CURB RAMPS, AND COMMERCIAL, INDUSTRIAL AND APARTMENT DRIVEWAY ENTRANCES

(2) CONCRETE TO BE TYPE HS, 30MPa COMPRESSIVE STRENGTH AT 28 DAYS WITH 5.5% TO 8.0% AIR ENTRAINMENT.

(3) BACKFILL WITH SUITABLE MATERIAL AND COMPACT TO 95% FOR 500 mm FROM BACK OF CURB.

(4) 200 mm (MIN.) OR THICKNESS OF ASPHALT, WHICHEVER IS GREATER

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

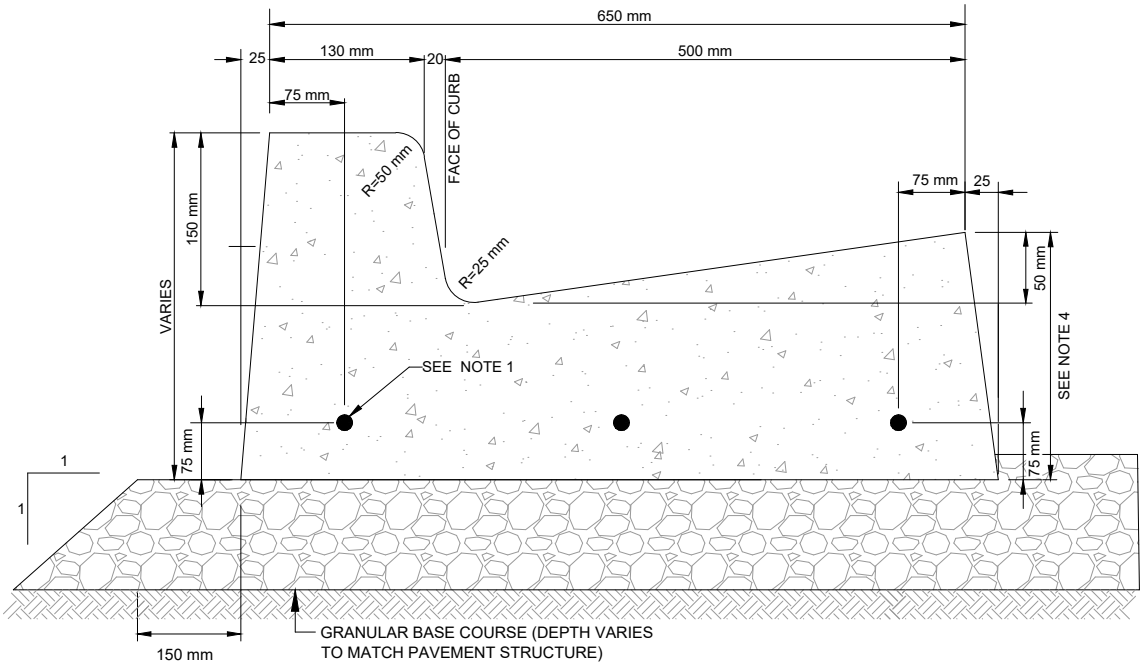
Gateway to the Rockies
HINTON

TOWN OF HINTON

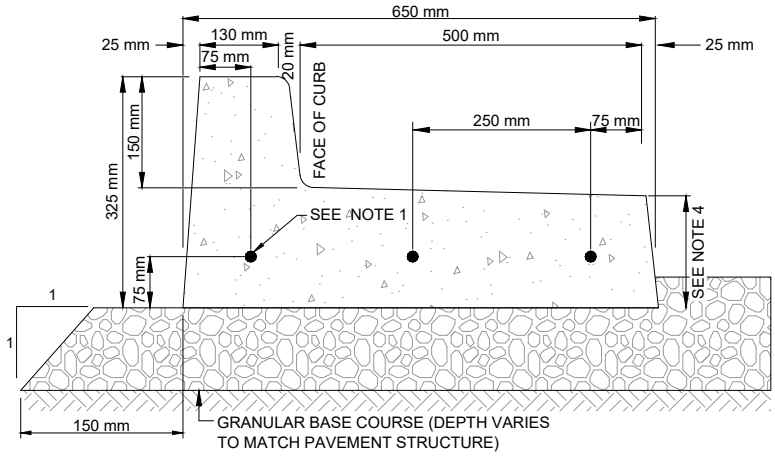
Standard Straight Face Curb and Gutter

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-202.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-203	
Date:	NOV, 2020	Rev. 0



STANDARD



SUPER ELEVATED

NOTES:

(1) 3-10M REINFORCING BARS AT ALL LANES, CURB RAMPS, AND COMMERCIAL, INDUSTRIAL AND APARTMENT DRIVEWAY ENTRANCES

(2) CONCRETE TO BE TYPE HS, 30MPa COMPRESSIVE STRENGTH AT 28 DAYS WITH 5.5% TO 8.0% AIR ENTRAINMENT.

(3) BACKFILL WITH SUITABLE MATERIAL AND COMPACT TO 95% FOR 500mm FROM BACK OF CURB.

(4) 200mm (MIN.) OR THICKNESS OF ASPHALT, WHICHEVER IS GREATER

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

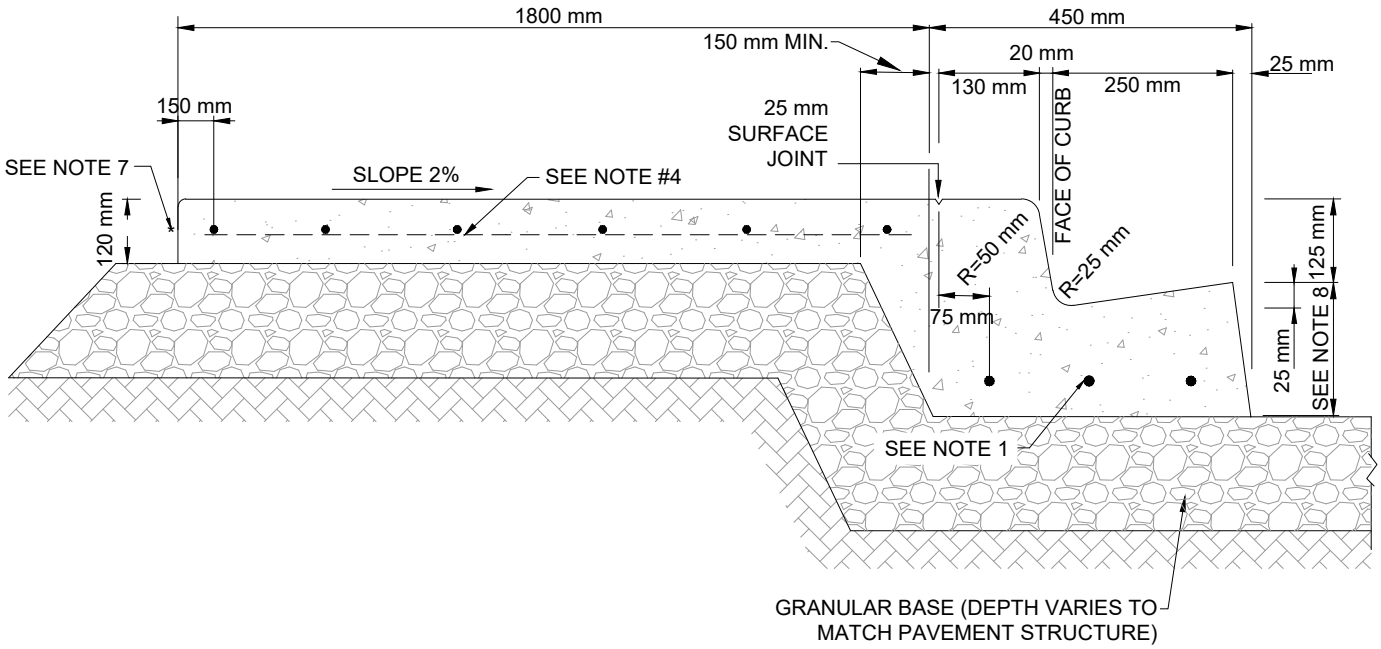
Gateway to the Rockies
HINTON

TOWN OF HINTON

Straight Face Curb and 500 mm Gutter

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-203.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-204	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) 3 - 10 M REINFORCING BARS AT ALL COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT DRIVEWAY ENTRANCES.

(2) CONCRETE TO BE TYPE HS, 30 MPa COMPRESSIVE STRENGTH AT 28 DAYS WITH 5.5% TO 8.0% AIR ENTRAINMENT.

(3) BACKFILL WITH SUITABLE MATERIAL AND COMPACT TO 95% FOR 500 mm FROM BACK OF CURB.

(4) 150 x 150 PI8 / PI8 GAUGE WIRE MESH TO BE PLACED IN SIDEWALK ACROSS ALL COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES.

(5) SEE STANDARD DWG. NO. 4-202 FOR A MORE DETAILED STRAIGHT FACED CURB & GUTTER.

(6) SEE STANDARD DWG. NO. 4-205 FOR JOINT DETAILS.

(7) 175 mm AT ALL LANES, CURB RAMPS, AND COMMERCIAL, INDUSTRIAL, AND APARTMENT BUILDING DRIVEWAY ENTRANCES.

(8) 200 mm (MIN.) OR THICKNESS OF ASPHALT, WHICHEVER IS GREATER.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

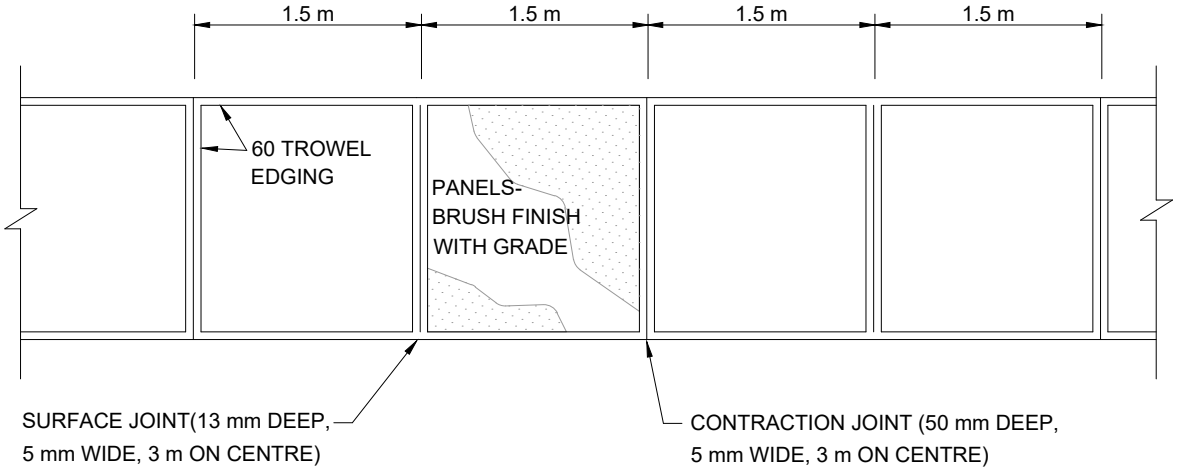
Gateway to the Rockies
HINTON

TOWN OF HINTON

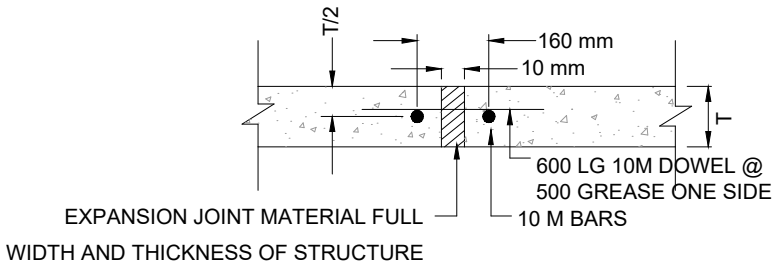
Straight Face Monolithic Curb, Gutter, and Sidewalk

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-204.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-205	
Date:	NOV, 2020	Rev. 0



PLAN



EXPANSION JOINT DETAIL

NOTES:

(1) EXPANSION JOINTS TO BE PROVIDED WHERE NEW SIDEWALKS ABUT EXISTING CONCRETE STRUCTURES AND EVERY 100 METERS MINIMUM.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

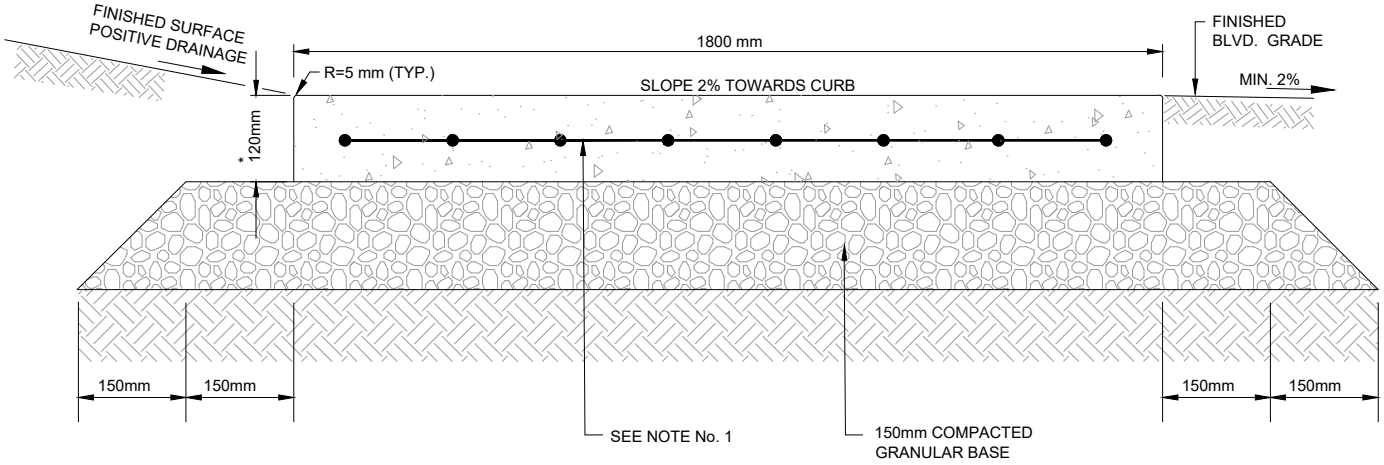
Gateway to the Rockies HINTON

TOWN OF HINTON

Sidewalk Joint and Finishing Details

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-205.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-206	
Date:	NOV, 2020	Rev. 0



* 175mm AT ALL LANES, CURB RAMPS, AND COMMERCIAL, INDUSTRIAL AND APARTMENT BUILDING DRIVEWAY ENTRANCES. REQUIRES GRANULAR BASE TO LANE STANDARD.

NOTES:

(1) 150 x 150 PI8 / PI8 GAUGE WIRE MESH TO BE PLACED IN SIDEWALK PRIOR TO PLACING CONCRETE ACROSS ALL LANES, CURB RAMPS, AND COMMERCIAL, INDUSTRIAL AND APARTMENT BUILDING DRIVEWAY ENTRANCES.

(2) ELEVATION OF FRONT OF WALK TO BE SET SUCH THAT A MINIMUM SLOPE OF 2% IS MAINTAINED ACROSS BOULEVARD BETWEEN FRONT OF WALK AND TOP OF CURB.

(3) CONCRETE TO BE CLASS C, 30MPa. COMPRESSIVE STRENGTH AT 28 DAYS WITH 5.5% TO 8.0% AIR ENTRAINMENT.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

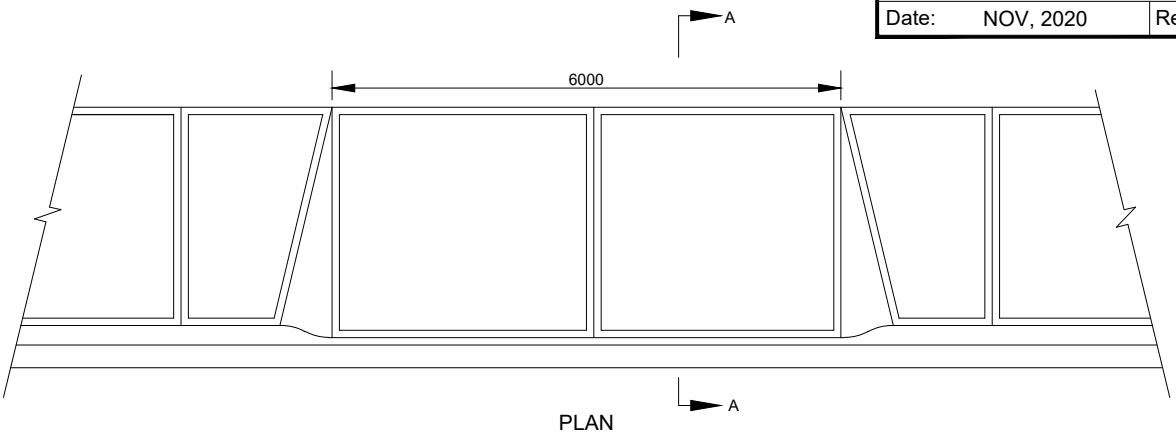
Gateway to the Rockies
HINTON

TOWN OF HINTON

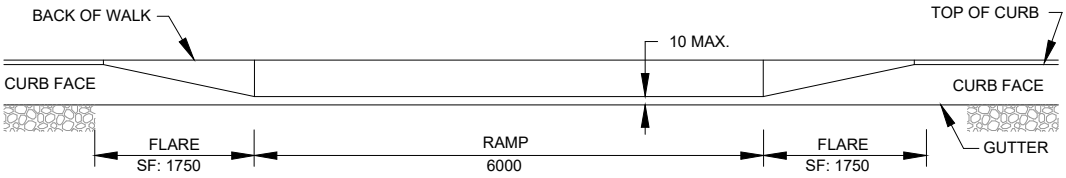
Separate Sidewalk

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-206.dwg by
Xrefs: TH-G-TTBL_8.5x11

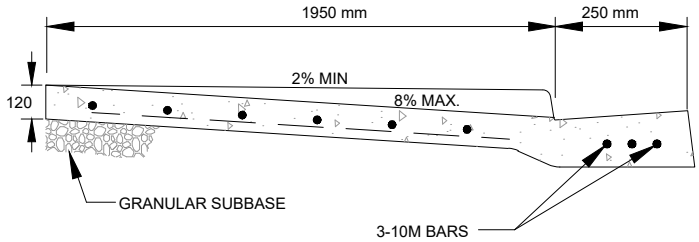
STANDARD DETAIL	4-300	
Date:	NOV, 2020	Rev. 0



PLAN



ELEVATION



SECTION A-A

NOTES:

(1) CONCRETE TO BE TYPE HS, 30MPa COMPRESSIVE STRENGTH AT 28 DAYS WITH 5.5% TO 8.0% AIR ENTRAINMENT.

(2) SIMILAR FOR SEPARATE WALKS WITH THE EXCEPTION OF THE FLARES (400 mm)

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

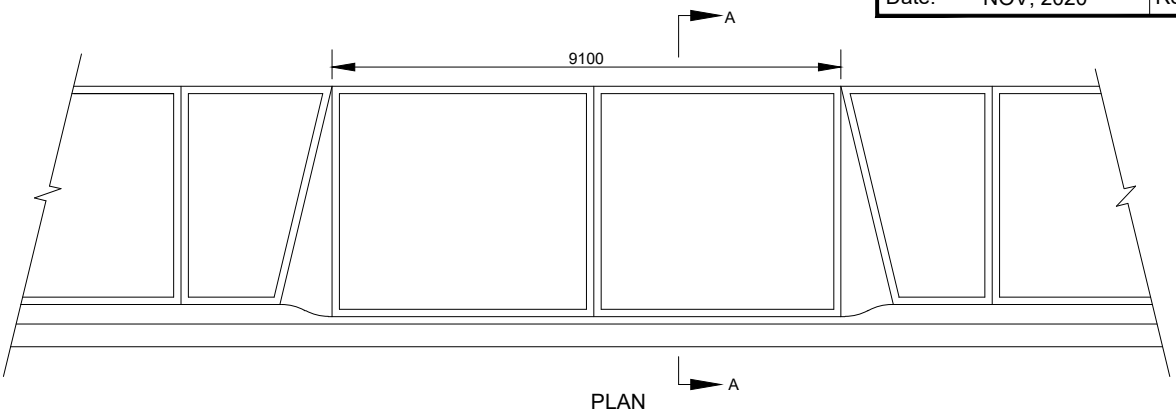
Gateway to the Rockies
HINTON

TOWN OF HINTON

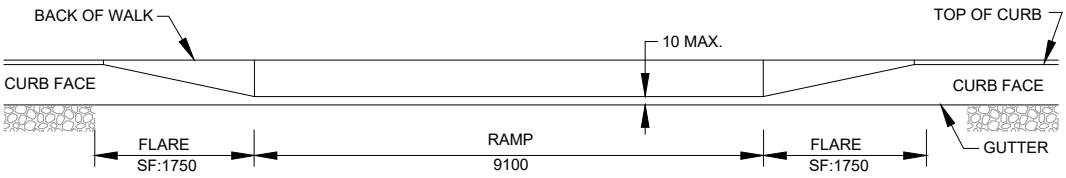
Residential Driveway Ramp
For Straight Face Curb and Gutter

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-300.dwg by
Xrefs: TH-G-TTBL_8.5x11

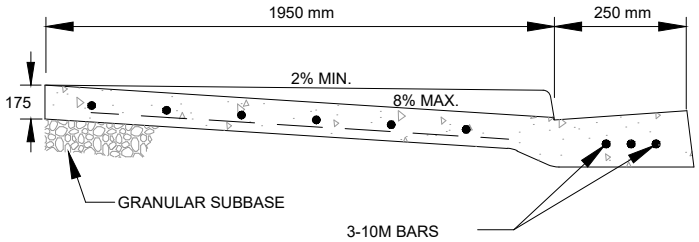
STANDARD DETAIL	4-301	
Date:	NOV, 2020	Rev. 0



PLAN



ELEVATION



SECTION A-A

NOTES:

(1) 150 x 150 P18 / P18 GAUGE WIRE MESH TO BE PLACED IN SIDEWALK. CURB AND GUTTER SECTION REQUIRES 3-10M.

(2) SIDEWALK THICKNESS = 175 mm

(3) CONCRETE TO BE TYPE HS, 30MPa COMPRESSIVE STRENGTH AT 28 DAYS WITH 5.5% TO 8.0% AIR ENTRAINMENT.

(4) SIMILAR FOR SEPARATE WALKS WITH THE EXCEPTION OF THE FLARES (400 mm)

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

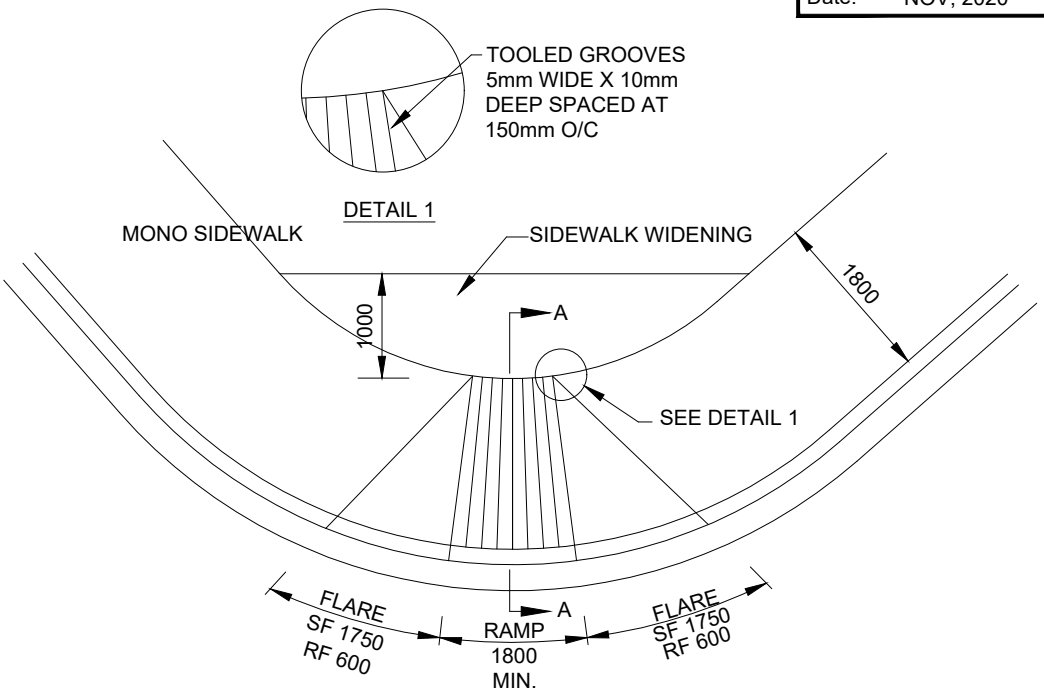
Gateway to the Rockies
HINTON

TOWN OF HINTON

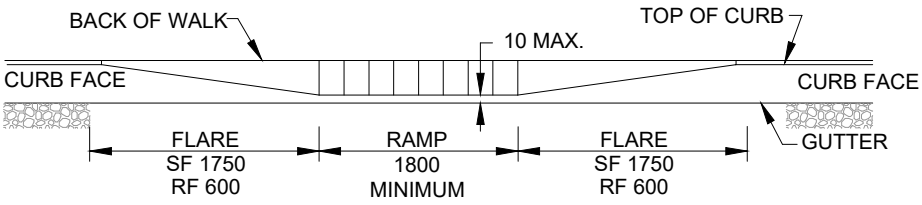
Commercial or Lane Crossing for Straight Face Curb and Gutter

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-301.dwg by
Xrefs: TH-G-TTBL_8.5x11

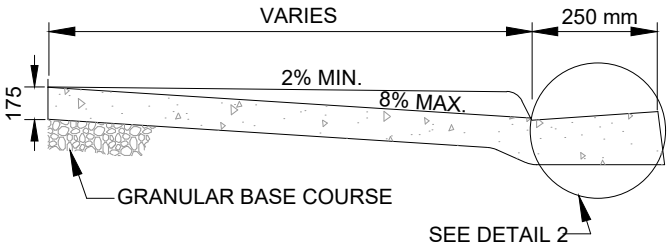
STANDARD DETAIL	4-400	
Date:	NOV, 2020	Rev. 0



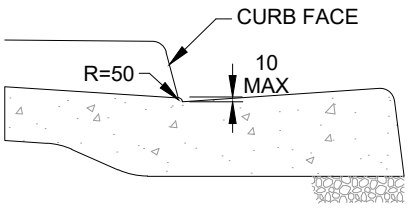
PLAN VIEW



ELEVATION



SECTION A-A



DETAIL 2

NOTES:

(1) MAXIMUM SLOPE ON PARA RAMP TO BE 6%.

(2) CURB AND GUTTER TO BE POURED MONOLITHICALLY WITH CURB RAMP.

(3) CENTRE CURB RAMP WITH CENTRE OF PEDESTRIAN CROSSWALK.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

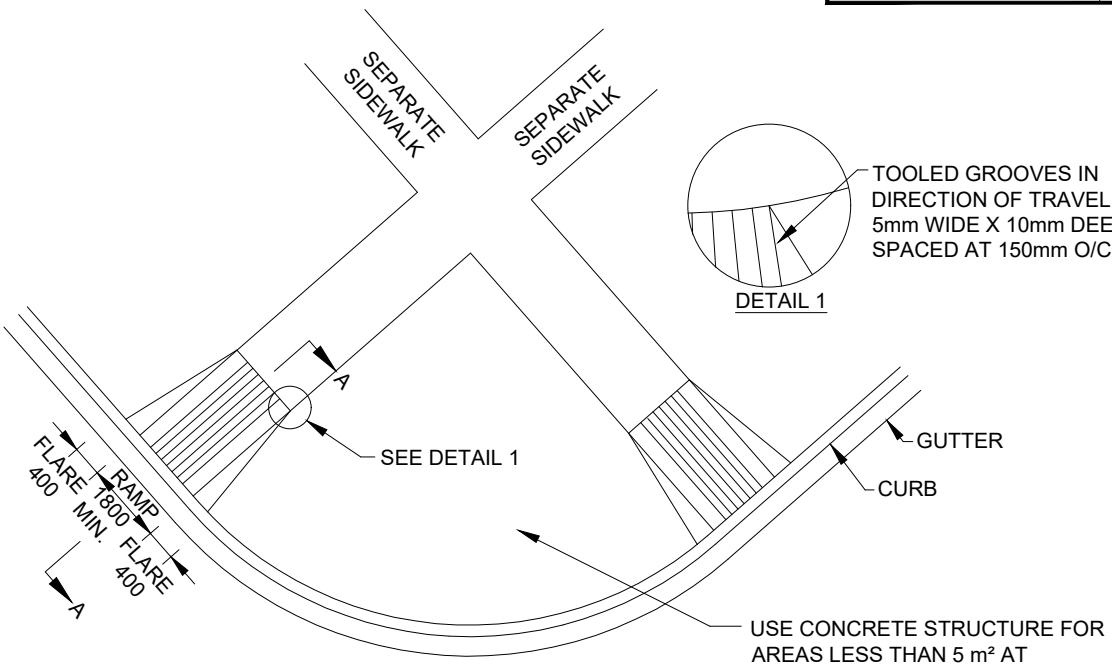
Gateway to the Rockies
HINTON

TOWN OF HINTON

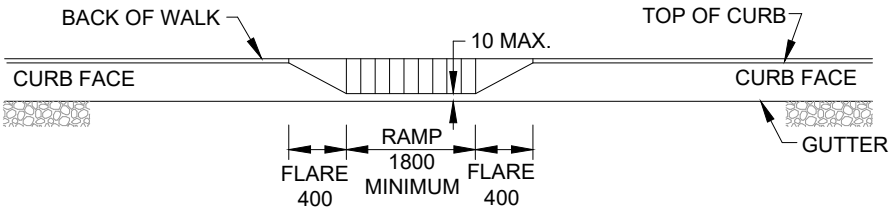
Curb Ramp Type 'A'
(Corner; Monowalk)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-400.dwg by
Xrefs: TH-G-TTBL_8.5x11

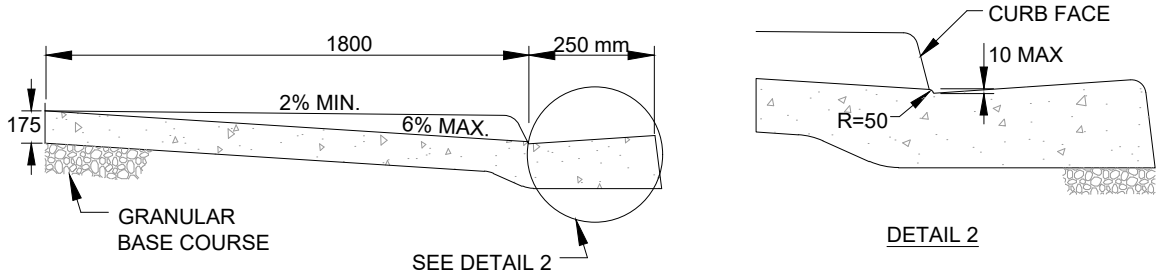
STANDARD DETAIL	4-401	
Date:	NOV, 2020	Rev. 0



PLAN VIEW



ELEVATION



SECTION A-A

NOTES :

(1) MAXIMUM SLOPE ON PARA RAMP TO BE 6%.

(2) CURB AND GUTTER TO BE POURED MONOLITHICALLY WITH CURB RAMP.

(3) CENTRE CURB RAMP WITH CENTRE OF PEDESTRIAN CROSSWALK.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

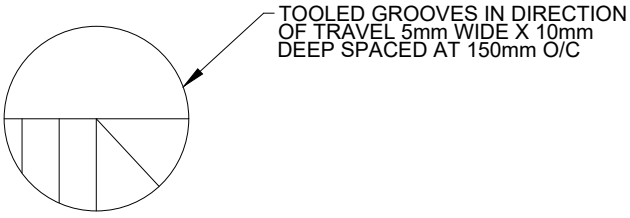
Gateway to the Rockies
HINTON

TOWN OF HINTON

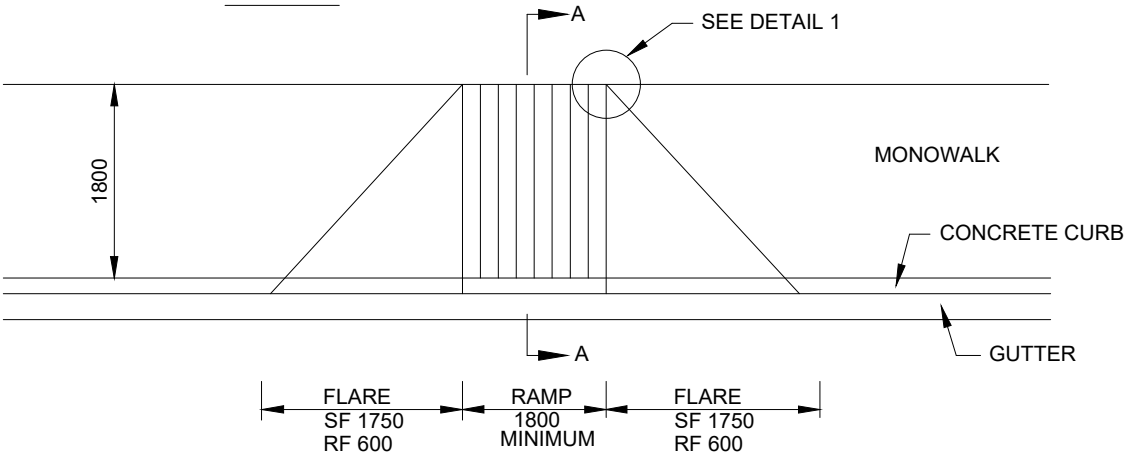
Curb Ramp Type 'B'
(Corner; Separate Sidewalk)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-401.dwg by
Xrefs: TH-G-TTBL_8.5x11

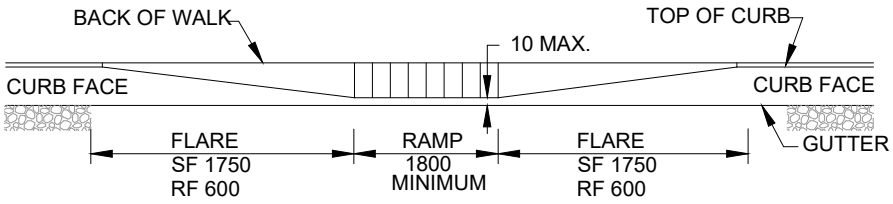
STANDARD DETAIL	4-402	
Date: NOV, 2020		Rev. 0



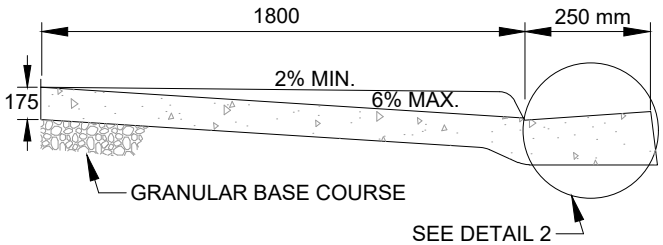
DETAIL 1

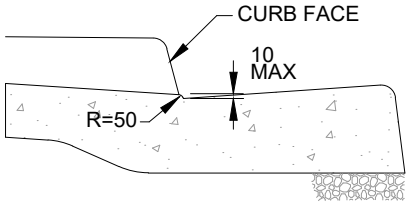


PLAN VIEW



ELEVATION





DETAIL 2

SECTION A-A

NOTES :

(1) MAXIMUM SLOPE ON PARA RAMP TO BE 6%.

(2) CURB AND GUTTER TO BE POURED MONOLITHICALLY WITH CURB RAMP.

(3) CENTRE CURB RAMP WITH CENTRE OF PEDESTRIAN CROSSWALK.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

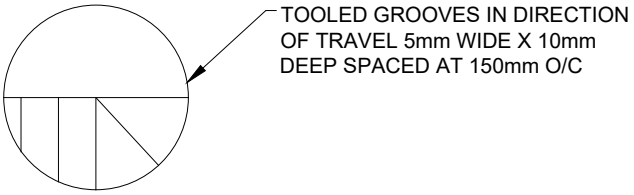
Gateway to the Rockies
HINTON

TOWN OF HINTON

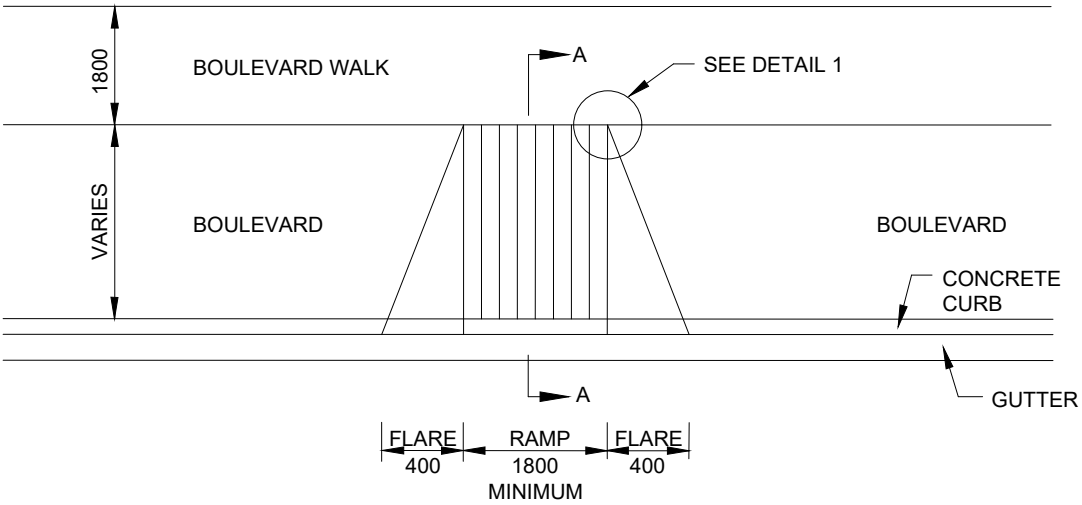
Curb Ramp Type 'C'
(Midblock; Monowalk)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-402.dwg by
Xrefs: TH-G-TTBL_8.5x11

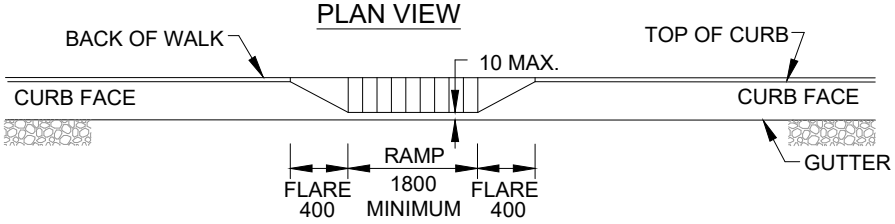
STANDARD DETAIL	4-403	
Date:	NOV, 2020	Rev. 0



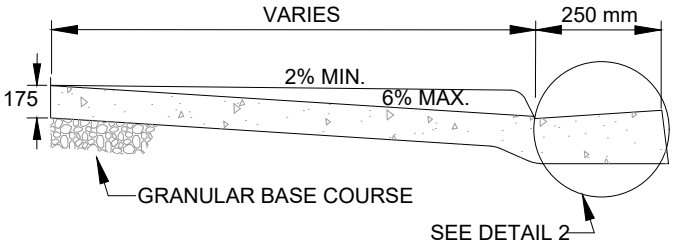
DETAIL 1



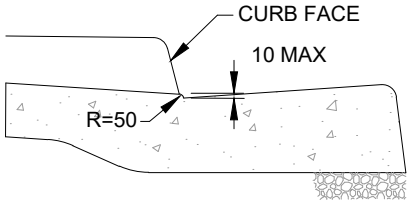
PLAN VIEW



ELEVATION



SECTION A-A



DETAIL 2

NOTES :

(1) MAXIMUM SLOPE ON PARA RAMP TO BE 6%.

(2) CURB AND GUTTER TO BE POURED MONOLITHICALLY WITH CURB RAMP.

(3) CENTRE CURB RAMP WITH CENTRE OF PEDESTRIAN CROSSWALK.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

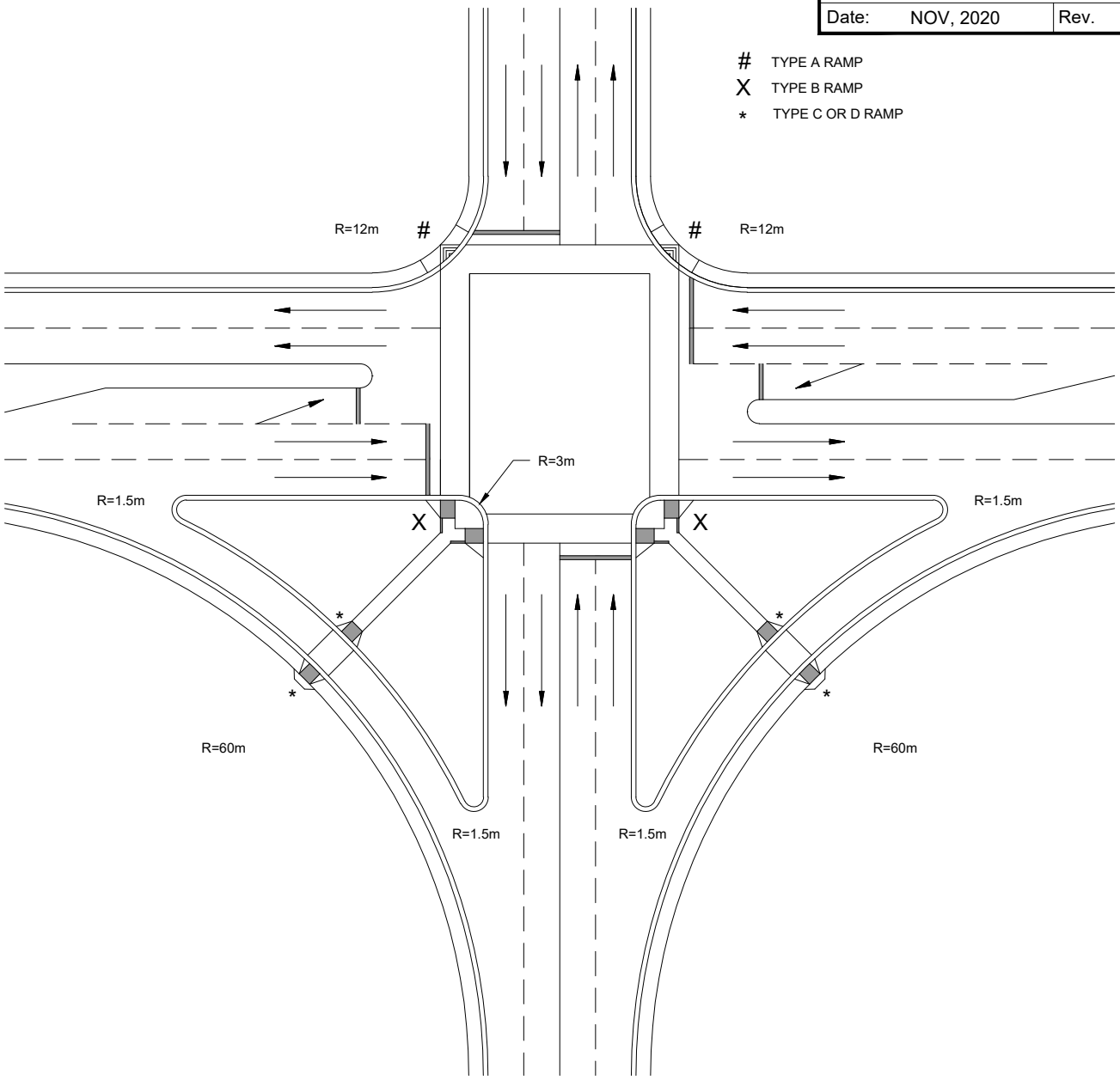
Gateway to the Rockies
HINTON

TOWN OF HINTON

Curb Ramp Type 'D'
(Midblock; Separate Sidewalk)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-403.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-404	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

(2) CURB RAMPS MUST PROVIDE ACCESS DIRECTLY TO CROSSWALKS.

(3) THE SELECTION OF CURB RAMP TYPE IS DEPENDANT ON THE LOCATION OF THE CROSSWALK RELATED TO THE CURB FACE.

(4) WHERE CROSSWALKS ARE CONTROLLED BY SIGNALS WITH A PUSH-BUTTON SYSTEM, THE SIDEWALKS AND RAMPS MUST ALLOW ACCESS BY WHEELCHAIR TO THE PUSH-BUTTON.

(5) WHERE TWO TYPE 'A' RAMPS ARE USED, THE SLOPE ON THE FLARED AREAS BETWEEN THE RAMPS CAN BE LESS THAN 6% MAX. SHOWN, PROVIDING A SMOOTHER TRANSITION ON THE SIDEWALK THROUGH THE RAMP AREA

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies
HINTON

TOWN OF HINTON

Urban Intersection Crosswalks and Sidewalk Ramps

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-404.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-500	
Date:	NOV, 2020	Rev. 0

FONT: 150 mm ClearviewHWY 1-B OR APPROVED ALTERNATE
OFFSET: 37.5 mm

ARTERIAL

FONT: 150 mm ClearviewHWY 1-B OR APPROVED ALTERNATE
OFFSET: 37.5 mm

COLLECTOR

FONT: 100 mm ClearviewHWY 1-B OR APPROVED ALTERNATE
OFFSET: 25 mm

LOCAL

NOTES

(1) STREET SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CANADA, ISSUED BY THE TRANSPORTATION ASSOCIATION OF CANADA.

(2) 3M™ DIAMOND GRADE™ DG³ REFLECTIVE SHEETING (OR APPROVED ALTERNATE) WITH WHITE LETTERING ON A GREEN BACKGROUND IS TO BE USED.

(3) MAXIMUM LENGTH OF STREET NAME SIGN SHALL BE 1 m. IN CASES WHERE THE STREET NAME WILL NOT FIT ON A 1 m LONG BLADE, A SECOND NAME BLADE SHALL BE USED AND SHALL BE MOUNTED DIRECTLY BELOW THE FIRST NAME BLADE. OTHERWISE, A CUSTOM NAME BLADE MAY BE REQUIRED.

LOCAL ROADWAYS SHALL BE ABBREVIATED AS PER THE FOLLOWING:

ROADWAY TYPE	ABBREVIATION
Alley	ALLEY
Avenue	AVE
Boulevard	BLVD
Circle	CIR
Close	CLOSE
Court	CRT
Crescent	CRES
Cul-De-Sac	CDS
Drive	DR
Gate	GATE
Highway	HWY
Lane	LANE
Link	LINK
Loop	LOOP
Parkway	PKY
Place	PL
Road	RD
Square	SQ
Street	ST
Terrace	TERR
Trail	TRAIL
Way	WAY
Wynd	WYND

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

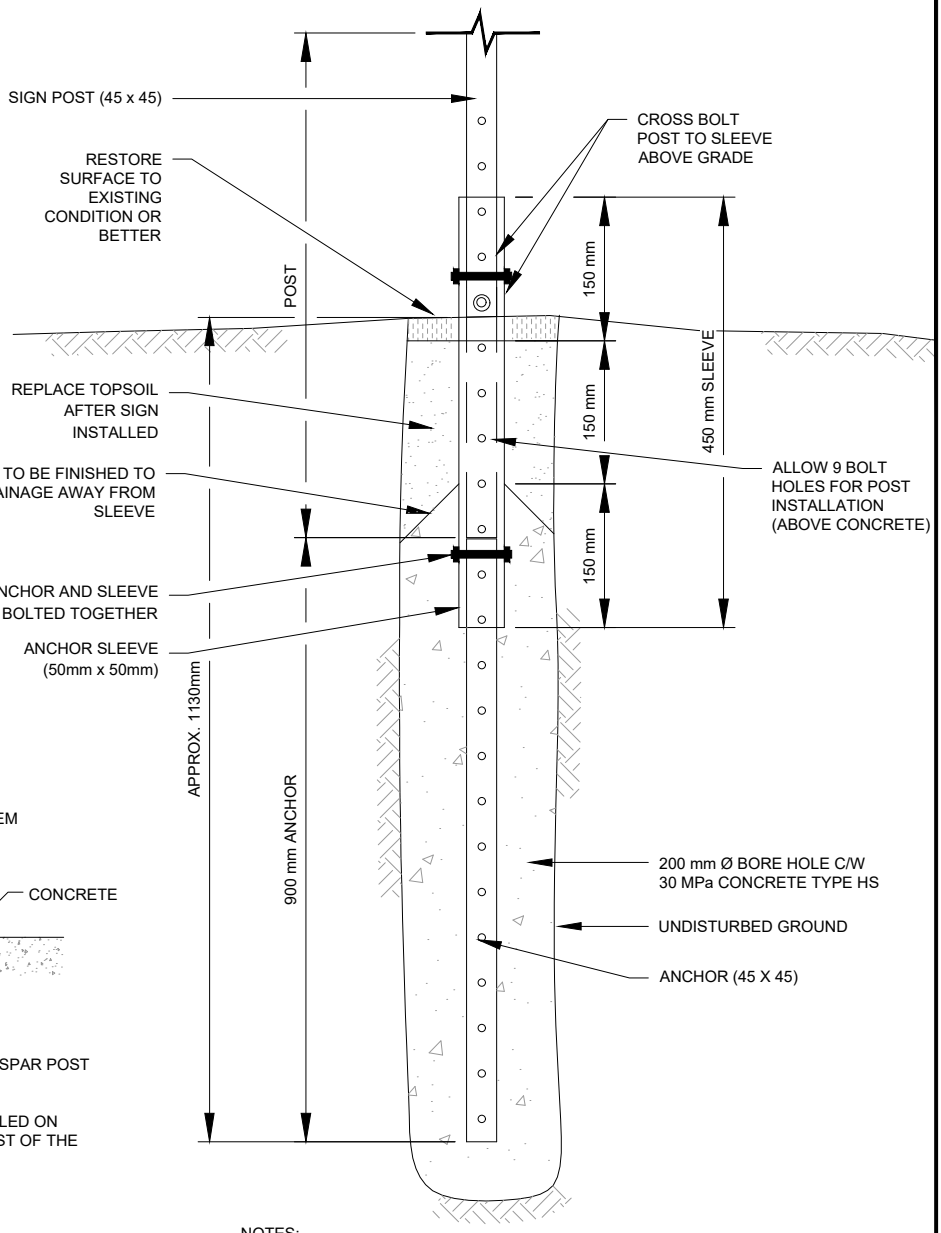
Gateway to the Rockies
HINTON

TOWN OF HINTON

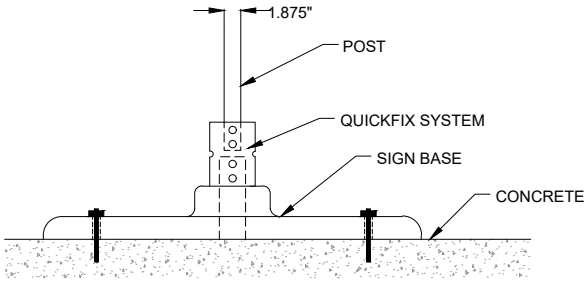
Street Name Signage

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_4-500.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-501	
Date:	NOV, 2020	Rev. 0



CONCRETE POST INSTALLATION DETAIL



NOTES:

(1) THIS BASE IS ONLY TO BE USED WHERE A BURIED TELESPAR POST CANNOT BE INSTALLED

(2) EXISTING CONCRETE: WHERE SIGNS ARE TO BE INSTALLED ON EXISTING CONCRETE, THE INSTALLATION SHALL CONSIST OF THE FOLLOWING:
- POSTS: ALUMINUM PIPE, SCHEDULE 40, 47.5 mm
- OUTSIDE DIAMETER.
- BASE: ROUND CAST PATT. #AD5, 2169
- BREAKAWAY: QUIKFIX SIGN SYSTEMS

NOTES:

(1) USE 45mm SQUARE TELESPAR POSTS AND ANCHORS, AND 50mm SQUARE TELESPAR SLEEVES OR APPROVED ALTERNATE.

(2) FOR SIGNS LARGER THAN 750mm, PROVIDE ENGINEERED DESIGN.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

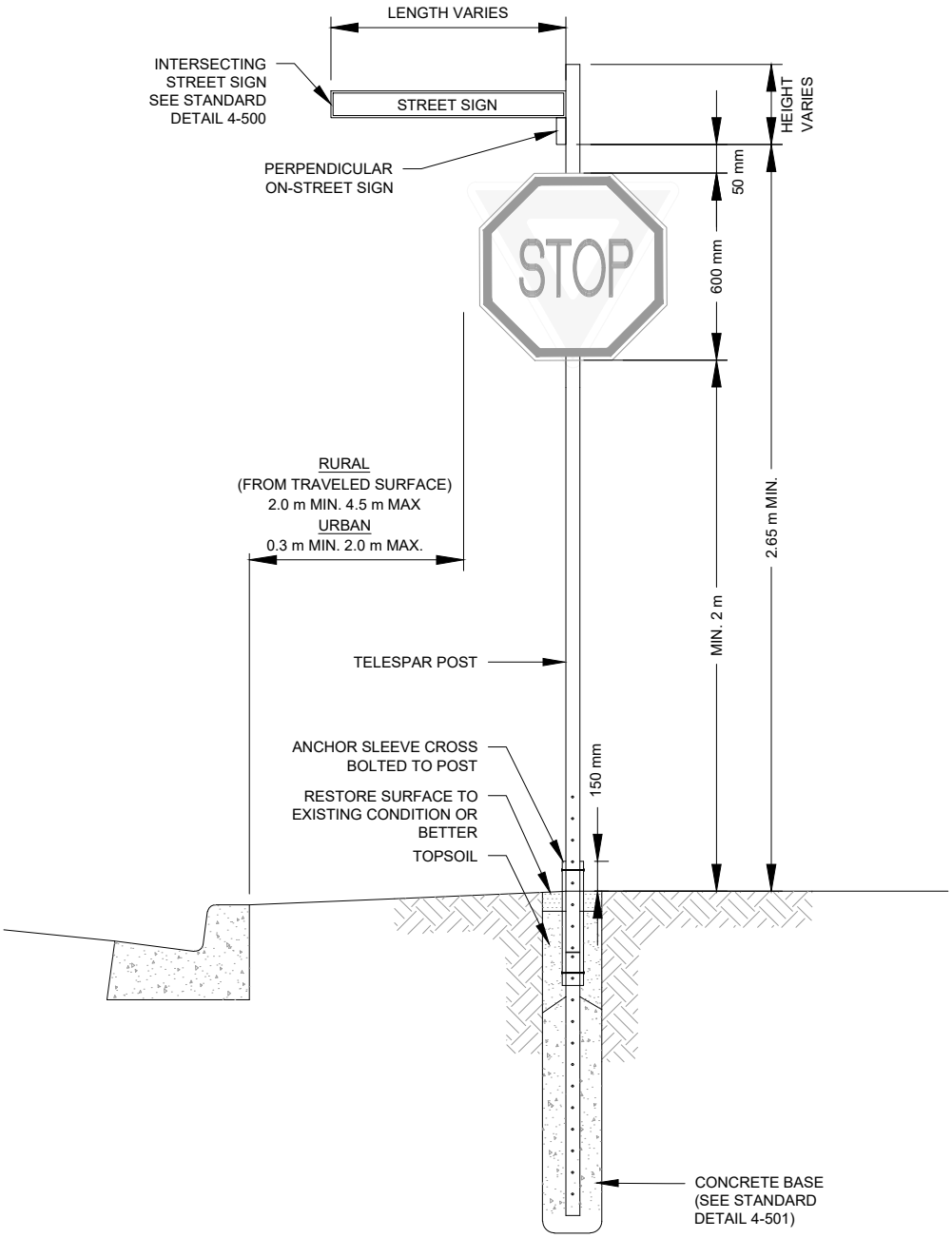
Gateway to the Rockies
HINTON

TOWN OF HINTON

Sign Support

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-501.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-502	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) IN LOCATIONS WHERE A STOP OR YIELD SIGN IS NOT CURRENTLY REQUIRED, THE STREET NAME SIGNAGE IS TO BE INSTALLED TO PROVIDE A SPACE FOR A STOP OR YIELD SIGN SHOULD THEY BE REQUIRED IN THE FUTURE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

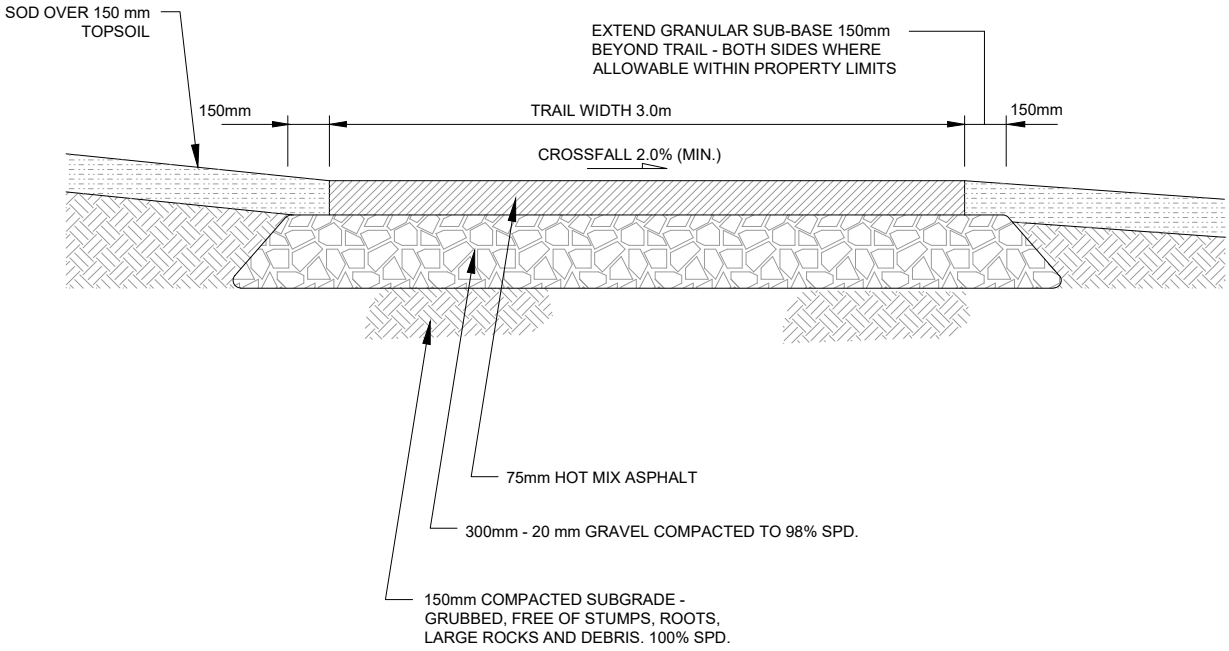
Gateway to the Rockies
HINTON

TOWN OF HINTON

Sign Installation

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-502.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-600	
Date:	NOV, 2020	Rev. 0



ALTERNATE STRUCTURE:

(1) 75mm HOT MIX ASPHALT

(2) 300mm 20 mm GRAVEL ON CLASS 2 WOVEN GEOTEXTILE FABRIC (NILEX 2002, LAYFIELD LP 200, OR APPROVED EQUIVALENT). EXTEND EDGES OF GEOTEXTILE FABRIC UP EDGES OF GRAVEL.

(3) NATIVE GROUND

NOTE:

(1) WHEN SHALLOW UTILITIES ARE LOCATED BENEATH A MULTI-USE TRAIL, THE MULTI-USE TRAIL SHALL BE CONCRETE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

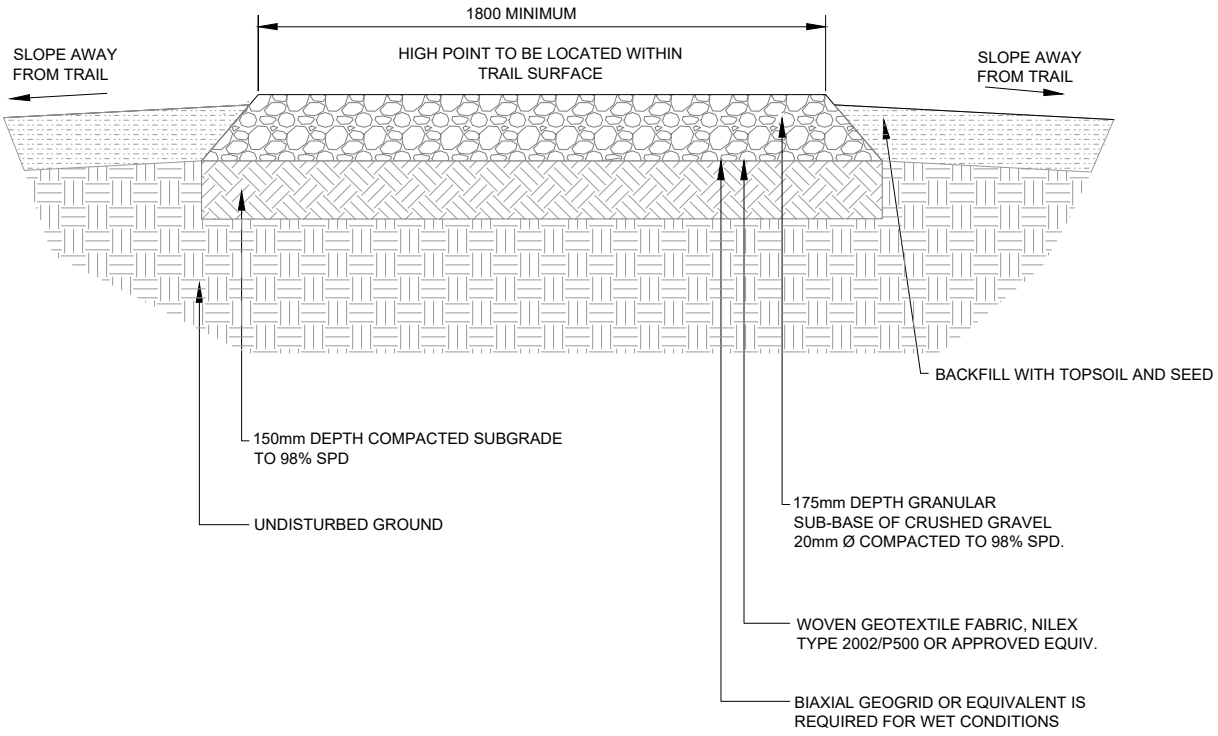
Gateway to the Rockies HINTON

TOWN OF HINTON

Asphalt Trail

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-600.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-601	
Date:	NOV, 2020	Rev. 0



NOTES

(1) EXCAVATION OF TOP MATERIAL TO BE DONE TO A WIDTH OF 2100 mm, OR MORE AS REQUIRED

(2) ALL DISTURBANCE ALONG TRAIL EDGE TO BE REHABILITATED WITH TOPSOIL AND APPROVED SEED MIX.

(3) COMPACTION REQUIREMENTS MAY BE MODIFIED ACCORDING TO SITE CONDITIONS

(4) ENSURE SLOPE ON TRAIL TIES IN WITH EXISTING GRADES (TRAIL CROSS FALL MAX 3% / MIN 1%).

(5) TRAIL TO BE 50 mm ABOVE ADJACENT GRADE (FOR DRAINAGE).

(6) ALL DIMENSIONS ARE IN MILLIMETRES (mm), UNLESS OTHERWISE NOTED

(7) WHEN SHALLOW UTILITIES ARE LOCATED BENEATH A MULTI-USE TRAIL, THE MULTI-USE TRAIL SHALL BE CONCRETE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

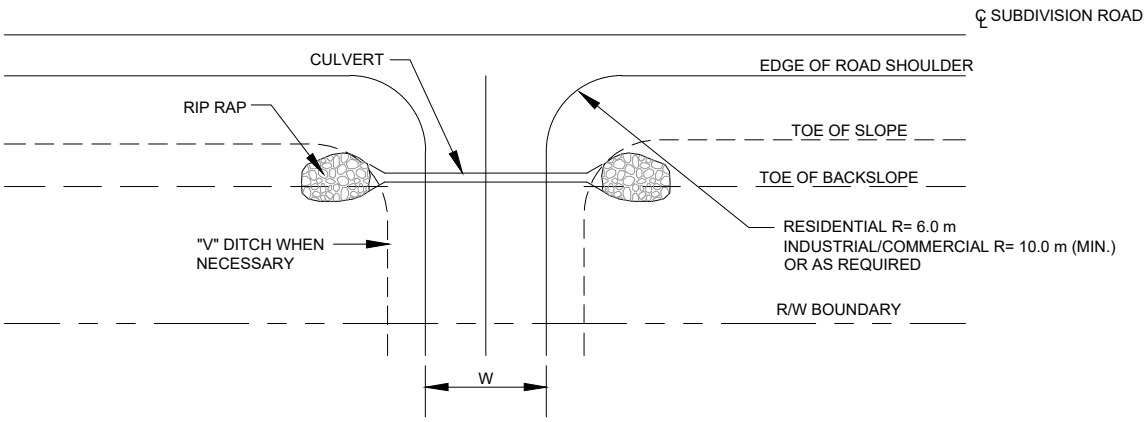
Gateway to the Rockies
HINTON

TOWN OF HINTON

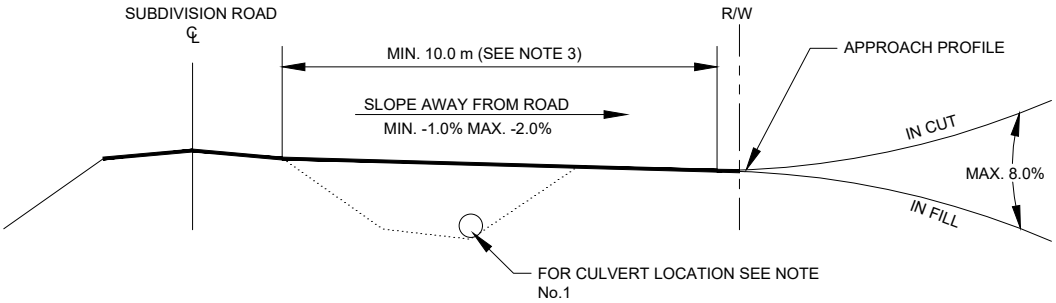
Gravel Trail

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-601.dwg by
Xrefs: TH-G-TTBL_8.5x11

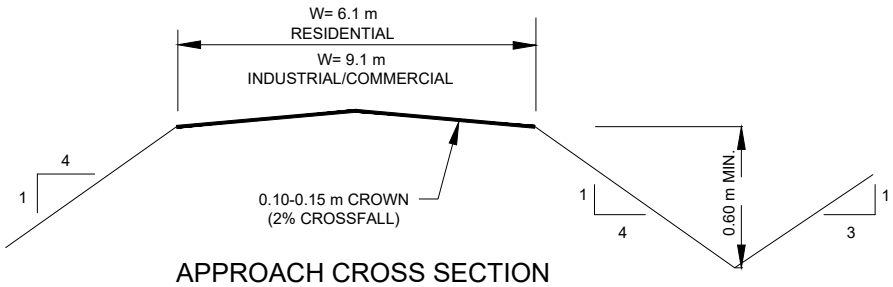
STANDARD DETAIL	4-700	
Date:	NOV, 2020	Rev. 0



APPROACH PLAN



DITCH AND CULVERT LOCATION



APPROACH CROSS SECTION

NOTES

(1) WHEN CULVERTS ARE REQUIRED THEY SHALL BE C.S.P. WITH A MIN. DIAMETER OF 600mm. - LENGTH WILL VARY WITH DEPTH OF FILL - CULVERT TO BE PLACED AT TOE OF BACKSLOPE

(2) ALL DIMENSIONS SHOWN ARE IN METERS UNLESS NOTED OTHERWISE

(3) MIN. APPROACH LENGTH - FROM EDGE OF ROAD SHOULDER TO R/W BOUNDARY

(4) PAVEMENT STRUCTURE OF DRIVEWAY TO MATCH THAT OF ROADWAY.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

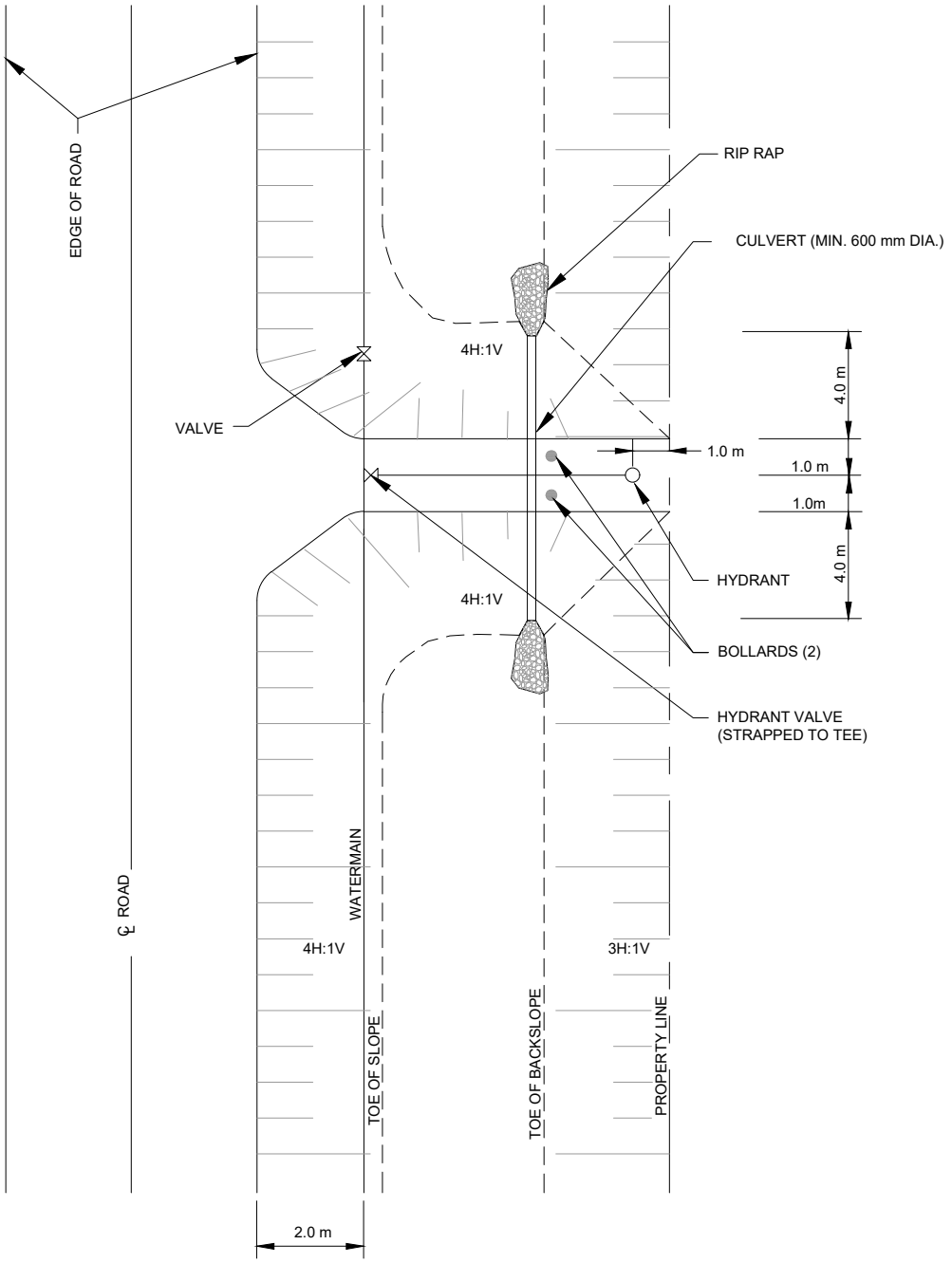
Gateway to the Rockies
HINTON

TOWN OF HINTON

Rural Residential &
Industrial/Commercial Approaches

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-700.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-750	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) WATERMAIN AND HYDRANTS MAY BE LOCATED ON EITHER SIDE OF ROAD

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

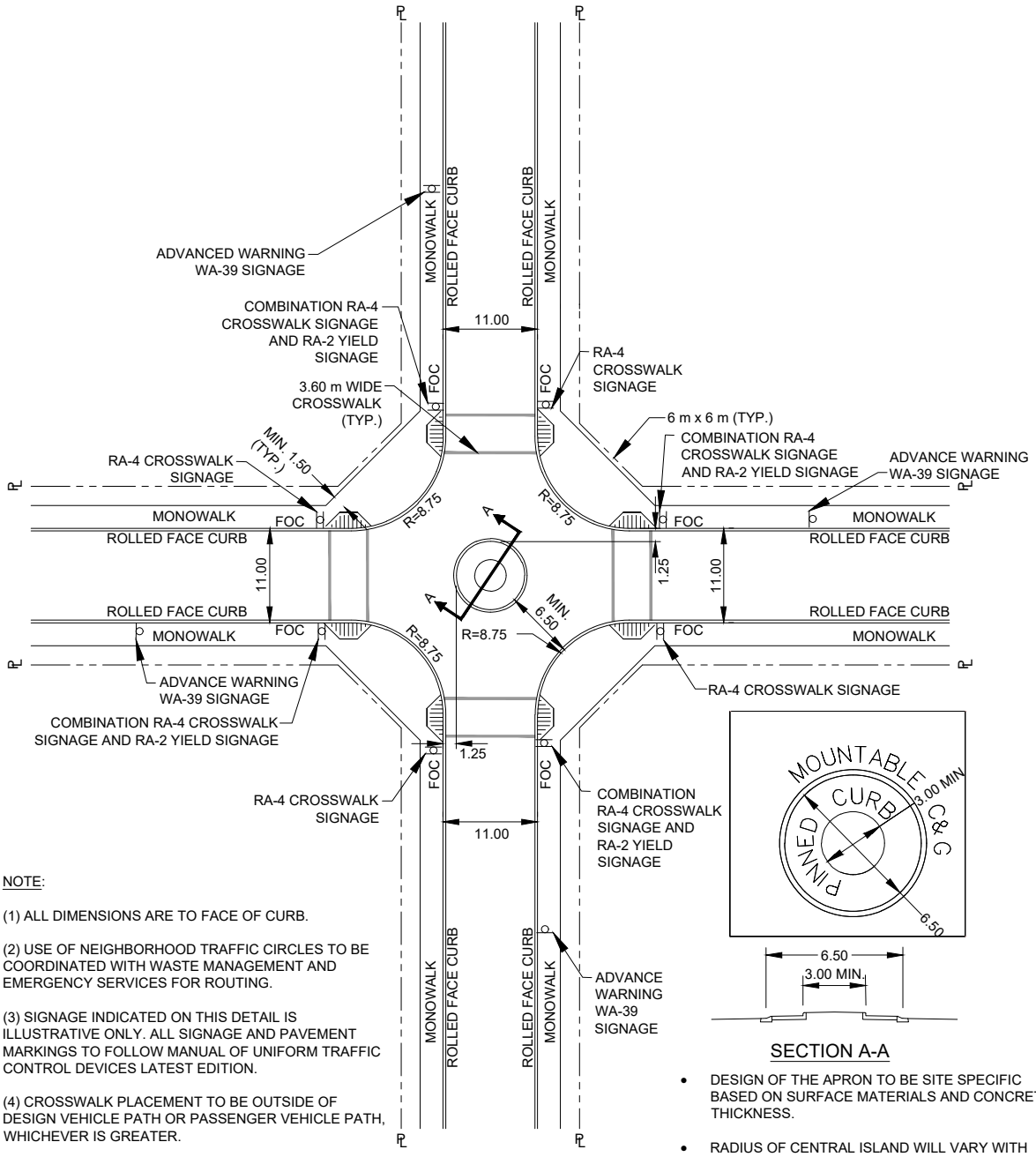
Gateway to the Rockies
HINTON

TOWN OF HINTON

Rural Shoulder Widening at Hydrant

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-750.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	4-800	
Date:	NOV, 2020	Rev. 0



SECTION A-A

NOTE:

(1) ALL DIMENSIONS ARE TO FACE OF CURB.

(2) USE OF NEIGHBORHOOD TRAFFIC CIRCLES TO BE COORDINATED WITH WASTE MANAGEMENT AND EMERGENCY SERVICES FOR ROUTING.

(3) SIGNAGE INDICATED ON THIS DETAIL IS ILLUSTRATIVE ONLY. ALL SIGNAGE AND PAVEMENT MARKINGS TO FOLLOW MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES LATEST EDITION.

(4) CROSSWALK PLACEMENT TO BE OUTSIDE OF DESIGN VEHICLE PATH OR PASSENGER VEHICLE PATH, WHICHEVER IS GREATER.

(5) CROSSWALK SIGNAGE MUST BE LEGIBLE IN BOTH DIRECTIONS OF TRAVEL.

- DESIGN OF THE APRON TO BE SITE SPECIFIC BASED ON SURFACE MATERIALS AND CONCRETE THICKNESS.
- RADIUS OF CENTRAL ISLAND WILL VARY WITH APRON WIDTH BASED ON CONTROL VEHICLE MOVEMENT REQUIREMENTS

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies
HINTON

TOWN OF HINTON

Neighborhood Traffic Circle

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_4-800.dwg by
Xrefs: TH-G-TTBL_8.5x11

5 SANITARY SEWER SYSTEMS

5.1 General

These standards cover the design and construction of sanitary sewer mains and appurtenances to be built or re-built in the Town. Standard Details relating to sanitary sewer system construction are provided at the end of this section.

These standards provide the minimum design criteria, general construction requirements, and construction materials for consulting Engineers to use in their preparation of specifications and drawings. These standards may be exceeded if warranted by the design consultant. Good engineering practices and designs must prevail on all projects.

The Town of Hinton prefers the installation of gravity sewers. Developers who wish to propose a low pressure sewer must provide adequate justification for the low pressure sewer. Low pressure sewers shall not be installed without prior approval by the Town.

5.2 Design Flow

Sanitary sewer systems shall be designed on the population density basis of either the ultimate subdivision design population in the Area Structure Plan or Land Use Bylaw or as follows; whichever is greater:

- Single Family 40 people / ha
- Low Density 40 people / ha
- Medium Density 80 people / ha
- High Density 200 people / ha

Commercial and Industrial design flows will be based on the gross developed area or the specific application; refer to Section 5.2.2.

A blended population of 52 people / developable hectare (20 units per developable hectare) can be used for planning purposes, when exact land uses are unknown.

The sewer main capacity shall be designed to convey the peak sewage contribution plus infiltration, without the use of holding tanks, and shall be based on the following:

5.2.1 Domestic Contribution

1. Minimum average contribution of 320 litres per capita per day.

2. Peak hourly flow for each contributing area calculated at an average flow multiplied by a peaking factor:

$Q_{PDW} = (G * P * PF) / 86{,}400$

Where: Q_{PDW} = Peak dry weather flow (L/s)

G = Average daily per capita contribution, 320 L/c/d

P = Design population

PF = Peaking factor, calculated using Harmon's Formula

$= 1 + (14 / (4 + P_{pf}^{0.5}))$

Where: P_{pf} = design population, in thousands

The maximum peaking factor shall be 3.8.

5.2.2 Non-Residential Contribution

1. For high level planning purposes, when the specific type(s) of Commercial / Industrial / institutional uses are unknown, the following flow generation rates can be used:

    1. Commercial / institutional 18,000 L/ha/day
    2. Industrial 13,500 L/ha/day

2. For design purposes, when the specific Industrial, Commercial, and Institutional uses are known, Table 5-1 may be used unless the development has higher or specialized flow generation.

Table 5-1
Commercial, Institutional, and Industrial Sanitary Flow Generation Factors Based on Land Use

Type of Establishment	Average Flow Generation (L/day/m^2 of Floor Area)
Office Buildings	8
Restaurants	20
Bars and Lounges	12
Hotels and Motels	14
Neighbourhood Stores	8
Department Stores	8
Shopping Centres	4
Laundries and Dry Cleaning	41
Banks and Financial Buildings	12
Medical Buildings and Clinics	12
Warehouses	4
Meat and Food Processing Plants	115
Car Washes	77
Service Stations	8
Auto Dealers, Repair and Service	6
Super Market	8
Trade Businesses - Plumbers, Exterminators, etc.	8
Mobile Home Dealer, Lumber Co., Drive-In Movies, Flea Market	7
Places of Assembly - Churches, Schools, Libraries, Theatres	24
Factories - Manufacturing raw products into finished products	33
Hospitals	1700 L/bed/day

3. The peak flow, Q_{PDW}, in litres per second, for each contributing area shall be calculated based on the average flow, Q_{AVG}, in litres per second, multiplied by a peaking factor:

    Q_{AVG} = (average flow generation from Table 5-1) x (floor area) / 86,400

    $Q_{PDW} = Q_{AVG}$ x PF

    The peaking factor shall be calculated as described in section 5.2.1, by converting Q_{AVG} to an equivalent population: ep = Q_{AVG} (L/s) * 86,400 (s/d) / G (L/c/d)

5.2.3 Infiltration

1. Roof leaders and weeping tiles shall not be connected to the sanitary sewer system. In existing areas where roof leaders and weeping tiles are connected to the sanitary system, an allowance for roof leader / weeping tile contribution of 0.6 litres per second per gross hectare shall be provided.
2. The sanitary sewer and manhole system shall be watertight; however, an infiltration allowance of 0.28 litres per second per gross hectare shall be used.
3. Any existing manholes located in sags (low areas subject to inundation during major rainfall events) are subject to an additional allowance of 0.4 litres per second per manhole. Every effort is to be made to ensure new manholes are not located in sags or else inflow / infiltration reduction features shall be installed.

5.3 Pipe Flow Formula

5.3.1 Gravity Sewers

Required full flow sewer capacity = (estimated peak wet weather flow rate) / 0.86

Manning's formula shall be used to calculate pipe capacity:

$$Q = (AR^{(2/3)}s^{0.5}) / n$$

Where: Q = Pipe capacity (m^3/s)
A = Cross-sectional area of pipe (m^2)
R = Hydraulic radius (area / wetted perimeter) (m)
s = Slope of hydraulic grade line (m/m)
n = Roughness coefficient = 0.013 for smooth-walled pipe (for example, PVC)
= 0.015 for older pipe (for assessment purposes)

5.3.2 Sewage Force Mains

Use Hazen-Williams formula:

$$Q = CD^{2.63}s^{0.54} * 278.5$$

Where: Q = Rate of flow (L/s)
D = Internal pipe diameter (m)
s = Slope of hydraulic grade line (m/m)
C = Roughness coefficient = 120 for all mains

5.4 Velocity

Pipes shall be designed such that the velocity falls within ranges identified below.

Type of Sewer	Minimum Velocity	Maximum Velocity
Gravity	0.60 m/s	3.00 m/s
Force Main	0.76 m/s	1.50 m/s

5.5 Minimum Pipe Diameter for Gravity Sewers

5.5.1 Mains

- Single Family Residential Areas 200 mm diameter
- Multi-Family Residential Areas 250 mm diameter
- Non-Residential Areas 250 mm diameter

5.5.2 Services

- Single Family Dwellings 150 mm diameter
- Multi-Family Dwellings 150 mm diameter*
- Non-Residential Buildings 150 mm diameter*

Note:
* Multi-family and non-residential services shall be sized based on the anticipated peak wet weather flow for the development; however, in no case shall the services for these types of developments be less than 150 mm in diameter.

5.6 Minimum Pipe Grade

Minimum pipe grades for sewers along a straight alignment are indicated in Table 5-2; however, steeper grades are preferred.

Table 5-2
Minimum Pipe Grades

Nominal Pipe Diameter (mm)	Minimum Grade [1] (%)
200	0.40
250	0.28
300	0.22
375	0.15
450	0.12
525 and larger	0.10

Note:
[1] Pipe grades shall be increased for each upstream leg of the system as follows:

- 30 to 50 lots 0.6%
- less than 30 lots 0.8%

For curved sewers, the minimum grade shall be 50% greater than the above values.

5.7 Minimum Depth of Cover

Sanitary sewers require a minimum cover of 3 m from finished surface to pipe crown and shall be of sufficient depth to satisfy the following criteria:

- Permit all buildings to drain by gravity to the sewer main;
- Prevent freezing;
- Clear other underground utilities; and
- Prevent damage from surface loading.

When it is not feasible to provide 3 m cover from finished surface to pipe crown, the sewer shall be insulated as per Standard Detail 7-700.

5.8 Manhole Spacing

1. Manholes shall be provided at the end of each line and at all changes in pipe sizes, grades, or alignment.
2. The maximum allowable distances between manholes for sewers along a straight alignment shall be as follows:
   - Sewers smaller than 600 mm: 120 m maximum spacing; and
   - Sewers 600 mm and larger: 150 m maximum spacing.
3. The maximum allowable distances between manholes for sewers along a curved alignment shall be as follows:
   - Sewers smaller than 600 mm: 90 m maximum spacing; and
   - Sewers 600 mm and larger: 120 m maximum spacing.

5.9 Curved Sewers

1. Maximum joint deflection shall be as recommended by the pipe manufacturer.
2. Curved sewers shall be aligned parallel to the road centreline.

5.10 Hydraulic Losses Across Manholes

1. Generally, for increasing pipe diameters, the crown of the downstream pipe shall match crown of the upstream pipe; however, the upstream 0.8 depth point shall not be below the downstream 0.8 depth point.
2. The minimum drop in invert elevations across manholes shall be as follows:
   - Straight runs and deflections up to 45o 30 mm
   - Deflections between 45o and 90o 60 mm

   Deflections greater than 90° shall be accommodated using two or more manholes.
3. A drop pipe shall be installed when the drop between inverts exceeds 0.6 m. The manhole shaft shall be sized to attain a clear entry access width of at least 0.6 m; refer to Standard Details 5-203 and 5-204 at the end of this section.

5.11 Sewer Location

1. Sanitary sewer mains shall be located within the municipal road right-of-way as per the typical cross-sections (Standard Details 4-100 through 4-108).
2. Utility rights-of-way shall be provided for all utilities not located within road rights-of-way or PULs.
   - Minimum width of 4 m is required for one utility
   - Minimum width of 6 m is required for two utilities
   - Minimum width of 8 m is required for three utilities
   - A 1.5 m wide Easement is required on each side of a utility right-of-way
3. Single family residential sanitary services shall be installed in a common trench with the water and storm services. Services shall be located under landscape areas, as close to the centre of the property as possible. Multi-family residential and non-residential sanitary and water services require 3 m horizontal separation.

4. Sanitary sewer mains shall maintain the following clearances from watermains, storm sewers, and power / telephone / cable infrastructure:
    - Minimum 3.0 m horizontal clearance unless sewer depth requires increased spacing; and
    - Minimum 0.5 m vertical clearance above or below at crossings; however, sanitary sewer mains shall cross under watermains wherever possible.

5.12 Manhole Details

1. Refer to Standard Detail 5-200 at the end of this section.
2. Manhole frames and covers shall not be located within sidewalks.
3. Manhole frames and covers shall be exposed when located in landscape areas.
4. To abandon a manhole, plug all pipes with non-shrink grout, remove and dispose the manhole to 1.0 m below ground and fill remainder with fillcrete.

5.13 Service Connections

1. Refer to Standard Details 5-300 and 5-400 at the end of this section.
2. Sanitary sewer services for Commercial, Industrial, multi-family, or institutional areas, unless otherwise accepted by the Town, shall only be made after the service requirements have been determined and a permit, approving the installation, is issued by the Town.
3. Sanitary sewer services shall be designed as a single connection from the main to the property line.
4. Sanitary sewer services shall terminate at the property line or 1 m past the shallow utility Easement.
5. Services shall be located at the centre of the lot; dual servicing layouts shall be reviewed by the Town on a case-by-case basis.
6. All sanitary sewer services shall be designed for gravity flow with a minimum grade of 2.0% and require a minimum of 2.8 m of cover at property line, from finished surface to pipe crown.
7. Sanitary sewer services which are 150 mm in diameter shall be PVC DR28 building service pipe conforming to CSA specification B182.2, latest revision thereof. Sanitary sewer services 200 mm in diameter and larger shall be PVC DR35 conforming to CSA specification B182.2, latest revision thereof.
8. Single family residential sanitary service connections shall be via the use of in-line tees. Manholes for sanitary sewer service connections to the main are required for all multi-family, Commercial, Industrial, or institutional lots.
9. Pipe saddles shall be used to connect sanitary sewer services to mains only in instances where retrofit work is undertaken.
10. Risers shall be employed where the service connection at the main is 4.0 m or deeper.
11. An inspection / sampling manhole, located at 0.6 m inside private property, is required for all Industrial and Commercial sanitary sewer service connections.
12. The end of sanitary sewer services shall be adequately capped or plugged to prevent the entry of earth, water, or other deleterious material into the pipe. Furthermore, the end of the pipe shall be marked by a vertical, nominal size 2" x 4" timber set at the service invert and extending 0.5 m above the ground surface. The top 300 mm of the exposed portion of this marker shall be painted red. These marker stakes are required prior to issuance of a Construction Completion Certificate for the development.

13. Roof leaders and building foundation drain sump pumps shall not be connected to the sanitary sewer system; refer to Section 6 of these Minimum Development Engineering Design and Servicing Standards (MDEDSS).
14. Grease, suspended solids, and sediment traps shall be provided at all food processing establishments, shopping centres, service stations, car washes, hotels/motels, manufacturing, equipment servicing and cleaning facilities, institutions (churches, schools, etc.) and any other facility that is anticipated to discharge sediment and/or grease.

5.14 Service Abandoning

Sanitary services are to be abandoned by installing a plug in the sanitary service at the connection to the main.

5.15 Service Connection Records

The Developer's Consultant shall provide detailed service reports for all installed services. Service reports shall provide information related to pipe diameter, invert elevations at the property line, location of services relative to property line(s), manholes or watermain valves, and lot number. A sample service report is provided in Section 3.

5.16 Special Conditions

Special design requirements such as pipe foundations, special bedding, anchors, etc., may be required for certain soil conditions. All special designs are subject to acceptance by the Town.

5.17 Materials and Specifications

Pipe materials shall be selected using a rational design method, with the following information as a guide. The Developer's Consultant is responsible to ensure that the selected pipe material and class is suitable for the proposed application (site conditions, depth of installation, etc.).

Alternative pipe materials will be evaluated through a variance request submitted by the Developer's Consultant. Developer's Consultant shall provide a justification for the request for variance. Alternative pipe materials shall not be installed without receiving written authorization from the Town.

5.17.1 Gravity Sewers

Table 5-3
Acceptable Pipe Materials for Gravity Sewers

Material	Specification
Polyvinyl Chloride (PVC)	ASTM D3034, SDR 35 (CSA B182.2)
Casing Pipe (Steel)	CAN3-Z245.1, Grade 241*

* or higher as required by crossing owner.

5.17.2 Manholes

1. Precast manhole sections and grade rings shall conform to CAN/CSA A257.4 and shall be manufactured using sulphate-resistant Type 50 cement.
2. Manhole sections shall be precast reinforced concrete sections conforming to ASTM C478 and CSA A257.4. All precast units shall be marked with manufacturer's identification, date of casting, type of cement, and CSA standard.
3. Manhole steps shall be standard safety type, aluminium forged of 6061-T6 alloy having a minimum tensile strength of 260 MPa.
4. All manhole sections shall have flexible watertight joints sealed with rubber gaskets conforming to ASTM C443 and grouted inside and outside with non-shrink grout.
5. Manholes shall be fitted with the appropriate cast-iron frame and cover conforming to Class 35B ASTM A48. All castings shall be true to form and dimension, and shall be free from faults, sponginess, cracks, blowholes, or other defects affecting their strength.
6. Pre-benched manhole bases shall be used wherever possible with pre-cored connection holes and watertight Duraseal or G-Loc joints or approved equal.
7. Benching shall be PVC-lined.
8. Tee-riser manholes shall conform to CSA 257.2 / ASTM C76 for the pipe component and CSA A257.4 / ASTM C76 for the manhole riser component.
9. Perched manholes are required when adding a manhole along an existing sanitary sewer.
10. Internal drop pipes for services are not permitted. If a drop manhole is required for a service, an external drop pipe shall be used as per Standard Detail 5-203.

5.17.3 Pipe Bedding

1. Granular material for bedding of pipes in sound dry soils shall be Class B sand (refer to Standard Detail 5-100) conforming to Table 5-4:

Table 5-4
Class B Sand Bedding Material Gradation

Standard Sieve Size (µm)	% Passing
10 000	100
5 000	70 - 100
1 600	5 - 20
80	0 - 12

2. Washed rock wrapped in filter cloth shall be used in areas with high water table. Washed rock shall consist of washed, crushed, or screened stone or gravel consisting of hard and durable particles meeting the gradation limits specified in Table 5-5 and shall be free from sand, clay, cementitious, organic, and other deleterious material.

Table 5-5
Washed Rock Bedding Material Gradation

Standard Sieve Size (µm)	% Passing
25 000	100
5 000	10 (max.)
80	2 (max.)

5.17.4 Trench Section

For trenching and bedding details, refer to the Standard Details 5-100 and 5-150 provided at the end of this section.

5.17.5 Corrosion Protection

All concrete used in a sanitary sewer system shall be made with sulphate-resistant cement.

A specialist's evaluation of cathodic protection requirements shall be supplied to the Town, in triplicate, for all steel applications.

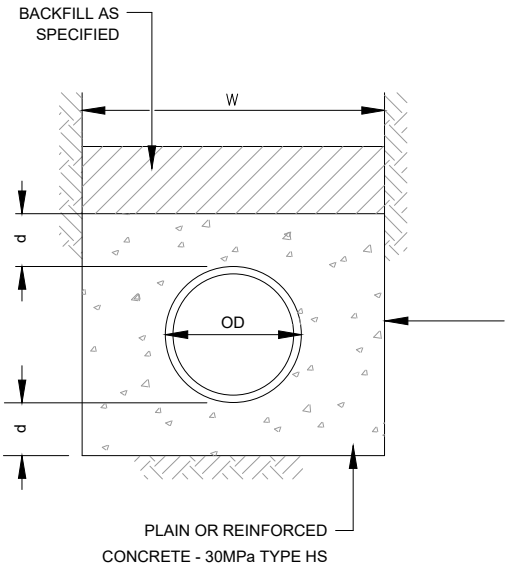
5.17.6 Private Sewage Systems (Rural Areas Only)

1. All installations of private sewage systems shall be in accordance with the Safety Codes Council: Alberta Private Sewage System – Standard of Practice.
2. In general, private sewage systems are required for Rural residential and Industrial / Commercial developments without reasonable access to a common sewage collection and disposal system.
3. The owner of a private sewage system shall ensure the system:
   - Is maintained;
   - Is operated within the design parameters of the system; and
   - Effectively treats and disposes of the sewage and effluent.
4. The use of septic tanks is preferred over the use of septic fields.
5. The Developer's Consultant is responsible for selecting a septic tank(s) of the appropriate size for the proposed development. An access road to the tank is required and shall be designed to accommodate sewage collection truck wheel loads. Refer to Section 4.

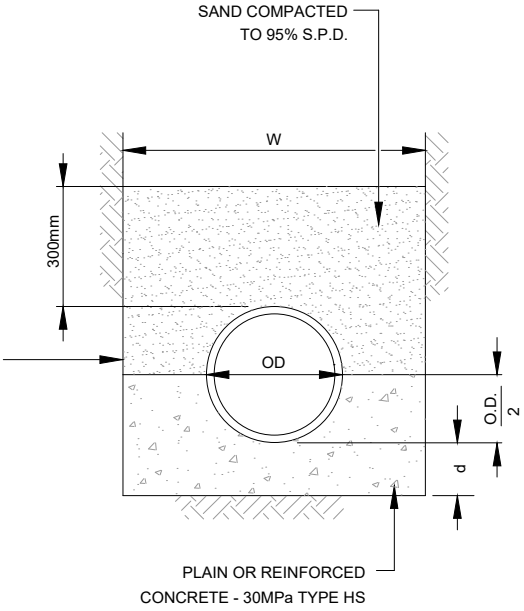
5.18 Standard Details – Sanitary Sewer Systems

Standard Detail No.	Title
5-100	Pipe Zone Bedding Details (Class A, A-1, B)
5-150	Trench Backfill
5-200	1200 mm Diameter Precast Manhole
5-201	Perched Manhole
5-202	Tee-riser Manhole
5-203	External Drop Manhole
5-204	Internal Drop Manhole
5-300	Single Service Layout
5-400	Sanitary Service Connection
5-500	Sanitary Inspection Chamber

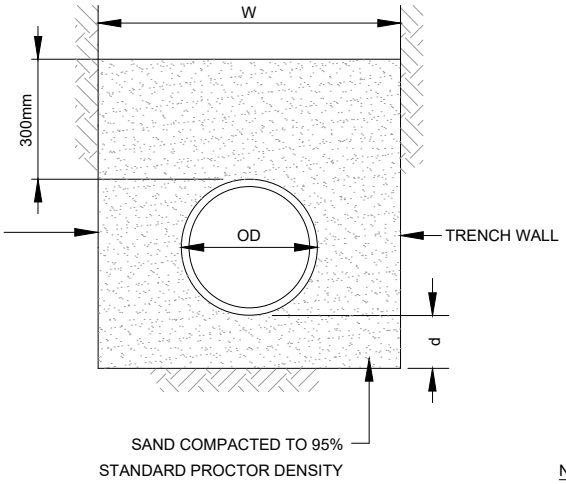
STANDARD DETAIL	5-100	
Date:	NOV, 2020	Rev. 0



CLASS A



CLASS A-1



CLASS B

PIPE SIZE	d MIN.(mm)
675mm OR SMALLER	75
750mm TO 1500mm	100
1650mm AND LARGER	150

LEGEND:
d = DEPTH OF BEDDING MATERIAL BELOW PIPE
W = TRENCH WIDTH = 2 x OD (MIN.)
OD = OUTSIDE DIAMETER OF PIPE

NOTES:

(1) ADD 100mm TO d IN ROCK EXCAVATION.

(2) IN AREAS WITH HIGH WATER TABLE, CLASS B PIPE ZONE MATERIAL SHALL BE WASHED ROCK AS PER SECTION 5.18.4 AND SHALL BE WRAPPED IN NON-WOVEN GEOTEXTILE (NILEX 4551 OR APPROVED EQUAL).

(3) THESE BEDDING TYPES APPLY ONLY WHERE SUITABLE SOIL CONDITIONS EXIST. IN AREAS WITH UNSUITABLE SOIL CONDITION, SPECIAL BEDDING & PIPE FOUNDATION DESIGNS ARE REQUIRED

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

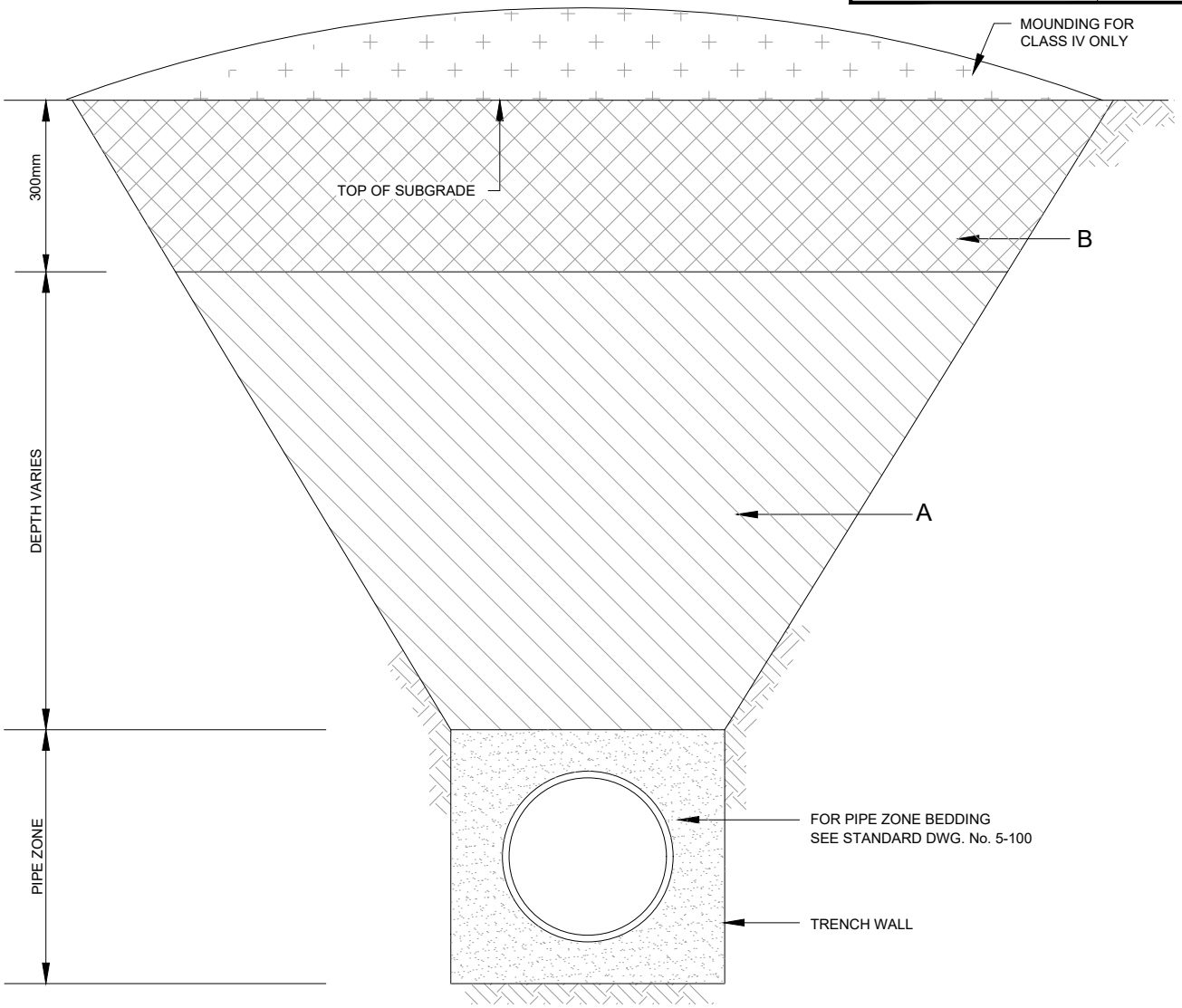
Gateway to the Rockies
HINTON

TOWN OF HINTON

Pipe Zone Bedding Details (Class A, A-1, B)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_5-100.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	5-150	
Date:	NOV, 2020	Rev. 0



CLASS	USE	A			B		
		MATERIAL	MAX LIFT	% SPD	MATERIAL	MAX LIFT	% SPD
I	UNDER ROADS	IMPORTED GRANULAR	200	97	IMPORTED GRANULAR	150	100
II	UNDER ROADS	SCREENED NATIVE	200	97	SCREENED NATIVE	150	100
III	LANDSCAPED AREAS	SCREENED NATIVE	200	95	SCREENED NATIVE	200	95
IV	OPEN FIELD	SCREENED NATIVE	300	95	SCREENED NATIVE	300	95

NOTES:

(1) ALL TRENCH WALLS SHALL BE SLOPED OR SHORED IN CONFORMANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY REGULATIONS CURRENTLY IN EFFECT, OR AS PER GEOTCHNICAL RECOMMENDATIONS, WHICHEVER IS MORE STRINGENT.

(2) SUBGRADE TO BE SPECIFIED WITH COMPLETE ROADWAY STRUCTURE DESIGN.

(3) SURFACE DRAINAGE TO BE RECTIFIED FOR IMMEDIATE AREA IF CLASS IV BACKFILL IS USED.

(4) FILLCRETE MAY BE REQUIRED AS BACKFILL FOR EXISTING ROADWAYS, AT THE DISCRETION OF THE TOWN

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

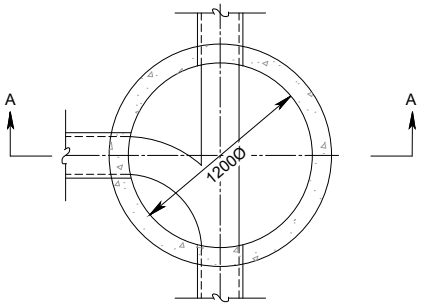
Gateway to the Rockies
HINTON

TOWN OF HINTON

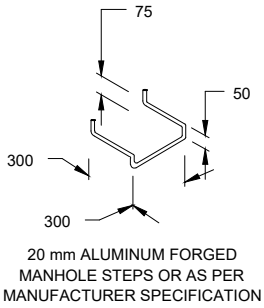
Trench Backfill

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_5-150.dwg by
Xrefs: TH-G-TTBL_8.5x11

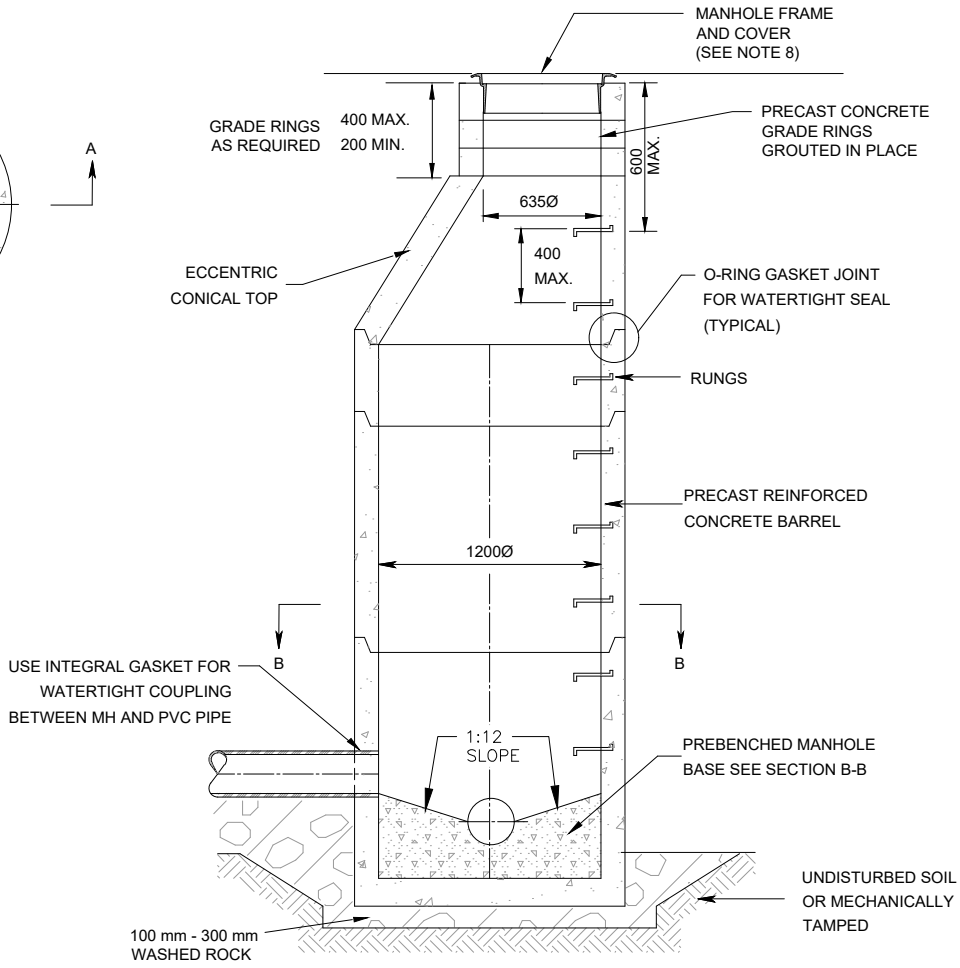
STANDARD DETAIL	5-200	
Date:	NOV, 2020	Rev. 0



SECTION B-B



20 mm ALUMINUM FORGED MANHOLE STEPS OR AS PER MANUFACTURER SPECIFICATION



SECTION A-A

NOTES:

(1) PRECAST RINGS, CONES AND BARRELS TO MEET CURRENT A.S.T.M. C478 STANDARDS.

(2) SPECIAL BASE DESIGN REQUIRED FOR DEPTHS OVER 9.0 m.

(3) CHANNELING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS AND LINED WITH PVC.

(4) CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO MH COVER EXCEEDS 2 m.

(5) VERTICAL SIDE OF CONICAL TOP TO BE SITUATED SO AS NOT TO CONFLICT WITH PIPING.

(6) BENCHING CONCRETE SHALL BE A MINIMUM OF 30MPa COMPRESSIVE STRENGTH, TYPE HS.

(7) RETROFIT RUNGS TO BE EPOXIED IN PLACE (NO PLASTIC SLEEVES)

(8) F-80 FRAME AND COVER FOR ASPHALT AREAS.
F-39 FRAME AND COVER FOR OFF ROAD AREAS.
F-90 FRAME AND COVER WITH GASKET FOR SANITARY MANHOLES IN SAG LOCATIONS

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

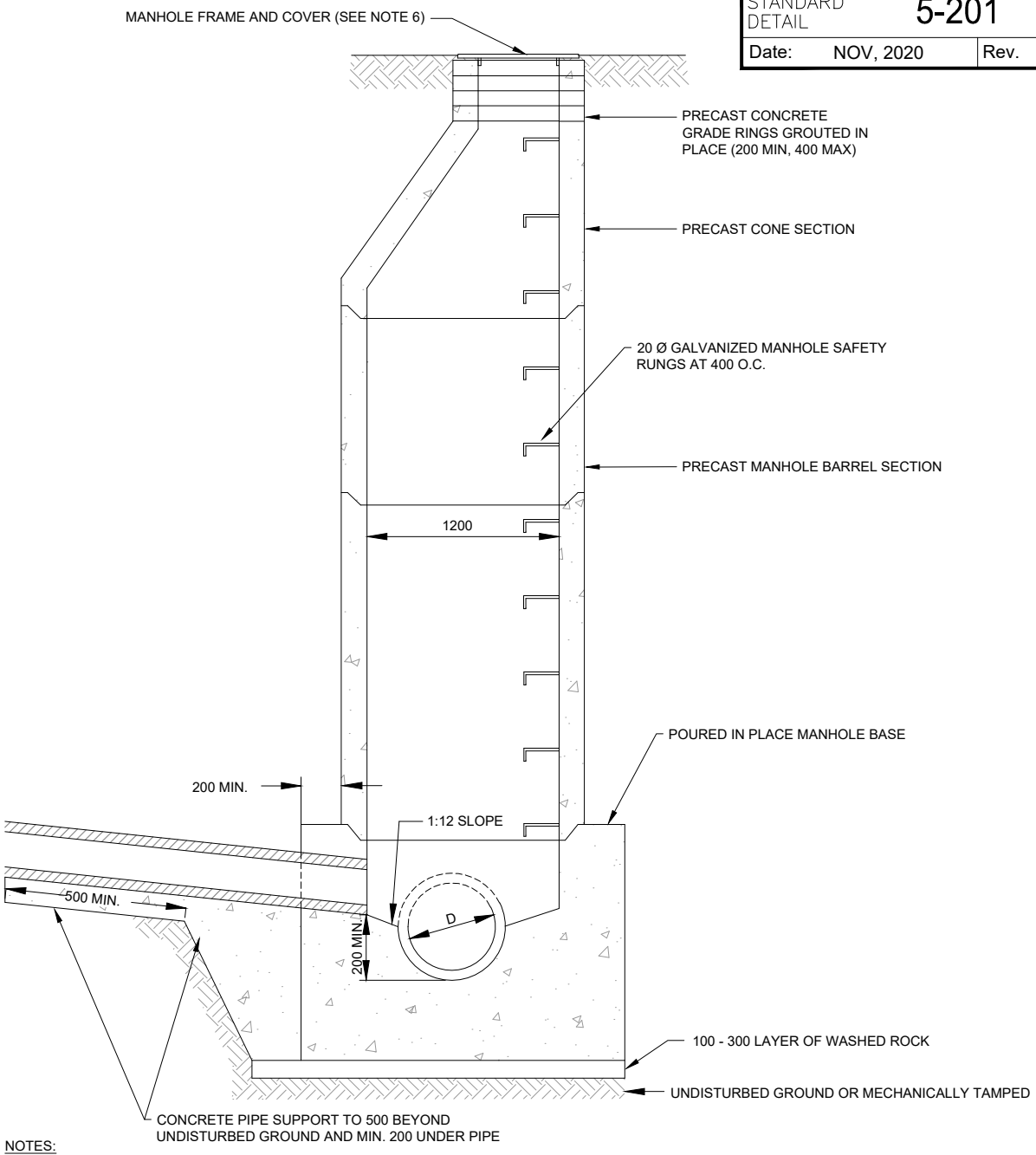
Gateway to the Rockies
HINTON

TOWN OF HINTON

1200 mm Diameter Precast Manhole

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_5-200.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	5-201	
Date: NOV, 2020		Rev. 0



NOTES:

(1) ALL PRECAST CONCRETE TO MEET CURRENT ASTM C478 STANDARDS.

(2) ALL POUR-IN PLACE CONCRETE TO BE 30MPa AT 28 DAYS.

(3) CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO MH COVER EXCEEDS 2 m.

(4) VERTICAL SIDE OF CONICAL TOP TO BE SITUATED SO AS NOT TO CONFLICT WITH PIPING.

(5) CHANNELIZATION AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS AND LINED WITH PVC.

(6) F-80 FRAME AND COVER FOR ASPHALT AREAS.
F-39 FRAME AND COVER FOR OFF ROAD AREAS.
F-90 FRAME AND COVER WITH GASKET IN SAG LOCATIONS

(7) ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

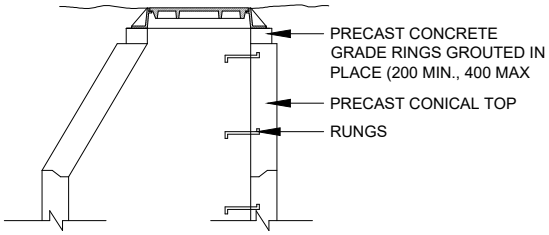
Gateway to the Rockies
HINTON

TOWN OF HINTON

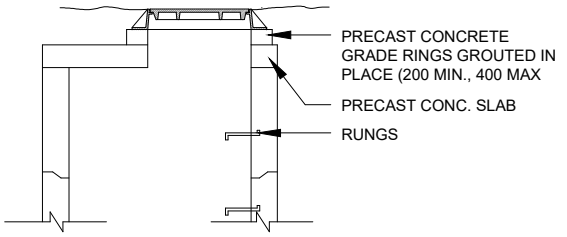
Perched Manhole

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_5-201.dwg by
Xrefs: TH-G-TTBL_8.5x11

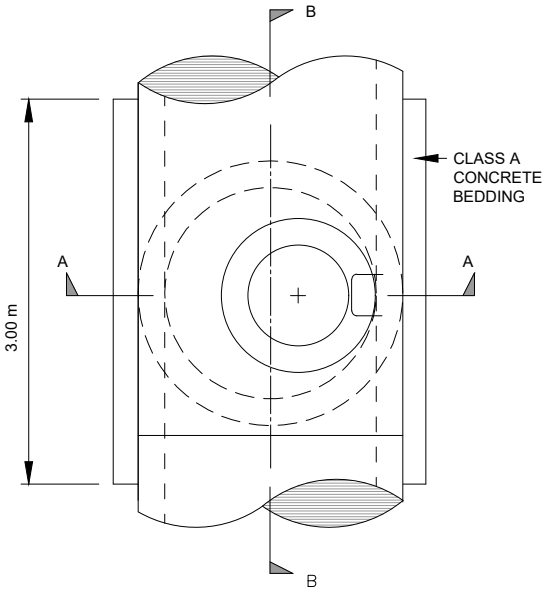
STANDARD DETAIL	5-202	
Date:	NOV, 2020	Rev. 0



CONICAL TOP



FLAT TOP



PLAN

NOTES:

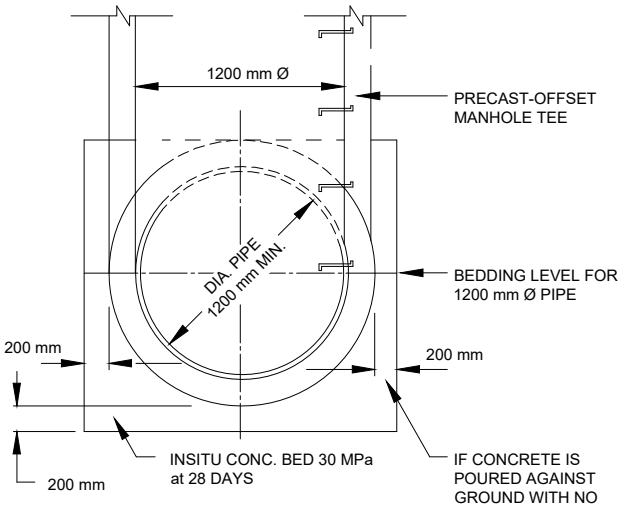
(1) CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO M.H. COVER EXCEEDS 2.0 m.

(2) PRECAST RINGS, CONES AND BARRELS TO MEET CURRENT A.S.T.M. C478 STANDARDS.

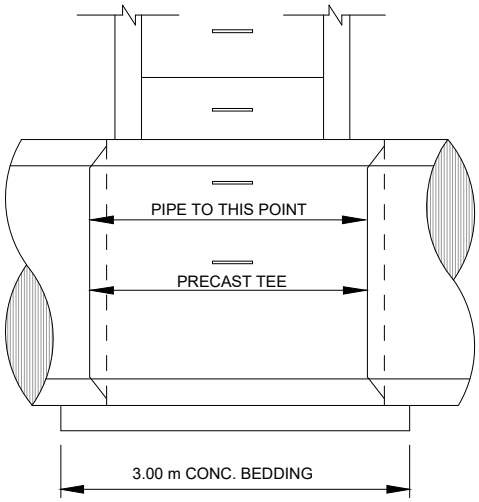
(3) VERTICAL SIDE OF CONICAL TOP TO BE SITUATED SO AS NOT TO CONFLICT WITH PIPING.

(4) F-80 FRAME AND COVER FOR ASPHALT AREAS.
F-39 FRAME AND COVER FOR OFF ROAD AREAS.
F-90 FRAME AND COVER WITH GASKET FOR SANITARY MANHOLES IN SAG LOCATION

(5) CONTRACTOR TO PROVIDE SHOP DRAWINGS.



SECTION A-A



SECTION B-B

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

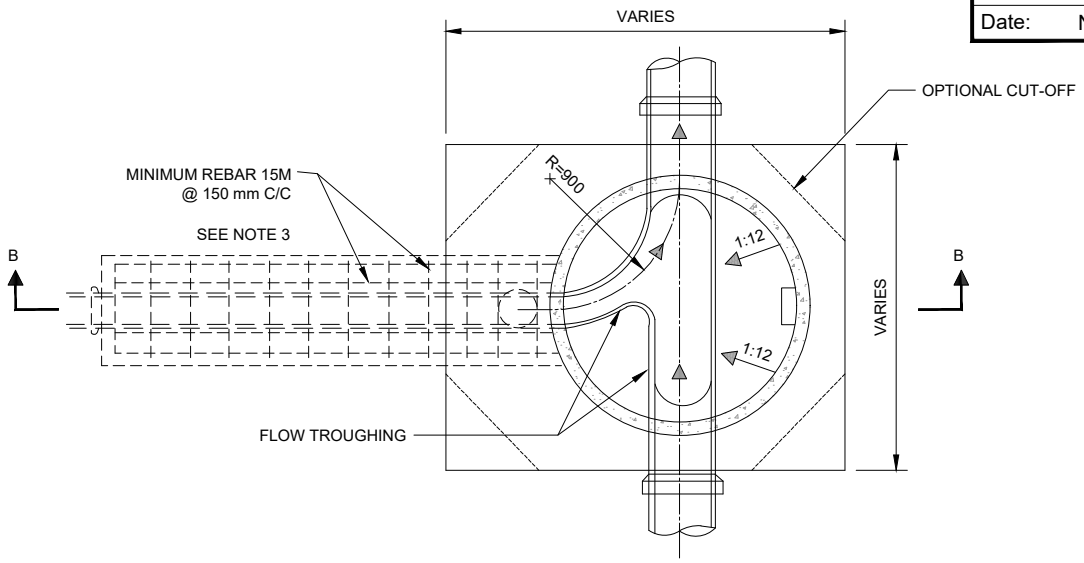
Gateway to the Rockies
HINTON

TOWN OF HINTON

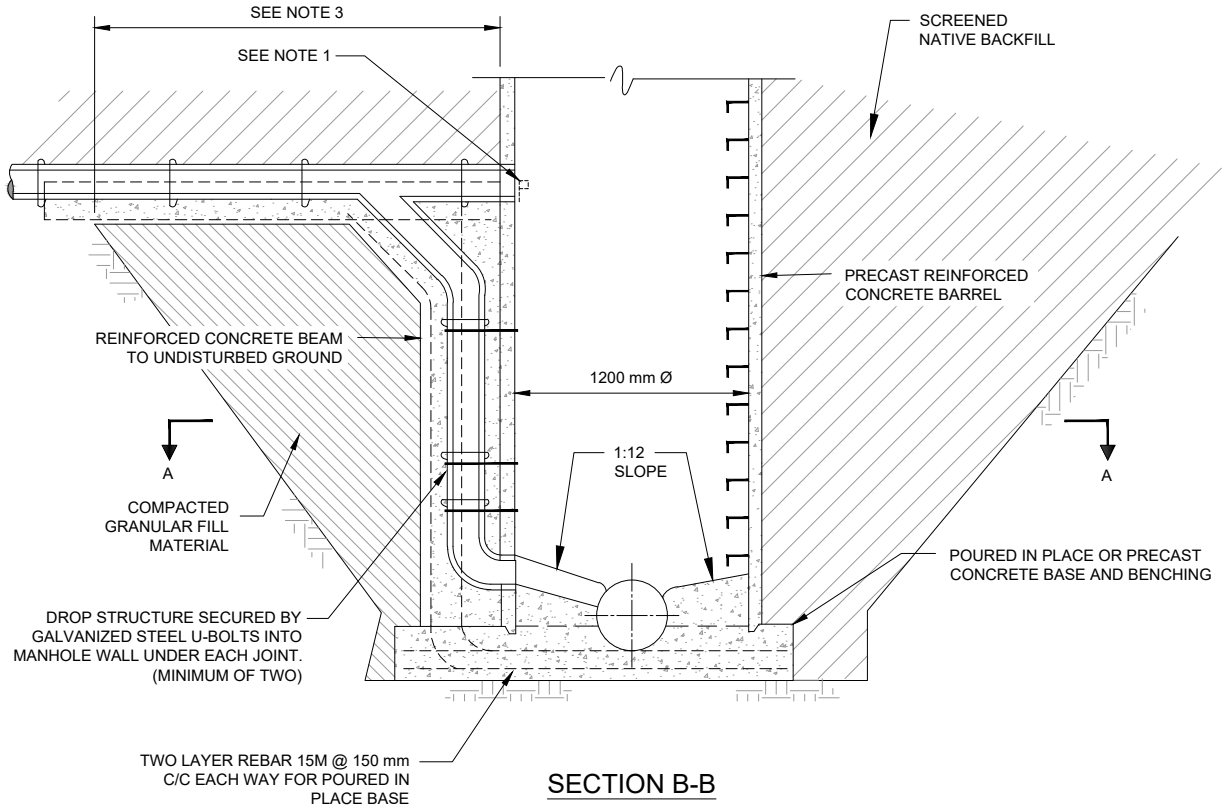
Tee-Riser Manhole

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_5-202.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	5-203	
Date:	NOV, 2020	Rev. 0



PLAN A-A



SECTION B-B

NOTES:

(1) ½ CAP, SECURED WITH SS 304 SCREWS AT 3, 6, AND 9 O'CLOCK, IMPEDING WATER FROM FLOWING OUT END OF TEE BUT NOT OBSTRUCTING FLOW IN CASE OF BLOCKAGE.

(2) CONCRETE SHALL BE A MINIMUM OF 30MPa COMPRESSIVE STRENGTH, TYPE HS.

(3) WHERE SPAN EXCEEDS 4.5 m CONSTRUCT 300 mm Ø. CONCRETE COLUMNS (SONOTUBES) SUPPORTS AT 3.5 m O.C.

(4) CHANNELIZATION AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS AND LINED WITH PVC.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

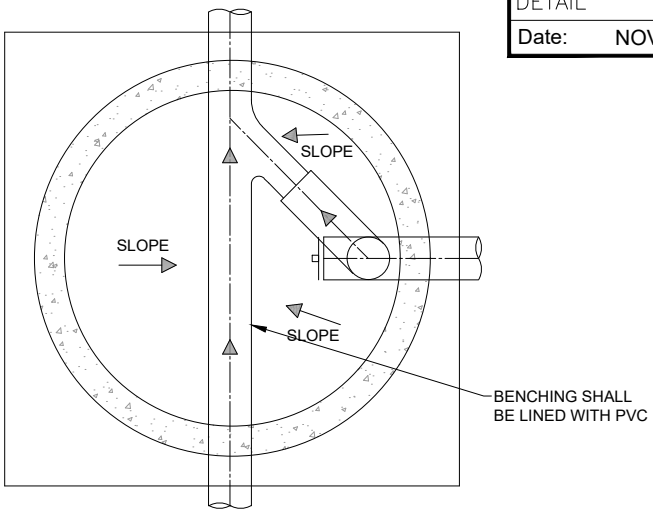
Gateway to the Rockies
HINTON

TOWN OF HINTON

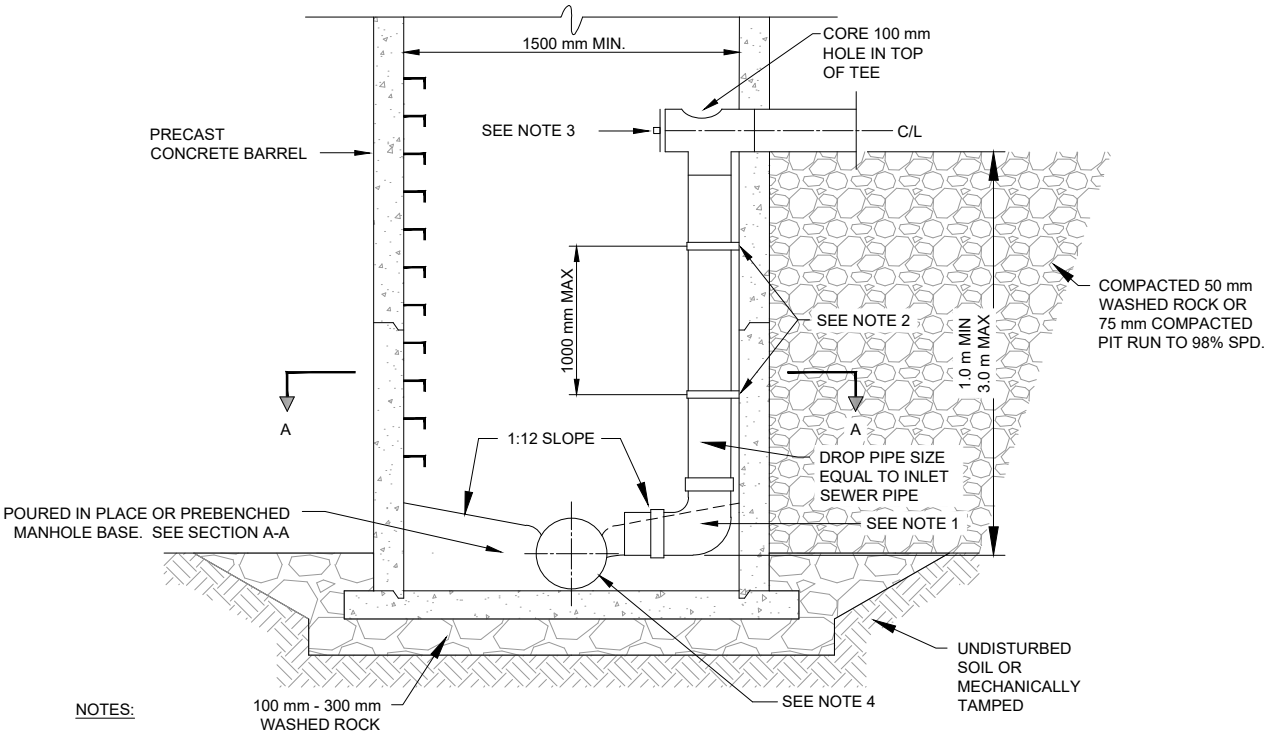
External Drop Manhole

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_5-203.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	5-204	
Date: NOV, 2020		Rev. 0



SECTION - A-A



NOTES:

(1) ELBOW EMBEDDED IN CONCRETE BENCHING AT 45° IN FLOW DIRECTION OF SEWER.

(2) CLAMPING BRACKETS (MIN 2) ARE TO BE STAINLESS STEEL (TYPE 304 - 11 GAUGE) AND SECURED TO THE STRUCTURE WITH TWO STAINLESS STEEL BOLTS.

(3) 1/2 CAP, SECURED WITH SS 304 SCREWS AT 3, 6 AND 9 O'CLOCK, IMPEDING WATER FROM FLOWING OUT END OF TEE BUT NOT OBSTRUCTING FLOW IN CASE OF BLOCKAGE.

(4) DROP CONNECTION INVERT WILL MATCH THE SPRING LINE OF EXIT PIPE.

(5) SIZE DIAMETER OF MANHOLE TO PROVIDE A 600 mm CLEAR ACCESS PATH.

(6) INTERNAL DROP PIPES FOR SERVICES ARE NOT PERMITTED

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

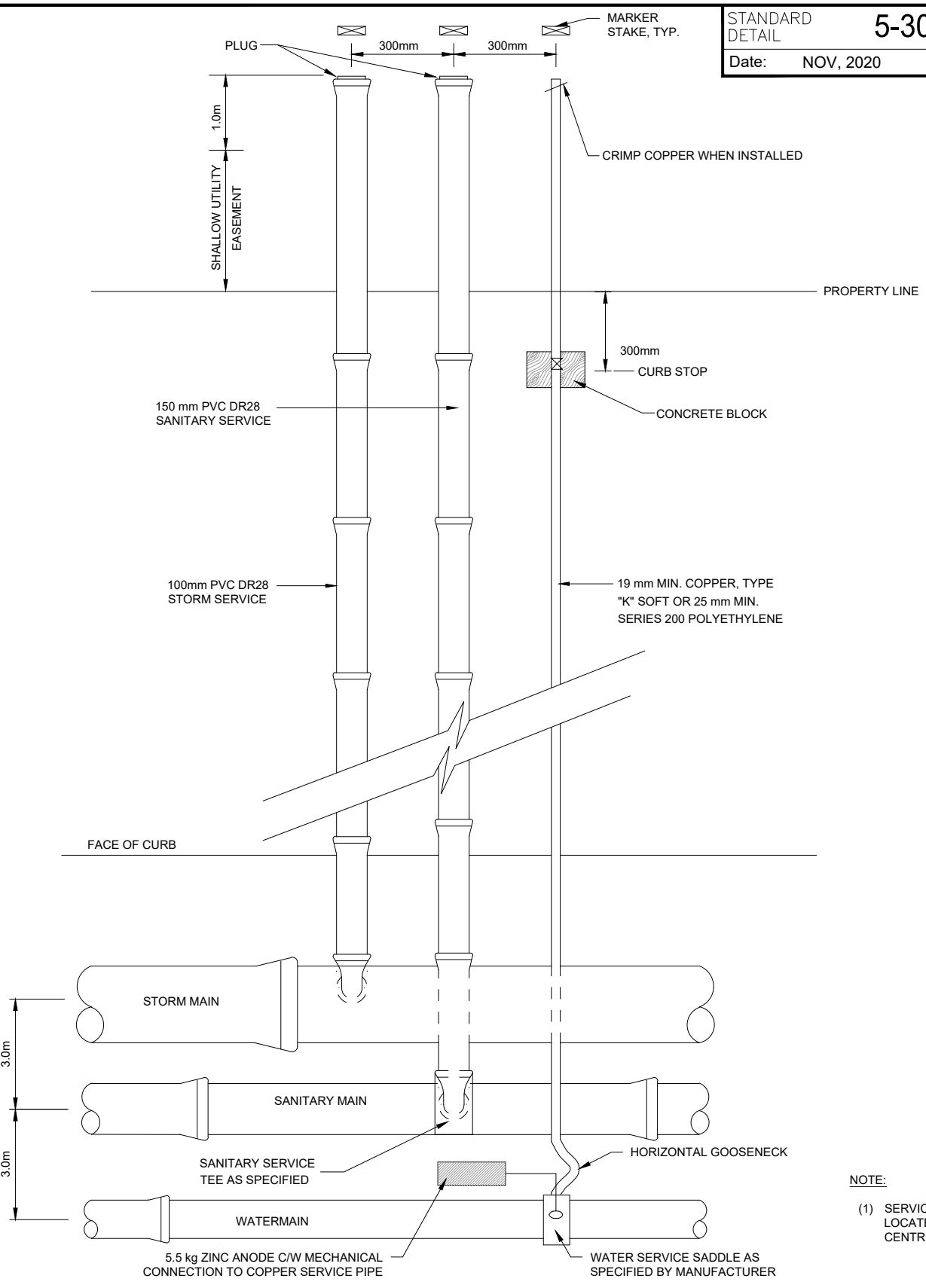
Gateway to the Rockies
HINTON

TOWN OF HINTON

Internal Drop Manhole

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_5-204.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	5-300
Date: NOV, 2020	Rev. 0



NOTE:

(1) SERVICES ARE TO BE LOCATED AT THE CENTRE OF THE LOT.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

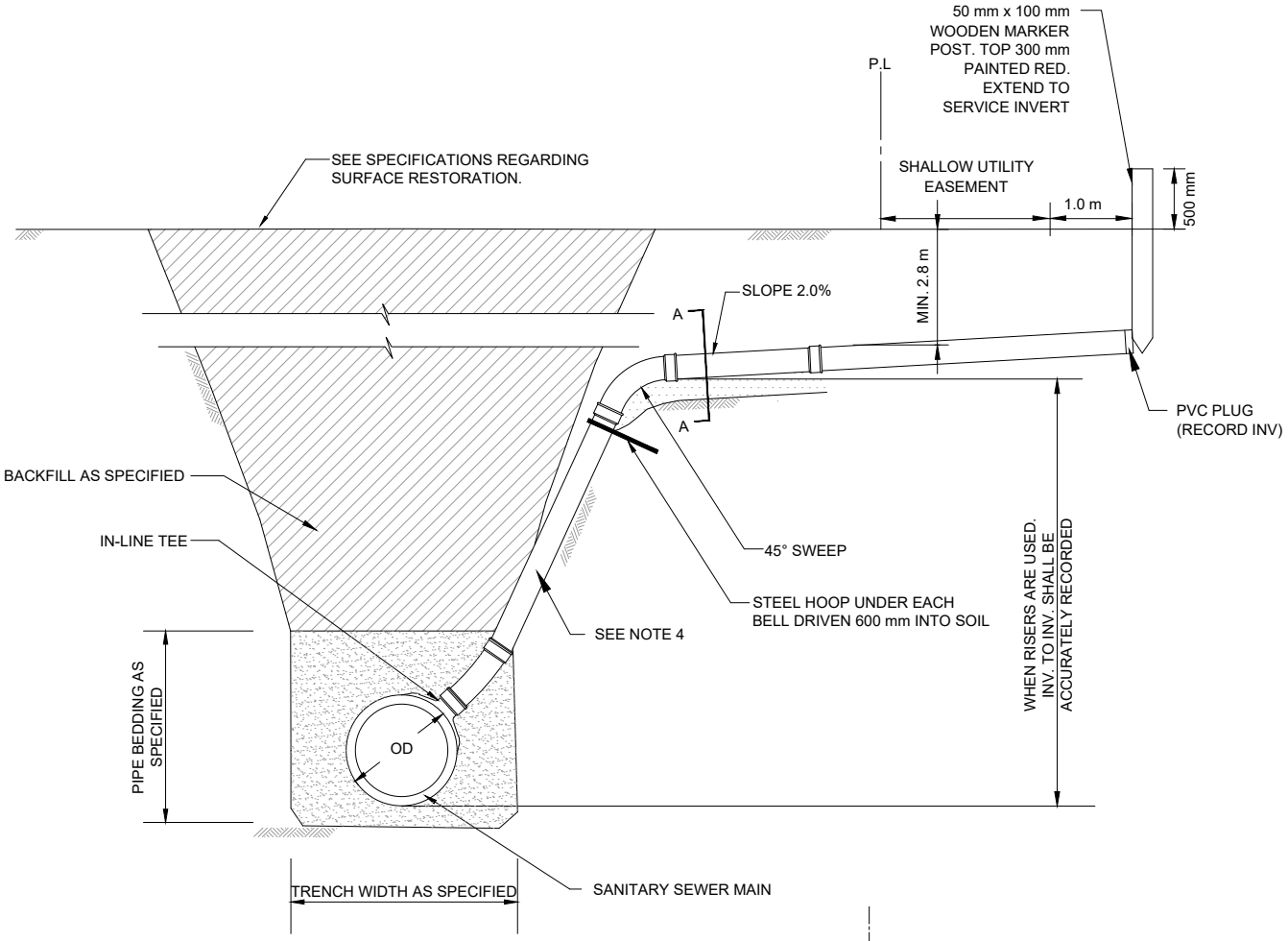
Gateway to the Rockies
HINTON

TOWN OF HINTON

Single Service Layout

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_5-300.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	5-400	
Date:	NOV, 2020	Rev. 0



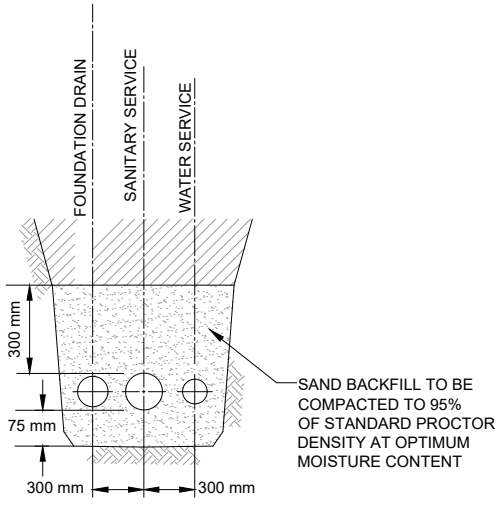
NOTES:

(1) ALL TRENCH WALLS SHALL BE SLOPED OR SHORED IN CONFORMANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY REGULATIONS CURRENTLY IN EFFECT, OR AS PER GEOTECHNICAL RECOMMENDATIONS, WHICHEVER IS MORE STRINGENT.

(2) OD = OUTSIDE PIPE DIAMETER.

(3) SERVICE CONNECTIONS TO BE MADE AT THE 10:00 AND 2:00 POSITIONS.

(4) RISERS FOR SERVICE LINES ARE REQUIRED WHEN SEWER MAINS EXCEED 4.0 m IN DEPTH.



SECTION A-A

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

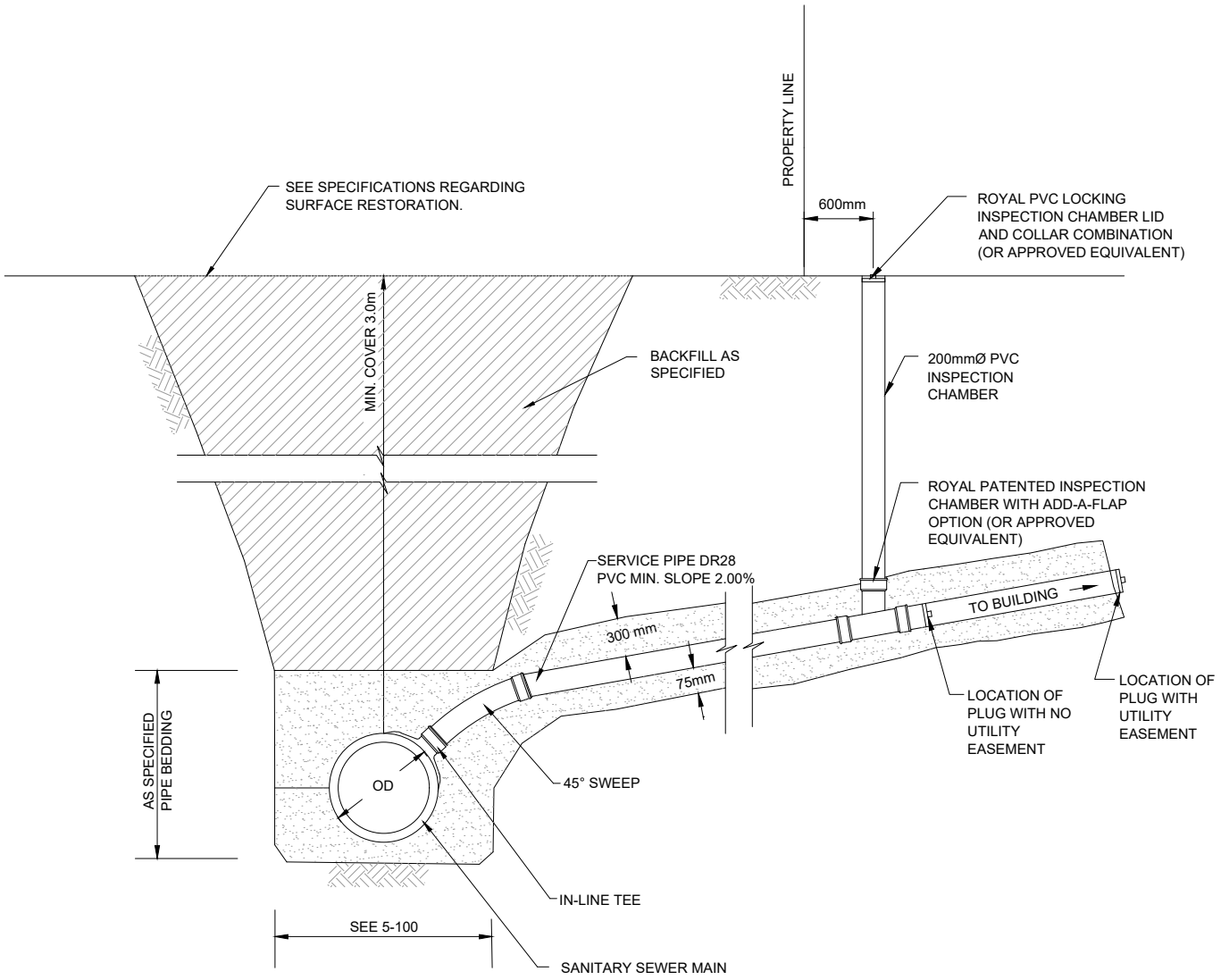
Gateway to the Rockies
HINTON

TOWN OF HINTON

Sanitary Service Connection

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_5-400.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	5-500	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) ALL TRENCH WALLS SHALL BE SLOPED OR SHORED IN CONFORMANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY REGULATIONS CURRENTLY IN EFFECT, OR AS PER GEOTECHNICAL RECOMMENDATIONS, WHICHEVER IS MORE STRINGENT.

(2) OD = OUTSIDE PIPE DIAMETER.

(3) SERVICE CONNECTIONS TO BE MADE AT THE 10:00 AND 2:00 POSITIONS.

(4) RISERS FOR SERVICE LINES ARE REQUIRED WHEN SEWER MAINS EXCEED 4.0m IN DEPTH.

(5) SANITARY INSPECTION CHAMBERS ARE ONLY TO BE USED WHEN SPACE IS LIMITED AND WILL NOT PERMIT THE INSTALLATION OF A SAMPLING MANHOLE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies
HINTON

TOWN OF HINTON

Sanitary Inspection Chamber

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_5-500.dwg by
Xrefs: TH-G-TTBL_8.5x11

6 STORM DRAINAGE SYSTEMS

6.1 General

These standards cover the requirements for storm drainage systems and shall be dependent on the type of development, the drainage area, and the length of surface drainage runs. Standard Details relating to the storm drainage system construction are provided at the end of this section.

6.2 Stormwater Management Plan

Stormwater runoff generated from within the subdivision shall be routed through a stormwater management facility as required to regulate the rate of outflow prior to discharge, unless otherwise accepted by the Town.

Stormwater management facilities shall be designed in accordance with the "Stormwater Management Guidelines" prepared by Alberta Environment and in accordance with good engineering practice. Evaporation ponds are not permitted and will not be accepted by the Town.

A phased construction approach to match the expected development sequence may be acceptable to the Town, provided the requirements of this guideline are met. Temporary ponds and structures, without the required facilities and design components per this guideline, are not acceptable.

Prior to submission of any detailed design, a stormwater management plan shall be prepared by the Developer and submitted to the Town for acceptance. The stormwater management plan shall be consistent with the standards outlined herein and shall:

1. Identify the impact of the proposed development on the watershed.
2. Identify and quantify the amount of upstream drainage entering the proposed development lands, including all points of entry.
3. Identify all existing flow channels, drainage patterns or routes, and containment areas.
4. Identify the point(s) of discharge from the lands, as well as the type and calculated capacity of the receiving drainage facility(ies), whether natural, man-made, or a combination of both.
5. Provide details of required stormwater retention / detention facilities.
6. Provide details of water quality enhancement facilities.
7. Identify all licensing requirements and/or approvals as may be required by Provincial or Federal environmental acts.

6.3 Minor and Major Systems

Each drainage system shall consist of the following components:

1. **Minor System**: pipes, open channels, and water courses which convey flows of a 5-year return frequency, without surcharging.
2. **Major System:** surface flood paths, roadways, and water courses which convey flows of a 100-year return frequency. The major system shall include culverts crossing roadways.

6.4 Design Flows

Design flows shall be computed using one or more of the following methods:

6.4.1 Rational Formula

$$Q = \frac{CIA}{360}$$

Where: Q = Design flow (m^3/s)
A = Drainage area (ha)
I = Rainfall intensity (mm/hr)
C = Runoff coefficient

The rational formula is applicable for minor system storm sewer main design for watersheds (less than 65 ha) which discharge into detention facilities or other outlets acceptable to the Town.

6.4.2 Hydrograph Methods

Computer modelling shall be used for stormwater drainage design for:

- Urban residential and Commercial / Industrial development areas greater than 65 ha in size.
- High Density Rural Residential and Commercial / Industrial development areas greater than 65 ha in size.
- Low Density Rural Residential development areas greater than 65 ha in size.
- Any development requiring storage or detention facilities.
- Alternatively, computer modelling may be used for areas smaller than those outlined above.

The 4-hour Chicago distribution hyetographs should be used for analysis of major and minor conveyance systems by computer simulation. When the design of stormwater management is involved, the 24-hour Huff distribution design hydrographs should be used.

Contact the Municipal Engineer prior to design to confirm the type of modelling software to be used in the design.

6.5 Runoff Coefficient, C

Runoff coefficients for storm events with return periods of up to 10-years shall be taken from Table 6-1.

Table 6-1
Runoff Coefficients for 5-Year and 10-Year Event Return Periods

Description	Runoff Coefficient		
	Minimum	Average	Maximum
Pavement (Asphalt or Concrete)		0.95	
Roofs		0.95	
Business			
Downtown	0.70	0.83	0.95
Neighbourhood	0.50	0.60	0.70
Industrial			
Light	0.50	0.65	0.80
Heavy	0.60	0.75	0.90
Residential			
Low Density Residential	0.40	0.50	0.60
Medium Density Residential	0.60	0.68	0.75
High Density Residential	0.50	0.60	0.70
Rural	0.25	0.33	0.40
Parks / Cemeteries	0.10	0.18	0.25
Playgrounds	0.20	0.28	0.35
Railroad Yards	0.20	0.28	0.35
Unimproved	0.10	0.20	0.30

Notes:

- Values within the range specified depend on the soil type if the watershed is significantly unpaved (sand is minimum, clay is maximum) and on the nature of the development.
- For storms with return periods of more than 10 years, increase the specified values as follows, up to a maximum coefficient of 0.95:
  - 25-Year: Add 10%
  - 50-Year: Add 20%
  - 100-Year: Add 25%

6.6 Rate of Precipitation

The most up-to-date Intensity-Duration-Frequency (IDF) curves published by EPCOR Drainage shall be used for design purposes. The 5-year IDF curve shall be used for the design of minor systems; the 100-year IDF curve shall be used for the design of major systems.

The time of concentration is the sum of the inlet time and travel time. Inlet time is the time required for runoff to become established and drain to the inlet of the storm sewer system. The inlet time shall be as per Table 6-2.

Table 6-2
Design Inlet Time

Catchment Area	Imperviousness (%)		
	30	50	>70
8 ha or less	8 mins	8 mins	5 mins
Between 8 ha and 40 ha	9.2 mins	9.2 mins	6 mins
40 ha or greater	10.4 mins	10.4 mins	7.25 mins

Travel time is the time required for the flow to travel within the storm sewer system to the design location. Travel time shall be determined based on the part-full velocity in each pipe upstream of the design location.

6.7 Rough Grading

1. To provide basic positive drainage until a lot is developed, the lot(s) shall be rough graded, allowing for earth balancing of future basement excavation and landscaping. Rough grading shall ensure positive drainage is maintained in the interim; the Developer shall be responsible to remove and properly dispose of standing water on lots. Rough-grading of lots to ensure positive drainage is required prior to requesting a CCC inspection.
2. Rough grading shall be carried out without damage to the root and branch systems of existing plant material to be retained.
3. All sites requiring topsoil shall be rough graded to within 150 mm of final grade.
4. At the toes of slopes and banks, grades shall be smoothly rounded to a minimum slope of 8H:1V. All slopes, banks and disturbed areas, as a result of the development, are to be feathered to meet with existing grades.
5. The maximum allowable slope for berms shall be 4H:1V, unless otherwise acceptable to the Town. Slopes of 3H:1V may be acceptable in areas of minimal pedestrian traffic and for the side slopes of drainage swales. Slopes of 3H:1V must be acceptable to the Town.
6. All fill material required for rough grading shall be free of sticks, stones, and debris greater than 7 cm and any other material which may be subject to rot or corrosion.
7. The Developer shall be responsible for clean-up after rough grading operations; the area around the lot being graded shall be left in a developable condition.

6.8 Final Site and Lot Grading

The following criteria shall be used:

1. Each lot shall be graded to drain to the municipal storm drainage system. Cross-lot drainage is not permitted.
2. Where feasible, lot grading plans shall be prepared such that rear-to-front drainage is provided throughout the subdivision.
3. Split drainage or front-to-back drainage is only permitted when the lot is located such that there is a road, lane, public right-of-way, or stormwater management facility at both the front and back of the lot. Front-to-back drainage shall slope from the property line; i.e., drainage within a municipal right-of-way shall be contained within the municipal right-of-way and shall not drain through private property.
4. Areas around buildings shall be graded away from the foundations to prevent flooding. Refer to Standard Details 6-400 and 6-401 for typical grading requirements.
5. Lots lower than adjacent roadways shall be avoided where possible.
6. Building foundations shall be above the major system hydraulic grade line for a 100-year storm event, plus a minimum of 0.3 m freeboard. This requirement may not apply to replacement of structures / developments within existing flood plains. In these areas, suitable precautions, such as mounting electrical panels above the 1:100-year hydraulic grade line, shall be taken.
7. Reserves and public lands shall be graded to drain towards developed streets, lanes, and/or the storm drainage system.

6.9 Lot Grading Tolerances

1. The Developer shall ensure that all lots are graded in accordance with the accepted lot grading plan.
2. Rough grading tolerance: 150 mm below finished grade.
3. Final grading tolerance: ±25 mm from finished grade.

6.10 Foundation Drains

Foundation drain sewers are required in all areas without a storm sewer and shall discharge to the nearest downstream storm sewer. The system shall be dedicated to the collection of foundation drain flows produced from basement sump pump discharge only.

Roof drains shall discharge to surface and shall not be connected to the foundation drain sewer.

A sump pump, in the basement with a pressure discharge connection to a foundation drain service riser pipe on the outside of the building foundation, and a foundation drain service connection pipe from the riser connection at the house to the property line are required (refer to Standard Detail 6-200). The pressure discharge connection to the gravity foundation drain service riser pipe shall be provided with a cleanout and an overflow discharge to a concrete splash pad. Installation and maintenance of these on-lot components are the responsibility of the homeowner.

The remainder of the system components are located within road right-of-way or a PUL and consist of:

1. Foundation drain service from the property line to the storm sewer, or
2. Where there is no storm sewer in the street, a foundation drain sewer shall be installed to permit connection of foundation drain services to the nearest downstream storm sewer. Manholes shall be provided for the foundation drain sewer at a maximum spacing of 120 m.

The following criteria shall be used:

1. Under no circumstances shall a foundation drain service be discharged to the sanitary system.
2. The depth of the foundation drain service shall be 2.4 m from the finished grade to the crown of the service at the property line. In areas where it is not feasible to provide a minimum depth of cover of 2.4 m, evaluate alternative solutions with the Municipal Engineer.
3. The depth of the foundation drain sewer shall be adequate to receive the drainage from the foundation drain service such that the service can be connected to the sewer above its mid diameter, within 45 degrees of the pipe crown. A minimum of 2.4 m of cover, measured from the finished grade to the crown of the sewer, must be provided. In areas where it is not practical to provide a minimum depth of cover of 2.4 m, evaluate alternative solutions with the Municipal Engineer.
4. Size the foundation drain sump pump discharge collection system to provide the capacity in free flow based on all connected sump pumps operating simultaneously.
5. The minimum size and grade of the foundation drain sewer shall be 200 mm and 0.60%, respectively. The respective minimum size and grade of the foundation drain service shall be 100 mm and 1.0%, respectively.

The Developer's Consultant shall estimate weeping tile flows as part of the detailed geotechnical investigation.

1. The geotechnical investigation shall include an assessment of the pre-development subsurface soil and groundwater, and the anticipated post-development conditions. The geotechnical investigation shall estimate weeping tile flows and define any special design and construction measures to be taken for foundations or other infrastructure that may be impacted by weeping tile flows.
2. Where significant flows are anticipated from the foundation drain sewer system, these flows shall be added to the flows used to size the storm sewers to ensure an adequate level of service is provided by the storm system.
3. Where high flows are expected such that sump pumps will be required to pump continuously, or run excessively, the Developer shall present alternative solution(s) to the Town.

6.11 Roof Drainage

1. Roof drainage from one-family and two-family dwellings shall be discharged to the ground and dispersed via splash pads at the downspouts. The point of discharge shall be a minimum of 1.2 m away from the building (including downspout extensions) to ensure positive drainage.
2. Roof drainage from multi-family, Commercial, and Industrial areas may discharge to the storm sewer where the new and existing systems are designed to accommodate the direct discharge and only if acceptable to the Town.

6.12 Retaining Walls

6.12.1 Sideyard Retaining Walls

Where differences in elevation of abutting lots require the construction of a retaining wall, such shall be indicated on the detailed engineering drawings. No Development / Building / Occupancy Permits will be issued without submission of the detailed design, for each retaining wall, for review by the Town. Retaining walls shall be within a 6.0 m wide drainage easement registered in favour of the Town of Hinton. The retaining wall shall be placed such that it is located on the lot with the higher ground elevations, with the face of the retaining wall coinciding with the shared property line. Refer to Standard Detail 6-900.

6.12.2 Retaining Walls Along Rear of Properties

Where differences in elevation of several abutting lots require the construction of a retaining wall, such shall be indicated on the detailed engineering drawings. No Development / Building / Occupancy Permits will be issued without submission of the detailed design, for each retaining wall, for review by the Town. Retaining walls shall be within a 6.0 m wide drainage easement registered in favour of the Town of Hinton. The retaining wall shall be placed such that it is located on the lots with the higher ground elevations, with the face of the retaining wall coinciding with the rear property line. Refer to Standard Detail 6-901.

6.13 Flow Capacities

6.13.1 Storm Sewers and Open Channels

Manning's formula shall be used to calculate pipe capacity:

$$Q = (AR^{(2/3)}s^{0.5}) / n$$

Where: Q = Pipe capacity (m^3/s)
A = Cross-sectional area of pipe (m^2)
R = Hydraulic radius (area / wetted perimeter) (m)
s = Slope of hydraulic grade line (m/m)
n = Roughness coefficient = 0.013 for smooth-walled pipe (for example: PVC, concrete)
= 0.024 for corrugated steel pipe (unpaved)
= 0.020 for corrugated steel pipe (invert paved)
= 0.033 for gravel lined channels
= 0.020 for concrete or asphalt lined channels
= 0.05 for natural streams and grassed channels

6.13.2 Culverts

Use the inlet control and outlet control methods referred to in:

1. The Handbook of Steel Drainage and Highway Construction Products, by the Corrugated Steel Pipe Institute
2. The Handbook of Concrete Culvert Pipe Hydraulics, by the Portland Cement Association
3. Design Guidelines for Bridge Size Culverts, by Alberta Transportation

6.14 Pipe Location

1. Storm sewer mains shall be located within the municipal road right-of-way as per the typical cross-sections (Standard Details 4-100 through 4-108).
2. Utility rights-of-way shall be provided for all utilities not located within road rights-of-way or PULs.
    - Minimum width of 4 m is required for one utility
    - Minimum width of 6 m is required for two utilities
    - Minimum width of 8 m is required for three utilities
    - A 1.5 m wide Easement is required on each side of a utility right-of-way
3. Service connections, if accepted, should be located adjacent to sanitary service connections at property line and shall be as shown on Standard Detail 5-300.
5. Services shall be located under landscape areas, as close to the centre of the property as possible.
6. Storm sewer mains shall maintain the following clearances from watermains, sanitary sewers, and power / telephone / cable infrastructure:
    - Minimum 3.0 m horizontal clearance unless sewer depth requires increased spacing; and
    - Minimum 0.5 m vertical clearance above or below at crossings.

6.15 Minimum Depth of Cover

The minimum depth of cover, to pipe crown, shall be as follows:

- Storm sewers in roads: Minimum 2.4 m
- Culverts across roads: Greater of half the culvert diameter or 500 mm
- Catch basin leads at the catch basin: Minimum 1.8 m
- Landscaped areas: Minimum 2.1 m

When it is not feasible to provide the required depth of cover from finished surface to pipe crown, the sewer shall be insulated as per Standard Detail 7-700.

6.16 Minimum Pipe Diameter

1. Storm Sewers: 300 mm
2. Culverts crossing roads: 500 mm
3. Catch Basin Leads: 250 mm
4. Foundation Drain Sewers: 200 mm
5. Foundation Drain Services: 100 mm

6.17 Minimum Velocity and Grade

6.17.1 Minimum Velocity

All storm sewers shall be designed with velocities ranging from 0.90 m/s to 1.0 m/s where feasible, based on Manning's formula, when flowing at the design (part-full) flow. Velocities below 0.60 m/s will not be allowed. Special design considerations are required when velocities exceed 3.0 m/s.

6.17.2 Minimum Grade

Minimum pipe grades for sewers along a straight alignment are indicated in Table 6-3; however, steeper grades are preferred.

Table 6-3
Minimum Grade for Storm Sewers Along a Straight Alignment

Pipe Size (mm)	Minimum Grade
200	0.60% [1]
250	0.60% [1]
300	0.22%
375	0.15%
450	0.12%
525 and larger	0.10%

Note:

[1] Foundation drain sewers only.

6.18 Curved Sewers

1. Minimum grades of sewers along a curved alignment shall be 50% greater than the minimum grades outlined in Table 6-3.
2. Maximum joint deflections shall be as recommended by the pipe manufacturer.
3. Curved sewers shall be aligned parallel to the road centreline.

6.19 Manhole Spacing

1. Manholes shall be provided at the end of each line and at all changes in pipe sizes, grades, or alignment.
2. The maximum allowable distances between manholes for sewers along a straight alignment shall be as follows:
   - Sewers smaller than 900 mm: 120 m maximum spacing; and
   - Sewers 900 mm and larger: 150 m maximum spacing.
3. The maximum allowable distances between manholes for sewers along a curved alignment shall be as follows:
   - Sewers smaller than 1200 mm: 90 m maximum spacing; and
   - Sewers 1200 mm and larger: 120 m maximum spacing.

6.20 Hydraulic Losses Across Manholes

1. Generally, for increasing pipe diameters, the crown of the downstream pipe shall match crown of the upstream pipe; however, in no case will the upstream 0.8 depth point be below the downstream 0.8 depth point.
2. A smooth transition shall be provided between the inverts of incoming sewers and the outlet sewer and extreme changes in elevation at manholes should be avoided wherever possible.

3. The minimum drop in invert elevations across manholes shall be as follows:
   - Straight runs and deflections up to 45° 30 mm
   - Deflections between 45° and 90° 60 mm
   - Deflections greater than 90° shall be accommodated using two or more manholes.
4. Where drops greater than 1.0 m cannot be avoided, a specially designed drop manhole will be required to address the hydraulic requirements of the change in elevation. The following shall be considered in the design of the drop manhole:
   - The pipe shall be sized so that it does not surcharge.
   - A smooth vertical curve shall be formed between the inlet pipe and the drop shaft with no breaks in grade, projections, or edges.
   - The drop shaft diameter shall be equal to or greater in size than that of the largest inlet pipe. For multiple connections, a larger drop shaft shall be supplied.
   - Air vents shall be provided.
   - The cover shall be able to withstand pressures from air discharge and surcharging.
   - The outlet shall provide a hydraulic jump basin to dissipate energy, to convert the flow to subcritical velocity and to allow for air release.
   - Baffled vertical drop shafts are generally not permitted due to potential Maintenance and access problems. Vortex type drop shafts are preferred. Proposals to use vortex type drop shafts must be supported by the appropriate design calculations and submitted to the Municipal Engineer for acceptance.

6.21 Manhole Abandonment

1. To abandon a manhole, plug all pipes with non-shrink grout, remove and dispose of manhole to 1.0 m below ground and fill remainder with fillcrete.

6.22 Catch Basins

1. Catch basins shall be of sufficient number and have sufficient inlet capacities and adequate catch basin leads to receive and convey the calculated stormwater flow.
2. Catch basins shall be provided to intercept surface runoff and shall be spaced a maximum of every 120 m. The maximum flow distance to first catch basin shall be 150 m.
3. Wherever possible, catch basins shall be installed upstream of crosswalks.
4. All catch basin bodies shall be of precast concrete sections conforming to the most recent ASTM specifications and constructed to provide a 500 mm sump to trap rocks and gravel.
5. All catch basin sections shall have flexible watertight joints sealed with rubber gaskets conforming to ASTM C443.
6. Precast catch basins shall have pre-cored connection holes and watertight Duraseal or G-Loc joints or approved equal.
7. Catch basin leads shall be installed to provide a minimum depth of cover of 1.8 m, measured from finished grade to pipe crown, unless otherwise accepted. The minimum slope of catch basin leads shall be 2%.
8. Catch basin leads shall generally discharge directly into stormwater manholes. Catch basins may be connected in series, provided that the downstream catch basin is a catch basin manhole which discharges into a stormwater manhole.

9. The maximum length of a catch basin lead shall be 18 m. Where catch basin leads in excess of 18 m in length are required, a catch basin manhole must be installed to intercept surface runoff.
10. To abandon a catch basin, follow the procedure for the abandonment of manholes as outlined in section 6.21.
11. Catch basin grade rings and the catch basin frame shall be installed within 50 mm of plumb with catch basin shaft. A clear distance of 810 mm must be provided within the catch basin.

6.23 Roadway Base Drainage

6.23.1 Wick Drains

1. All streets shall be constructed to have continuous longitudinal subgrade drainage (wick drains).
2. Wick drains shall be Nilex Nudrain MD7407, or approved equal, and shall be installed adjacent to the curb line at the bottom of the granular base course, on both sides of all roads or along the centreline of lanes.
3. Wick drains shall generally be installed at the same grade as the curb and gutter; in no case shall the grade of the wick drain be less than 0.6%.
4. Wick drains shall be connected to catch basins.

6.23.2 Transverse Drains

1. Transverse drains shall be installed where required, as per the recommendations in the geotechnical investigation, to ensure drainage continuity.
2. Transverse drains shall have a minimum diameter of 100 mm and shall consist of perforated pipe, wrapped in filter cloth, and shall be installed in a free draining trench.
3. The type and class of pipe shall be selected based on anticipated traffic loading and depth of bury.
4. Trenches excavated for transverse drains shall be backfilled using washed rock; refer to section 5.17.4 for gradation requirements.
5. Transverse drains shall be connected to the storm drainage system at catch basins or manholes.
6. The subgrade drainage system shall be constructed such that a free draining linkage is provided directly between the roadway granular base course and the subgrade drainage trench.

6.24 Swales and French Drains

1. Swales are required to intercept runoff between adjacent private properties where the overall gradient of the land is perpendicular to the property lines.
2. Swales servicing three or more lots must be within a registered drainage Easement.
3. Grass swales may be used for longitudinal slopes of at least 2%, with provision for erosion protection. Concrete swales shall be used where the longitudinal slope of the swale is less than 2%.
4. Drainage Easements of a minimum 3.0 m width are to be registered with the Plan of Subdivision. Restrictive covenants are also required to be registered on titles of private properties where the drainage Easements and related infrastructure are installed.
5. Design consideration shall be given to the proper interception of lateral flow into the swale, and the discharge of the flow across sidewalks at the ends of the swale.
6. Concrete swales are required when the length of a grass swale would exceed 100 m, and for all swales designed to accommodate flows from three or more lots.

7. French Drains, if required, shall be constructed as per Standard Detail 6-800.

6.25 Culverts and Rural Drainage

Ditches and culverts shall be designed to convey the 1:100 year flow. The 1:100 year flow shall be contained within the ditch with no flooding of the road surface or adjacent properties. The minimum floor elevation for lots adjacent to a ditch shall be 0.3 m above the 1:100 year water elevation.

The minimum allowable ditch grade shall be 0.6%. Ditch grades in excess of 2.0% shall be protected against erosion through rock ditch checks, silt fences, Enviroberm fences, and/or erosion control blankets. Steep ditches may require drop structures.

The minimum ditch bottom width shall be 1.5 m, sloping away from the roadway at a minimum of 5.0%.

Culvert size requirements shall be determined through the stormwater drainage analysis; however, the minimum size of culverts shall be as follows, and in no case shall a culvert less than 400 mm diameter be installed, except in retrofit situations, subject to acceptance by the Town.

- Roadway cross culvert: 600 mm
- Residential driveway culvert 600 mm
- Industrial driveway culvert 600 mm

Culverts shall be new galvanized CSP (corrugated steel pipe) with a minimum wall thickness of 1.6 mm, or as required by the loading criteria, and a profile of 68 mm x 13 mm. Other acceptable materials for culverts include concrete and ultra-rib. All culverts shall be installed in accordance with the manufacturer's recommendations and shall be installed complete with bevelled end sections, on both the inlet and outlet ends, with the invert extended to the toe of the side slope. Steel marker posts shall be installed at culvert ends, for location purposes, and shall extend to 1 m above road centreline elevation.

Box culverts may also be acceptable to the Town, provided that the Developer’s Consultant provides sufficient supporting documentation outlining the design and construction considerations.

Culverts shall be installed to provide a minimum depth of cover of 500 mm or one-half (½) the culvert diameter, whichever is greater, as measured from finished grade to the top of the culvert.

Riprap shall be placed around the inlet and outlet of all culverts; refer to Standard Detail 6-600 at the end of this section. Generally, Alberta Transportation Class 1M riprap, meeting the requirements of Table 6-4, shall be used; however it is the responsibility of the Developer’s Consultant to select a class of riprap appropriate to the site and flow conditions.

Table 6-4
Class 1M Riprap Requirements

Criteria	Value
Nominal Mass	7 kg
Nominal Diameter	175 mm
None greater than	40 kg 300 mm
20% to 50%	10 kg 200 mm
50% to 80%	7 kg 175 mm
100% greater than	3 kg 125 mm

Geotextile filter fabric shall be a non-woven fabric with the following minimum properties:

- Grab Strength: 650 N
- Elongation (Failure): 50%
- CBR Puncture Strength: 1,800 N
- Burst Strength: 2.1 MPa
- Trapezoidal Tear: 250 N
- Minimum Fabric Overlap: 300 mm

6.26 Pipe, Manhole, and Bedding Materials and Specifications

6.26.1 Pipe

The Developer's Consultant is responsible to ensure that the selected pipe material and class is suitable for the proposed application (site conditions, bedding, depth of installation, etc.).

Alternative pipe materials will be evaluated through a variance request submitted by the Developer's Consultant. Developer's Consultant shall provide a justification for the request for variance. Alternative pipe materials shall not be installed without receiving written authorization from the Town.

Table 6-5
Acceptable Pipe Materials

Material	Specifications
Reinforced Concrete	CAN/CSA A257.2
PVC	ASTM D3034, CSA B182.2, Class DR35
Ultra-Rib	ASTM F794, CSA B182.4, 320 kPa minimum stiffness
Corrugated Steel Pipe (culverts only)	CSA-G401, stiffness AASHO-M-36

6.26.2 Manholes

1. Precast manhole sections and grade rings shall conform to CAN/CSA A257.4 and shall be manufactured using sulphate-resistant Type 50 cement; refer to Standard Detail 5-200.
2. Manhole sections shall be precast reinforced concrete sections conforming to ASTM C478 and CSA A257.4. All precast units shall be marked with manufacturer's identification, date of casting, type of cement, and CSA standard.
3. Manhole steps shall be standard safety type, aluminium forged of 6061-T6 alloy having a minimum tensile strength of 260 MPa.
4. All manhole sections shall have flexible watertight joints sealed with rubber gaskets conforming to ASTM C443 and grouted inside and outside with non-shrink grout.
5. Manholes shall be fitted with the appropriate cast-iron frame and cover conforming to Class 35B ASTM A48. All castings shall be true to form and dimension, and shall be free from faults, sponginess, cracks, blowholes, or other defects affecting their strength.
6. Manhole frames and covers shall be exposed when located in landscape areas.
7. Pre-benched manhole bases shall be used wherever possible with pre-cored connection holes and watertight Duraseal or G-Loc joints or approved equal.
8. Benching shall be PVC-lined.
9. Tee-riser manholes shall conform to CSA 257.2 / ASTM C76 for the pipe component and CSA A257.4 / ASTM C76 for the manhole riser component.
10. Perched manholes are required when adding a manhole along an existing storm sewer.
11. Internal drop pipes for services are not permitted. If a drop manhole is required for a service, an external drop pipe shall be used as per Standard Detail 5-203.

6.26.3 Bedding Materials

Bedding material shall be in accordance with section 5.17.4.

6.27 Outfall Structures

1. A hydraulic analysis is required for outfalls to ensure that exit velocities will not negatively impact natural watercourses. Final velocities into a natural drainage course shall not exceed 1.5 m/s.
2. Appropriate erosion control measures, including energy dissipaters, are to be provided downstream of the outfall.
3. All storm sewer outfalls shall be constructed with lockable grates to allow Maintenance but prevent entrance of unauthorized personnel. Where required, guardrails, and/or fences shall be installed to provide fall protection.
4. Outfall structures shall be designed with consideration of aesthetics as they are generally located within parks, ravines, and on riverbanks. Concrete end treatment is recommended. Refer to Standard Detail 6-500 at the end of this section.

6.28 Major Systems

6.28.1 Roadways and Overland Flow Routes

1. Ponding at sag locations along roadways shall not exceed 300 mm. The sag shall spill at a depth of 250 mm to allow for 50 mm of flow depth at the spill point from the sag during the maximum ponding of 300 mm.
2. Continuity of overland flow routes between adjacent developments shall be maintained.
3. The lowest building opening adjacent to roadways or overland flow routes shall be a minimum of 300 mm above the maximum water elevation.

6.28.2 Stormwater Management Facilities

Stormwater management facilities shall be designed to meet Alberta Environment guidelines and the following sections:

6.28.2.1 General Stormwater Management Facility Requirements

1. Stormwater management facilities shall be sized such that there will be storage for a 1:100-year storm event, plus adequate freeboard to contain the maximum historical event.
2. Stormwater management facilities shall control the release rate to the pre-development flow rate; refer to the Stormwater Master Plan, available on the Town's website. Should the downstream infrastructure or water body(ies) be unable to accommodate the restricted release rate, the release rate shall be further restricted based on the available downstream capacity.
3. The preference is that a maximum of two stormwater management facilities be used to manage the runoff from a quarter section. The Town may approve a variance from this criteria if suitable justification is provided by the Developer's Consultant.
4. All outflow piping shall be sized for a flow twice that of the maximum designed control flow.
5. Water release shall be controlled via an orifice or other accepted means and shall include provisions for increasing the release rate in an emergency.
6. The minimum floor elevation for lots surrounding a stormwater management facility shall be 0.3 m above the high water level. The lowest building opening for lots surrounding a stormwater management facility shall be 0.5 m above the high water level.
7. An emergency overland drainage swale shall be provided from the downstream end of the stormwater management facility to the receiving stream with capacity to transport storm runoff should a downstream malfunction occur.
8. If an emergency overland flow path to the receiving channel is not feasible, the stormwater management facility shall be sized to be able to accommodate two back-to-back 1:100-year storm events. This may be achieved by proving that the combined available storage in the active zone and freeboard zone are sufficient to store the second 1:100-year storm event after 96 hours. If the drawdown time from the first 1:100-year storm event is longer than 96 hours, the Developer's Consultant shall take into consideration that the full active storage zone is not available for the second storm event.
9. Wet ponds and constructed wetlands require warning signs, posted along the perimeter of the PUL, to prohibit activities that may present a danger to public health and safety or interfere with the operation of the facility.

10. Stormwater management facilities require an outlet control structure. The Developer's Consultant shall submit a design for all outlet control structures, detailing:
    - Size and configuration of concrete chamber;
    - Types of hatches (must be lockable);
    - How the structure will be accessed for Maintenance (all-weather access suitable for a hydro-vac truck is required);
    - Locations of safety railings around the hatches;
    - Provision for kickplates at the base of railings;
    - Locations and models of davit bases (if required – Developer's Consultant to discuss this requirement with the Municipal Engineer);
    - Locations and models of water level control gates (if required); and
    - Location and size of orifice and provisions for increasing the release rate for rapid drawdown.
11. Discharge from stormwater management facilities shall be by gravity; no pumped discharge shall be permitted.

6.28.2.2 Design of Dry Ponds

1. Dry ponds (detention storage) temporarily store stormwater runoff to promote the settlement of runoff pollutants and to restrict discharge to predetermined levels to reduce downstream flooding and erosion potentials. They are often designed as two-stage facilities: the upper stage (flood fringe area) is designed to store large, infrequent storms; the lower stage (extended detention stage) is designed to store and promote sedimentation of smaller, more frequent storms. Unlike a wet pond; however, the lower stage is designed to empty completely between storm events. Low flows are not usually detained.
2. Dry ponds should only be used when topological or planning constraints exist which limit the use of wet ponds or constructed wetlands.
3. All dry ponds shall be offline storage. A low flow bypass shall direct storm runoff around the dry pond during minor rain events.
4. Dry ponds shall be located in a PUL which covers up to the 5-year water level.
5. Side slopes shall not be steeper than 5H:1V within public property and shall not be steeper than 7H:1V within private property.
6. The pond bottom shall be graded to provide positive drainage to the outlet, with a minimum longitudinal slope of 2% and minimum lateral slope of 1.5%. A French drain may be required below the invert of the longitudinal slope, depending on the intended recreational use of the dry pond.
7. All surfaces, including the bottom, shall be topsoiled and seeded with approved materials, except for the low flow channel which can be either aquatic type plants or a rip-rapped channel.
8. The maximum storage depth shall be 3 m, as measured from the invert of the outlet pipe.
9. Provide a landscaped or rip-rapped channel to accommodate the 1:5-year event and low flow condition.
10. Dry ponds shall be designed as an amenity to the development with Open Space for passive play and links to pedestrian walkways for use by the public.

6.28.2.3 Design of Wet Ponds

1. Wet ponds (retention storage) temporarily store stormwater runoff to promote the settlement of runoff pollutants and to restrict discharge to predetermined levels to reduce downstream flooding and erosion potentials. They are often designed as two-stage facilities: the upper stage (flood fringe area) is designed to store large, infrequent storms; the lower stage (extended detention stage) is designed to store and promote sedimentation of smaller, more frequent storms.
2. Wet ponds shall have a minimum surface area at normal water level (NWL) of 2 ha. If a wet pond is not to become a publicly-owned and maintained facility, a surface area of less than 2 ha may be permitted, upon acceptance by the Town and Alberta Environment.
3. The active storage depth shall be as required to provide storage for a 1:100-year storm event.
4. An impervious pond bottom shall be constructed of material with a permeability coefficient in the order of $1x10^{-6}$ cm/s.
5. A minimum pond depth of 2 m, from pond bottom to NWL, shall be required; however, a 3 m depth is preferred.
6. Dead bay areas are not permitted.
7. All inlet and outlet pipes shall be submerged a minimum of 1 m below NWL and shall be posted at the surface. Inlet and outlet pipe inverts shall be a minimum of 150 mm above the pond bottom.
8. Inlets and outlets shall be located to maximize the detention time and circulation within the wet pond.
9. The side slopes of the pond shall, generally, not be steeper than 7H:1V from free board elevation to 1 m below NWL; however, when space limitations exist, side slopes of 5H:1V may be permitted. Side slopes of 3H:1V are permitted from pond bottom to 1 m below NWL.
10. The normal water elevation shall be such that the collection system shall not surcharge to an elevation greater than the lowest catch basin invert in the collection system during a 1:5-year storm.
11. The shoreline treatment of the pond shall consist of a band of granular material, from 0.3 m above to 0.3 m below NWL, on top of woven polypropylene geotextile fabric. The granular material shall be chemically sterilized, shall be 75 mm minimum size, and shall be installed in a 250 mm thick layer. An evaluation of wave action shall be made and, if necessary, additional bank protection shall be provided.
12. A buffer strip shall be provided between NWL and the 1:25-year flood level. The difference between the NWL and the 1:25-year flood level shall be limited to 1 m vertical rise.

6.28.2.4 Design of Constructed Wetlands

1. Constructed wetlands (retention storage) improve water quality and control peak discharge rates by retaining runoff for a prolonged period. Relatively deep permanent pools are maintained at the inlet and outlet and along low flow paths to minimize resuspension of settled pollutants. Relatively shallow extended detention storage areas with extensive plantings (submergent and emergent) make up the majority of the permanent storage.
2. The size of a constructed wetland should be approximately 5% of the watershed area that it will be servicing.
3. Approximately 25% of the surface area at NWL should consist of deep pools (at inlets(s) and the outlet) which are 2.4 m to 3.0 m deep to allow for settleable solids removal.
4. Average permanent wetland water depth shall be 0.3 m with 1 m deep zones for flow redistribution and for fish and submerged or floating aquatic vegetation habitat.

5. The normal water elevation shall be such that the collection system shall not surcharge to an elevation greater than the lowest catch basin invert in the collection system during a 1:5-year storm.
6. Active storage shall be 0.3 m to 0.6 m deep. Fluctuation in excess of 1 m above NWL should be infrequent to avoid killing vegetation.
7. The side slopes shall generally be no steeper than 7H:1V; however, where space limitations exist, the side slopes may be as steep as 5H:1V.
8. A length to width ratio of 3:1 is preferred; however, if space limitations exist, the length to width ratio can be as low as 1:1, provided that additional considerations are made to maximize the travel time through the wetland for treatment and to prevent short-circuiting.
9. The deep zone shall be sloped at 1.0% from inlet to outlet and the shallow marshy areas are to have a smooth bottom to promote sheet flow through the system.
10. An impervious pond bottom shall be constructed of material with a permeability coefficient in the order of $1x10^{-6}$ cm/s.
11. Dead bay areas are not permitted.
12. All inlet and outlet pipes shall be submerged a minimum of 1 m below NWL and shall be posted at the surface. Inlet and outlet pipe inverts shall be a minimum of 100 mm above the wetland bottom.
13. Design with the landscape, not against it; take advantage of natural topography and drainage patterns.
14. Incorporate as much "edge" as possible and design in conjunction with a buffer and the surrounding land and aquatic systems.
15. Design to protect the wetland from any potential high flows and sediment loads.
16. Design for self-sustainability and to minimize Maintenance; however, an all-weather Maintenance access is required to all deep pool areas for sediment removal.

6.28.2.5 Recreation

1. Recreational use of wet and dry ponds will be regulated by the Town. Recreational uses are not permitted for constructed wetlands.
2. Suitable recreational facilities such as bicycle trails, benches, trees, etc. shall be provided for stormwater management facilities.
3. Primary recreational activities will not be allowed on or in wet ponds. Signage will be posted, prohibiting primary recreational activities, i.e. all water-based activities where there is body contact with the water, such as swimming and wading.

6.28.2.6 Erosion

1. Construction of new developments shall be undertaken in a manner such that erosion of the site and sediment discharge via runoff to the receiving stream are minimized. The Developer's Consultant shall be required to submit a formal erosion and sedimentation control plan to the Town.
2. Adequate erosion protection will be required for all natural and man-made water courses within the new development.
3. Outfalls of storm sewers shall be designed to control local erosion to the conveyance channel or receiving stream and shall not change the hydraulic characteristics of the receiving stream.

6.28.2.7 Maintenance

1. The Developer shall be responsible for any defects of the works and lands associated with the stormwater management facility, including adjacent park lands, for the duration of the Warranty Period.
2. The Developer shall assume full responsibility with respect to the operation and Maintenance of the stormwater management facilities in all aspects relating to flows, water volumes, surface debris, aeration, hydrological cycle, hydraulic performance, utility devices such as outlet structures, vegetation control, insect control, and on-shore facilities until issuance of a Final Acceptance Certificate (FAC).
3. The Developer will be responsible for siltation and debris problems which are caused due to poor erosion control for the development. Should siltation and debris problems occur in the stormwater management facilities that are the result of stormwater draining lands beyond the Developer's control, the Town shall assume responsibility for any necessary remedial actions.
4. The monitoring and Maintenance of water quality to eliminate any nuisance factors and to protect against health hazards shall be the responsibility of the Developer during the Warranty Period.

6.28.2.8 Boundary Control and Use

1. All stormwater management facility and shoreline areas must be sufficient to accommodate the 1:100-year design event and will be retained in public ownership (i.e., within a PUL).
2. Land above the 1:100-year design flood level within lots that back onto a stormwater management facility, when no overflow is provided, shall be protected by a restrictive covenant registered against the title of the property. The restrictive covenant shall indicate that the land is subject to flooding and that the owner will not construct any permanent structures susceptible to flood damage.
3. If the provision of public access to the shoreline is being considered, fencing of a uniform type shall be constructed by the Developer along the 100-year event elevation to separate public from private lands.
4. Noxious Industrial land uses are considered unacceptable adjacent to or upstream of stormwater management facilities.
5. Minimum lot dimensions and rear yard depths, as measured from the property line, shall conform to the requirements of the Town of Hinton Land Use Bylaw and relevant Area Structure Plan.

6.28.2.9 Site Acquisition and Financing of Construction

1. The acquisition of all stormwater management facility sites shall occur prior to subdivision approval and at no cost to the Town. The stormwater management facility site shall be excluded from all subsequent tentative plans for the purposes of roadway, Public Utility, density, and potential Municipal Reserve calculations. The parcel of land acquired shall be designated as a PUL.
2. All design and construction of stormwater management facilities, interconnecting pipe systems, and outfalls shall be completed to the Town's acceptance and shall be paid for by the Developer and such works shall be closely coordinated with the grading and earthworks balance of the reminder of the subdivision.
3. When a new development is within the drainage basin of an existing system, designed and constructed by others, the Town will endeavour to collect off-site levies or development charges from the Developer of the new development which is benefitting from the existing system.

6.28.2.10 Legal Liability and Safety

1. Given that primary water contact (i.e. swimming and wading) will be forbidden, supervision will not be provided.
2. Proper and adequate signage to alert people to the potential hazards (No Swimming – Deep Water, subject to flooding, etc.) shall be provided by the Developer; refer to Standard Detail 6-700.
3. Fencing of municipal park areas shall be determined during the detailed design stage in consultation with the Town and shall be provided by the Developer.
4. Lighting, in accordance with Fortis requirements, shall be provided by the Developer at the interface between the stormwater management facility and the adjacent land. Additional lighting requirements are to be determined at the detailed design stage in consultation with the Town.

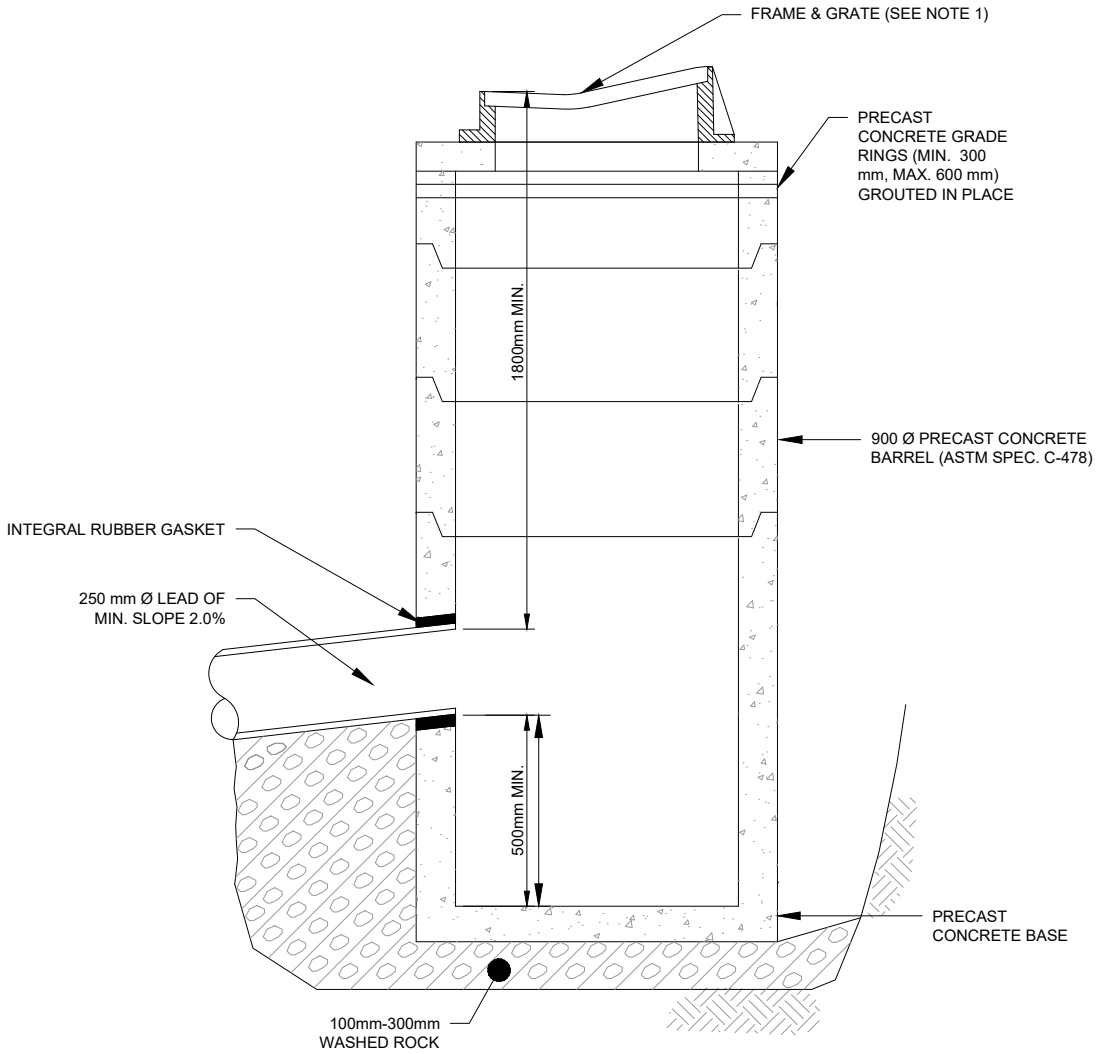
6.29 Erosion Control

All storm drainage systems, including pipe outlets and other drainage channel outlets or overflows, shall be designed to control erosion that may result from piped or overland stormwater flows and discharge into the storm drainage system.

6.30 Standard Details – Storm Drainage Systems

Standard Detail No.	Title
6-100	900 mm Diameter Catch Basin
6-101	1200 mm Diameter Catch Basin Manhole
6-102	Type F-51 Catch Basin Curb Finishing Detail
6-200	Weeping Tile and Sump Pump Discharge
6-300	Wick Drain Connection to Catch Basin
6-301	Under-drain Trench Detail
6-400	Rear to Front Lot Grading
6-401	Split Lot Drainage
6-500	Concrete Outfall Structure
6-501	Bar Screen for Inlet / Outfall Structures
6-600	Rock Rip Rap for Culverts
6-700	Stormwater Management Facility Caution Sign
6-701	Wet Pond
6-702	Constructed Wetland
6-800	French Drain
6-900	Retaining Wall Layout (Sideyard)
6-901	Retaining Wall Layout (Rear of Properties)

STANDARD DETAIL	6-100	
Date:	NOV, 2020	Rev. 0



NOTE:

(1) FOR ROLLED FACE CURB AND GUTTER: USE DK-7 FRAME AND GRATE
FOR STRAIGHT FACE CURB AND GUTTER: USE F-51 FRAME AND GRATE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

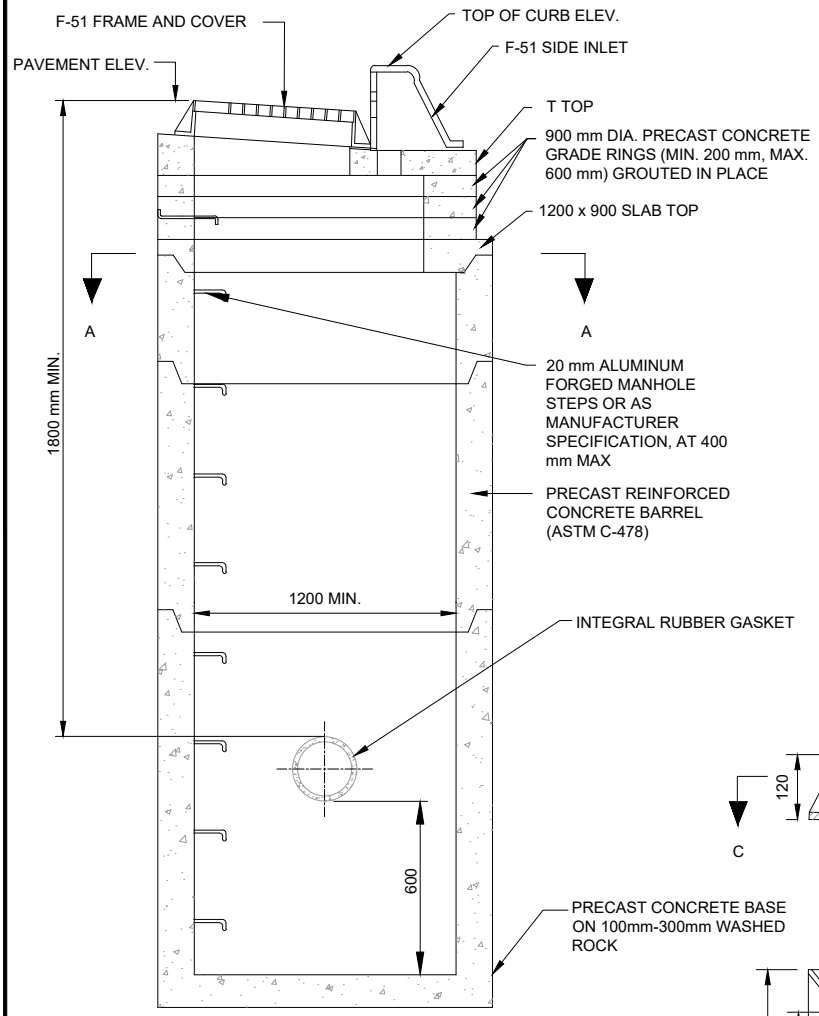
Gateway to the Rockies
HINTON

TOWN OF HINTON

900 mm Diameter Catch Basin

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-100.dwg by
Xrefs: TH-G-TTBL_8.5x11

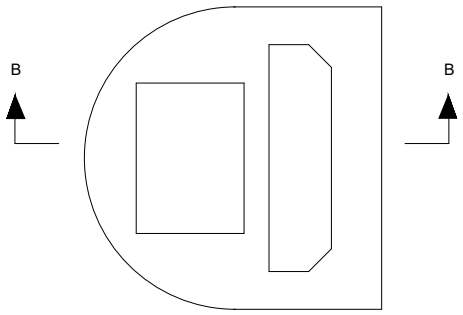
STANDARD DETAIL	6-101	
Date:	NOV, 2020	Rev. 0



NOTES:

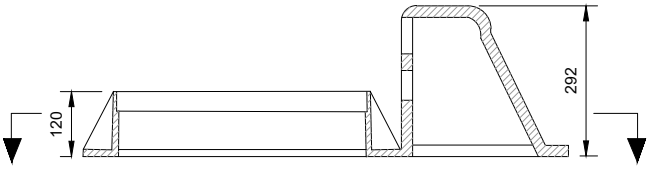
(1) UNIT COULD BE MADE UP FROM TWO ITEMS (BASE AND BARREL)
(2) OPPOSITE ORIENTATION OF JOINTS IS ACCEPTABLE

SECTION B-B

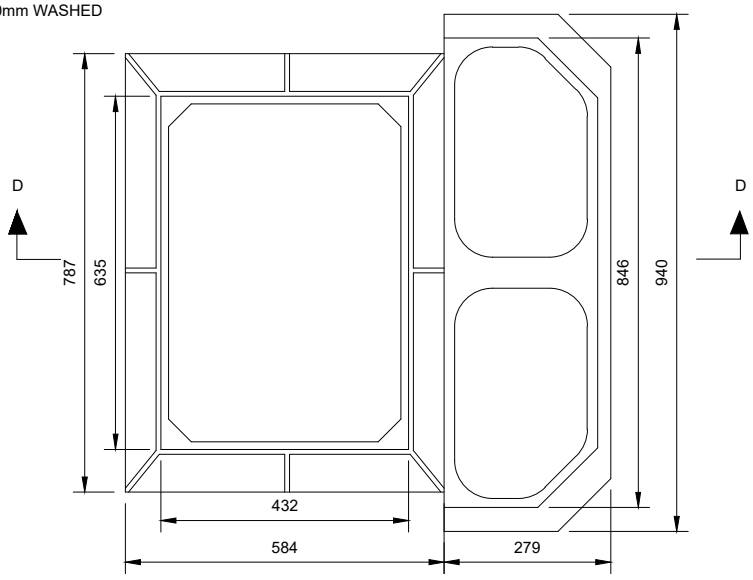


NOTE: ALL TOP SLABS ARE SEPARATE.

PLAN A-A



SECTION D-D



PLAN C-C

NOTES:

(1) FRAME AND GRATE TYPE F-51 SIDE INLET TYPE

(2) ALL GRADE RINGS ARE TO BE PRECAST CONCRETE.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

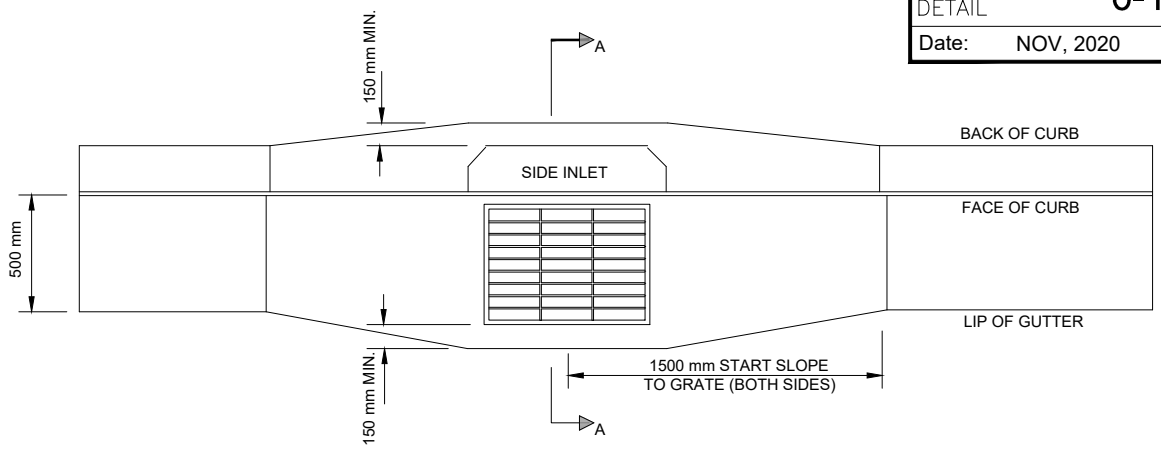
Gateway to the Rockies
HINTON

TOWN OF HINTON

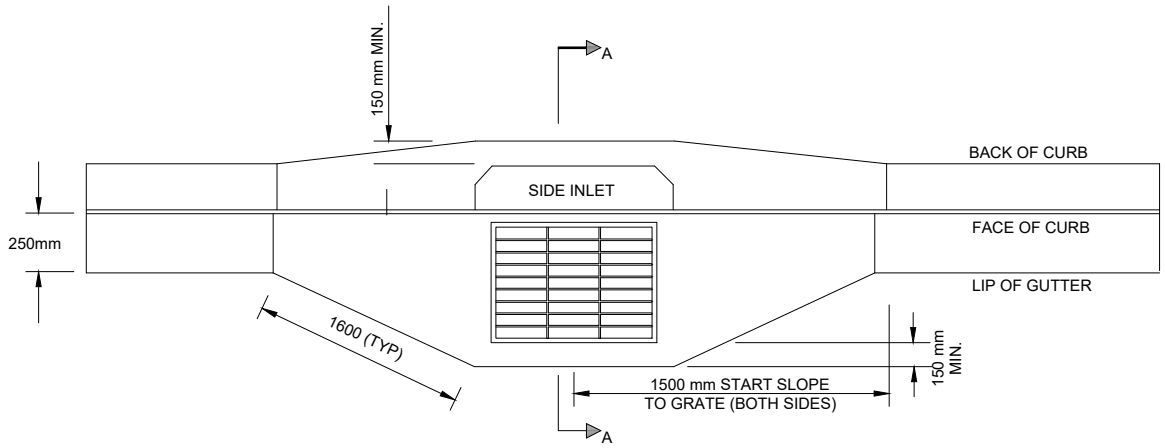
1200 mm Diameter Catch Basin Manhole

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_6-101.dwg by
Xrefs: TH-G-TTBL_8.5x11

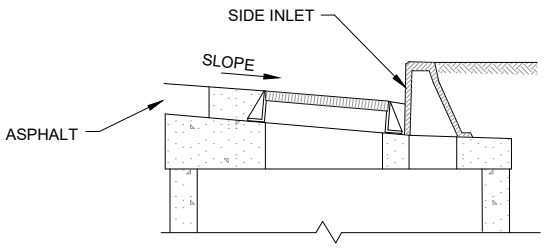
STANDARD DETAIL	6-102	
Date:	NOV, 2020	Rev. 0



PLAN - F-51 SIDE INLET, FRAME AND COVER SET IN 150 mm CURB WITH 500 mm GUTTER



PLAN - F-51 SIDE INLET, FRAME AND COVER SET IN 150 mm CURB WITH 250 mm GUTTER



SECTION A-A

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

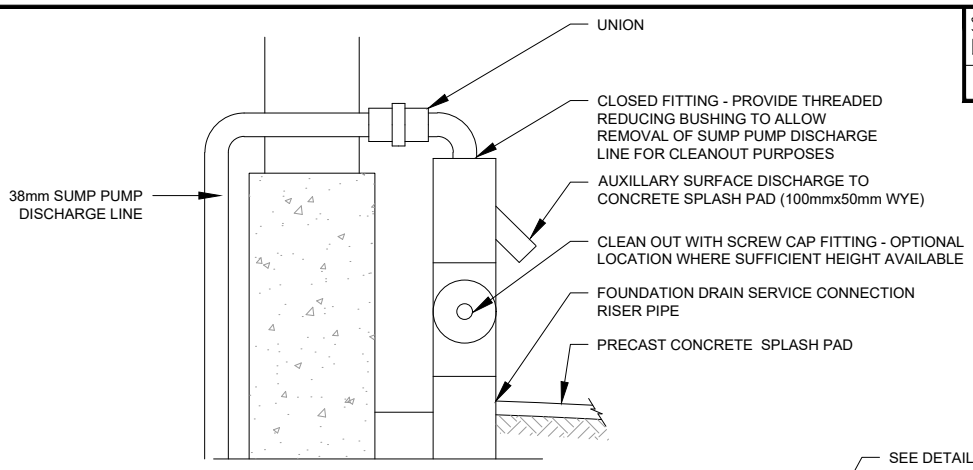
Gateway to the Rockies
HINTON

TOWN OF HINTON

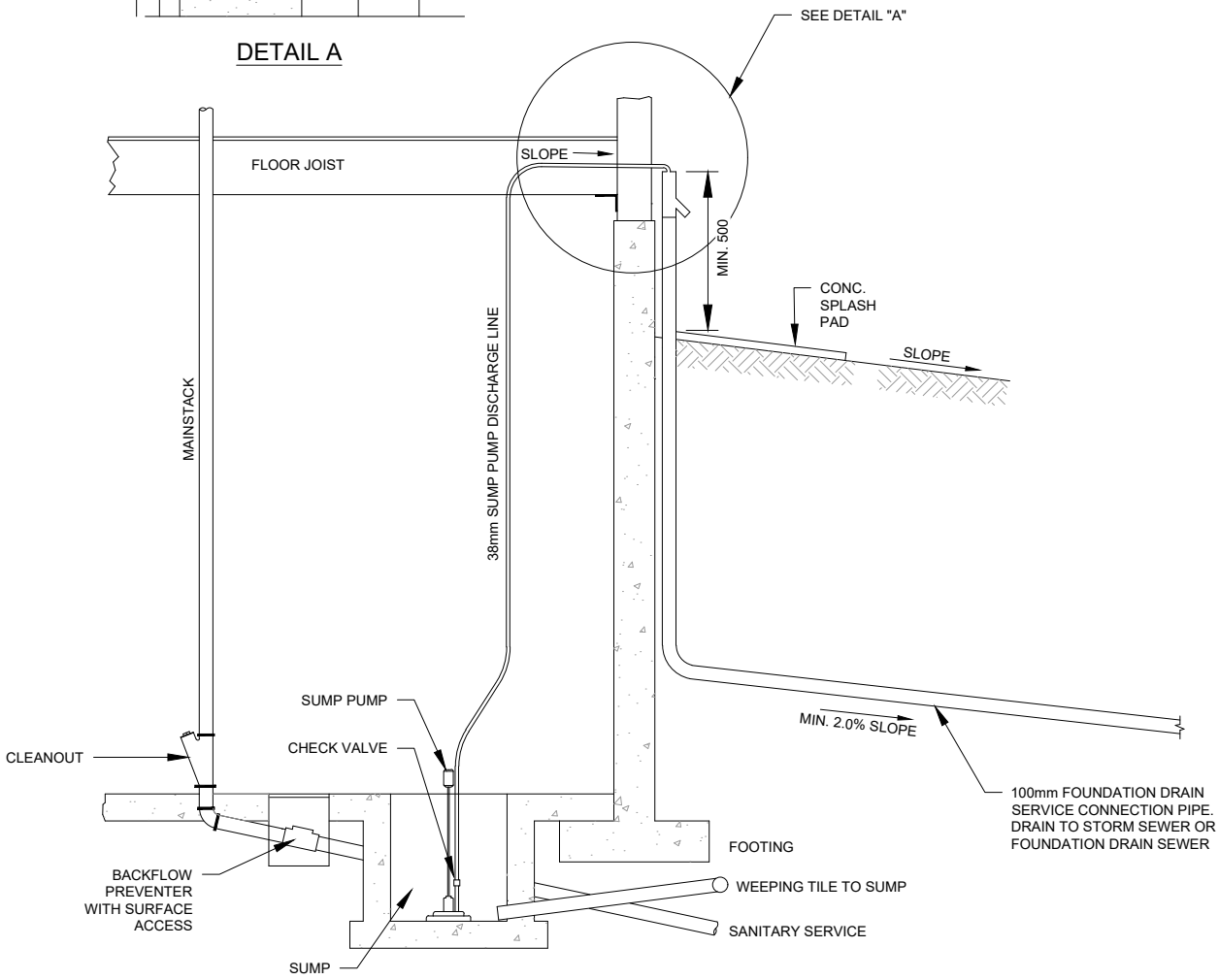
Type F-51 Catch Basin Curb Finishing Detail

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-102.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-200	
Date:	NOV, 2020	Rev. 0



DETAIL A



NOTES:

(1) ROOF LEADERS (DOWNSPOUTS) OR ANY OTHER STORM WATER SOURCE MUST NOT BE CONNECTED TO THE FOUNDATION DRAIN DISCHARGE COLLECTION SYSTEM

(2) THE AUXILIARY SURFACE DISCHARGE MUST BE INSTALLED TO PROVIDE AN OVERFLOW IN THE EVENT THAT THE STORM DRAINAGE SYSTEM CANNOT ACCOMMODATE FLOWS DUE TO CAPACITY, FREEZING, BLOCKAGE OR OTHER PROBLEMS.

(3) EVERY PART OF THE PLUMBING SYSTEM SHALL BE PROTECTED FROM FREEZING THROUGH THE USE OF AN APPROVED METHOD.

(4) WEEPING TILES SHALL NOT BE CONNECTED TO THE SANITARY SYSTEM.

(5) BACKFLOW PREVENTORS SHALL BE INSTALLED BY LOT OWNERS ON ALL STORM SERVICES.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

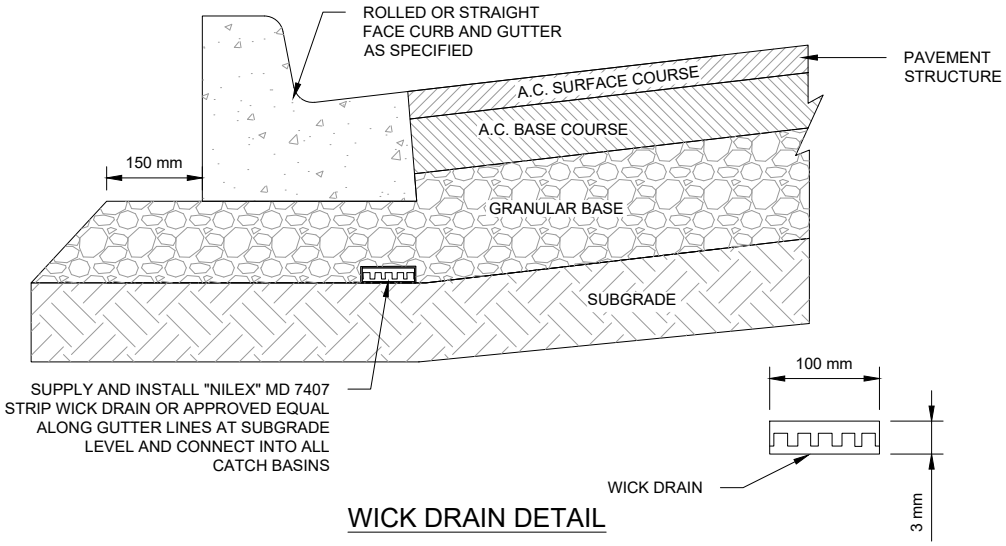
Gateway to the Rockies HINTON

TOWN OF HINTON

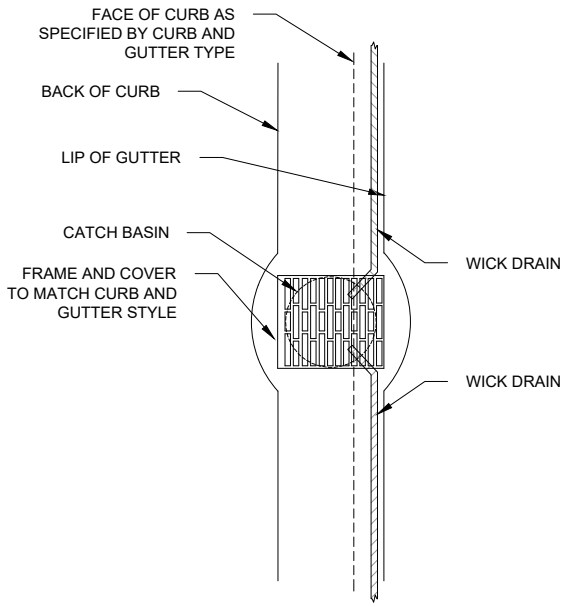
Weeping Tile and Sump Pump Discharge

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_6-200.dwg by
Xrefs: TH-G-TTBL_8.5x11

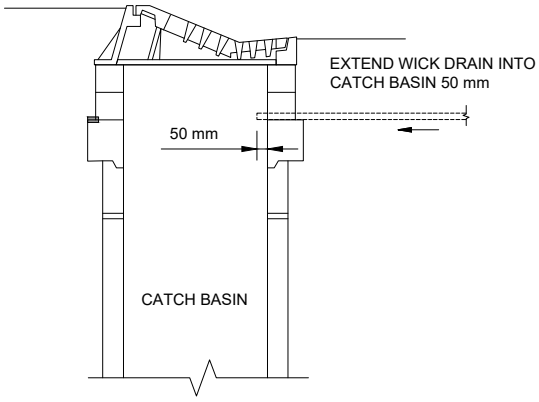
STANDARD DETAIL	6-300	
Date:	NOV, 2020	Rev. 0



WICK DRAIN DETAIL



PLAN VIEW



ELEVATION VIEW

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

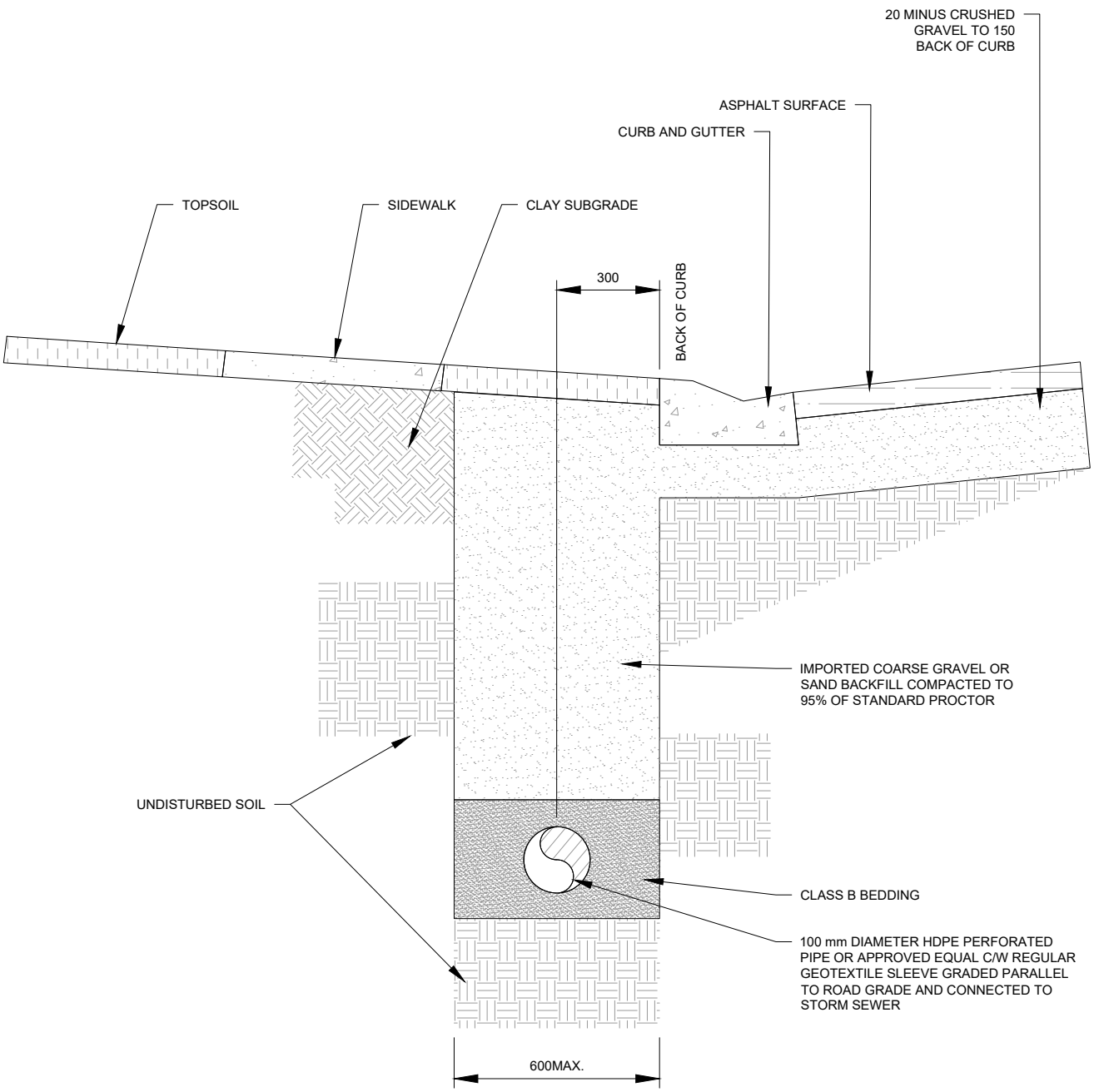
Gateway to the Rockies
HINTON

TOWN OF HINTON

Wick Drain Connection to Catch Basin

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-300.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-301	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) APPLICABLE WHERE UNDERGROUND STORM SYSTEM EXISTS AND SOIL TYPE IS PREDOMINANTLY CLAY

(2) ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

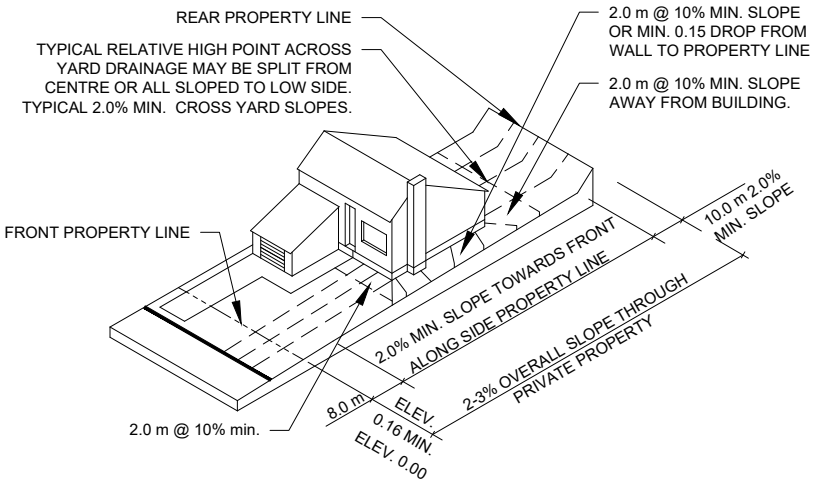
Gateway to the Rockies
HINTON

TOWN OF HINTON

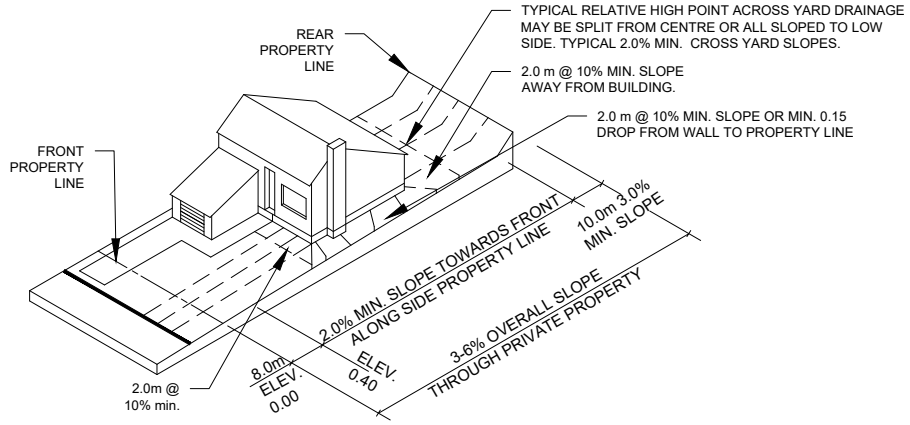
Under-Drain
Trench Detail

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-301.dwg by
Xrefs: TH-G-TTBL_8.5x11

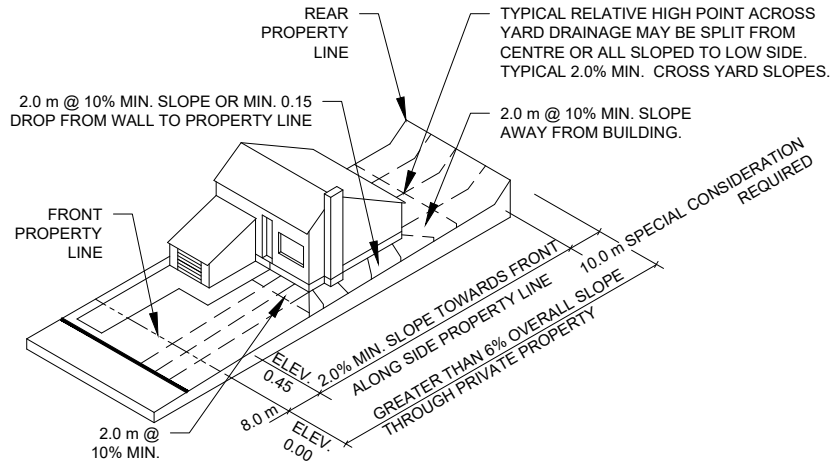
STANDARD DETAIL	6-400	
Date:	NOV, 2020	Rev. 0



LOT GRADING TYPE "A"



LOT GRADING TYPE "B"



LOT GRADING TYPE "C"

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

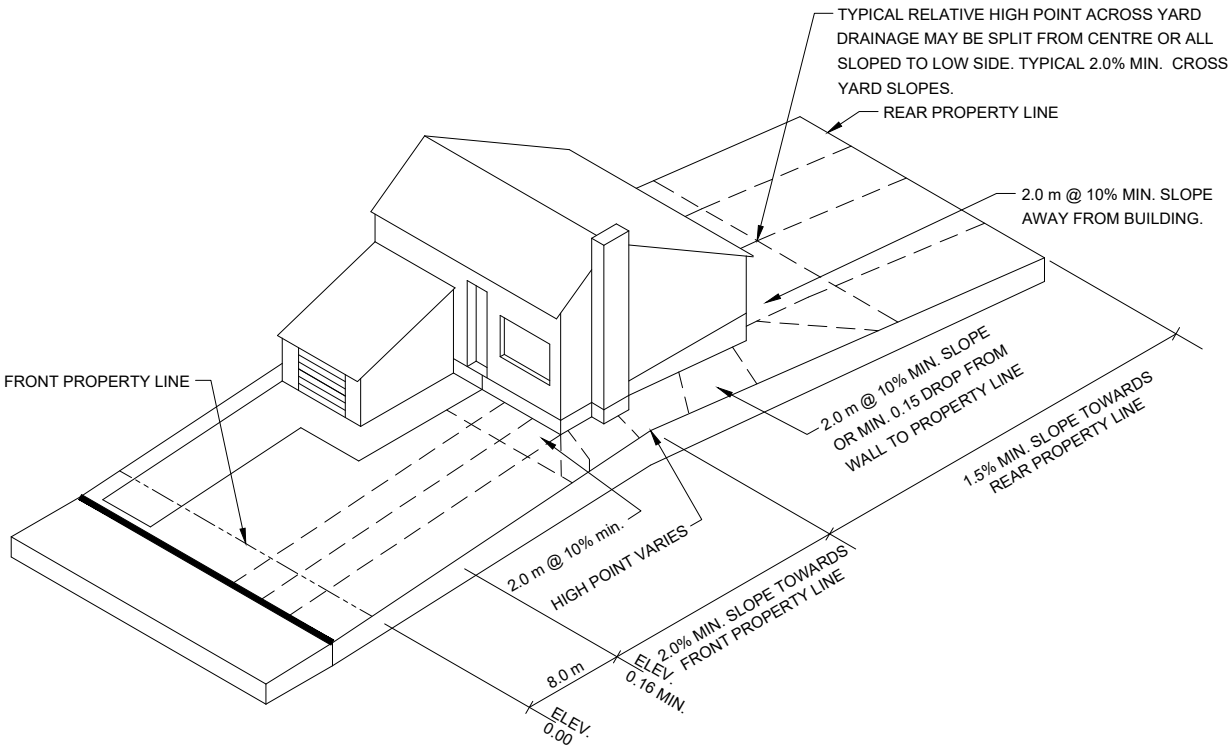
Gateway to the Rockies HINTON

TOWN OF HINTON

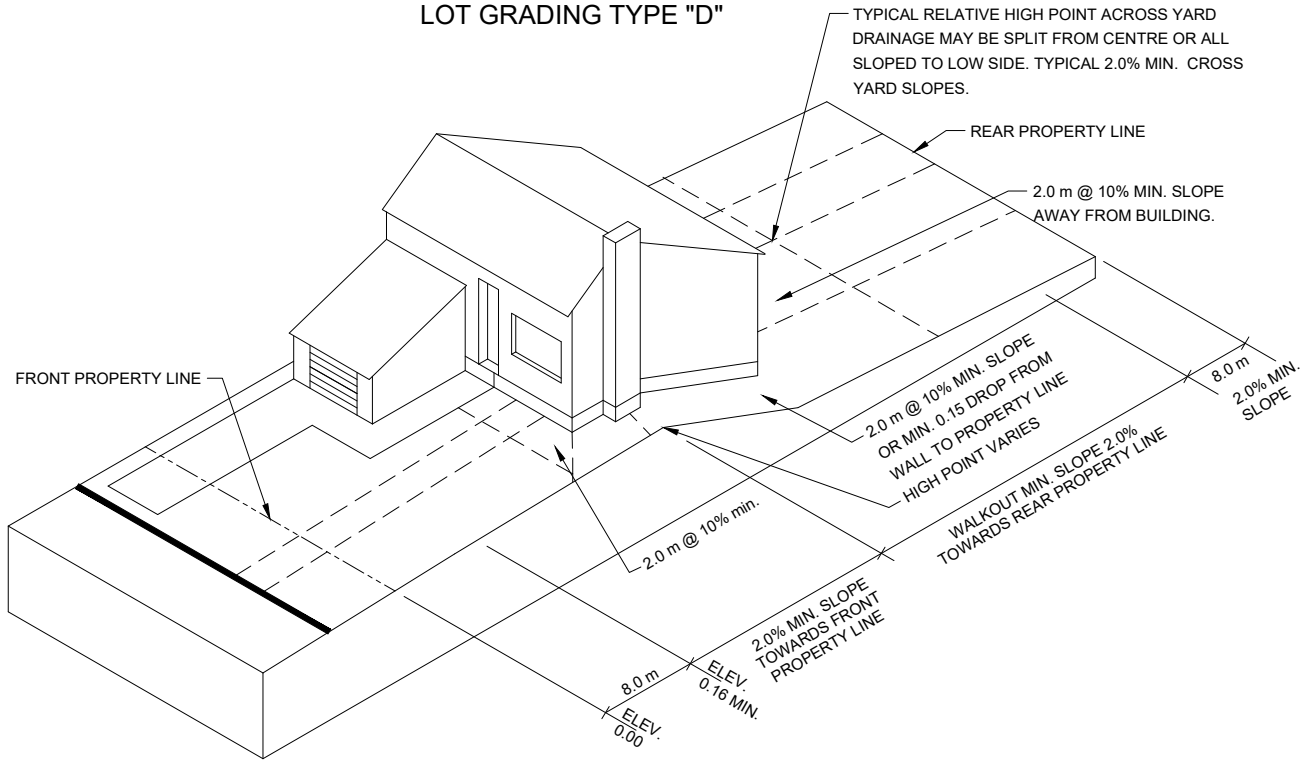
Rear to Front Lot Grading

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-400.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-401	
Date:	NOV, 2020	Rev. 0



LOT GRADING TYPE "D"



LOT GRADING TYPE "W"

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

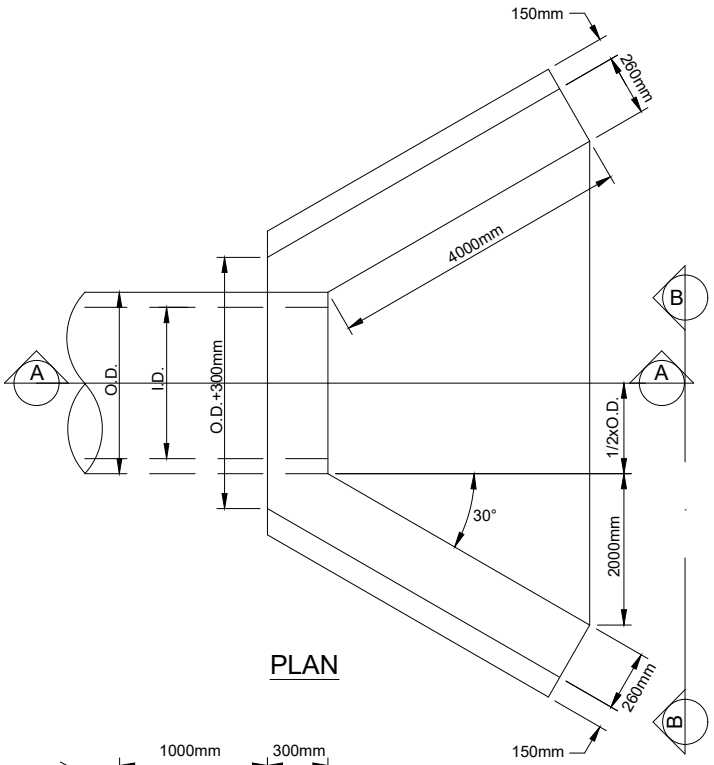
Gateway to the Rockies
HINTON

TOWN OF HINTON

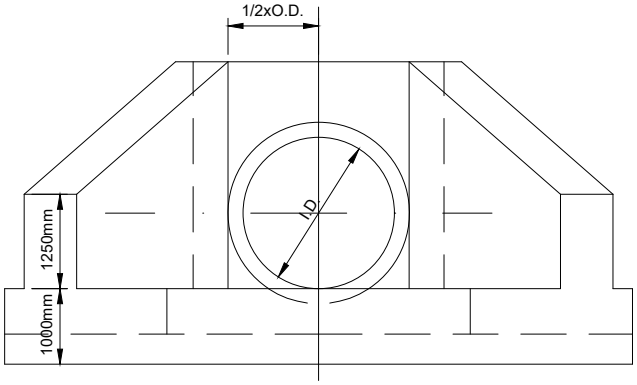
Split Lot Grading

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-401.dwg by
Xrefs: TH-G-TTBL_8.5x11

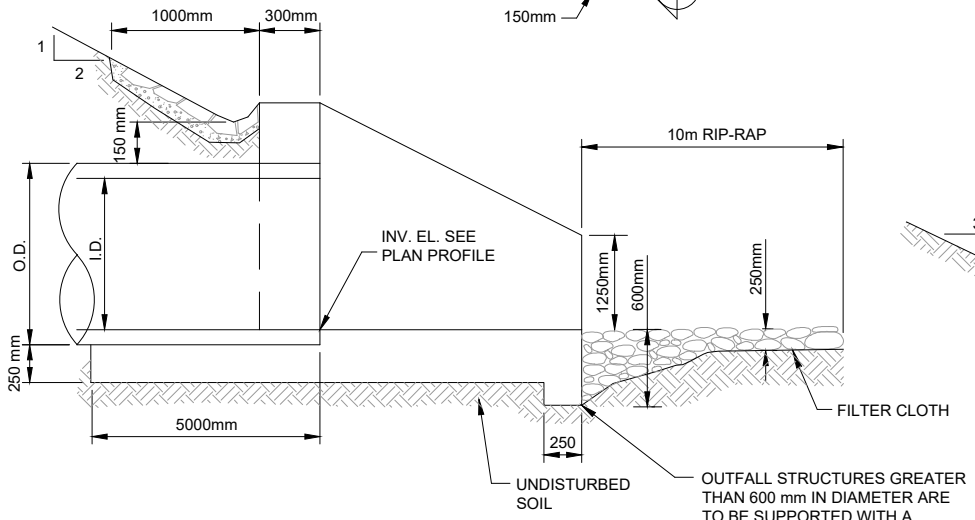
STANDARD DETAIL	6-500	
Date:	NOV, 2020	Rev. 0



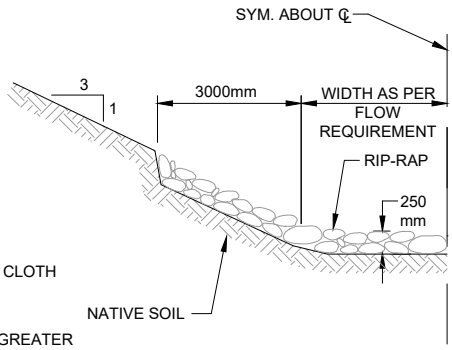
PLAN



END VIEW



SECTION A-A



SECTION B-B

NOTES:

(1) COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS SHALL BE 30 MPa

(2) STILLING BASIN SHALL BE REQ'D FOR HIGH VELOCITY FLOWS

(3) FILTER CLOTH TYPE TO BE AS SPECIFIED

(4) ALL FILTER CLOTH PANEL JOINTS TO OVERLAP 500 mm AND BE ZIP-TIED

(5) SEE STD. DWG. NO. 6-501 FOR BAR SCREEN

(6) RIP-RAP TO BE AS PER SECTION 6

(7) RIP-RAP TO BE INSTALLED AS PER STANDARD DETAIL 6-600

(8) THIS DETAIL DEPICTS A PRECAST CONCRETE HEADWALL

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

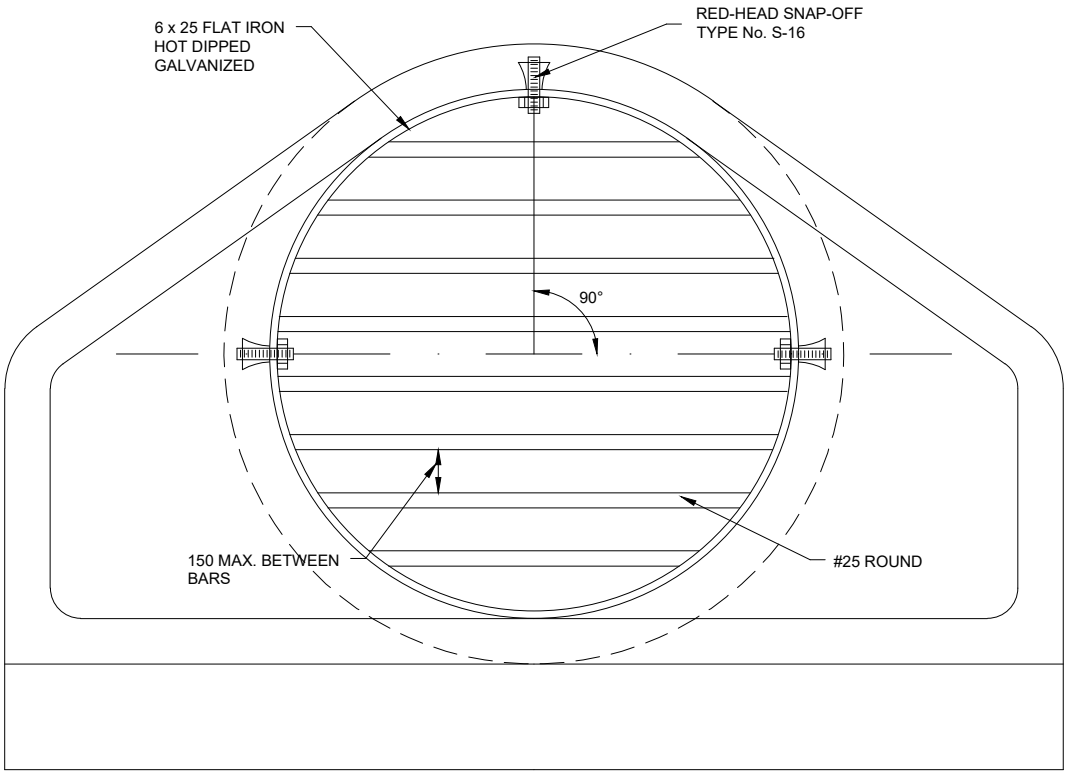
Gateway to the Rockies
HINTON

TOWN OF HINTON

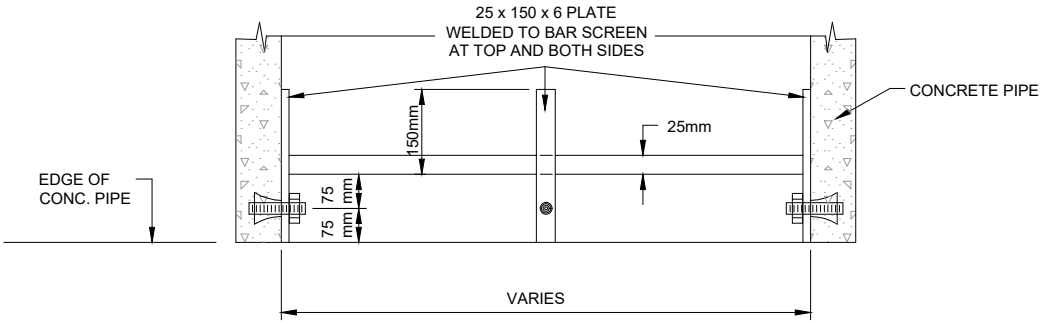
Concrete Outfall Structure

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-500.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-501	
Date:	NOV, 2020	Rev. 0



FRONT VIEW



TOP VIEW

NOTES:

(1) BAR SCREENS FOR INLET AND OUTLET STRUCTURES ARE TO BE LOCKABLE.

(2) INLET BARS SHALL BE VERTICAL; OUTLET BARS SHALL BE HORIZONTAL.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

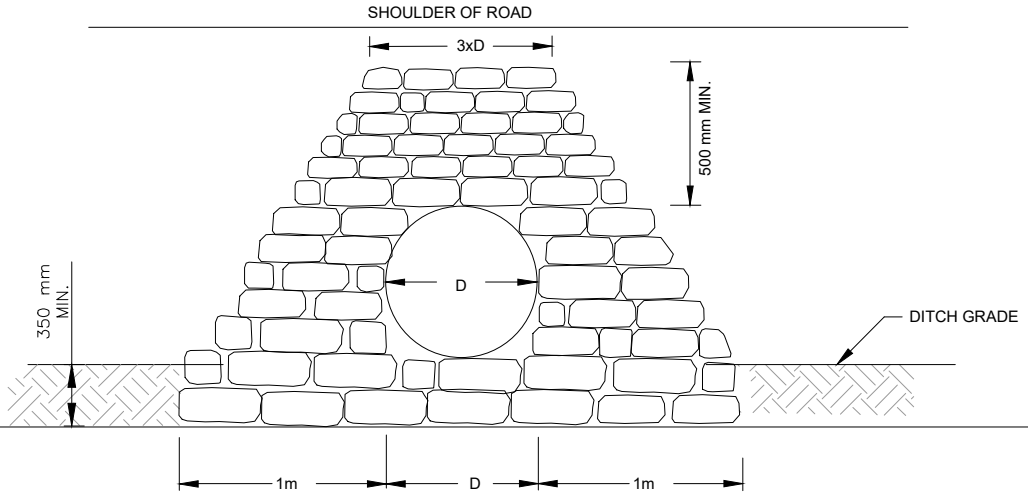
Gateway to the Rockies
HINTON

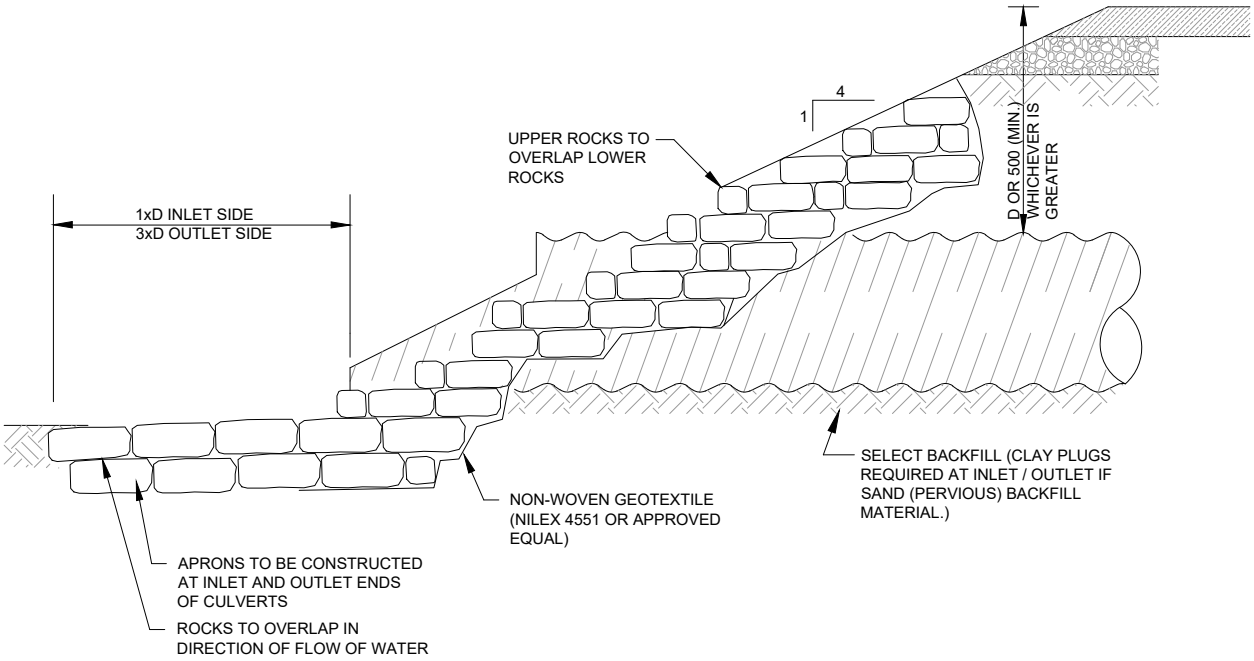
TOWN OF HINTON

Bar Screen for Inlet / Outlet Structures

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-501.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-600	
Date:	NOV, 2020	Rev. 0





NOTES:

(1) ROCKS AND BOULDERS SHALL BE SELECTED AS NEARLY CUBICAL IN FORM AS PRACTICAL AND OF A SIZE GREATER THAN 150mm.

(2) THE STONES SHALL BE PLACED WITH THEIR BEDS AT RIGHT ANGLES TO THE SLOPE, THE LARGER STONES BEING USED IN THE BOTTOM COURSE AND THE SMALLER STONES AT THE TOP.

(3) THE STONES SHALL BE LAID IN CLOSE CONTACT SO AS TO BREAK JOINTS AND IN SUCH MANNER THAT THE WEIGHT OF THE STONES IS CARRIED BY THE EARTH AND NOT BY THE ADJACENT STONES

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies
HINTON

TOWN OF HINTON

Rock Rip Rap For Culverts

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-600.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-700	
Date:	NOV, 2020	Rev. 0

STORMWATER FACILITY

CAUTION

THIS IS A MAN-MADE FACILITY DESIGNED TO HELP CONTROL FLOODING DURING RAINSTORMS AND SNOW MELT. WATER LEVELS, WATER QUALITY AND ICE THICKNESS CAN CHANGE SUDDENLY WITHOUT NOTICE. FOR YOUR SAFETY, RECREATION IS NOT ALLOWED.

NO SWIMMING OR WADING | NO DUMPING FISH | NO PETS IN WATER | NO BOATING

KEEP OFF ICE | NO SKATING | NO SLEDDING | NO THROWING ROCKS

Gateway to the Rockies HINTON

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

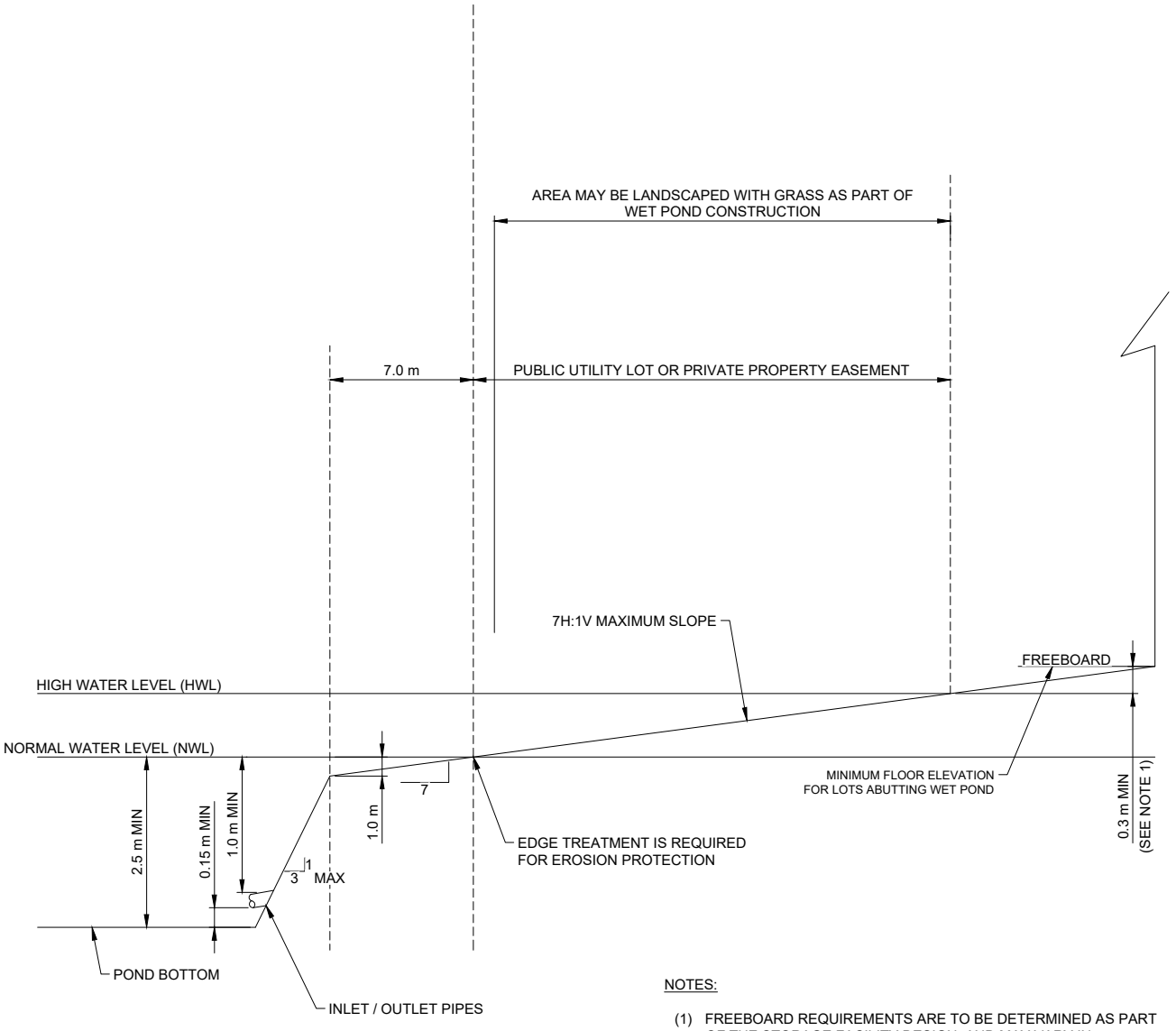
Gateway to the Rockies HINTON

TOWN OF HINTON

Stormwater Management Facility Caution Sign

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-700.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-701	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) FREEBOARD REQUIREMENTS ARE TO BE DETERMINED AS PART OF THE STORAGE FACILITY DESIGN, AND MAY VARY IN CONSIDERATION OF THE FACILITY DESIGN BASIS. WHERE AN EMERGENCY OVERFLOW IS NOT FEASIBLE, A DEPTH OF FREEBOARD OF 0.5 m IS REQUIRED.
(2) RESTRICTIVE COVENANT REQUIRED FOR ALL LOTS ADJACENT TO POND.
(3) IF GROUND WATER LEVEL IS BELOW NORMAL WATER LEVEL, IMPERVIOUS MATERIAL IS REQUIRED FOR POND BOTTOM.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

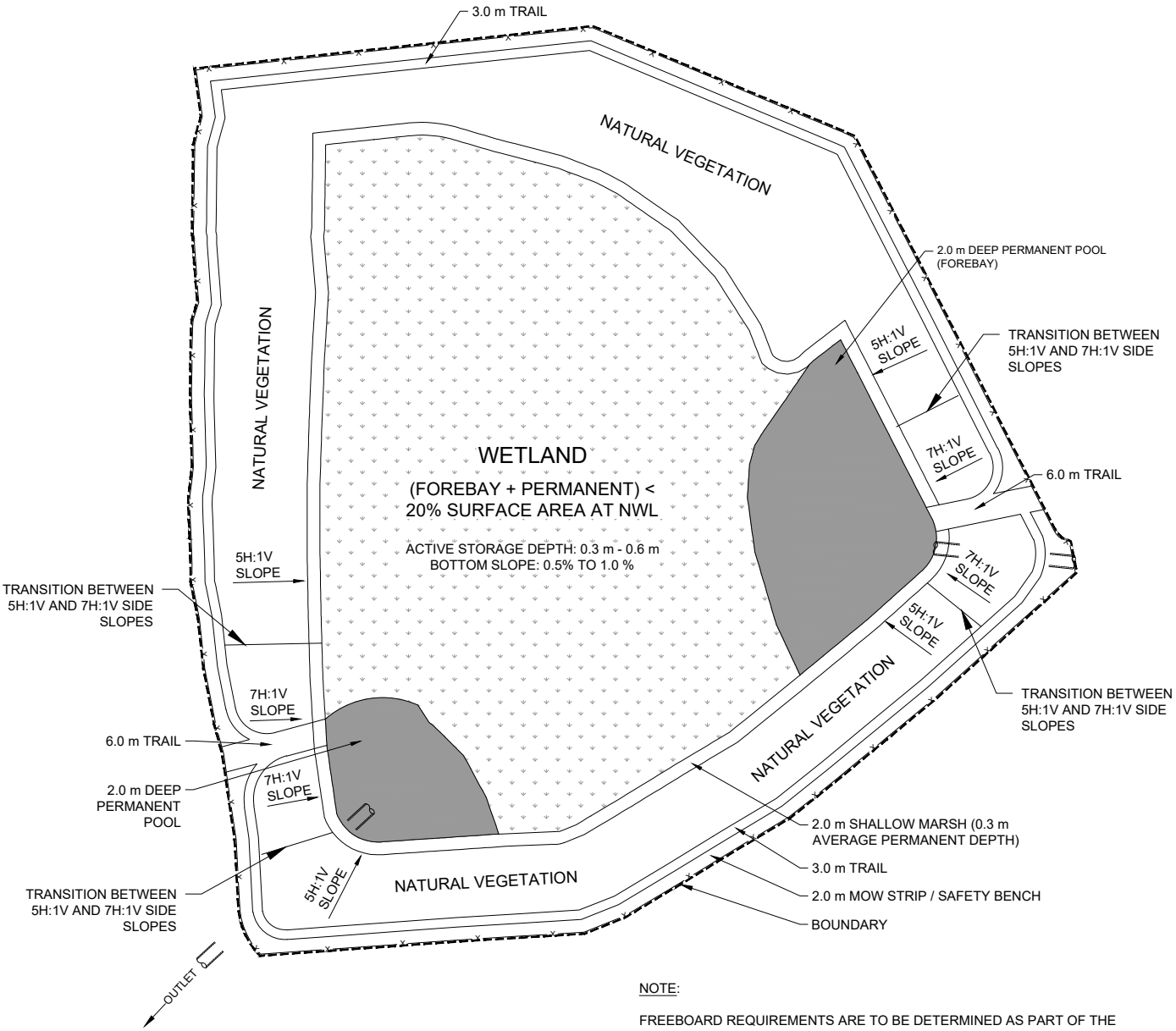
Gateway to the Rockies
HINTON

TOWN OF HINTON

WET POND

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-701.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-702	
Date:	NOV, 2020	Rev. 0



NOTE:

FREEBOARD REQUIREMENTS ARE TO BE DETERMINED AS PART OF THE STORAGE FACILITY DESIGN, AND MAY VARY IN CONSIDERATION OF THE FACILITY DESIGN BASIS. WHERE AN EMERGENCY OVERFLOW IS NOT FEASIBLE, A DEPTH OF FREEBOARD OF 0.5 m IS REQUIRED.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

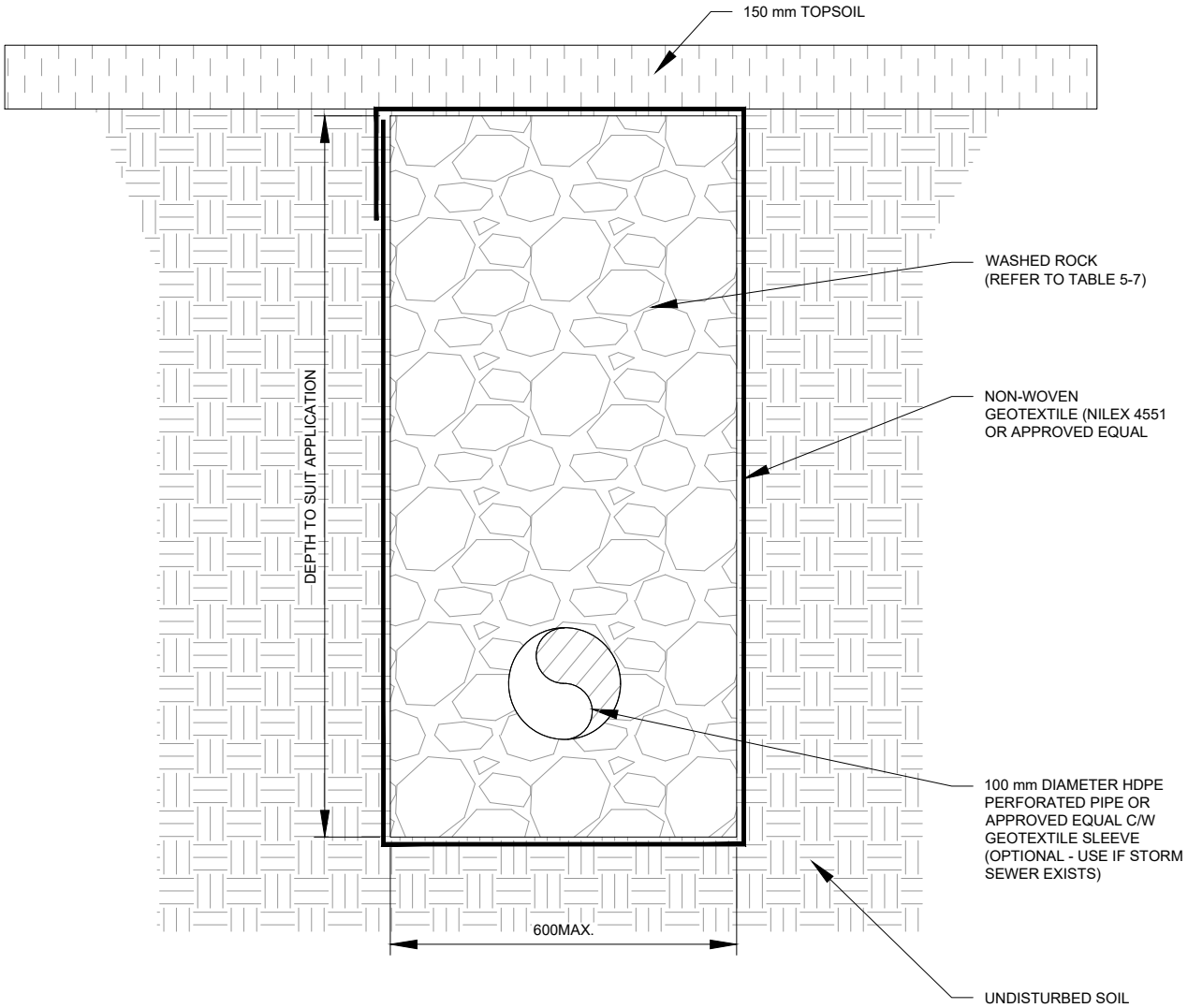
Gateway to the Rockies
HINTON

TOWN OF HINTON

Constructed Wetland

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-702.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-800	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) APPLICABLE WHERE SOIL TYPE IS PREDOMINANTLY CLAY

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

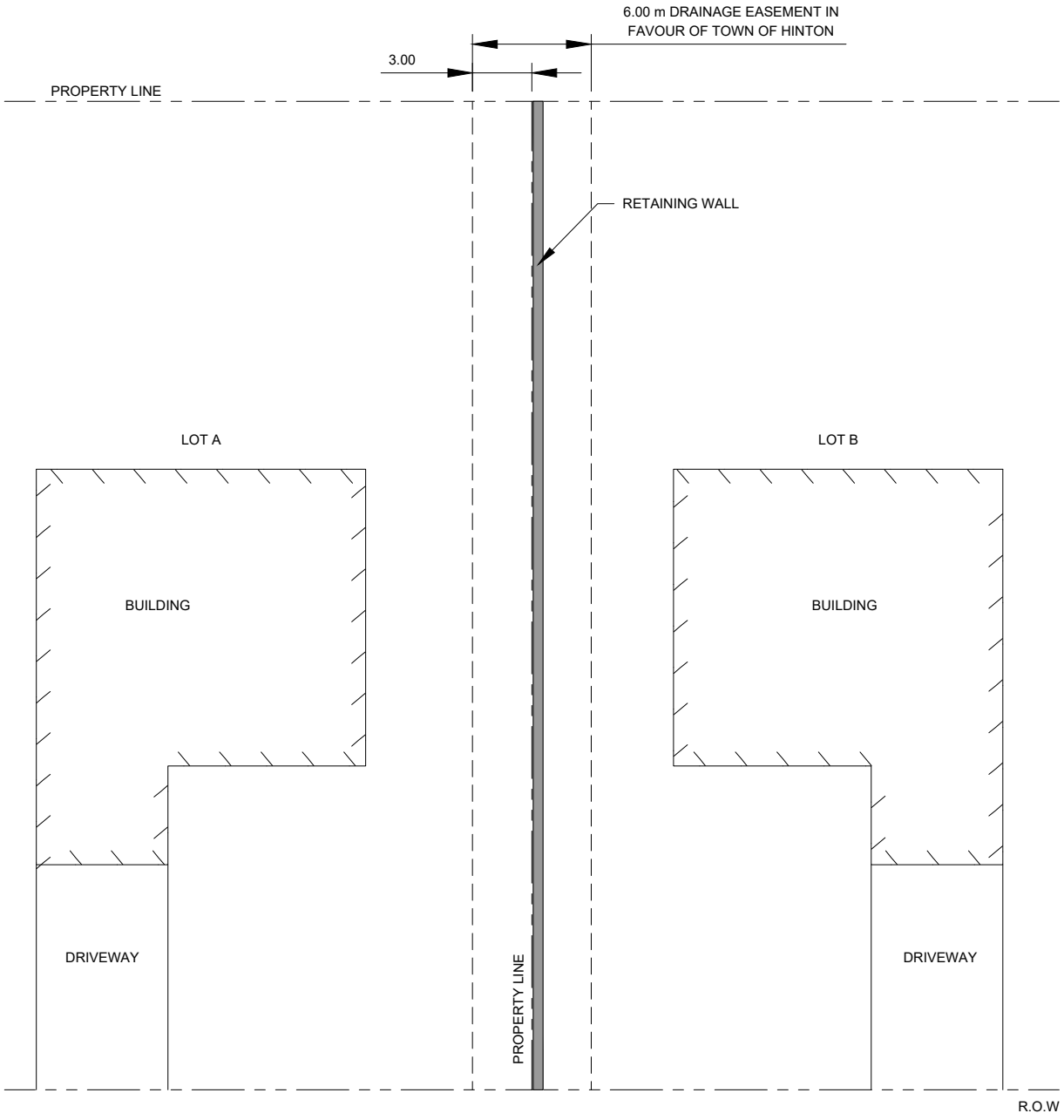
Gateway to the Rockies
HINTON

TOWN OF HINTON

French Drain

Time: 10:05am
Date: Nov 12, 2020
File: \\s-edm-fs-01\working\2020-3749-00\civl\Standard Details\3749-00_6-800.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-900	
Date:	NOV, 2020	Rev. 0



NOTES

(1) FACE OF RETAINING WALL COINCIDES WITH PROPERTY LINE

(2) LOT B IS HIGHER THAN LOT A

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

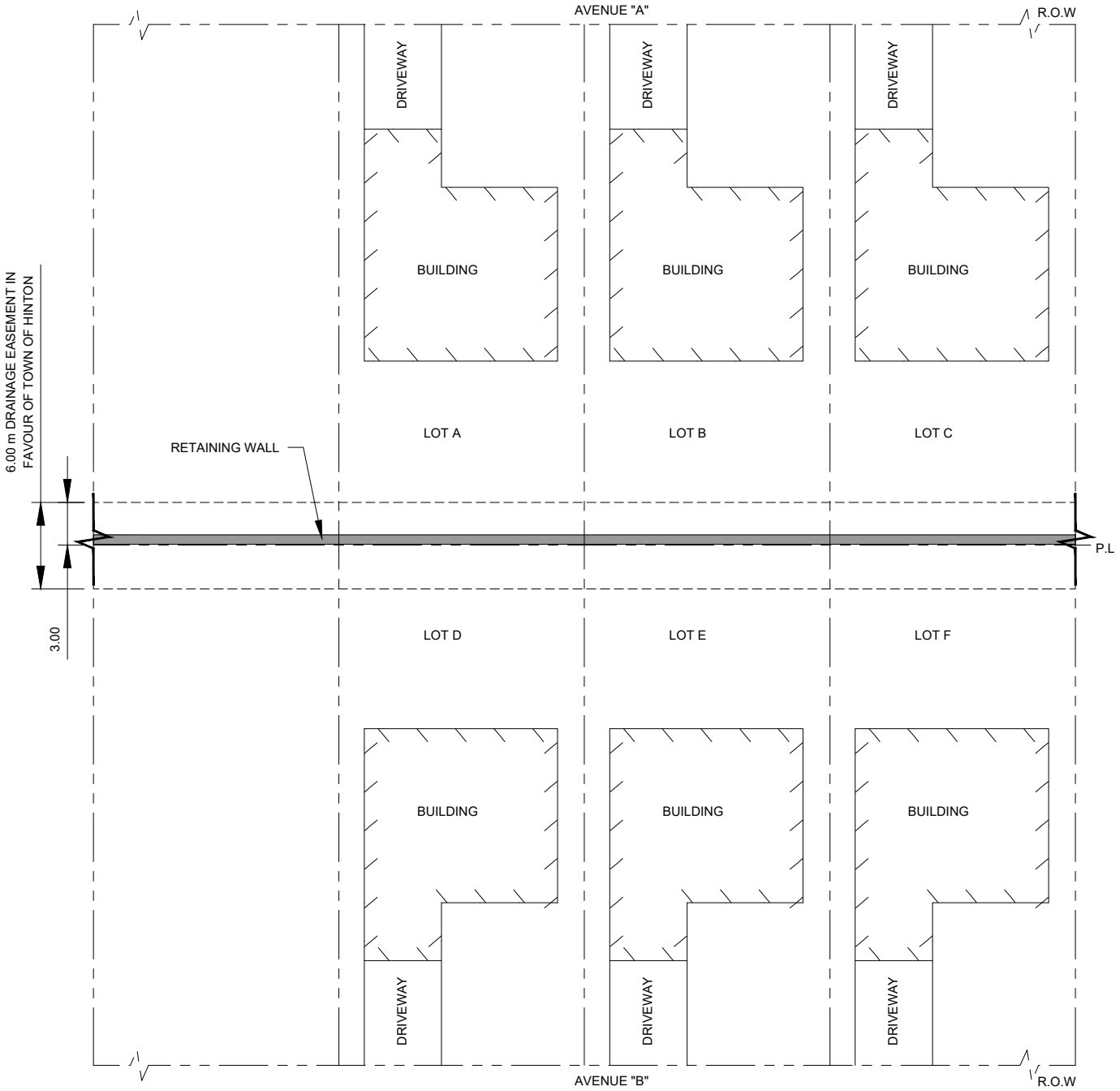
Gateway to the Rockies HINTON

TOWN OF HINTON

RETAINING WALL LAYOUT
(SIDE YARD)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-900.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	6-901	
Date:	NOV, 2020	Rev. 0



NOTES

(1) FACE OF RETAINING WALL COINCIDES WITH PROPERTY LINE

(2) LOTS A, B, AND C ARE HIGHER THAN LOTS D, E, AND F

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies
HINTON

TOWN OF HINTON

RETAINING WALL LAYOUT
(REAR OF PROPERTIES)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_6-901.dwg by
Xrefs: TH-G-TTBL_8.5x11

7 WATER DISTRIBUTION SYSTEMS

7.1 General

This section covers the design and construction of watermains and appurtenances to be built or re-built in the Town. Refer to the Standard Details at the end of this section for details relating to the construction of water distribution systems.

This section provides the minimum acceptable standard for general construction requirements, construction materials, and construction procedures. These standards may be exceeded wherever appropriate; good engineering practices and designs must prevail on all projects.

7.2 Design Flow

1. The water distribution system shall be designed in accordance with the design manual of the American Water Works Association (AWWA) as part of the overall municipal distribution system. The system shall be capable of delivering the peak day demand plus fire flow, or the peak hour flow, whichever is greater. Velocities shall not exceed 1.5 m/s during normal operation or 3.0 m/s during a fire event.

2. The rate of water demand is based on residential population or based on area for non-residential land uses. The water demand shall be based on the ultimate subdivision design population in the Area Structure Plan or, if the ultimate subdivision design population is unknown, based on the following:

    - Single Family 40 people / ha
    - Low Density 40 people / ha
    - Medium Density 80 people / ha
    - High Density 200 people / ha

3. A blended population of 52 people / developable hectare (20 units per developable hectare) can be used for planning purposes, when exact land uses are unknown.

4. The minimum per capita water demands for the Town are as follows:

    - Average Daily Demand (ADD) - Residential: 400 litres/capita/day (L/c/d)
    - Average Daily Demand (ADD) - Commercial / Institutional: 22,500 L/ha/d
    - Average Daily Demand (ADD) - Industrial: 16,875 L/ha/d
    - Peak Daily Demand (PDD): 2.0 times ADD
    - Peak Hour Demand (PHD): 3.0 times ADD

5. Fire flows shall be in accordance with the Fire Underwriters Survey; typical requirements are provided in Table 7-1.

Table 7-1
Fire Flow Requirements based on Land Use

Land Use / Description of Development	Fire Flows
Single Family Residential	
Wood frame construction	
Two stories or less	
100 m^2 to 150 m^2	5,000 L/min. (83 L/s)
150 m^2 to 275 m^2	6,000 L/min. (100 L/s)
Multi-Family Residential	
Wood frame construction with a fire separation	
4 units, up to 100 m^2 each	8,000 L/min. (133 L/s)
Walk-up Apartments	
Ordinary construction	
Up to 3,200 m^2 (with a 10 m to 20 m separation)	12,000 L/min. (200 L/s)
Schools	
Non-combustible construction	
Up to 3,300 m^2	10,000 L/min. (167 L/s)
Up to 4,000 m^2	11,000 L/min. (183 L/s)
Up to 12,000 m^2	19,000 L/min. (317 L/s)
Institutional, Churches	
Ordinary construction (15% exposure)	
Up to 850 m^2	6,000 L/min. (100 L/s)
Commercial	
Non-combustible construction (50% exposure)	
Up to 2,900 m^2	11,000 L/min. (183 L/s)
Up to 4,200 m^2	14,000 L/min. (233 L/s)
Light Industry	
Non-combustible construction	
Up to 2,900 m^2 (25% exposure)	9,000 L/min. (150 L/s)
Up to 2,900 m^2 (50% exposure)	11,000 L/min. (183 L/s)

Land Use / Description of Development	Fire Flows
If the Town designates that a rural residential area will receive fire protection, then examples of fire flow requirements are:	
Low Density Rural Residential	
2 stories or less	
Over 30 m separation	2,000 L/min. (33 L/s)
High Density Rural Residential	
2 stories or less	
10.1 m to 30 m separation	3,000 L/min. (50 L/s)

The Developer's Consultant shall confirm the required flows for these and other types of construction with the latest edition of Fire Underwriters Survey, "Water Supply for Public Fire Protection."

In instances where automatic sprinkler systems are to be installed in residences, the distribution and/or storage systems must consider the additional demand resulting from these fixtures.

7.3 Design Computations

1. Use Hazen-Williams formula:

$$Q = CD^{2.63}s^{0.54} * 278.5$$

Where: Q = Rate of flow (L/s)
D = Internal pipe diameter (m)
s = Slope of hydraulic grade line (m/m)
C = Roughness coefficient, as per Table 7-2

Table 7-2
Hazen-Williams Roughness Coefficient for Watermains

Pipe Material	Roughness Coefficient, C
PVC	130
Asbestos Cement (AC) [1]	110
Cast Iron [1]	100
Steel [1]	120
Ductile Iron [1]	120

Note:
[1] These materials are not accepted pipe materials. Roughness coefficients have been provided for the assessment of the existing system only.

2. Minimum pressure at peak demand: 280 kPa
   Minimum pressure with automatic sprinklers 350 kPa
   Maximum allowable pressure: 550 kPa
   Minimum fire pressure at main (demand hydrant): 140 kPa
   Minimum zone pressure during a fire event: 280 kPa

3. Network analysis shall be by the Hardy-Cross method or a suitable computer program.

7.4 Minimum Main Pipe Diameter

- Single Family Residential: 200 mm
- Multi-Family Development: 250 mm
- Industrial / Commercial / Institutional / High Density Residential: 300 mm

Main sizes shall be confirmed by a Water Network Analysis (WNA) and may be increased, as considered necessary by the Municipal Engineer, to accommodate future development.

7.5 Dead Ends

All dead end watermains shall be provided with a hydrant.

Every effort is to be made to minimize the occurrence of dead-end watermains. Except in cul-de-sacs of less than 120 m length, all watermains shall be looped.

7.6 Location

1. Watermains shall be located within the municipal road right-of-way as per the typical cross-sections (Standard Details 4-100 through 4-108).

2. Utility rights-of-way shall be provided for all utilities not located within road rights-of-way or PULs.
   - Minimum width of 4 m is required for one utility
   - Minimum width of 6 m is required for two utilities
   - Minimum width of 8 m is required for three utilities
   - A 1.5 m wide Easement is required on each side of a utility right-of-way

3. Services shall be located under landscape areas, as close to the centre of the property as possible.

4. Watermains shall maintain the following clearances from other infrastructure:
   - Minimum 3.0 m horizontal clearance from sanitary and storm sewers, unless sewer depth requires increased spacing;
   - Minimum 2.0 m horizontal clearance from power / telephone / cable infrastructure (including services, street lights, and power poles);
   - Minimum 0.5 m vertical clearance above or below utilities at crossings;
   - Minimum 3.5 m horizontal clearance from trees;
   - Minimum 1.5 m horizontal clearance between watermains and catch basins; and
   - Minimum 3.0 m horizontal clearance between water services and catch basins.

7.7 Minimum Depth of Cover

1. Minimum depth of cover shall be 3.3 m from finished grade to pipe crown, unless recommended otherwise by the geotechnical report or the Engineer of Record, and shall be sufficient to:
   - Prevent freezing; and
   - Clear other underground utilities.

   When it is not feasible to provide 3.3 m depth of cover from finished surface to pipe crown, the watermain shall be insulated as per Standard Detail 7-700.

7.8 Valving

In general, valves shall be located as follows:

1. At intersections, in line with the face of curb of the intersecting street:
   - 3 valves at cross intersections
   - 2 valves at tee intersections
2. Valves shall be located a minimum of 30 m from arterial intersections.
3. Valves shall be provided at both ends of PULs / walkways / Easements, located 0.5 m from the property line, inside municipal right-of-way.
4. Not more than 2 hydrants shall be isolated during a watermain break or shutdown for Maintenance purposes.
5. A maximum of 4 valves shall be closed to isolate any one section of watermain.
6. No more than 21 lots shall be cut-off from the water supply during a watermain break or shutdown for Maintenance purposes.

Hot-tapped connections shall follow the valving notes outlined above. In addition, hot-tap valves shall be located a minimum of 1.5 m from joints.

7.9 Hydrant Location

Fire hydrants shall generally be located at street intersections and shall be spaced as follows:

1. Not more than 150 m apart within single family residential areas and not more than 90 m apart in all other areas.
2. For cul-de-sacs less than 90 m in length, hydrants shall be placed along the intersecting street, at the intersection with the cul-de-sac.
3. In accordance with "Water Supply for Public Fire Protection", published by Fire Underwriters Survey.
4. Refer to Standard Details 4-100 to 4-108 for locations of hydrants within the road cross-section in addition to the following requirements:
   - Hydrant valves shall be strapped to the hydrant tee; in no case shall a hydrant valve be located in a sidewalk.
   - Hydrants require 3.0 m separation from franchise utilities (pedestals, transformers, street lights, etc.).
   - Hydrants shall be located at curb returns.
   - A 1.5 m clear distance is required around all hydrants.

7.10 Service Connections

Refer to Standard Details 5-300 and 7-500 for service connection installation details.

1. A water service for a single family residence shall have a minimum diameter of 19 mm if copper piping is used and 25 mm if Series 200 Polyethylene piping is used. Water services for multi-family and non-residential uses shall be sized by the Developer's Consultant based on the calculated water demand.
2. Water, sanitary, and storm services shall have the following minimum horizontal separation from each other:
   - 50 mm diameter or smaller: 0.3 m (installed in a common service trench)
   - 100 mm diameter or greater: 3.0 m
3. Water services shall have a minimum depth of cover of 3.0 m at the property line, measured from finished grade to pipe crown. Services with less than 3.0 m of cover shall be insulated.
4. Services shall terminate at the property line or 1.0 m past the shallow utility Easement.
5. Services shall be located at the centre of the lot; dual servicing layouts shall be reviewed by the Town on a case-by-case basis.
6. Curb stops shall be a minimum of 1.8 m from power infrastructure located in the shallow utility Easement.
7. The minimum distance between corporation (main) stops shall be 600 mm.
8. Parks may require a water service; the Developer shall consult with the Town to determine the requirement for water services to parks.

7.11 Thrust Blocking

Concrete thrust blocking shall be provided at bends, tees, wyes, reducers, plugs, caps, hydrants, valves, dead ends, and transition couplings, as per the Standard Details.

7.12 Chamber Drainage

Chambers or manholes containing valves, blow-offs, meters, or other appurtenances shall not be connected directly to a storm or sanitary sewer by gravity, nor shall blow-offs or air release valves be connected to any sewer. Such chambers or manholes shall be drained either to the surface, by gravity, where they are not subjected to flooding by surface water, to absorption pits underground where they are above the groundwater table or shall be pumped to a storm or sanitary sewer. Chambers shall be insulated to prevent freezing where necessary.

7.13 Abandoned Service Connections

If an existing service connection is to be abandoned, the main stop shall be closed and the service pipe shall be cut at the goose neck and removed.

7.14 Approved Materials and Specifications

7.14.1 Approved Pipe Materials

Table 7-3 lists specifications for acceptable watermain pipe materials.

Table 7-3
Acceptable Pipe Materials for Watermains

Material	Specification	Manufacturer	Model / Type
Polyvinyl Chloride (PVC)	AWWA C900, DR18	IPEX	Blue Brute
Polyvinyl Chloride (PVC)	AWWA C905, DR25	IPEX	Centurion

7.14.2 Approved Fittings and Hardware

Table 7-4 identifies acceptable materials for fittings and hardware.

Table 7-4
Acceptable Materials for Fittings and Hardware

Type of Fitting / Hardware	Specifications
Cast Iron Fittings	AWWA C110, 1.03 MPa working pressure
PVC Fittings	CSA B137.2 (Class 150); AWWA C907 CSA B137.3 (Class 150); AWWA C905
Flanged Joints	Class 150, ASME B16.5, flat-faced
Bolts and Nuts	Stainless Steel, Type 304, wrapped with Denso paste and tape

7.14.3 Cathodic Protection

1. Cathodic protection for buried non-steel metallic fittings, valves, and hydrants:
   - All buried non-steel metallic fittings and valves shall be cathodically protected with 2.3 kg zinc anodes.
   - All hydrants shall be cathodically protected with 5.5 kg zinc anodes.
   - Zinc anodes shall conform to ASTM B418.
   - Refer to Standard Details 7-400 and 7-401 for typical anode installation.
2. Cathodic protection for water services:
   - All copper services 50 mm diameter and smaller shall have a 5.5 kg zinc anode attached to the copper service pipe.
   - The zinc anode wire shall be clamped to the copper service within 1.0 m of the curb stop, within the road right-of-way.
   - An all-brass clamp shall be used.
   - Refer to Standard Detail 7-400 for typical anode installation.
3. Cathodic protection for buried steel pipe and fittings (retrofit work only):
   - All steel pipe and fittings require cathodic protection with high-potential magnesium anodes.
   - A soil resistivity analysis shall be conducted along length of the pipeline to calculate the weight and spacing of anodes.

- A cathodic protection report shall be provided to the Town in conjunction with the detailed design.
- Cathodic protection design shall be undertaken by a corrosion specialist.

4. Anode Requirements:
   - Zinc anodes shall be Type II in accordance with ASTM B418.
   - The anode container shall consist of a water permeable cardboard tube or bag.
   - The anode shall be centered in the tube and backfilled with material sufficient to cover all parts of the anode to a minimum thickness of 25 mm.
   - The backfill material shall possess a maximum resistivity of 50 ohm-cm when wet and as measured by the soil box method in ASTM G57.
   - The water used for wetting the backfill should be distilled or demineralised and no more than 15% - 20% water by weight should be added.

7.14.4 Approved Bedding Materials

Bedding material for pipes shall conforming to the Standard Detail 5-100 and the gradation identified in section 5.17.4.

7.14.5 Trench Section

Refer to Standard Detail 5-150 for trenching and backfilling requirements.

7.14.6 Approved Fire Hydrant Materials

1. Approved materials for fire hydrants are listed in Table 7-5, or as approved by the Town of Hinton.

Table 7-5
Acceptable Materials for Fire Hydrants

Manufacturer	Model / Type	Specification
Canada Valve	Darling or Century	AWWA C502
Clow Canada (McAvity)	M-67 Brigadier	AWWA C502
Mueller	Centurion	AWWA C502

Other hydrant bodies may be considered, at the discretion of Protective Services, provided they meet operational requirements.

2. Hydrants are to be complete with a breakaway flange and a 300 mm (maximum) spool piece. Refer to Standard Detail 7-200.
3. The minimum hydrant connection size shall be a 150 mm hub end.
4. The minimum cover over hydrant leads shall be 3.3 m, as measured from finished grade to the pipe crown.
5. Drain outlets shall be provided and the Developer's Consultant shall confirm the level of the groundwater table to determine whether to plug drain ports. All hydrants with drain ports plugged shall be identified on the Record Drawings.

6. Hydrants shall have two 63.5 mm hose connections and one 125 mm pumper connection (36A Major Thread) as presently used in the Town.
7. Threads on hose and pumper connection to be standard AMA thread.
8. Operating nuts shall be hexagon, to match the shape of existing operating nuts in use in the Town.
9. Hydrant main spindles shall turn to the left (counter-clockwise) to open.
10. A gate valve, strapped to the tee, shall be provided on each connection between a hydrant and watermain.
11. Hydrants shall be enamel painted to CAN/CGSB-1.59. Municipal hydrants are to be painted yellow; private hydrants are to be painted red. Primer shall be Benjamin Moore Retardo White Primer or approved equivalent.

    For municipal hydrants:

    - An intermediate yellow paint coat shall be applied.
    - Paint shall be General Paint #17-204 Hi-Vis yellow, Glidden Spread Gloss Alkyd Enamel 969, or approved equivalent.
    - One coat of paint shall be applied; as heavy a coat as possible (to slump point).
    - Hydrant domes and steamer caps shall be painted with Glidden Spread Gloss Alkyd Enamel or approved equivalent.
12. All bolts and nuts shall be stainless steel, type 304, and wrapped with Denso paste and tape.
13. Hydrants shall be cathodically protected; refer to Standard Detail 7-401.
14. Ensure concrete for thrust blocking does not interfere with the operation of flange bolts and nuts, nor prevent proper operation of the drain outlets.

7.14.7 Approved Gate Valve Materials

Gate valves shall be in accordance with AWWA C509 and the following:

1. Gate valves shall have an epoxy-coated iron body, bronze mounted, and are to be cathodically protected. Refer to Standard Details.
2. Gate valves shall be wrapped with Denso paste and tape.
3. Valves shall be resilient seat gates with non-rising stem, to open by turning in a counter-clockwise direction.
4. Valve ends shall be provided to fit the pipe. Where flanged valves are used, they must be accompanied by flexible couplings.
5. The position of the valve in line shall be vertical.
6. Stem seals shall be O-ring.
7. Valve boxes with operating stem and 50 mm square operating nut are required on all valves. All valve boxes shall be sliding Norwood Type A.
8. All gate valves larger than 350 mm shall have a bypass built into the body of the valve.

7.14.8 Approved Service Connection Materials

1. Water Service Pipe:
   - Approved materials for water services and associated appurtenances are listed in Tables 7-6 through 7-11.
   - Services shall be Type K copper for services 50 mm and smaller; services 100 mm and greater are to be PVC DR18. Kitec service piping is prohibited.
   - Couplings shall be Standard Brass, compression type.
   - Minimum pipe size:
     - Non-sprinklered dwelling (copper service): 19 mm
     - Non-sprinklered dwelling (Series 200 Polyethylene): 25 mm
     - Sprinklered dwelling: 38 mm
     - Multi-family / Commercial / Industrial / Institutional: Sized appropriately
2. Water Service Fittings:
   - Curb stop shall be copper to copper invert and key stop and drain.
   - Non-draining curb stops are to be provided in areas with high water table.
   - All fittings shall be able to withstand a test pressure of 1,035 kPa.
3. Rural Residential Service Pipe Sizing:
   - Rural residential dwellings may require larger service connections due to additional demands such as irrigation systems or a higher number of fixtures. Each system should be sized according to the expected demand and the distance from the main.

Table 7-6
Acceptable Materials for Service Saddles

Manufacturer	Model / Type
Robar	2606

Table 7-7
Acceptable Materials for Corporation (Main) Stops

Manufacturer	Model / Type	Comments
Cambridge Brass	E17073	Compression End
Cambridge Brass	E17076	Compression End
Mueller	H-15008	Compression End

Table 7-8
Acceptable Materials for Water Service Unions

Manufacturer	Model / Type	Comments
Cambridge Brass	E17084	Compression Ends
Cambridge Brass	E17087	Compression Ends
Cambridge Brass	E17088	Compression Ends
Mueller	H-15403	Compression Ends

Table 7-9
Acceptable Materials for Curb Stops

Manufacturer	Model / Type	Comments
Cambridge Brass	E17403	Compression Ends
Cambridge Brass	E17030	Compression Ends
Cambridge Brass	E17040	Compression Ends
Mueller	H-15209	Compression Ends

Table 7-10
Acceptable Materials for PVC Services

Manufacturer	Model / Type	Specifications
IPEX	Blue Brute	AWWA C900, DR18

Note:
Table 7-10 is for large diameter water services (100 mm and larger).

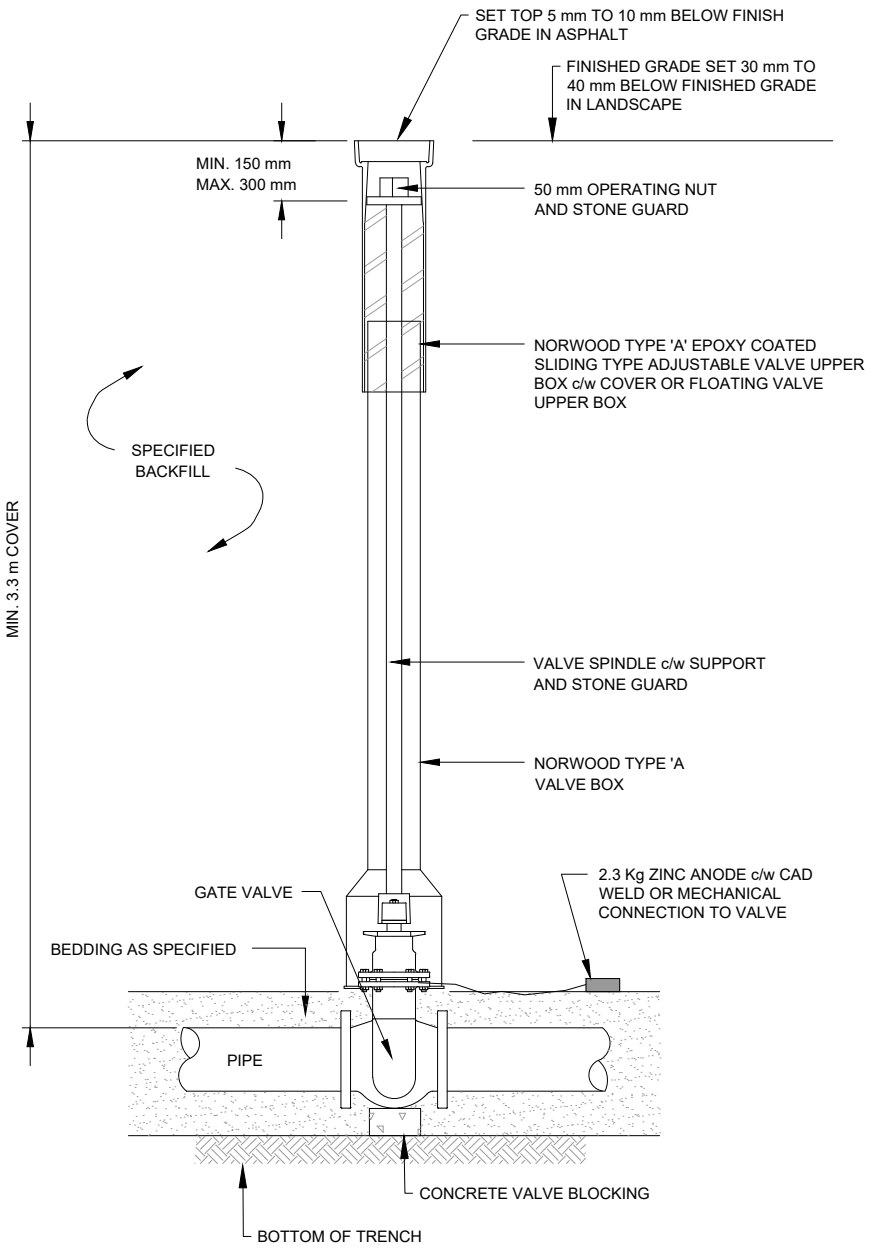
Table 7-11
Acceptable Pipe Materials for Copper Services

Manufacturer	Model / Type
Wolverine	Type K
Cerro	Type K
Halstead	Type K

7.15 Standard Details – Water Distribution Systems

Standard Detail No.	Title
7-100	Valve Installation
7-200	Hydrant Installation
7-300	Poured Concrete Thrust Blocks for Horizontal Tees and Bends
7-301	Poured Concrete Thrust Blocks for Vertical Bends (Downward Thrust)
7-302	Poured Concrete Thrust Blocks for Vertical Bends (Upward Thrust)
7-303	Poured Concrete Thrust Blocks for Dead Ends
7-400	Typical Anode Installation for Iron Fittings Used with PVC Watermains
7-401	Anode Installation at Hydrant
7-402	Typical Cad Weld Connection for Anodes
7-500	Water Service Connection
7-700	Pipe Insulation

STANDARD DETAIL	7-100	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) VALVES REQUIRE THRUST BLOCKS. DEVELOPER'S CONSULTANT TO REVIEW AND PROVIDE RECOMMENDATIONS FOR MECHANICAL JOINT RESTRAINTS IN AREAS OF UNSUITABLE SOIL CONDITIONS.

(2) RISERS ARE NOT PERMITTED IN NEW CONSTRUCTION

(3) GATE VALVES SHALL BE WRAPPED WITH DENSO PASTE AND TAPE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

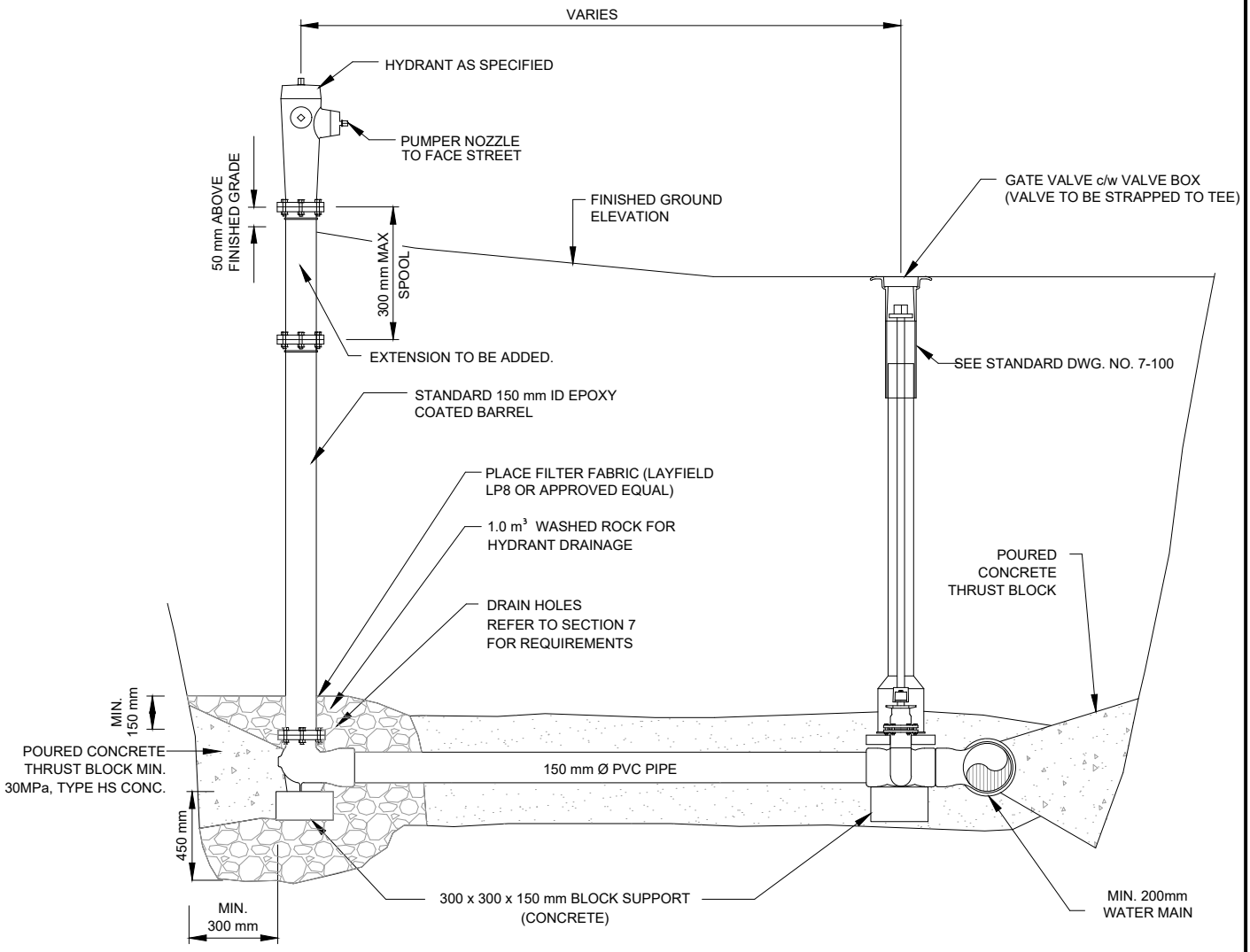
Gateway to the Rockies
HINTON

TOWN OF HINTON

Valve Installation

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_7-100.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-200	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) HYDRANT TO BE SET PLUMB WITH BARREL EXTENSIONS TO SUIT DEPTH OF BRANCH. BRANCH TO BE SET LEVEL WITH A MIN. OF 3.3 m OF COVER ABOVE TOP OF PIPE. EXTENSION TO BE INSTALLED BETWEEN HYDRANT AND TOP OF BARREL.

(2) ALL THRUST BLOCKING TO BE AGAINST UNDISTURBED TRENCH WALL WITH DRAIN HOLES CLEAR OF CONCRETE.

(3) VALVE BOX TO BE INSTALLED IN VERTICAL POSITION WITH TOP FLUSH WITH FINISHED GRADE.

(4) HYDRANT SHALL BE COMPRESSION TYPE AS SPECIFIED.

(5) ALL CAST IRON VALVES AND FITTINGS SHALL BE CATHODICALLY PROTECTED BY 2.3 kg SACRIFICIAL ANODES, HYDRANT SHALL BE CATHODICALLY PROTECTED BY 5.5 kg SACRIFICIAL ANODE.

(6) HYDRANT TO BE SUPPLIED WITH BREAKAWAY FLANGE.

(7) IN NO CASE SHALL A HYDRANT VALVE BE LOCATED IN A SIDEWALK

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

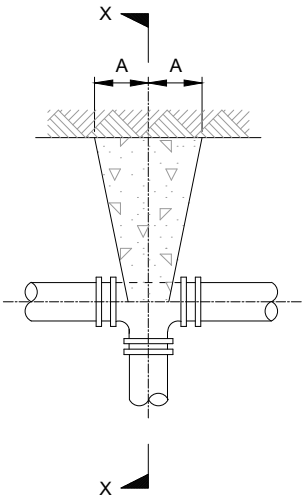
Gateway to the Rockies HINTON

TOWN OF HINTON

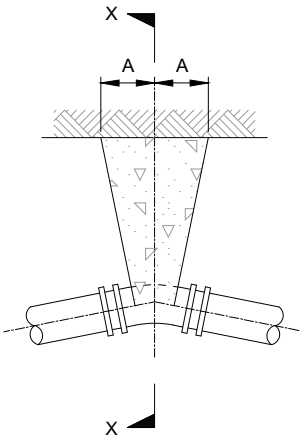
Hydrant Installation

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_7-200.dwg by
Xrefs: TH-G-TTBL_8.5x11

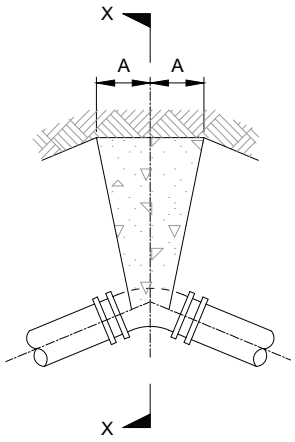
STANDARD DETAIL	7-300	
Date:	NOV, 2020	Rev. 0



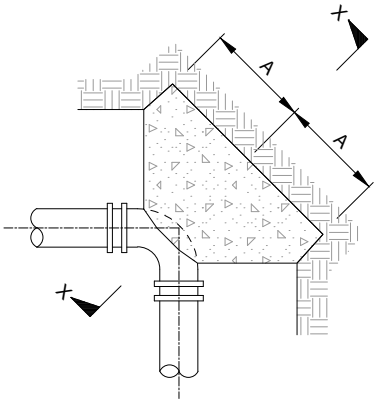
TEE



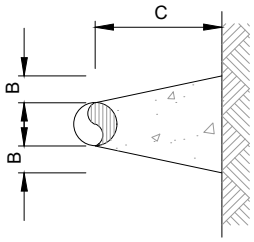
11 1/4° & 22 1/2° BENDS



45° BENDS



90° BENDS



SECTION X-X

PIPE SIZE	FITTINGS															
	TEE & DEAD END				11 1/4° & 22 1/2° BENDS				45° BEND				90° BEND			
	A	B	C	BEARING AREA	A	B	C	BEARING AREA	A	B	C	BEARING AREA	A	B	C	BEARING AREA
	(mm)	(mm)	(mm)	(m²)	(mm)	(mm)	(mm)	(m²)	(mm)	(mm)	(mm)	(m²)	(mm)	(mm)	(mm)	(m²)
150	348	100	275	0.244	159	75	225	0.095	311	75	225	0.187	575	75	225	0.345
200	433	150	400	0.433	211	100	300	0.169	415	100	300	0.332	766	100	300	0.613
250	521	200	525	0.677	264	125	375	0.264	518	125	375	0.518	958	125	375	0.958
300	609	250	650	0.975	317	150	450	0.380	622	150	450	0.746	1149	150	450	1.379
400	867	300	800	1.733	423	200	600	0.676	829	200	600	1.327	1532	200	600	2.451
450	954	350	925	2.194	476	225	675	0.856	933	225	675	1.679	1724	225	675	3.102
600	1393	400	1100	3.900	634	300	900	1.522	1244	300	900	2.985	2298	300	900	5.515
750	1741	500	1375	6.094	793	375	1125	2.378	1555	375	1125	4.664	2873	375	1125	8.618

NOTES:

(1) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.

(2) DESIGN BASIS:
a. HYDRAULIC DESIGN PRESSURE 690kPa (100psi)
b. SOIL BEARING CAPACITY 50kPa (1044 lb/sq.ft)(SOFT CLAY)

(3) CONCRETE THRUST BLOCK BEARING SURFACE AREA AND PARAMETER "A","B", & "C" MUST BE ADJUSTED IF HYDRAULIC DESIGN PRESSURE AND SOIL BEARING CAPACITY ARE DIFFERENT THAN SHOWN IN ITEM 2, DESIGN BASIS.

(4) HYDRAULIC DESIGN PRESSURE MUST INCLUDE HIGHEST OPERATING PRESSURE SCENARIO WITH SURGE PRESSURE INCLUDED.

(5) TEMPORARY BLOCKING MUST BE APPROVED BY THE ENGINEER

(6) CONCRETE STRENGTH SHALL BE 30MPa AT 28 DAYS, SULPHATE RESISTANT.

(7) CONCRETE TO BE CLEAR OF BELLS AND TO BEAR AGAINST UNDISTURBED TRENCH WALLS.

(8) CONCRETE TO BE PLACED UNDER ALL FITTINGS.

(9) CONCRETE TO BE CURED FOR 24 HOURS PRIOR TO BACKFILLING.

(10) BOND BREAKER TO BE USED BETWEEN CONCRETE AND FITTINGS.

(11) IF THE DESIGN IS BASED ON INFORMATION NOT VERIFIED IN THE FIELD AND NOT SUPPORTED BY HYDRAULIC MODELING / CALCULATIONS, A MIN. FACTOR OF SAFETY 1.50 SHOULD BE APPLIED TO ALL TABULATED BEARING AREAS.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

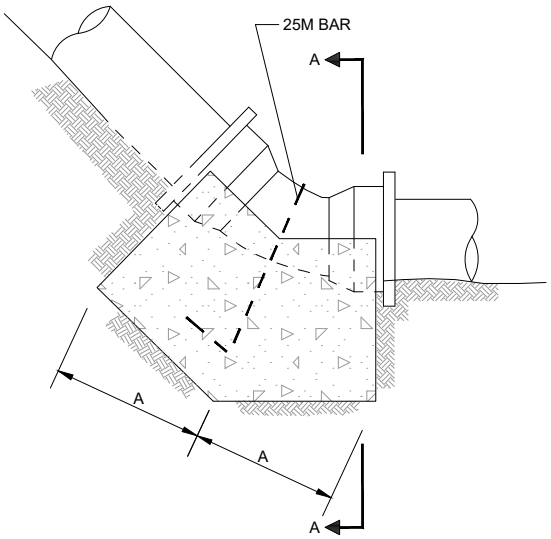
Gateway to the Rockies
HINTON

TOWN OF HINTON

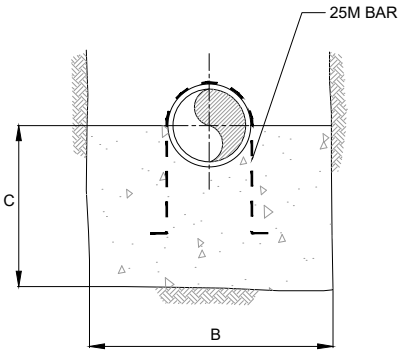
Poured Concrete Thrust Blocks for Horizontal Tees and Bends

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_7-300.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-301	
Date:	NOV, 2020	Rev. 0



ELEVATION



SECTION A-A

PIPE SIZE	FITTINGS							
	11 1/4° & 22 1/2° BENDS				45° BEND			
	A	B	C	BEARING AREA	A	B	C	BEARING AREA
	(mm)	(mm)	(mm)	(m²)	(mm)	(mm)	(mm)	(m²)
150	106	450	375	0.095	207	450	375	0.187
200	169	500	400	0.169	332	500	400	0.332
250	240	550	425	0.264	471	550	425	0.518
300	317	600	450	0.380	662	600	450	0.746
400	483	700	500	0.676	948	700	500	1.327
450	571	750	525	0.856	1119	750	525	1.679
600	845	900	600	1.522	1658	900	600	2.985
750	1132	1050	675	2.378	2221	1050	675	4.664

NOTES:

(1) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.

(2) DESIGN BASIS:
a.HYDRAULIC DESIGN PRESSURE 690kPa (100psi)
b.SOIL BEARING CAPACITY 50kPa (1044 lb/sq.ft)(SOFT CLAY)

(3) CONCRETE THRUST BLOCK BEARING SURFACE AREA AND PARAMETER "A","B", & "C" MUST BE ADJUSTED IF HYDRAULIC DESIGN PRESSURE AND SOIL BEARING CAPACITY ARE DIFFERENT THAN SHOWN IN ITEM 2, DESIGN BASIS.

(4) HYDRAULIC DESIGN PRESSURE MUST INCLUDE HIGHEST OPERATING PRESSURE SCENARIO WITH SURGE PRESSURE INCLUDED.

(5) TEMPORARY BLOCKING MUST BE APPROVED BY THE ENGINEER.

(6) CONCRETE STRENGTH SHALL BE 30MPa AT 28 DAYS, SULPHATE RESISTANT.

(7) CONCRETE TO BE CLEAR OF BELLS AND TO BEAR AGAINST UNDISTURBED TRENCH BOTTOM.

(8) CONCRETE TO BE PLACED UNDER ALL FITTINGS.

(9) CONCRETE TO BE CURED FOR 24 HOURS PRIOR TO BACKFILLING.

(10) BOND BREAKER TO BE USED BETWEEN CONCRETE AND FITTINGS.

(11) IF THE DESIGN IS BASED ON INFORMATION NOT VERIFIED IN THE FIELD AND NOT SUPPORTED BY HYDRAULIC MODELING / CALCULATIONS, A MIN. FACTOR OF SAFETY 1.50 SHOULD BE APPLIED TO ALL TABULATED BEARING AREAS.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

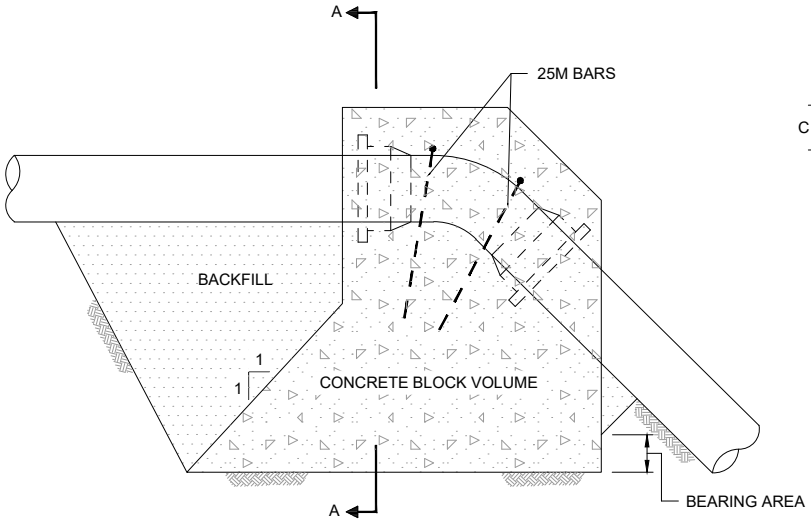
Gateway to the Rockies
HINTON

TOWN OF HINTON

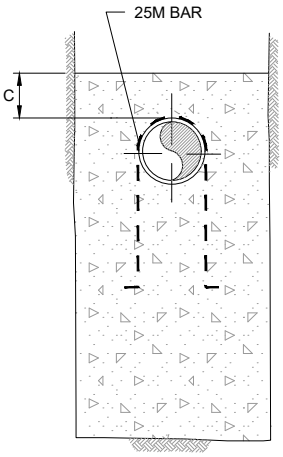
Poured Concrete Thrust Blocks for Vertical Bends (Downward Thrust)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_7-301.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-302	
Date: NOV, 2020		Rev. 0



ELEVATION



SECTION A-A

PIPE SIZE	FITTINGS					
	11 1/4° & 22 1/2° BENDS			45° BEND		
	BLOCK VOL.	C	BEARING AREA	BLOCK VOL.	C	BEARING AREA
	(m^3)	(mm)	(m^2)	(m^3)	(mm)	(m^2)
150	0.4	375	0.019	0.7	375	0.071
200	0.7	400	0.033	1.3	400	0.127
250	1.1	425	0.052	2.0	425	0.198
300	1.6	450	0.074	2.9	450	0.286
400	2.8	500	0.132	5.2	500	0.508
450	3.6	525	0.167	6.6	525	0.643
600	6.3	600	0.297	11.7	600	1.142
750	9.9	675	0.464	18.3	675	1.785

NOTES:

(1) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.

(2) DESIGN BASIS:
a. HYDRAULIC DESIGN PRESSURE 690kPa (100psi)
b.SOIL BEARING CAPACITY 50kPa (1044 lb/sq.ft)(SOFT CLAY)

(3) CONCRETE THRUST BLOCK BEARING SURFACE AREA MUST BE ADJUSTED IF HYDRAULIC DESIGN PRESSURE AND SOIL BEARING CAPACITY ARE DIFFERENT THAN SHOWN IN ITEM 2, DESIGN BASIS.

(4) HYDRAULIC DESIGN PRESSURE MUST INCLUDE HIGHEST OPERATING PRESSURE SCENARIO WITH SURGE PRESSURE INCLUDED.

(5) TEMPORARY BLOCKING MUST BE APPROVED BY THE ENGINEER.

(6) CONCRETE STRENGTH SHALL BE 30MPa AT 28 DAYS, SULPHATE RESISTANT.

(7) CONCRETE TO BE CLEAR OF BELLS AND TO BEAR AGAINST UNDISTRUBED TRENCH WALLS. (8) CONCRETE TO BE PLACES UNDER ALL FITTINGS.

(9) CONCRETE TO BE CURED FOR 24 HOURS PRIOR TO BACKFILLING.

(10) BOND BREAKER TO BE USED BETWEEN CONCRETE AND FITTINGS.

(11) IF THE DESIGN IS BASED ON INFORMATION NOT VERIFIED IN THE FIELD AND NOT SUPPORTED BY HYDRAULIC MODELING / CALCULATIONS, A MIN. FACTOR OF SAFETY 1.50 SHOULD BE APPLIED TO ALL TABULATED BEARING AREAS.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

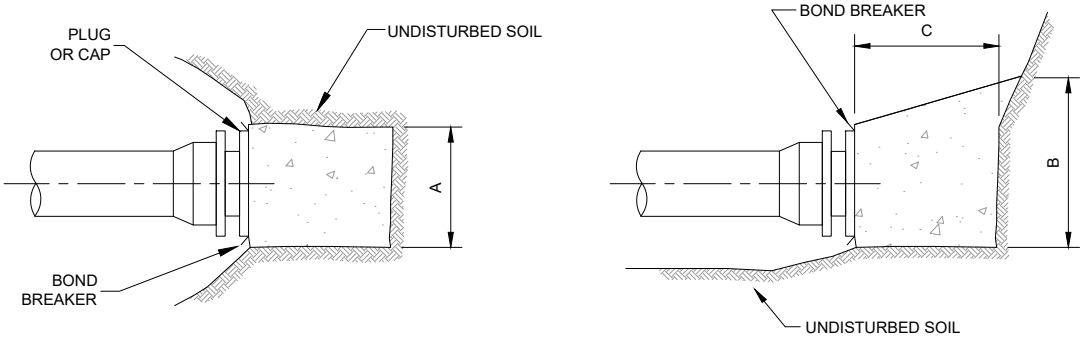
Gateway to the Rockies
HINTON

TOWN OF HINTON

Poured Concrete Thrust Blocks for Vertical Bends (Upward Thrust)

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_7-302.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-303	
Date:	NOV, 2020	Rev. 0



MINIMUM DIMENSIONS IN mm's				
SIZE OF PIPE	A	B	C	BEARING AREA
100	430	250	200	0.11
150	700	350	200	0.24
200	870	500	200	0.43
250	1040	650	275	0.68
300	1220	800	350	0.98
400	1730	1000	400	1.73
450	1910	1150	475	2.19
600	2790	1400	500	3.90
750	3480	1750	625	6.09

NOTES:

(1) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.

(2) DESIGN BASIS:
a.HYDRAULIC DESIGN PRESSURE 690kPa (100psi)
b.SOIL BEARING CAPACITY 50kPa (1044 lb/sq.ft)(SOFT CLAY)

(3) CONCRETE THRUST BLOCK BEARING SURFACE AREA AND PARAMETER "A","B", & "C" MUST BE ADJUSTED IF HYDRAULIC DESIGN PRESSURE AND SOIL BEARING CAPACITY ARE DIFFERENT THAN SHOWN IN ITEM 2, DESIGN BASIS.

(4) HYDRAULIC DESIGN PRESSURE MUST INCLUDE HIGHEST OPERATING PRESSURE SCENARIO WITH SURGE PRESSURE INCLUDED.

(5) TEMPORARY BLOCKING MUST BE APPROVED BY THE ENGINEER.

(6) CONCRETE STRENGHT SHALL BE 30MPa AT 28 DAYS, SULPHATE RESISTANT.

(7) CONCRETE TO BE CLEAR OF BELLS AND TO BEAR AGAINST UNDISTURBED TRENCH WALLS.

(8) CONCRETE TO BE PLACED UNDER ALL FITTINGS.

(9) CONCRETE TO BE CURED FOR 24 HOURS PRIOR TO BACKFILLING.

(10) BOND BREAKER TO BE USED BETWEEN CONCRETE AND FITTINGS.

(11) IF THE DESIGN IS BASED ON INFORMATION NOT VERIFIED IN THE FIELD AND NOT SUPPORTED BY HYDRAULIC MODELING / CALCULATIONS, A MIN. FACTOR OF SAFETY 1.50 SHOULD BE APPLIED TO ALL TABULATED BEARING AREAS.

(12) THRUST BLOCKS FOR DEAD ENDS TO BE LOCATED A MINIMUM OF 3.0 m FROM VALVES

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

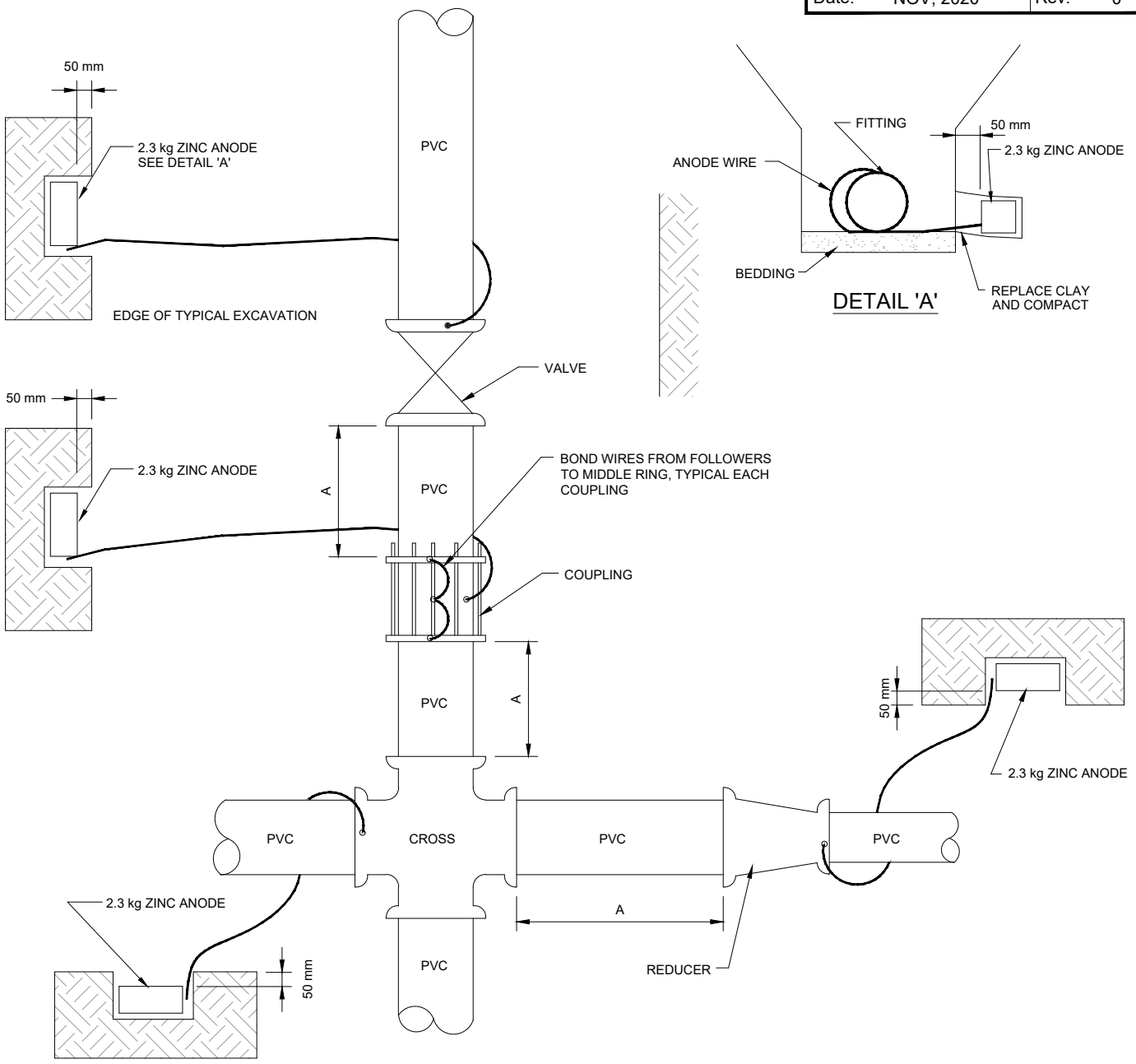
Gateway to the Rockies
HINTON

TOWN OF HINTON

Poured Concrete Thrust Blocks for Dead Ends

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_7-303.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-400	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) MINIMUM DISTANCE FROM ANODE TO PIPE, FITTING, VALVE OR HYDRANT IS 150 mm.

(2) INSTALL ANODE AT APPROXIMATE PIPE DEPTH IN NATIVE SOIL.

(3) BOND WIRES MAY BE USED TO PROTECT UP TO TWO FITTINGS WITH ONE ANODE WHEN DIMENSION 'A' DOES NOT EXCEED ONE (1) METER.

(4) ALL ZINC ANODES ON FITTINGS AND VALVES ARE 2.3 kg.

(5) ZINC ANODES TO BE EMBEDDED INTO TRENCH WALL TO PROVIDE FOR A MINIMUM OF 50mm OF NATIVE CLAY COMPLETELY SURROUNDING THE ANODE.

(6) ANODES TO BE AT LEAST 300 mm CLEAR OF THRUST BLOCK.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

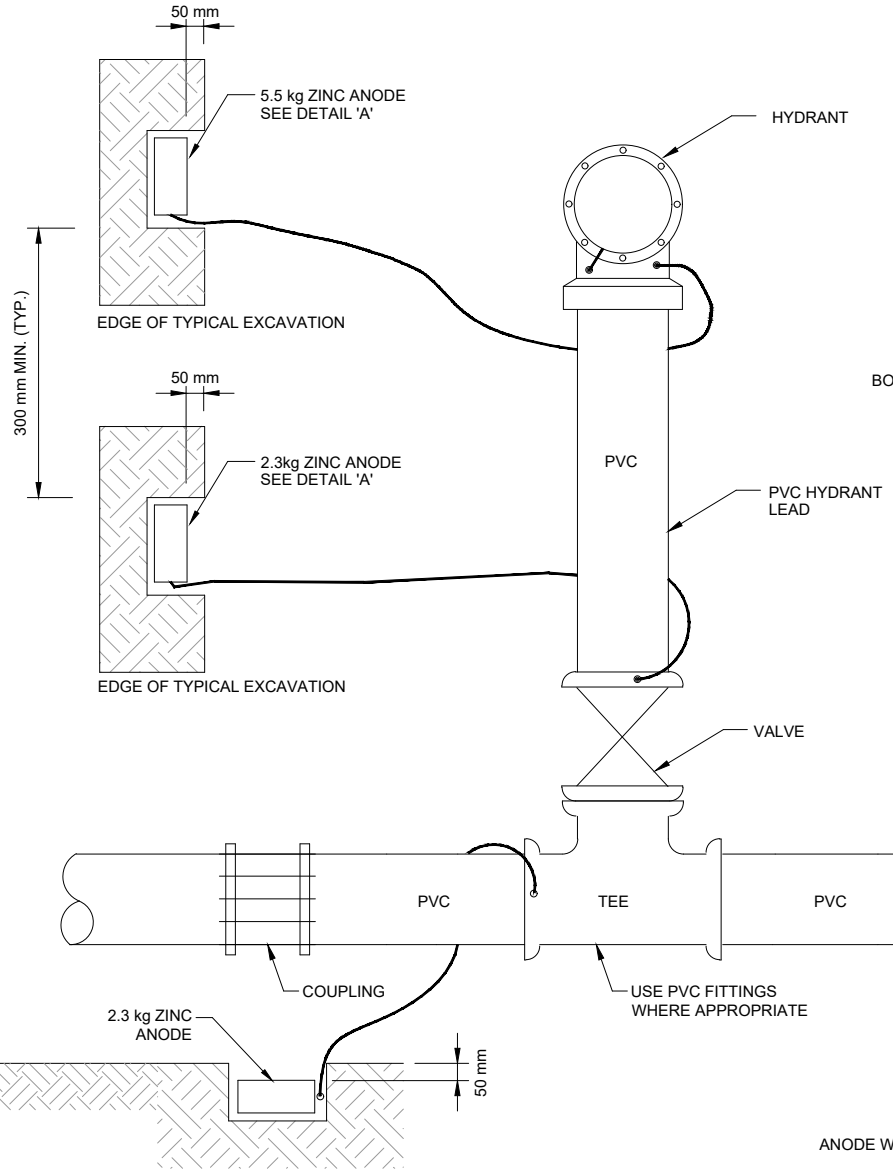
Gateway to the Rockies
HINTON

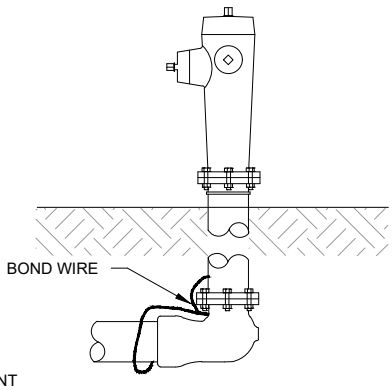
TOWN OF HINTON

Anode Installation for Iron Fittings used with PVC Watermains

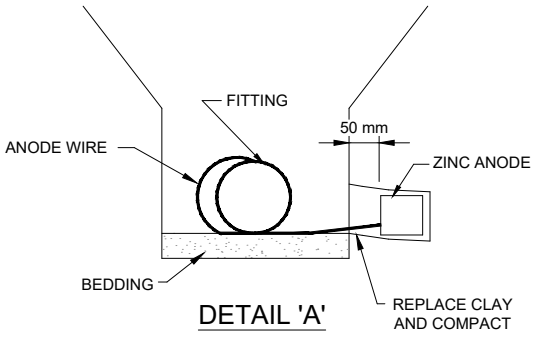
File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_7-400.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-401	
Date:	NOV, 2020	Rev. 0





HYDRANT ELEVATION



DETAIL 'A'

NOTES:

(1) MINIMUM DISTANCE FROM ANODE TO PIPE, FITTING, VALVE, OR HYDRANT IS 150 mm.

(2) INSTALL ANODE AT APPROX. PIPE DEPTH IN NATIVE SOIL.

(3) ZINC ANODES TO BE EMBEDDED INTO TRENCH WALL TO PROVIDE FOR A MINIMUM OF 50 mm OF NATIVE CLAY COMPLETELY SURROUNDING THE ANODE.

(4) ANODES TO BE AT LEAST 300 mm CLEAR OF THRUST BLOCK.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

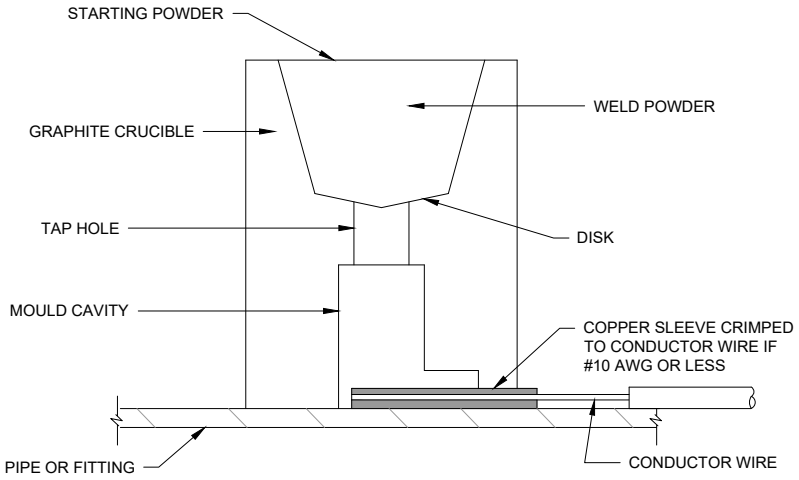
Gateway to the Rockies
HINTON

TOWN OF HINTON

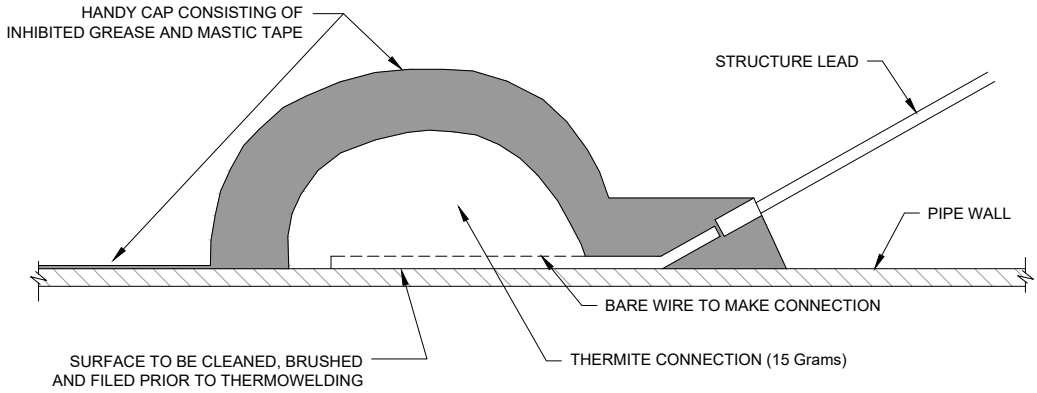
Anode Installation at Hydrant

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_7-401.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-402	
Date:	NOV, 2020	Rev. 0



WELDING OF TERMINATED CONDUCTOR WIRE



DETAIL 2

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

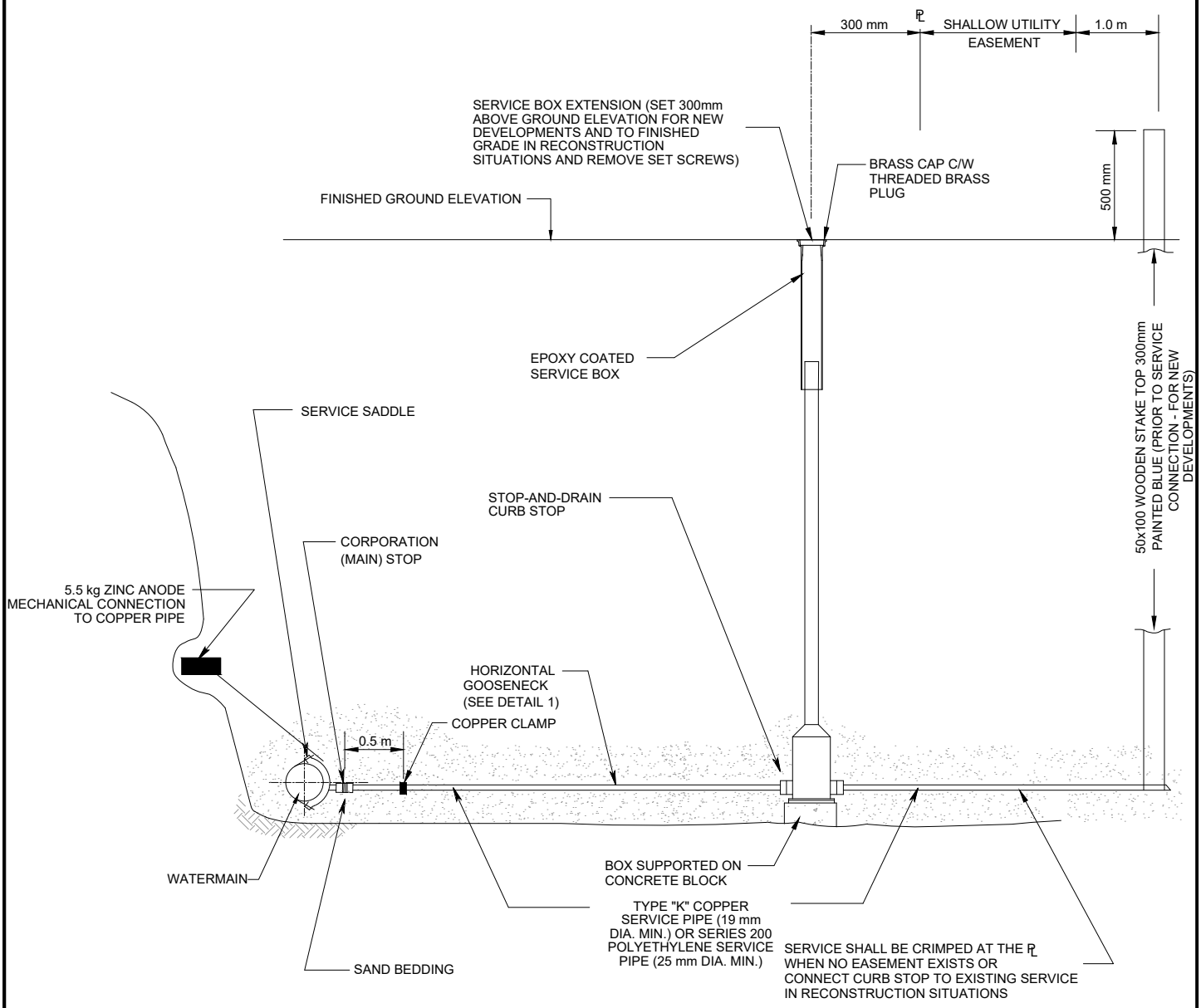
Gateway to the Rockies
HINTON

TOWN OF HINTON

Typical Cad Weld Connection for Anodes

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_7-402.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-500	
Date:	NOV, 2020	Rev. 0



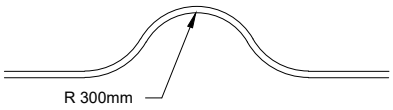
NOTES:

(1) SERVICES TO BE INSTALLED AT RIGHT ANGLES TO WATERMAINS WHERE POSSIBLE

(2) SERVICE BOXES TO BE INSTALLED PLUMB

(3) DIAMETER OF COPPER SERVICE PIPE TO BE UNIFORM FROM CORPORATION STOP TO METER

(4) MINIMUM COVER OVER SERVICE PIPES TO BE 3.0 m



DETAIL 1- PLAN VIEW
HORIZONTAL GOOSENECK

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

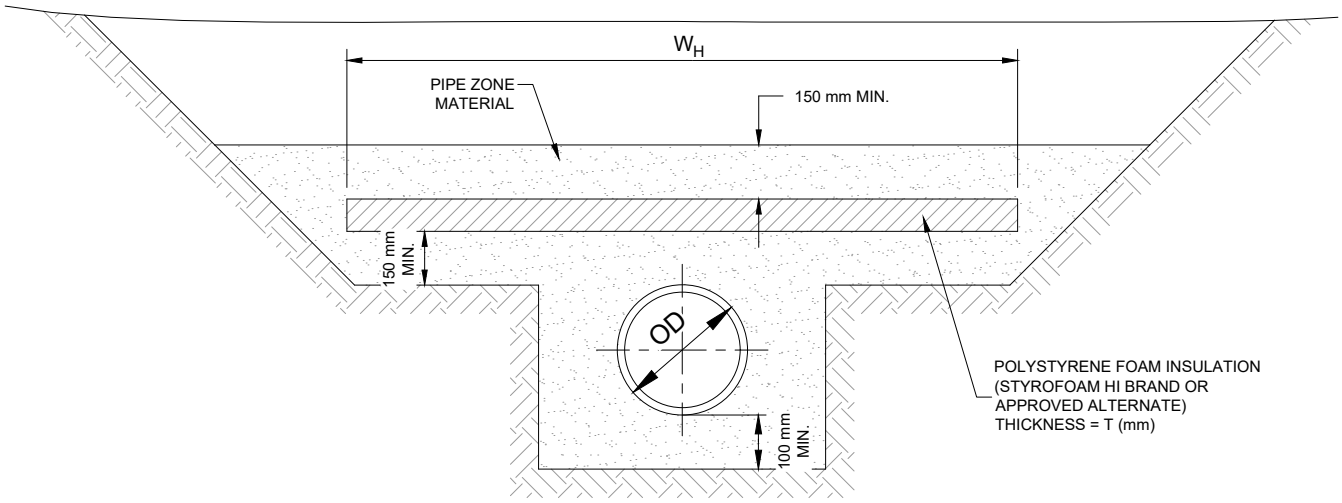
Gateway to the Rockies
HINTON

TOWN OF HINTON

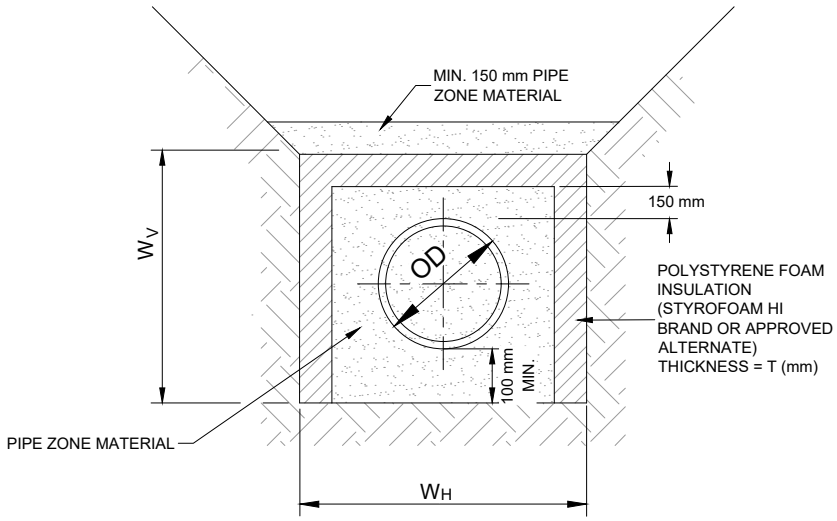
Water Service Connection

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_7-500.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	7-700	
Date:	NOV, 2020	Rev. 0



SHEET INSULATION



BOX INSULATION

X (m)	T (mm)	WIDTH OF INSULATION (W) FOR OUTSIDE PIPE DIAMETERS			
		0.15	0.20	0.25	0.30
1.6	65	3.0	3.1	3.3	3.4
1.8	50	2.6	2.7	3.9	3.0
2.0	50	2.2	2.3	2.5	2.6
2.2	40	1.8	1.9	2.3	2.4
2.4	25	1.4	1.5	1.9	2.0
2.6	25	1.0	1.1	1.5	1.6
2.8	25	0.6	0.7	1.1	1.2

NOTES:

X = DEPTH FROM GROUND SURFACE TO BOTTOM OF INSULATION (METRES)
W = WIDTH OF INSULATION (METRES) = WH + 2(WV)
OD = OUTSIDE DIAMETER OF PIPE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies
HINTON

TOWN OF HINTON

Pipe Insulation

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_7-700.dwg by
Xrefs: TH-G-TTBL_8.5x11

8 FRANCHISE UTILITIES

8.1 General

All work necessary for the installation of gas, power, street lighting, telephone, and cable shall be the responsibility of the Developer and the installation of these utilities will be a condition of development. In addition to the financial responsibilities, the Developer must initiate and coordinate the design, approval, and construction of these services. The actual design and construction of each utility is normally handled by the respective utility company.

Four-party trenching (one common trench for telephone, cable, gas, and electric) located within a 3.5 m Easement on property is the accepted trench configuration; refer to Standard Detail 8-100.

The following provides some of the basic procedures and requirements for the installation of franchise utilities.

8.2 Design Standards

8.2.1 Design and Approval

To coordinate design of gas, power, street lighting, telephone, and cable systems, it is necessary to first classify and designate cross-sections for each street (and walkway) within a subdivision area, in relation to Standard Details.

Upon approval of a tentative subdivision plan, the Developer's Consultant shall circulate to each utility company copies of the approved subdivision plan, complete street classifications, and utility alignments, and any other information the utility companies may require. The utility companies shall indicate on this plan their basic design, complete with all rights-of-way, Easements, and PUL requirements, and return it to the Developer's Consultant. After checking for and eliminating potential conflicts, the Developer's Consultant shall prepare a servicing plan showing all franchise utilities on a site plan. This site plan will also show the Municipal Improvements.

This plan shall then be circulated to, and approved by, the respective utility companies. The plan will then be included with the other engineering drawings submitted by the Developer's Consultant to the Municipal Engineer for acceptance by the Town.

8.2.2 Location of Utilities

For all Urban applications, power shall be underground. For isolated Rural applications where the installation of buried power may not be practical, aboveground power may be acceptable to the Town.

All distribution cables for primary and secondary power, telephone, cable, and streetlight feeders, may be installed in one common 300 mm wide trench at the required alignment.

Streetlights shall be placed at locations not interfering with proposed driveways and shall be located in line with the extensions of common property lines between two lots.

The face of the posts, poles, pedestals, and transformers shall be at least 1 m clear of the face of the curb.

The minimum depth of cover over shallow utilities shall be 1 m from finished grade.

8.2.3 Separation from Other Utilities

The franchise utilities shall be separated from the deeper municipal utilities (i.e., water, sanitary sewer, and storm sewer) by not less than 3.0 m laterally.

A separation of 1.2 m from other franchise utilities is also required; common (four-party) trench installations excepted.

8.3 Installation

8.3.1 Road Crossings

Adequate ducts shall be installed under roadways prior to their construction to accommodate the installation of power, telephone, and cable.

Where the road crossings are installed after the construction of road improvements, they shall be installed via an appropriate trenchless method to avoid disruption of the surface improvements.

8.3.2 Site Preparation

The Developer shall pre-grade all boulevards, lanes, and/or Easements, where franchise utilities are to be installed, in accordance with the franchise utilities' standards.

8.3.3 Survey & Record Information

The Developer shall be responsible for laying out all work, lines, and levels as required to proceed with the entire installation and for the preservation of all such stakes and marks during construction. Record information (.dwg and shapefiles) shall be provided to the Town for incorporation into their GIS database.

8.3.4 Compaction of Trenches

All trenches located on municipal property or within municipal Easements are to be compacted to the following standards:

- 95% Standard Proctor Density for trenches in boulevards and landscaped areas.
- 97% Standard Proctor Density for trenches under roadways, with the top 300 mm of subgrade material compacted to 100% Standard Proctor Density.
- Restore granular base course to a thickness matching that of the existing roadway, compacted to 100% Standard Proctor Density.
- Restore asphaltic concrete pavement to a thickness matching that of the existing roadway, compacted to 98% Marshall Density.

8.3.5 Rights-of-Way, Easements, and Public Utility Lots

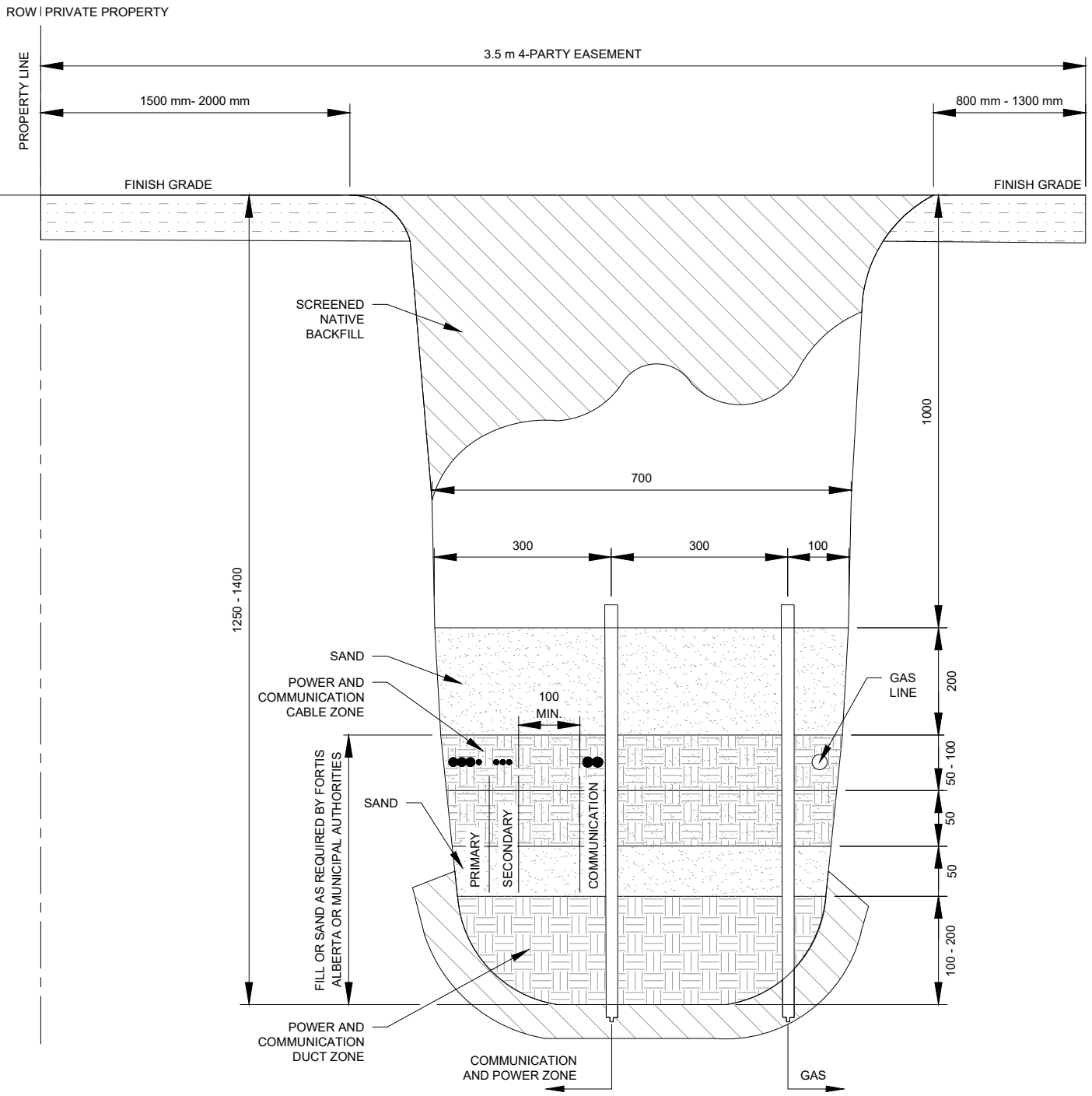
The Developer shall provide, to the satisfaction of the utility companies, rights-of-way, Easements, or PULs to accommodate the utility servicing, registered in the name of the Town.

Easements shall be registered on each lot prior to the sale of any lot in the development area.

8.4 Standard Details – Franchise Utilities

Standard Detail No.	Title
8-100	Franchise Utility Placement within 3.5 m Easement

STANDARD DETAIL	8-100	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) ENSURE 0.30 m MINIMUM SEPARATION BETWEEN GAS LINE AND CLOSEST DUCT/CABLE

(2) STAKES INSTALLED AT 3.00 m INTERVALS

(3) KEEP PRIMARY CABLE THE GREATEST DISTANCE FROM THE GAS LINE

(4) ALL MEASUREMENTS IN MILLIMETERS UNLESS NOTED OTHERWISE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies
HINTON

TOWN OF HINTON

Franchise Utility Placement
Within 3.5 m Easement

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_8-100.dwg by
Xrefs: TH-G-TTBL_8.5x11

9 MECHANICAL PLANTS

9.1 General

This section covers the design and construction of mechanical plants to be built or re-built in the Town.

General construction requirements, construction materials, and procedures are not alluded to in this section and are left to the Developer's Consultant to present to the Town for acceptance.

All mechanical plants shall be in accordance with the Alberta Environment, Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems, and all other relevant standards and codes (i.e. electrical, building, etc.). Where a roof structure cost exceeds $50,000, ARCA certification is required.

Underground power shall be installed to all mechanical plants; overhead power will not be permitted.

9.2 Water Booster Pumping Stations

9.2.1 Hydraulic Design Parameters

The need for a pumping facility shall be determined during preliminary discussions between the Developer and the Town.

The design flows and pressures shall be based on parameters and computation methods outlined in Section 7 - Water Distribution Systems. The design period for sizing pump stations shall be a minimum of 25 years.

9.2.2 Sump and Intake Design

Sumps and intakes shall be designed in accordance with the current edition of the Hydraulics Institute Standards.

Minimum submergence shall not be less than the pump manufacturer's recommendations.

Net positive suction head (NPSH) required at the operation point and at the best efficiency point shall be at least 7 kPa less than the NPSH available.

Open sumps shall have an overflow and a drain point. Provision shall be made to allow over-pumping or bypassing the pump station.

9.2.3 Pump and Driver Selection

Service pumps shall be vertical turbine or horizontal split case centrifugal pumps. Fire pumps shall be FM/UL approved, unless otherwise accepted, in writing, by the Town. Pump shafts and line shafts shall be stainless steel.

Pumps shall have their maximum efficiency within the normal operating range. Maximum pump speed shall be 1,800 rpm. Slower speed pumps are preferred where available. Spare parts as recommended by the pump manufacturer shall be provided.

Pumps shall be variable speed or soft start. Service pumps shall be driven by open drip proof, NEMA Design B, CSA-approved electric motors. The Developer's Consultant shall contact the Municipal Engineer to confirm the requirements for any proposed fire pumps.

Service pumps shall be sized such that the station can meet the peak hour demand with the largest pumping unit out of service. Fire pumps shall be sized for the fire flows indicated in Section 7. Jockey pumps can be used to meet average day demands.

In-line booster pumps may be canned vertical turbine or horizontal split case pumps. Vertical turbine pumps with flanged suction connections may be considered for in-line booster pumps, provided the inlet arrangement complies with the pump manufacturer's recommendations.

Horizontal split case pumps and vertical turbine pumps with flanged suction connections shall be tested to a hydraulic pressure of twice the maximum operating pressure or 1.5 times the shutoff head, whichever is greater.

Intermittent type pumping systems including pumps, bladder type pressure tanks may be used when the average flow is less than 0.25 L/s.

9.2.4 Dry Well / Pump Room Layout

The layout shall be such that all equipment and valves are easily accessible. There shall be a minimum horizontal clearance around pumps and motors of 1 m and a vertical clearance of at least 3 m. Additional clearance may be required by the Town for critical or large pieces of equipment. Special attention shall be given to the ease of removal of pumps, motors, and valves for Maintenance and repair.

If the initial capacity of the proposed pumps is to be less than the 25-year design capacity, the station shall be designed so that the capacity can be easily increased, when required, without significant changes to the existing structural, architectural, mechanical, electrical, or instrumentation systems.

9.2.5 Valves and Fittings

Magnetic type meters shall be installed on all discharge headers.

Check valves shall be installed in each pump discharge line between the pump and the discharge isolating valve. They shall be the tilting disc type with dashpot controlled closing or globe style silent checks. All pump discharge check valves shall have an external arm to allow for position monitoring with a proximity style limit switch.

Isolating valves shall be installed on each pump suction and pump discharge line. They shall be AWWA Standard C504 short body flanged butterfly valves. In booster stations, isolating valves must be provided 10 diameters upstream.

Motorized or hydraulic pump control valves shall be installed to reduce water hammer during pump start and stop. The pump discharge isolating valve may be motorized to function as a pump control valve.

Air release valves shall be installed on the discharge header. Air and vacuum valves shall be installed between the pump discharge and the check valve on wet well vertical turbine pumps which do not have a separate pump control valve discharging back to the wet well.

Pipes and valves shall be adequately supported, tied down by commercially available supports or concrete pillow blocks, spaced in accordance with the manufacturer's design data and restrained against thrust where necessary.

A flexible coupling shall be installed on each pump discharge line to enable easy removal of the pump and check valve. The isolating valve shall allow the facility to continue to operate during removals.

Pipe material up to and including 150 mm diameter shall be PVC to AWWA C900 or stainless steel, type 304, Schedule 80 to ASME B31.3 A53 Standard Wall. Pipe material greater than 150 mm diameter to 620 mm diameter shall be ASTM A53, Grade B, standard wall steel. Pipes greater than 150 mm shall be epoxy lined to AWWA Standard C210.

Pipework may be painted and colour coded to WHMIS Standards and the Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems.

9.2.6 Auxiliary Systems

Air

Where compressed air is used in a pumping station, the air system shall be complete with dual air compressors (one duty, one standby), receiver, dryer, controls, and all necessary appurtenances to supply dry air for all air-operated equipment. Each compressor shall be capable of continuously supplying air at a rate of at least twice the maximum anticipated consumption.

Water

Potable water for station service may be drawn from the pump discharge line or other suitable supply point having adequate pressure. Where necessary, a pressure reducing valve capable of maintaining the station service water between 350 kPa and 700 kPa shall be provided. The line supplying water for non-domestic uses such as cooling, gland sealing, hose bibbs, etc., shall be provided with an approved reduced pressure backflow preventer. Water for domestic use shall be drawn from a point upstream of the backflow preventer. At least one hose bibb shall be provided in the wet well area, in the dry well area, and on the exterior of the station.

Dry Well Drainage

Where practical, dry wells shall be drained by gravity to a sanitary sewer. If gravity drainage is impractical, dry wells shall be provided with a sump and two sump pumps (one duty, one standby). Pump capacity shall be at least 100 L/min. Liquid discharged by the sump pumps shall be considered contaminated and shall be discharged only to a sanitary sewer or other approved wastewater disposal system.

The floor of the dry well shall drain towards the sump with a minimum slope of 1.0%.

Lifting Equipment

Lifting equipment (bridge cranes, monorails, etc.) with capacity of 1.5 times the heaviest anticipated load, with allowance for impact, shall be provided. Where a monorail is used to convey heavy equipment, the rail shall extend a minimum distance of 2 m outside the building wall through a double doorway. A neoprene seal shall be installed around the monorail where it extends through the doorway.

Electrical Equipment
The pump station's electrical system shall be designed by a qualified electrical Engineer.

The Developer shall ascertain from the electric utility the nature of the available power supply and make all necessary arrangements for connection.

Wherever practical, there shall be two independent power supply feeders to the station, with provision for automatic switch over to the second feeder in the event of a failure of the first. If the Town determines that continuous operation of the station is essential (i.e. that failure would result in serious consequences), then an automatic standby power generation system shall be installed in the station. This system shall have sufficient capacity to allow the station to operate at the maximum anticipated flow rate.

Location of electrical switchgear and similar equipment shall be such that it is not subject to immersion in the event of dry well flooding.

Adequate lighting to meet the code requirements for the specific area shall be provided throughout the entire structure to ensure the safe operation and Maintenance of the complete facilities.

Conduit shall be required for all low voltage wiring (security systems, telephones, etc.).

Instrumentation and Control
All pumping stations shall have instrumentation and control systems which will allow the station to run unattended and are fully integrated and compatible with the Town's existing Supervisory Control and Data Acquisition (SCADA) System.

The nature of the instrumentation and control systems will vary depending on the size, type, and function of the station and shall be decided during discussions between the Developer and the Town. At a minimum, the following is required:

- Station discharge flow (meter to be magnetic type) - in critical applications a float back-up switch may also be required
- Wet well level indicator / controller (sensor to be ultrasonic type)
- Station discharge pressure indicator / alarm
- Dry well flooding alarm
- Intruder alarm for all entrance points
- Pump failure alarm
- Pump on/off indicator
- Main power failure alarm
- All alarms to be locally indicated separately
- Low temperature alarm

All the above shall be telemetered by means of digital or analog signals to a remote location determined by the Town. The telemetry system shall have a battery uninterruptible power supply to allow the system to operate for at least 4 hours after a power failure.

All instruments and sensors to be installed in a wet well or limited access area shall be, wherever possible, accessible and removable without entering the wet well or limited access area. All instruments which have local indication or which require access for programming should be installed at eye level. All instruments and electrical or control panels which require occasional access must be readily accessible.

9.2.7 Heating, Ventilation, and Air Conditioning

Heating and ventilation systems that use natural gas as a main fuel source shall be provided for all pumping stations. Air conditioning will be required only in unusual circumstances.

Ventilation systems shall conform to all existing local and/or provincial codes. Forced ventilation shall be provided for all rooms, compartments, pits, and other enclosures below ground floor and for all areas where an unsafe atmosphere may develop or where excessive heat build-up may occur.

In areas where excess moisture could cause safety hazards or damage to equipment, a suitable dehumidification system shall be provided.

Heating facilities shall have sufficient capacity to prevent freezing temperatures in any part of the station during the coldest anticipated weather conditions.

9.2.8 Prefabricated Pumping Stations

The use of prefabricated pumping stations is not acceptable.

9.3 Reservoirs

9.3.1 Hydraulic Design Parameters

Reservoirs are provided in a water supply system to satisfy the following criteria:

1. To balance hourly or daily peak demand variations.
2. To provide storage of water to meet fire flow demand.
3. To maintain supply in the event of a source failure.

The storage volume required to balance peak daily flow variations shall be determined from analysis of the daily demand variations.

The storage volume to meet fire flow demands shall be assessed in accordance with the recommendations contained in "Water Supply for Public Fire Protection" published by the Fire Underwriters Survey.

The storage volume required to maintain supply in the event of a source failure shall be determined from considerations of the reliability of sources and the consequences of supply failure. Generally, a storage volume of the peak day demand plus fire demand is considered acceptable but each case should be individually determined.

Demand
The total system demand shall be determined as outlined in Section 7 of these Minimum Development Engineering Design and Servicing Standards (MDEDSS). Future demands shall be determined from consideration of past trends and known planned developments.

Design Period
The design period for reservoir sizing shall be a minimum of 25 years.

Optimum Location
The optimum location for a reservoir is between the supply source and the distribution system to ensure that all stored water is in a fresh condition. In addition, locating reservoirs as close as possible to the centre of demand, to minimize the size of distribution mains, is recommended.

Connection to Distribution System
The outlet main from the reservoir should be sized to pass the peak hourly flow or peak day flow plus fire flow, whichever is greater.

9.3.2 Operating Philosophy

Pumped Feed
The pumps shall be sized to meet the peak day flow plus fire flow or the peak hourly flow, whichever is greater, and the pump station shall be designed in accordance with Sections 7 and 9 of these MDEDSS.

Stagnation
The design of reservoirs shall be such that stagnation caused by the retention of water for long periods is minimal.

The reservoir inlet shall be located at the opposite end as the outlet to ensure adequate turnover. In addition, the use of baffles or barrier walls are to be utilized to ensure water circulation.

Fill Control
All reservoirs shall be equipped with an electrically operated solenoid control valve located on the inlet main. The valve shall be designed to close when the reservoir level is 150 mm below overflow level.

Where it is required to maintain a minimum upstream pressure within the fill line, a mechanism shall be added to the valve to achieve this.

All fill control valves shall be sized in accordance with the manufacturer's recommendations.

Isolation
All inlet and outlet mains shall be fitted with valves to permit isolation of the reservoir. The reservoir shall be divided into two or more sections and the pump wet well into two sections to permit cleaning of one section while maintaining service to the distribution system, unless otherwise accepted by the Town.

9.3.3 Reservoir Types

The following are acceptable reservoir types:

1. Buried reinforced concrete;
2. Circular prestressed concrete; and
3. Prefabricated steel.

The optimum form should be determined for each application, taking into account serviceability, Maintenance, and economic considerations.

Other types may be considered, on a case-by-case basis, if they can be used to advantage.

9.3.4 Structural Considerations

Foundations, Geotechnical Evaluation
A detailed geotechnical evaluation shall be carried out at each proposed reservoir location by suitably qualified and experienced geotechnical consultants. The reservoir foundations and yard piping shall be designed and constructed in accordance with their recommendations.

Structural Design
Structural design shall be in accordance with CSA CAN3-A23-1, CSA CAN 3-A23-2, and CSA CAN 3-A23-3. Reference may also be made to BS 337 "The Structural Use of Concrete for Retaining Aqueous Liquids," published by the British Standards Institution.

Underdrainage
A 150 mm weeping tile drain shall be provided around the entire perimeter of the reservoir at a minimum depth of 500 mm below reservoir floor level. The effluent from the drain shall be disposed by gravity or pumping to prevent surcharging of a weeping tile drain.

All exposed above-grade surfaces shall have insulation equivalent to at least RSI-7 steel clad to protect the insulation and include electrical heat tracing cables. Below-grade surfaces with less than 0.6 m of earth cover shall have insulation equivalent to at least RSI = 3.5.

Construction Joints
All construction joints located beneath overflow level shall be cast with integral extruded ribbed PVC waterstops of accepted size and manufacture. Waterstops shall be continuous with pre-welded corner and intersecting pieces.

Environmental Impact
The environmental impact of the reservoir at the proposed location shall be carefully considered and consultation with all relevant authorities and affected parties will be conducted to achieve an acceptable appearance to all structures. The site shall be landscaped as required by the Town.

9.3.5 Other Considerations

Drawdown / Drainage of Reservoir
Provision shall be made to permit the drawdown or drainage of the reservoir with discharge to a suitable surface drain or stream. The reservoir floor shall have a minimum slope of 1:400 to the sump.

Overflow
The reservoir shall be provided with an emergency gravity overflow system designed to pass the maximum possible reservoir inflow rate. The overflow system shall be protected against ingress by insects, birds, or small animals.

The overflow system shall discharge into a suitable surface drain, stream, or soakaway capable of accepting the discharge flow at all times. The Developer's Consultant shall confirm if Provincial or Federal environmental acts require dechlorination prior to discharging water from a reservoir.

Venting
Each reservoir cell shall be provided with air vents sized at a rate equivalent to one 100 mm diameter vent per 1,000 m^3 of reservoir capacity.

All vents shall be fitted with insect screens.

Instrumentation
All reservoirs shall be provided with an ultrasonic type level indicator / controller. In critical applications, a float backup may also be required.

The discharge pipe and the fill line shall be provided with a magnetic type flow meter to balance consumption flows.

The requirement for further instrumentation, alarms, and control systems shall be discussed with the Town at the design stage and required equipment shall be installed and shall be fully integrated and compatible with the Town's SCADA system.

Where pumps are provided to draw directly from the reservoir, low level shutdown controls shall be provided.

Where a reservoir is required to provide fire storage in addition to normal balancing storage, controls shall be provided to prevent depletion of the fire storage by normal system demands.

All instruments and sensors to be installed in a wet well or limited access area shall be, wherever possible, accessible and removable without entering the wet well or limited access area. All instruments which have local indication or which require access for programming should be installed at eye level. All instruments and electrical or control panels which require occasional access must be readily accessible.

Cathodic Protection
Cathodic protection shall be provided, complete with aboveground test stations.

Testing
For testing of reservoir, refer to Section 11 of these MDEDSS.

9.4 Sanitary Sewage Lift Stations

9.4.1 Hydraulic Design Parameters

The need for pumping facilities shall be determined during preliminary discussions between the Developer and the Town.

The design flow shall be based on the parameters and computation methods described in Section 5 of these MDEDSS.

The design period for sizing pumping facilities shall be a minimum of 25 years. Growth projections shall be determined during discussions between the Developer and the Town.

9.4.2 Influent Structures

Sumps and wet wells shall be designed in accordance with the Hydraulic Institute and the recommendations of the pump manufacturer.

Sizing shall be determined after due consideration of all relevant factors, including flow, number of pumps, pump capacity, and collection system storage capacity. In general, the usable pit volume should be at least equal to twice the

maximum volume (in L/min.) to be pumped. In addition, the pit shall be sized to limit the number of starts per hour per pump to between 4 and 6.

Sumps and wet wells shall be designed to minimize dead areas where debris may accumulate.

The floor shall be benched and shall have a minimum slope of 1:1 in the direction of the suction inlets.

Ancillary mechanical equipment such as screens, comminutors, and grit removal devices should be avoided, unless special circumstances make the use of such equipment unavoidable.

Watertight gates shall be provided on the inlet to the manhole to permit cleaning and Maintenance.

Provision of a standby system shall be included in case of power failure.

9.4.3 Pump and Driver Selection

Pumps shall be of the centrifugal, submersible, non-clog type and shall have been designed specifically for use with wastewater, capable of handling 75 mm solids.

Pumps shall have their maximum efficiency within the normal operating range. Maximum speed shall be 1,800 rpm, with lower speeds preferred where possible. Pumps shall be constant speed, unless operational, Maintenance, or economic advantages would result from the use of variable speed drives.

Pumps shall be sized so that the station is able to handle the maximum anticipated flow with the largest pump out of service.

The number of pumps to be installed in the station will depend on the station capacity and range of flow. In stations with a maximum flow of less than 4,000 m^3/d, two pumps shall be installed, provided the capacity of each is capable of meeting the maximum inflow rate. For larger stations, the number of units should be selected so that the range of inflow can be met without starting and stopping pumps too frequently and without requiring excessive wet well storage capacity. If a pump is out of service, the remaining pumps shall have capacity to handle the maximum inflow rate.

Pumps will normally be driven by constant-speed, submersible motors, although special circumstances may require alternative equipment. Motors shall be sized to handle the maximum load anticipated under adverse conditions.

Pressure gauges shall be provided on the discharge header. Each gauge shall be equipped with a shut-off cock and a diaphragm seal.

Each pump shall be equipped with local lockout capability to prevent pump operation during maintenance.

9.4.4 Station Capacity

Provision shall be made to allow the capacity of the station to be increased in the future to its ultimate design capacity by the installation of additional pumping units or substitution of larger units, without the need for substantial changes to the structural, architectural, mechanical, electrical, or instrumentation systems.

9.4.5 Piping, Valves, and Fittings

Check valves used for sewage discharge pumps shall be sinking ball check valves, mounted vertically upwards.

Piping shall be sized so as to give average velocities of between 0.76 m/s and 1.5 m/s in suction piping and between 1.0 m/s and 2.5 m/s in discharge piping. In no cases shall piping be less than 100 mm in diameter. Future increases to capacity shall be taken into account when sizing piping. Piping shall have a 150 psi (1,035 kPa) pressure rating.

Pipe material shall be steel, AWWA C-200, standard wall thickness. The exterior surface of the pipes and fittings shall be coated in the wet well with coal tar epoxy (interior and exterior).

Discharge lines shall be designed to withstand the maximum pump discharge pressure, plus anticipated surge pressure. Each pump discharge line shall incorporate a concentric increaser, a restrained-type non-metallic flexible coupling, a check valve, and an isolating plug valve.

The isolating valve shall be located downstream of the check valve. The check valve shall be of the tilting disc type or ball check. Adequate supports and hangers shall be provided for all piping. Air relief valves, designed for use with sewage, shall be installed at all high points in the piping and drain valves at all low points.

9.4.6 Auxiliary Systems

Air (where required)
The air system shall be complete with dual air compressors (one duty, one standby), receiver, dryer, controls, and all necessary appurtenances to supply dry air for all air-operated equipment. Each compressor shall be capable of continuously supplying air at a rate of at least twice the maximum anticipated consumption.

Water
A potable water supply line from the Town's distribution system shall be provided, where practical. Line size shall be determined by anticipated maximum demand and length of run, but shall in no case be less than 50 mm. The water service shall be installed inside the building, as per Alberta Environment standards and guidelines. At least one hose bibb shall be provided in the wet well area, the dry well area, and on the building exterior. The wet well hose bib shall be 50 mm in diameter or greater. The dry well and external hose bibs shall be 25 mm in diameter or greater. The pump system and main distribution header shall be 50 mm or greater. A reduced pressure principle backflow preventer shall be installed on the water service.

Where provision of a piped water supply is impractical because of distance or other considerations, a potable water holding tank of at least 4,500 L (1,000 gallons) capacity and corresponding distribution system shall be provided.

Lifting Equipment
Lifting equipment (bridge cranes, monorails, etc.) with capacity of 1.5 times the heaviest anticipated load, with allowance for impact, shall be provided. Where a monorail is used to convey heavy equipment, the rail shall extend a minimum distance of 2 m outside the building wall through a double doorway. A neoprene seal shall be installed around the monorail where it extends through the doorway.

9.4.7 Electrical Equipment

The pumping station's electrical system shall be designed by a qualified electrical Engineer and shall be in accordance with the Canadian Electrical Code and any applicable Provincial and Municipal standards and guidelines.

Three-phase power shall be provided wherever possible and each phase shall be monitored using a 3-phase monitor back through the main control centre.

The Developer shall ascertain from the electric utility the nature of the available power supply and make all necessary arrangements for connection.

Wherever practical, there shall be two independent power supply feeders to the station, with provision for automatic switch-over to the second feeder in the event of a failure of the first. If it has been determined by the Town that continuous operation of the station is essential (i.e. that failure would result in serious consequences), then an automatic standby power generation system shall be installed in the station. Alternatively, an external connection shall be provided to accommodate a portable generator. The system provided shall have sufficient capacity to allow the station to operate at the maximum anticipated flow rate.

All electrical equipment shall match the class and division of the area in which it is installed.

Location of electrical switchgear and similar equipment shall be such that it is not subject to immersion in the event of dry well flooding.

A minimum of two receptacles shall be provided on the wet and dry sides of the station.

Adequate lighting shall be provided throughout the entire structure to ensure the safe operation and Maintenance of the complete facility. Metal Halide lighting (250W) shall be installed for both wet and dry wells. High-pressure sodium and incandescent lighting are not acceptable in the wells. LED lighting, complete with photocells, shall be installed for all outdoor lighting.

Conduit shall be required for all low voltage wiring (security systems, telephone, etc.).

All electrical outlets shall be protected by a ground fault interrupter.

9.4.8 Instrumentation and Control

All pumping stations shall have instrumentation and control systems which will allow the station to run unattended and are fully integrated and compatible with the Town's existing SCADA system.

The nature of the instrumentation and control systems will vary depending on the size, type, and function of the station and shall be decided during discussions between the Developer and the Town. At a minimum, the following are required:

- Station discharge flow (meter to be magnetic type)
- Wet well level indicator / controller (sensor to be ultrasonic type)
- Station discharge pressure indicator

- Pump failure alarm
- Pump on/off indicator
- Main power failure alarm
- Wet well high- and low-level alarm switches to provide backup to the wet well level indicator / controller
- Low temperature alarm

All alarms are to be locally indicated. All the above shall be telemetered by means of digital or analog signals to a remote location determined by the Town. The telemetry system shall have a battery-powered backup supply to allow the system to operate for at least 4 hours after a power failure.

All instruments and sensors to be installed in a wet well or limited access area shall be, wherever possible, accessible and removable without entering the wet well or limited access area. All instruments which have local indication or which require access for programming should be installed at eye level. All instruments and electrical or control panels which require occasional access must be readily accessible.

9.4.9 Heating and Ventilation

Heating and ventilation using natural gas shall be provided for all pumping stations.

Ventilation systems shall conform to the requirements of Alberta Environment standards and guidelines.

Wet well ventilation shall be continuous and capable of providing at least 60 complete air changes per hour when occupied; when unoccupied, a minimum 6 air changes per hour are required. Air shall be forced into the wet well rather than exhausted from it.

Exhaust fumes from standby engines or engine generators shall be discharged to the atmosphere.

Odour control facilities may be required where there is the likelihood of septic sewage and the station is located in a sensitive area. The need for odour control facilities shall be assessed on an individual basis.

9.4.10 Prefabricated Pumping Stations

Pump stations shall be of reinforced concrete construction and of the “wet well” configuration.

9.4.11 Submersible Pumps

The use of submersible pumps is preferred by the Town.

9.5 Other Requirements

9.5.1 Aesthetics

The Town shall be consulted regarding aesthetic requirements for the site. If the site is visible to the public, special architectural treatments, signage, landscaping, etc. are required.

Mechanical plants shall be of masonry and metal construction. All mechanical plants shall be equipped with double metal door structures complete with panic hardware for Maintenance and removal of large equipment.

9.5.2 Personnel Considerations

The work shall be designed and constructed in full accordance with all relevant Municipal, Provincial, and Federal safety standards.

All ladders, platforms, etc. shall comply with OHS Legislation and shall be provided such that pumping and related equipment and appurtenances can be removed.

9.5.3 Security

Station design shall be such that the potential for vandalism is minimized.

9.5.4 Access

An access road of minimum width 5.5 m shall be provided at all stations. The minimum standards shall be 50 mm asphalt surface, 250 mm granular base course, and 300 mm pitrun gravel base on 200 mm of cement-stabilized subgrade; however, the access road structure is to be confirmed by the Geotechnical Engineer as part of the geotechnical investigation. A more substantial road and parking structure may be required where the facility is subject to heavy wheel loads, pending the results of the geotechnical investigation. Asphalt stabilized base course (cold mix) or gravel surfacing will not be accepted.

Adequate provision shall be made at the site to enable vehicles to park, turn, and leave the site in a forward direction. A full perimeter road is not required but vehicle access must be available to all points and sufficient area is required immediately adjacent to the entrance for vehicle parking to facilitate the replacement and removal of large equipment.

9.5.5 Operations and Maintenance Manuals

Three (3) complete bound sets and one electronic (PDF) copy of the manufacturer's operation and maintenance manuals shall be provided to the Town. In addition, a manual completely describing the design and operational philosophy of the station shall be provided (Process Functional Specification) including PLC ladder logic printouts and copies of PLC controller programs provided on a disc or memory stick.

9.5.6 Equipment

Specific standard equipment (make and model) may be requested by the Town and shall be supplied by the Developer. Tables 9-1 to 9-5 below.

Table 9-1
Acceptable Pump Products

Product	Acceptable Manufacturer(s)
Sewage Pumps	Flygt N-series
Sump Pump	Flygt

Table 9-2
Acceptable Building Mechanical Products

Product	Acceptable Manufacturer(s)
Make Up Air Unit / Heater	Dexon

Table 9-3
Acceptable Electrical Products

Product	Acceptable Manufacturer(s)
Power Supplies	Allen Bradley 1606XLS series power supplies, Omron S82K series DC power supplies
Relays	Omron MY2N & MY4N indicating relays
Timers	Omron H3YN & H5BR indicating timers
Terminal Strips	Weidmuller WDU 2.5, WTR 2.5, WPE 1.5
Fuse Holders	Weidmuller ASK 1 with blown fuse indicator
Wire	AWG 16 (4-20mA analog signals) and 14 (digital signals) or smaller within control cabinets, where allowed by the Electrical Code
Solenoid	Asco 2, 3, and 4 port and time delay
Generator	Cummins
Variable Speed Drive (VFD)	Schneider Altivar
Motor Control Centre	Schneider, Rockwell, Eaton

Table 9-4
Acceptable Instrumentation Products

Product	Acceptable Manufacturer(s)
Ultrasonic Level	Transducer: Siemens Milltronics Echomax XPS series Controller: Siemens Milltronics HydroRanger Plus
Pressure Level	Transducer: Endress+Hauser WaterPilot FMX21 Controller: Endress+Hauser RIA46 Field Meter
Level Bulb	Flygt ENM-10 level bulb
Flow Meter	Endress+Hauser Proline Promag

Table 9-5
Acceptable Controls

Product	Acceptable Manufacturer(s)
PLC	Schneider Modicon M580
HMI Software	Wonderware Intouch, latest version
PLC Software	Unity Pro, latest version
Alarm Dialer	Win911, connected to Wonderware Intouch

Acceptable products for the SCADA system change as new technologies emerge and as existing facilities are upgraded. Contact the Municipal Engineer for current requirements at the planning stage of new projects.

9.5.7 Lubrication and Spare Parts

Sufficient lubricants for all equipment shall be provided for all testing and trial runs and in sufficient additional quantity for 12 months of operation by the Town. Identify lubricants furnished by brand, grade, and item of equipment for which it is intended. Operate, drain, and flush out bearings and refill with a new change of oil before completion. Type of lubricants shall be as recommended by the manufacturer and in consultation with the Town's Operation personnel.

Provide all spare parts as deemed necessary by the manufacturer and the Town for 12 months of operation. Identify spare parts furnished by brand, grade, and item of equipment for which it is intended. In addition, provide all special tools required for servicing and maintaining the equipment.

9.5.8 Responsibility for Maintenance

Stations shall be maintained by the Town following issuance of the Construction Completion Certificate; however, the Developer shall be responsible for rectifying any deficiencies for the duration of the Warranty Period, until issuance of the Final Acceptance Certificate.

9.5.9 Commissioning and Operator Training

General

The Contractor shall provide, commission, train operating personnel, and turnover a complete operating facility. Generally, commissioning will follow these steps:

- Test all individual items and ensure they are ready for operation.
- Commission the entire system.
- Turnover the facility to the Town.

The procedures outlined in this section are general only and more detailed requirements may be needed depending on the type and complexity of the system.

Preparation

- Establish a written, detailed procedure and schedule and submit to the Town for review.
- Arrange for any specialty testing and certification personnel.
- Provide all instruments required to test, adjust, and balance operation.
- Inspect all equipment to ensure the installations are complete, secure, and that the manufacturer's instructions have been complied with for lubrication, cooling fluids, and other requirements.

Personnel

- Provide competent, experienced, and if necessary, factory-trained personnel to supervise the installation, inspection, testing, and commissioning of equipment.
- The Town will provide a list of operating personnel requiring training and will coordinate their attendance.

Testing Systems

- Each individual item of equipment shall be tested by itself and in combination with related items to ensure that the item or subsystem is ready for operation. Provide test results.
- Test, adjust, check, and lubricate each individual item of equipment and ensure SCADA systems are fully operational.

Commissioning

- Commissioning shall generally include the Developer's personnel operating the complete system for a 2-week period, without failure, and the Town's personnel operating for the following 2-week period, without failure, under the Developer's supervision. These operating times will fluctuate depending on the complexity of the facility and any failures will restart the test period(s).
- Operation of existing facilities shall be performed by the Town.
- During the commissioning period, the Developer shall demonstrate that the operation of the entire facility, as well as individual components, is correct and in accordance with the manufacturer's performance criteria.
- All equipment shall be demonstrated in all expected conditions of operation including variation in flow, pressure, speed, and control.
- All alarm conditions, including malfunctions, safety devices, interlocks, and annunciations shall be demonstrated.
- During the Developer's period of operation, the Town's operators shall observe the operation and receive instruction.
- During the following period, the Developer shall observe the Town's personnel operating the equipment and provide any necessary guidance.

Turnover

Upon completion of training, satisfactory testing results, operations, and repair of any deficiencies, the Town will assume complete responsibility for operation of the facility.

10 LANDSCAPING, SITE FURNISHINGS, AND FENCING

10.1 General

This purpose of this section is to provide Developers and Consultants with an outline for the minimum requirements for development of Public Lands (Open Space and Roadways).

10.2 Public Lands*

10.2.1 Open Space

As defined in the Town of Hinton Parks, Open Space and Trails Master Plan (2018), **Open Spaces** include Public Land that is classified as Environmental Reserve Lots, Public Utility Lots, Stormwater Management Facilities, and Major Utility Corridors. Open Spaces are further defined as undeveloped Public Lands that are not formalized parks but are accessible by the public.

10.2.2 Roadways

These are classified as arterial, collector and local road Rights-of-Way (ROW). The landscape of these ROWs may include the boulevard between private property and the curb, medians, cul-de-sac islands, and entry feature areas.

*See the Town of Hinton's Landscape Minimum Design and Construction Standards for landscape requirements related to Public Lands not noted above.

10.3 Reference Documents

The following documents are a source of additional information and are referenced within this document:

- Canadian Nursery Stock Standard Ninth Edition, Canadian Nursery Landscape Association (CNLA);
- Landscape Alberta Nursery Trades Association (LANTA); and
- Weed Control Act.

10.4 Supplementary Definitions

The following words shall have the meaning hereinafter assigned to them:

Term	Definition
Restoration	A type of habitat restoration; the process of fully re-establishing a target level of ecosystem function and biodiversity to a degraded habitat, as defined by the reference habitat. This includes species composition and vegetation community structure.
Naturalization	A type of habitat restoration; the deliberate reintroduction of species that are native to a given area or are well adapted to the climate circumstance; activities that are intended to improve and enhance the natural environment. The biodiversity and ecosystem function of a naturalized ecosystem is lower compared to a reference habitat but higher compared to a reclaimed ecosystem
Reclamation	A type of habitat restoration; that aims to stabilize disturbed lands to an ecologically productive use. A reclaimed ecosystem has less biodiversity and ecosystem function

Term	Definition
	compared to a reference habitat, and the least compared to other types of habitat restoration
Low Impact Development (LID)	A land development and stormwater management approach that works with nature to manage stormwater as close to the source as possible. LID focuses on maintaining and restoring the natural hydrological processes of a site.

10.5 General Guidelines

The following general landscape requirements apply to all public lands noted above and establish the minimum requirements for landscape development. All landscaping is to be designed to minimize maintenance costs and labour. Practices such as xeriscaping and zero-scaping are encouraged, where appropriate, and will be subject to acceptance by the Town.

10.5.1 Plant Material Protection

1. Plant material to be preserved on the site shall be of high quality and worthy of preservation. All plant material to be preserved shall be accepted by the Town.
2. All plant material to remain on site shall be protected during all work on the site. Protection will be required for trunks, branches, and root systems of all plant material to be saved.
3. Passage of heavy equipment, stockpiling of gravel, soil, or building materials and spillage of gasoline, oil, solvents, and other chemicals will not be allowed under the tree canopy.
4. Temporary fencing will be required around all plant material to be preserved.
5. Existing grades around plant material are to be retained. If existing grades around plant material to remain are altered, either raised or lowered, the Developer will be responsible for constructing remedial measures, to compensate for the grade changes.
6. If the grade or elevation of surrounding land is altered in a manner which will adversely effect retained plant material, the Developer will be responsible for all remedial work. Plant material must not suffer from any grade changes. The Developer will also be responsible for replacing all plant material that has died or suffered due to construction disturbance or grade changes.
7. Landscaped areas are to have a maximum slope of 3H:1V. Slopes in excess of 3H:1V will require additional erosion control measures and are subject to acceptance by the Town.
8. If grades are to be lowered, two remedial techniques will be acceptable to the Town:
   - Tree mounds; and
   - Retaining walls.

   The Contractor will be responsible for supplying water to plant material where the grades have been lowered, for the first growing season.
9. If grades are to be raised around plant material to be preserved, the Contractor will be responsible for constructing tree wells to the satisfaction of the Town.

10.5.2 Topsoil

1. Topsoil shall be free of stones larger than 25 mm in diameter, debris, quack grass, restricted noxious weeds, any other plants and inorganic matter.
2. Topsoil for vegetative purposes shall be tested for N, P, K, Mg, soluble salt content, and pH value. The Developer shall be responsible for all appropriate soil testing.
3. Any 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, maximum 40% sand, maximum 30% clay, and minimum 30% silt by dry weight.
5. 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.
6. 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:
   - Shall be free of toxic material, live plants, live roots and seeds;
   - Shall be delivered in a pulverized condition; and
   - The source shall be approved prior to mixing with the topsoil.
7. Topsoil shall be spread over the entire area to be seeded or sodded and shall be applied to a compressed depth of no less than 100 mm.
8. Areas for planting beds shall be excavated and filled with topsoil to a depth of 600 mm below finished grade.

10.5.3 Seeding

1. Areas to be seeded (in lieu of sodding) to be accepted by the Town. Acceptance to be granted on the basis of:
   - Intensity of use of the area to be covered;
   - Size of the area to be covered.

   Generally, seeding will not be considered acceptable for patchwork in an existing, established turfed areas; i.e., if a Developer, utility company, or any third party disturbs an established turfed area, sodding, not seeding, will be considered the only acceptable remedial treatment.
   Seeding may be accepted in low traffic areas and for large quantities with the acceptance of the Town.
2. Grass seed shall be certified Canada #1 Grade Seed, meeting the requirements of the Seed Act of Canada.

   The seed is to be delivered in the original containers giving the following information:
   - Analysis of seed mixture
   - Percentage of pure seed production
   - Year of seed production
   - Net weight
   - Date when bagged and location;
   - Name of supplier.

   The Developer shall provide proof upon request of Certification of Compliance with the Canadian Wheat Board Act (Seeds Act).

3. Composition of Seed Mixtures shall be:

Boulevards	Roadside	Naturalization	Wet Meadow
55% Red Fescue	55% Red Fescue	35% Awned Wheatgrass	30% Fowl Bluegrass
20% Kentucky Blue Grass	30% Kentucky Blue Grass	25% Slender Wheatgrass	20% Tufted Hair Grass
15% Annual Rye	15% Annual Rye	15% Western Wheatgrass	15% Giant Wild Rye
10% Canada Blue Grass		15% Rocky Mountain Fescue	10% Awned Wheatgrass
		5% Western Porcupine grass	10% Western Wheatgrass
		5% Junegrass	10% Sloughgrass
			5% Annual Ryegrass

Seed must be capable of producing a minimum germination rate of 75% in a germination test.

4. All areas to be seeded shall be given a layer of topsoil as specified in these standards. 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.

5. The seed shall be evenly applied at a rate of not less than 3.5 kg per 100 m^2.

6. Seeding shall not be carried out in wind velocities above 8 km/hr.

7. 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.

8. After seeding, the Developer shall give the seeded area a light watering with a fine spray to an absorbed depth of not less than 25 mm.

9. The seeded area shall be appropriately maintained by the Developer; i.e., watering, rolling, fertilizing, until the time of final inspection and acceptance by the Town.

   Appropriate Maintenance to be determined by weather conditions, soil conditions, time of year and growing condition of the seed. A 2 year Maintenance schedule is to be submitted to the Town for acceptance at the time of the CCC inspection.

10. At the time of final inspection and acceptance by the Town, the grass shall:
    - Be mowed to a minimum height of 50 mm if area is to be maintained;
    - Cover 100% of the seeded area;
    - Be completely weed free;
    - Be completely free of thin bare and dead spots; and
    - Be in an overall healthy growing condition, satisfactory to the Town.

11. The Developer shall be responsible for providing and maintaining adequate barricades and signs to warn traffic entering the seeded area until the time of final inspection and acceptance by the Town.

10.5.4 Hydroseeding

1. Hydroseeding will be acceptable on steep slopes, in hard to reach areas, and for large areas to be seeded. Areas to be hydroseeded must be accepted by the Town.

   All areas to be hydroseeded shall be given a layer of topsoil as specified in these standards. Before hydroseeding, 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.
2. All pebbles, stones, roots, and debris shall be removed from the finished soil surface.
3. Water used for hydraulic and wood cellulose fibre mulching shall be free of any impurities which would inhibit germination or otherwise adversely affect the growth.
4. The material used for mulching shall be specially prepared wood cellulose fibre or an equal substitute. It shall contain no growth or germination inhibiting factors and shall form, after application, a blotter like ground cover which will allow absorption and percolation of water.
5. The tackifier shall be an approved non-asphalt product, water dilatable with no detrimental effects on germination or existing plants.
6. Seed shall be applied evenly at a rate of not less than 3.5 kg per 100 m^2. Seed type as specified in section 10.5.3.
7. A suitable fertilizer shall be applied at a rate of 11 kg per 100 m^2.
8. Grass seed and fertilizer shall be thoroughly mixed and uniformly distributed by means of an approved hydraulic seeder over the area to be hydroseeded.
9. The work shall be done only in good weather and on ground free of frost, snow, ice, and standing water.
10. The hydroseeded area shall be appropriately maintained by the Developer; i.e., watering, fertilizing, cutting, etc., until the time of final inspection and acceptance by the Town.

    Appropriate Maintenance to be determined by weather conditions, soil conditions, time of year, and growing condition of the seed. A 2 year Maintenance schedule is to be submitted to the Town for acceptance, at the time of the CCC inspection.
11. At the time of final inspection, the grass shall:
    - Be mowed to a minimum height of 50 mm if area is to be maintained;
    - Cover 100% of the seeded area;
    - Be well established;
    - Be completely free of weeds, thin, bare and dead spots; and
    - Be in an overall healthy growing condition satisfactory to the Town.

10.5.5 Sodding

1. Sodding shall be done in all areas of intensive use and for all patchwork and remedial work in areas of established turf.
2. All areas to be sodded shall be given a layer of topsoil as specified in section 10.5.2.
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 Blend: 75% by weight
    - Creeping Red Fescue: 25% by weight

The sod shall be:

- A minimum of 18 months old;
- Free of noxious weeds and debris;
- 25 mm - 30 mm in thickness;
- Cut in strips of uniform width;
- Sufficiently moist so that no burning of the edges has occurred; and
- 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. Secure sod to all steep slopes with pegs. Pegs shall not protrude above the surface of the sod.
6. The Developer shall be responsible for providing and maintaining adequate barricades and signs to warn traffic entering sodded areas, until the time of final inspection and acceptance by the Town.
7. The Developer shall be responsible for appropriately maintaining the sodded areas; i.e., watering, rolling, fertilizing, and mowing until the time of final inspection and acceptance by the Town.

   Appropriate Maintenance to be determined by weather conditions, soil conditions, time of year, and growing conditions of the sod. A 2 year Maintenance schedule is to be submitted to the Town for acceptance at the time of the CCC inspection.
8. At the time of inspection and acceptance by the Town, the sod shall be:
   - Mowed to a minimum of 50 mm and maximum of 75 mm height;
   - Well established over 100% of the sodded area;
   - Completely free of weeds, thin, bare, and dead spots; and
   - In an overall healthy condition satisfactory to the Town. No more than 30% of blade height shall be removed to achieve minimum height.

10.6 Naturalization

1. Naturalization will be acceptable for non-programmable or low-use open spaces and stormwater management facilities.
2. Developer's Consultant to select native trees and seed to reduce the need for ongoing Maintenance. The tree sizes are to be specified on plans and can be reduced to 40 mm caliper (deciduous), 2.0 m height (coniferous).
3. Mowing of naturalized seed mixtures to be completed only to establish plant health and must maintain a minimum height of 100 mm to 150 mm. Once seed is established, no additional mowing is to be completed.
4. Seed shall be applied evenly at a rate of not less than 3.5 kg per 100 m^2. Seed type and installation process as specified in section 10.5.3.
5. At the time of final inspection, the grass shall:
   - Be grown to full natural height;
   - Cover 100 % of the seeded area;
   - Be well established;
   - Be completely free of weeds, thin, bare and dead spots; and
   - Be in an overall healthy growing condition satisfactory to the Town.

10.7 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 Landscape Alberta Nursery Trades Association.
2. Plant material to be confined to tree planting only. Shrubs beds are only permitted at entry features or as agreed upon with the Town. All shrubs to be laid out as to not overlap and setback a minimum 500 mm from the edge of the bed to the mature spread of the plant material.
3. Where possible, trees shall be setback a minimum distance, measured from the centre of the tree, from above and below ground utilities and property lines as Table 10-1.

Table 10-1
Tree Setbacks from Utilities and Property Lines

Utility / Property Line	Distance
Light Standards / Power Hardware	3.5 m
Fire Hydrants	3.5 m
Stop / Yield Signs	3.5 m
Other Signs	2.0 m
Private Property on Walkway Right-of-Way	1.0 m
Private Property on Open Parkland	3.0 m
Private Property on Boulevards	1.0 m
Crosswalks	3.5 m
Shallow Underground Utilities (Power / Gas / Communication)	1.0 m
Gas or Oil Right-of-Way	Contact Utility
Sanitary & Storm Sewers	2.0 m
Sanitary & Storm Sewer Manholes	2.0 m
Watermains	2.5 m
* Ensure trees do not create sightline obstructions for vehicles approaching intersections / crosswalks.	
Note: Distance from overhead power utilities shall be as per the requirements established by the Utility Authority.	

4. At the time of planting, all deciduous / coniferous trees shall conform to Table 10-2:

Table 10-2
Tree Size Requirements

Deciduous Trees			
Height	**Caliper**	**Staking/ Ties**	**Rootball Diameter**
2.4 – 3.0 m	40 mm	1 stake w/ tie	600 mm
3.0 – 3.5 m	50 mm	2 stakes w/ ties	700 mm
3.5 – 4.5 m	75 mm	2 stakes w/ ties	850 mm
4.5 – 5.5 m	100 mm	2 stakes w/ ties	1050 mm
Coniferous Trees			
Height	**Spread**	**Staking/ Ties**	**Rootball Diameter**
1.8 – 2.0 m	975 mm – 1.0 m	2 stakes w/ ties	850 mm
2.0 – 2.5 m	1.0 m – 1.3 m	2 stakes w/ ties	850 mm
2.5 – 3.5 m	1.3 m – 1.5 m	3 guy wires w/ anchors	1220 mm

5. The following table lists all approved trees and shrubs within the Town. Alternate trees or shrubs may be approved following submission of a request for variance to the Municipal Engineer, dependant on quantity and location. Firesmart plants are indicated with * after Common Name and are considered low risk.

Table 10-3
Approved Tree and Shrub Species

Botanical Name	Common Name
Deciduous	
Acer glabrum	Rocky Mountain Maple
Acer x freemanii - cultivars	Autumn Blaze / Sienna Glen Maple
Acer rubrum – cultivars	Northwood / Autumn Spire / Red Rocket Maple
Acer negundo – cultivars	Manitoba Maple (male hybrids only) *
Betula papyrifera	Paper Birch *
Betula nigra	River Birch *
Populus balsamifera	Balsam Poplar *
Populus tremuloides	Trembling Aspen *
Populus x Brooks No. 6	Brooks No. 6 Poplar
Populus x jackii “Northwest”	Northwest Poplar
Salix acutifolia	Cut Leaf Willow
Salix discolour	Pussy Willow
Salix pentandra	Laurel Leaf Willow
Ulmus americana	American Elm *

Botanical Name	Common Name
Coniferous	
Abies lasiocarpa	Alpine Fir
Abies sibirica	Siberian Fir
Larix larcinia	Tamarack
Picea glauca	White Spruce *
Picea mariana	Black Spruce *
Picea pungens	Colorado Green Spruce *
Pinus banksiana	Jack Pine
Pinus contorta var. latifolia	Rocky Mountain Lodgepole Pine *
Pinus ponderosa	Ponderosa Pine
Pinus flexilis	Limber Pine
Pseudotsuga menziesii glauca	Rocky Mt. Douglas Fir
Deciduous Shrubs	
Alnus crispa	Green Alder *
Arctostaphylos uva-ursi	Bearberry
Cornus alba	Silver Leaf Dogwood
Cornus stolonifera	Red Osier Dogwood *
Elaeagnus commutata	Wolf Willow *
Potentilla fruticose	Shrubby cinquefoil *
Rosa acicularis	Prickly Wild Rose *
Rosa woodsia	Woods Rose *
Salix ssp.	Willow species and cultivars *
Spiraea betulifolia	Meadowsweet
Symphoricarpus albus	Snowberry *
Syringa ssp.	Lilac species and cultivars *
Coniferous Shrubs	
Juniperus horizontalis	Creeping Juniper
Grasses	
Agrostis scabra	Ticklegrass
Agropyron dasystichum	Northern Wheatgrass
Agropyron riparium	Streambank Wheatgrass
Agropyron smithii	Western Wheatgrass
Agropyron subsecundum	Awned Wheatgrass
Agropyon trachycaulum	Slender Wheatgrass
Agropyron violaceum	Broadglumed Wheatgrass

Botanical Name	Common Name
Bromus ciliatus	Fringed Brome
Bromus pumpellianus	Pumpelly brome
Deschampsia caespitosa	Tufted Hairgrass
Festuca campestris	Foothills Rough Fescue
Festuca hallii	Plains Rough Fescue
Koeleria cristata	June Grass
Poa alpina	Alpine Bluegrass
Poa glauca	Glaucous Bluegrass
Poa secunda	Sandberg bluegrass
Trisetum spicatum	Spike trisetum
Perennials	
Achillea millefolium	Common Yarrow
Anaphalis margaritacea	Pearly Everlasting
Anemone multifida	Cut-leaved Anemone
Anemone patens	Prairie Crocus
Antennaria parvifolia	Pussy Toes
Aquilegia flavescens	Yellow Columbine
Aquilegia formosa	Crimson Columbine
Arnica fulgens	Shining Arnica
Arnica mollis	Cordilleran Arnica
Artemisia frigida	Pasture Sagewort
Artemisia ludoviciana	Prairie Sagewort
Aster alpinus	Alpine Aster
Aster ciliolatus	Lindley's Aster
Aster conspicuus	Showy Aster
Aster laevis	Smoothing Aster
Astragalus alpinus	Alpine milk vetch
Astragalus americanus	American Milk Vetch
Campanula rotundifolia	Blue or Harebell
Cornus canadensis	Bunchberry
Corydalis aurea	Golden Corydalis
Epilobium latifolium	Broad-leaved Fireweed
Erigeron caespitosus	Tufted Fleabane
Erigeron compositus	Compound Fleabane
Erigeron glabellus	Smooth Fleabane

Botanical Name	Common Name
Fragaria virginiana	Wild Strawberry
Gaillardia aristata	Black-eyed Susan
Galium boreale	Northern Bedstraw
Geranium richardsonii	Wild White Geranium
Geum triflorum	Old Man's Whiskers
Hedysarum alpinum	Alpine Hedysarum
Hedysarum boreale	Northern Hedysarum
Hemerocallis hybrida	Daylily
Heracleum lanatum	Cow Parsnip
Linnaea borealis	Twinflower
Linum lewisii	Wild Blue Flax
Maianthemum canadense	Wild Lily-of-the-Valley
Mentha arvensis	Wild Mint
Oxytropis cusickii	Alpine Locoweed
Oxytropis deflexiai	Reflexed Locoweed
Oxytropis monticola	Late Yellow Locoweed
Oxytropis sericea	Early Yellow Locoweed
Oxytropis splendens	Showy Locoweed
Pentstemon procerus	Slender Blue Beardtongue
Phlox paniculata	Garden Phlox
Phlox subulata	Creeping Phlox
Potentilla gracilis	Graceful Cinquefoil
Senecio canus	Prairie Groundsel
Sisyrinchium montanum	Blue-eyed Grass
Smilacina racemosa	False Solomon's Seal
Smilacina stellata	Star-flowered Solomon's Sea
Solidago canadensis	Canada Goldenrod
Solidago spathulata	Rocky Mountain Goldenrod
Thalictrum venulosum	Veiny Meadow Rue
Viola adunca	Early Blue Violet
Zigadenus elegans	White Camas

6. At the time of inspection and final acceptance by the Town, the plant material shall:
    - Conform to the standards for plant material listed above;
    - Be planted and staked for CCC;
    - Have stakes removed and be stable at FAC; and
    - Exhibit 3 years of healthy growth to the satisfaction of the Town.

10.8 Mulches

1. All mulch to be bark or coniferous / deciduous wood chip mulch with a size range of 50 mm to 100 mm and be free of non-organic material, wood preservatives, and diseased wood. Contains no more than 5% total volume of soil, sawdust, and peat moss.
2. The following mulches are prohibited for use unless otherwise accepted by the Town: rock, gravel, riprap, shale, peat moss, manures, paper products, plastics, rubbers, and lumber containing chemicals or preservatives.

10.9 Site Furniture

The following sections outlining site furniture are to be used as a standard for all development within the Town unless otherwise accepted. Alternate furniture will require a request for variance, submitted to the Municipal Engineer, indicating supplier information, model number, colour and finish, and installation method prior to consideration.

10.9.1 General

1. Furnishings are to be surface mounted unless otherwise accepted by the Town.
2. All fasteners shall be stainless steel.
3. Frame shall be constructed of steel with a powder coated finish unless otherwise accepted by the Town.
4. Finish to provide a minimum of 10 years of protection from the elements.
5. An anti-graffiti compound within the coating or applied separately over the exposed surfaces is encouraged.
6. Seating and table top surface shall be shaped with rounded edges and corners and smooth surfaces.
7. Install all site furniture as per manufacturer's specifications.
8. All site furniture to be installed plumb and level and be aligned as per the landscape layout plans. Exposed mounting hardware to be painted to match site furniture colour following installation.
9. All site furniture shall be inspected prior to installation to ensure the furniture is free of all defects; site furniture with defects will be rejected and shall be replaced immediately.

10.9.2 Bench

1. Seat and back rest to be composed of individual, spaced slats to allow for drainage.
2. Overall length from 1,500 mm to 2,400 mm.
3. Overall heights between 762 mm and 813 mm as measured from mounting surface / finished ground.
4. Seating width from 450 mm to 660 mm.
5. Seating height between 430 mm and 500 mm as measured from counting surface / finished ground.

10.9.3 Picnic Table

1. Seat and table top to be composed of individual, spaced slats to allow for drainage.
2. Seating length range from 1,500 mm to 2,100 mm and width from 580 mm to 660 mm.
3. Seating height between 430 mm and 500 mm as measured from mounting surface / finished grade.
4. Table top length from 1,500 mm to 2,100 mm (where wheel chair accessibility is required, use longer length) and width from 610 mm to 711 mm.
5. Table top height from 750 mm to 863 mm as measured from the mounting surface / finished grade.

10.9.4 Waste Receptacles

1. All waste receptacles are to be animal proof and are subject to acceptance by the Town.

10.9.5 Setbacks

1. The following setbacks shall be required:

    - Benches – 2.0 m minimum from edge of walkway or multi-use trail;
    - Waste Receptacles – 2.0 m minimum from edge of walkway or multi-use trail and minimum 2.0 m from benches or picnic tables (due to odours, wasps, etc.);
    - Picnic Tables – 1.0 m minimum from edge of walkway or multi-use trail;
      Ensure a minimum 300 mm hard surface mowing strip from furniture to mown grass areas.

10.9.6 Bench Nodes

1. Bench nodes are required every 500 m along trail systems; waste receptacles to be placed at nodes where they are easily accessible to be emptied.

10.10 Uniform Fencing

1. All fencing to be constructed 150 mm inside private property with the posts on the interior of the fence alignment.

    1. Uniform wood fencing shall be constructed as accepted by the Town. Colour of stain shall be indicated on the landscape plans and accepted by the Town.

    2. Chain link fencing and gates shall be constructed as accepted by the Town. Finish and colour shall be indicated on the landscape plans and accepted by the Town.

2. Uniform fencing shall be constructed adjacent to and at the following locations:

    - Arterial roadways;
    - PULs;
    - Town-owned lands; e.g., Fire Hall sites, etc.;
    - Multi-family sites;
    - Neighbourhood Commercial sites;
    - Institutional sites; and
    - Other areas as required by the Town.

3. Single-sided wood fence is the minimum standard for residential properties.

4. Fences located within 1.5 m of a building structure, such as gates, are required to be constructed of fire-resistant materials; refer to FireSmart: Protecting Your Community from Wildfire.
5. Gates may be installed on all residential lots which back onto a PUL or public park. Gates shall be located approximately at the mid-point of each lot and shall be constructed to open inwards onto private property.

10.11 Specific Requirements by Area

10.11.1 Public Utility Lots (PULs)

1. PUL areas shall be graded, topsoiled, seeded, and planted with trees and shrubs to the satisfaction of the Town. Sod may be required adjacent to walkways and other areas of intensive use as per request from the Town.
2. A PUL corridor shall include trees installed at a rate of 1 per 60 m^2.
3. Shrubs shall be massed within planting beds.
4. The minimum setbacks for tree planting shall be met as outlined in Table 10-1.
5. All tree planting within a PUL shall be set back a minimum distance of 1.0 m from adjacent private property lines as measured from the centre of tree trunk.
6. Trees must be contained within mulched beds.
7. Furniture shall be provided by the Developer and placed at strategic locations where a walkway is also provided.
8. Bollards shall be installed to limit vehicular access.
9. Where a walkway is designated as an emergency access route, adequate clearance shall be provided for vehicular access.
10. Uniform chain link fencing shall be provided between PULs and private property and must be a minimum of 1.2 m in height.

10.11.2 Stormwater Management Facilities (SWMF)

1. Areas surrounding constructed wetlands, wet ponds, and dry ponds must be graded, topsoiled, seeded, and planted with trees and shrubs to the satisfaction of the Town. Sod may be required adjacent to walkways and other areas of intensive use as per request from the Town.
2. A SWMF shall include trees installed at a rate of 75 per ha.
3. Shrubs shall be massed within planting beds.
4. The area below the Normal Water Level (NWL) shall not be included in the area measurement.
5. The minimum setbacks for tree planting shall be as outlined in Table 10-1.
6. All tree planting within a SWMF shall be set back a minimum distance of 1.0 m from adjacent private property lines as measured from the centre of tree trunk.
7. Wood chip mulch shall not be used in planting beds below the 1:25 year water line.
8. Naturalized planting schemes below the 1:5 year water line is encouraged.
9. SWMF areas shall be weed and erosion free at CCC and FAC inspections and for the duration of the Warranty Period.
10. Uniform fencing shall be provided between SWMFs and private property and must be a minimum of 1.2 m in height.

10.11.3 Major Utility Corridors (ROW)

1. The Developer's Consultant shall contact the appropriate utility authority regarding acceptable grading, topsoil, seeding and planting on utility corridors or ROWs.
2. The Developer's Consultant shall submit design drawings to the utility companies for approval of development.
3. Where the Utility Authority will not allow landscaping in the ROW, the requirement for that portion of the landscaping will be waived by the Town. Written confirmation from the Utility Authority is required.
4. The Developer's Consultant shall contact the Utility Authority to review designs and achieve permission in the form of a Crossing Agreement. The Crossing Agreement is to be submitted with any design plans.
5. Utility corridors where landscaping is permitted shall be planted with at a rate of 75 per ha.
6. All tree planting shall adhere to the required setbacks outlined in Table 10-1.
7. Shrubs shall be massed within planting beds.
8. Uniform fencing shall be provided adjacent to Major Utility Corridors and must be a minimum of 1.8 m in height.

10.11.4 Roadways

1. Arterial ROWs and all boulevards shall be graded, topsoiled, and seeded between uniform fence and the back of sidewalk or curb to the satisfaction of the Town. Sod may be required adjacent to walkways and other areas of intensive use as per request from the Town.
2. Boulevards and medians shall be designed to include continuous large planting beds with trees, shrubs and groundcovers to the satisfaction of the Town. Shrub planting shall be low growing with a maximum height of 500 mm.
3. Trees are to be located as per recommended spacing and required setbacks (measured from centre of the tree trunk) along roadways as per Table 10-1.
4. Traffic and pedestrian sightlines in road ROWs must be respected as per the guidelines set out by the Transportation Association of Canada.
5. Alternative tree species for roadway planting, selected for their high canopy and low maintenance qualities, shall be considered and are subject to acceptance by the Town.
6. All boulevard, island, and median designs must be low maintenance.
7. Medians shall be 4.0 m or wider for tree planting; shrub planting is acceptable in narrower medians.
8. Turf areas within road islands and medians are subject to acceptance by the Town.
9. Uniform double-sided wood fencing shall be required adjacent to all arterial roadways and must be a minimum of 1.8 m in height.

10.12 Warranty Period

1. The Developer shall be responsible for, and at their own expense to remedy, any defect, fault, or deficiency in the completed works during the 2-year Warranty Period.
2. Landscape Maintenance shall be conducted throughout the Warranty Period and shall include all measures necessary to establish and maintain plant material in an acceptable, vigorous, and healthy growing condition. The Maintenance activities are to include, but not be limited to:
   - Watering during establishment period and weekly throughout the Warranty Period;
   - Weeding monthly;
   - Mowing at regular intervals to maintain a maximum of 75 mm height;
   - Pruning any broken, damaged, diseased branches; and
   - Structural Pruning prior to FAC by ISA Certified Arborist.
3. Monthly Maintenance logs are to be kept throughout the Warranty Period and submitted for review prior to FAC including all Maintenance items listed above.
4. Pesticide / herbicide applications for control of weeds is prohibited.
5. All weeds are to be controlled at CCC and throughout the Warranty Period, with full eradication at the time of FAC. All noxious weeds are to be removed and disposed of prior to flowerings wherever possible to reduce the rate to seed spread.
6. At the time of FAC site review, a maximum mortality / disturbance rate for that year's plant material is 25% of the overall plant count.
7. Any tree which is replaced during the Warranty Period will require an additional 2 years of Warranty; the additional 2 years of Warranty will commence on the date the tree is replaced. Security on the replaced trees will be held accordingly for the duration of the additional 2 years of Warranty, until the FAC is issued.
8. Third party damage occurring during the Warranty Period will be reviewed by the Town on a case-by-case basis; upon review and consideration by the Town, the Developer may be held responsible for the third party damage.

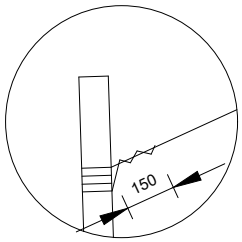
10.13 Standard Details – Landscaping

Standard Detail No.	Title
10-100	Typical Tree Planting
10-101	Tree Planting on a Slope
10-200	Typical Shrub Planting
10-300	Sod Installation
10-400	Shrub Planting on a Slope
10-500	Typical Picnic Bench Detail
10-600	Typical Bench Detail

STANDARD DETAIL	10-100	
Date:	NOV, 2020	Rev. 0

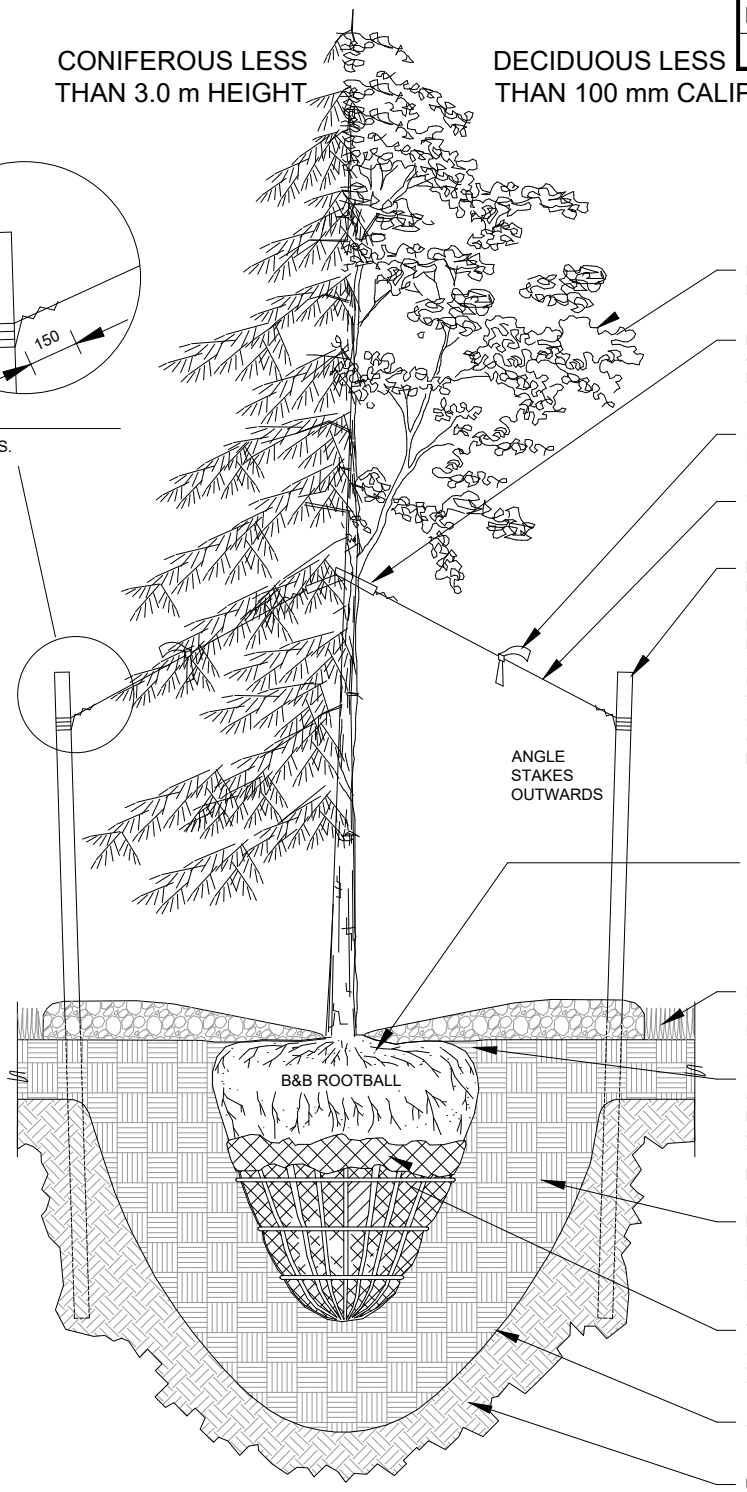
CONIFEROUS LESS THAN 3.0 m HEIGHT

DECIDUOUS LESS THAN 100 mm CALIPER



DETAIL

SCALE N.T.S.



PRUNE ONLY DEAD, BROKEN, OR DISEASED TREE LIMBS.

BLACK RUBBER HOSE - 12 mm Ø OR APPROVED EQUAL. POSITIONED APROX. 3/5 HT. FOR ALL TREES.

FLUORESCENT ORANGE FLAGGING ON ALL GUY WIRES.

GALVANIZED GUY WIRE No. 10 MIN.

MINIMUM OF 2 STAKES PER TREE. LARGE TREES TO HAVE 3-4 STAKES. METAL T-BAR (2450 mm) PAINTED 2 COATS OF FLAT BLACK PAINT PRIOR TO INSTALLATION AND EXTENDED 900 mm INTO UNDISTURBED SOIL. METAL T-BARS TO REMAIN FOR TWO GROWING SEASONS. TOP 300mm OF ALL TREE STAKES PAINTED TO MATCH ANNUAL COLOUR CODES.

TOP OF ROOT BALL TO BE 0 (ZERO) mm MAX. BELOW FINISH GRADE AND ROOT FLARE TO BE 40 mm ABOVE FINISH GRADE.

RE-ESTABLISH ANY DAMAGED SEED/SOD, TO THE TOWN OF HINTON STANDARDS.

100 mm MIN. DEPTH OF CONIFEROUS SHREDDED BARK MULCH OR APPROVED EQUAL OVER EXPOSED ROOTBALL. TAPER MULCH TO BASE OF TREE. MULCH TO EDGE OF DISTURBED AREA.

MODERATELY COMPACTED NATURAL, FERTILE, FRIABLE AGRICULTURAL SOIL. ENSURE STABILITY OF ROOTBALL. ALLOW FOR SETTLEMENT.

WIRE BASKET TO BE REMOVED AND BURLAP TO BE SLICED COMPLETELY. BURLAP TO BE TREATED NATURAL FIBRE.

SCARIFY WALL OF TREE WELL.

UNDISTURBED NATIVE SOIL.

NOTES

(1) SPECIFICATIONS: ALL COMPONENTS AND WORKMANSHIP TO CONFORM TO THE TOWN OF HINTON DESIGN STANDARDS

(2) POSITION TREE STAKES INTO DIRECTION OF PREVAILING WINDS OF MINIMUM UTILITY SETBACKS PERMIT

(3) ALL TREE STAKES TO HAVE A MINIMUM 1.0 m CLEARANCE FROM ALL U/G POWER, TELEPHONE AND GAS ALIGNMENTS

(4) ALL DIMENSIONS ARE IN MILLIMETERS

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies HINTON

TOWN OF HINTON

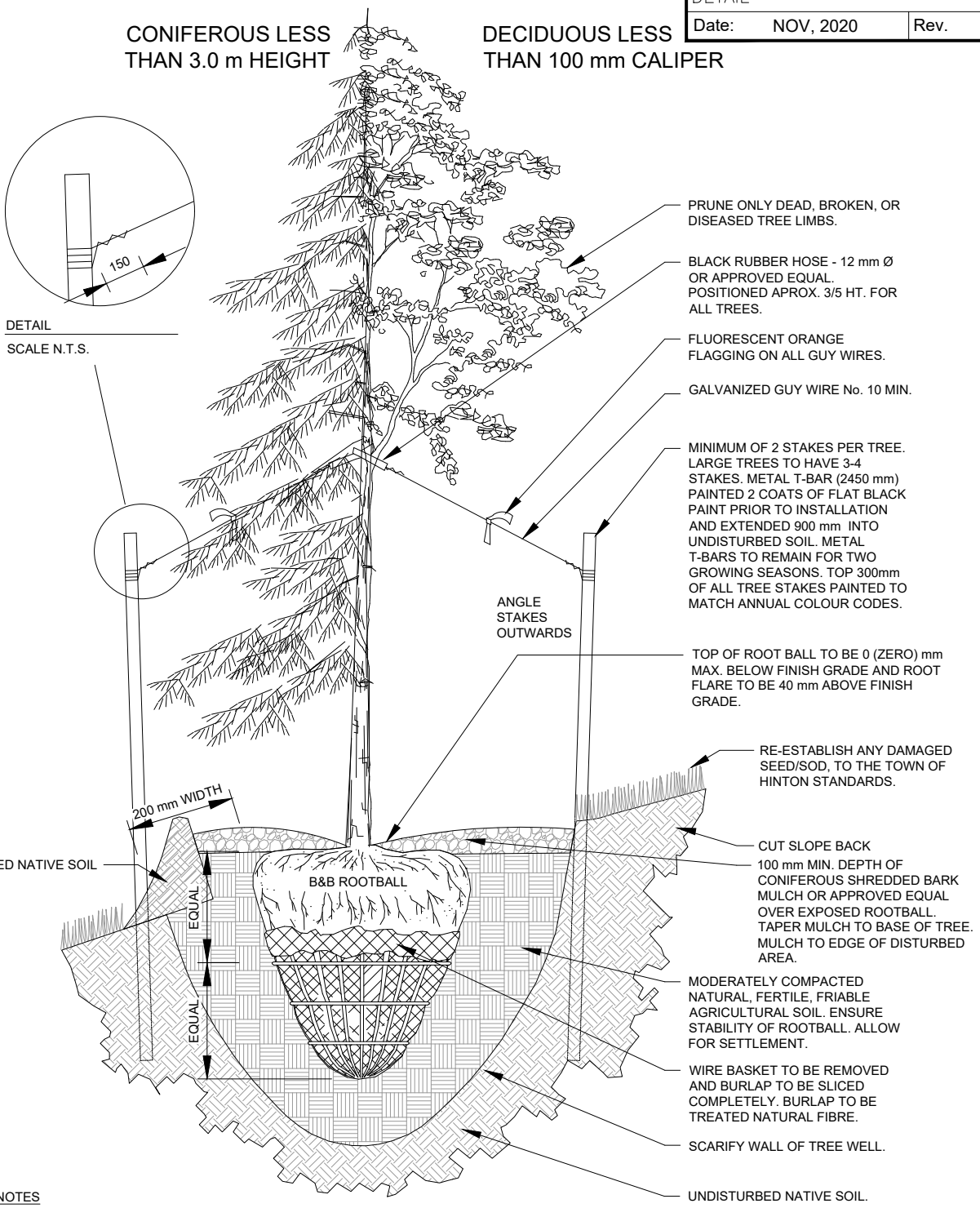
Typical Tree Planting

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_10-100.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	10-101	
Date:	NOV, 2020	Rev. 0

CONIFEROUS LESS THAN 3.0 m HEIGHT

DECIDUOUS LESS THAN 100 mm CALIPER



NOTES

(1) SPECIFICATIONS: ALL COMPONENTS AND WORKMANSHIP TO CONFORM TO THE TOWN OF HINTON DESIGN STANDARDS

(2) POSITION TREE STAKES INTO DIRECTION OF PREVAILING WINDS OF MINIMUM UTILITY SETBACKS PERMIT

(3) ALL TREE STAKES TO HAVE A MINIMUM 1.0 m CLEARANCE FROM ALL U/G POWER, TELEPHONE AND GAS ALIGNMENTS

(4) ALL DIMENSIONS ARE IN MILLIMETERS

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

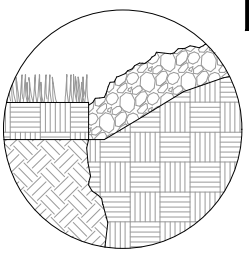
Gateway to the Rockies HINTON

TOWN OF HINTON

Tree Planting on a Slope

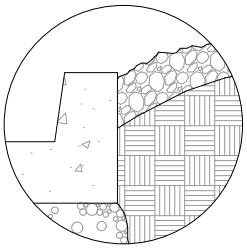
File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_10-101.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	10-200	
Date:	NOV, 2020	Rev. 0



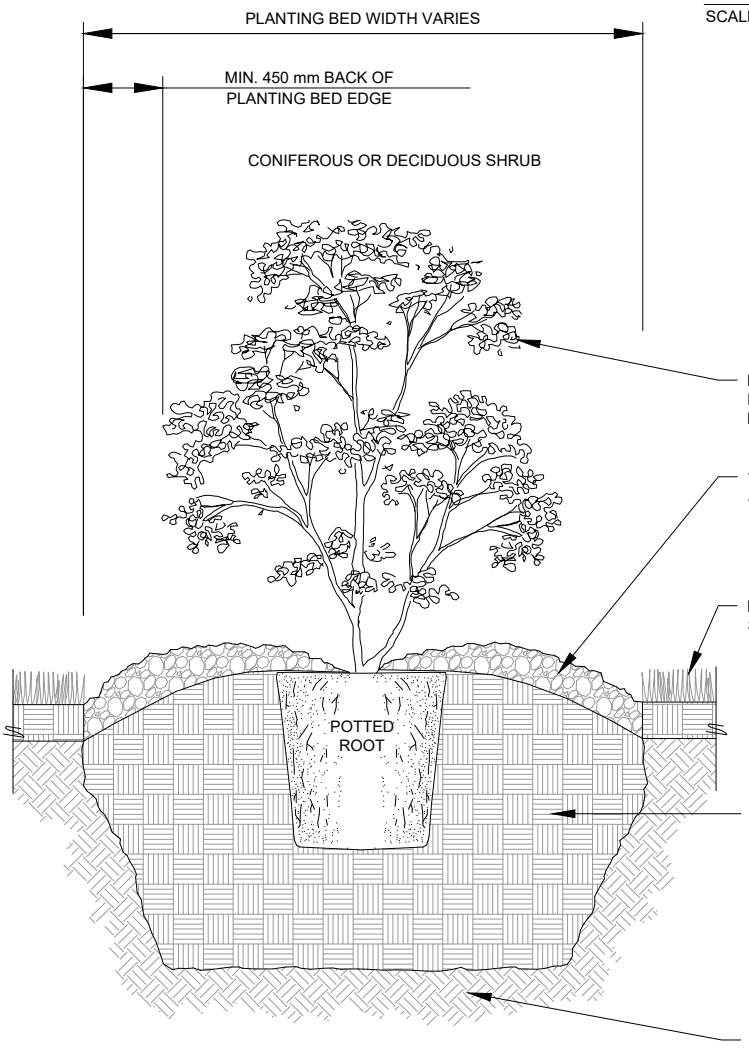
TYPICAL EDGING DETAIL

SCALE N.T.S



CONCRETE CURB DETAIL

SCALE N.T.S.



PRUNE ONLY DEAD, BROKEN, OR DISEASED SHRUB BRANCHES (DECIDUOUS ONLY). SHRUB LAYOUT AS PER PLANTING PLAN.

100 mm MIN. DEPTH CONIFEROUS SHREDDED BARK MULCH OR APPROVED EQUAL. TAPER MULCH TO BASE OF SHRUB.

RE-ESTABLISH ANY DAMAGED SEED/SOD, TO THE TOWN OF HINTON STANDARDS.

450 mm MIN. DEPTH MODERATELY COMPACTED NATURAL, FERTILE, FRIABLE AGRICULTURAL SOIL. SOIL MIX: 3 PARTS FERTILE SOIL; 1 PART HORTICULTURAL PEAT MOSS; 1 PART SHARP SAND. ENSURE STABILITY OF ROOTBALL.

UNDISTURBED NATIVE SOIL

NOTES:

(1) SPECIFICATIONS: ALL COMPONENTS AND WORKMANSHIP CONFORM TO THE TOWN OF HINTON DESIGN STANDARDS

(2) CONTRACTOR TO ALLOW FOR 20% SETTLEMENT WHEN PLACING SHRUB.

(3) CONTAINER IS TO BE REMOVED CAREFULLY FROM ROOT SYSTEM SO AS NOT TO DISTURB THE PLANT. SHRUB SHALL NOT BE PULLED FROM CONTAINER.

(4) PLANTING BED EDGERS ARE NOT REQUIRED, BUT MAY BE INCLUDED IF FLUSH TO THE GROUND.

(5) APPROVED SHRUB BED EDGERS AS PER ENLARGEMENTS.

(6) ALL SHRUB BED HOLES TO BE DUG BY HAND WHEN CLOSER THAN 1.0m TO U/G POWER, TELEPHONE AND GAS ALIGNMENTS.

(7) ALL DIMENSIONS ARE IN MILLIMETERS

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

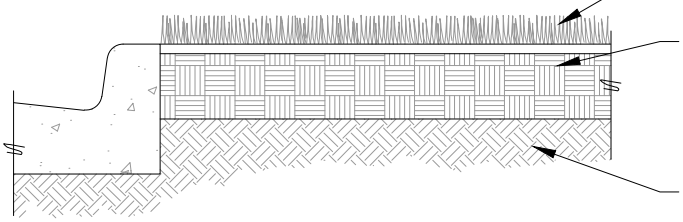
Gateway to the Rockies HINTON

TOWN OF HINTON

Typical Shrub Planting

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_10-200.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	10-300	
Date:	NOV, 2020	Rev. 0

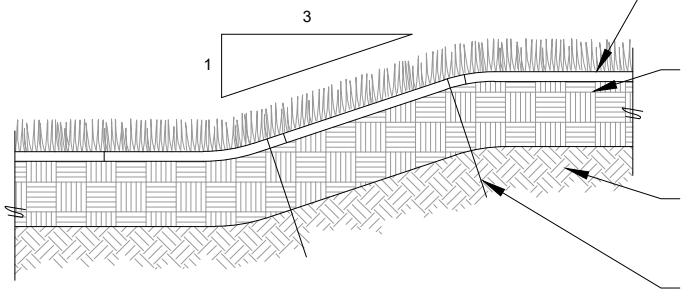


CANADA NO. 1 SOD TO BE FLUSH WITH ADJACENT SURFACE.

100mm DEPTH MIN. ROLLED AND COMPACTED NATURAL, FERTILE, FRIABLE AGRICULTURAL SOIL. ALLOW FOR SETTLEMENT. ROOT ENHANCING FERTILIZER (11-51-0) TO BE SPREAD ON TOPSOIL PRIOR TO SODDING.

COMPACTED CLAY SUBGRADE GRUBBED FREE OF STUMPS, ROOTS, LARGE ROCKS AND DEBRIS.

CROSS SECTION



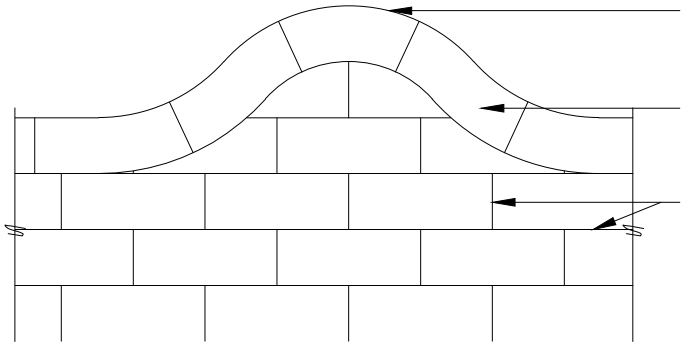
SOD TO BE LAID LENGTHWISE ACROSS FACE OF SLOPE. MAX. SLOPE SODDED 3:1. ROOT ENHANCING FERTILIZER (11-51-0) TO BE SPREAD ON TOPSOIL PRIOR TO SODDING.

100mm DEPTH ROLLED AND COMPACTED NATURAL, FERTILE, FRIABLE AGRICULTURAL SOIL. ALLOW FOR SETTLEMENT.

COMPACTED CLAY SUBGRADE GRUBBED FREE OF STUMPS, ROOTS, LARGE ROCKS AND DEBRIS.

ALL UPHILL ENDS OF SOD TO BE PEGGED WITH TWO 25 mm x 25 mm x 230 mm WOODEN PEGS, DRIVEN IN BELOW LAWN LEVEL. REMOVE PEGS PRIOR TO FAC.

CROSS SECTION THROUGH SLOPE



LIMIT OF SOD OR ADJACENT TO HARD SURFACE.

FULL ROW OF SOD TO BE USED ALONG PERIMETER OF SODDED AREA.

SOD TO BE LAID CLOSELY PACKED TOGETHER. JOINTS IN ADJACENT ROWS SHALL BE STAGGERED. TOPDRESS WITH NATURAL, FERTILE, FRIABLE AGRICULTURAL SOIL TO FILL ALL JOINTS.

PLAN VIEW

NOTES:

(1) SPECIFICATIONS: ALL COMPONENTS AND WORKMANSHIP TO CONFORM TO THE TOWN OF HINTON DESIGN STANDARDS.

(2) LIMIT OF SOD AS SHOWN ON LANDSCAPE DRAWINGS. ANY REPAIRS REQUIRED BEYOND THE LIMIT ARE THE SOLE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.

(3) ALL DIMENSIONS ARE IN MILLIMETERS.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

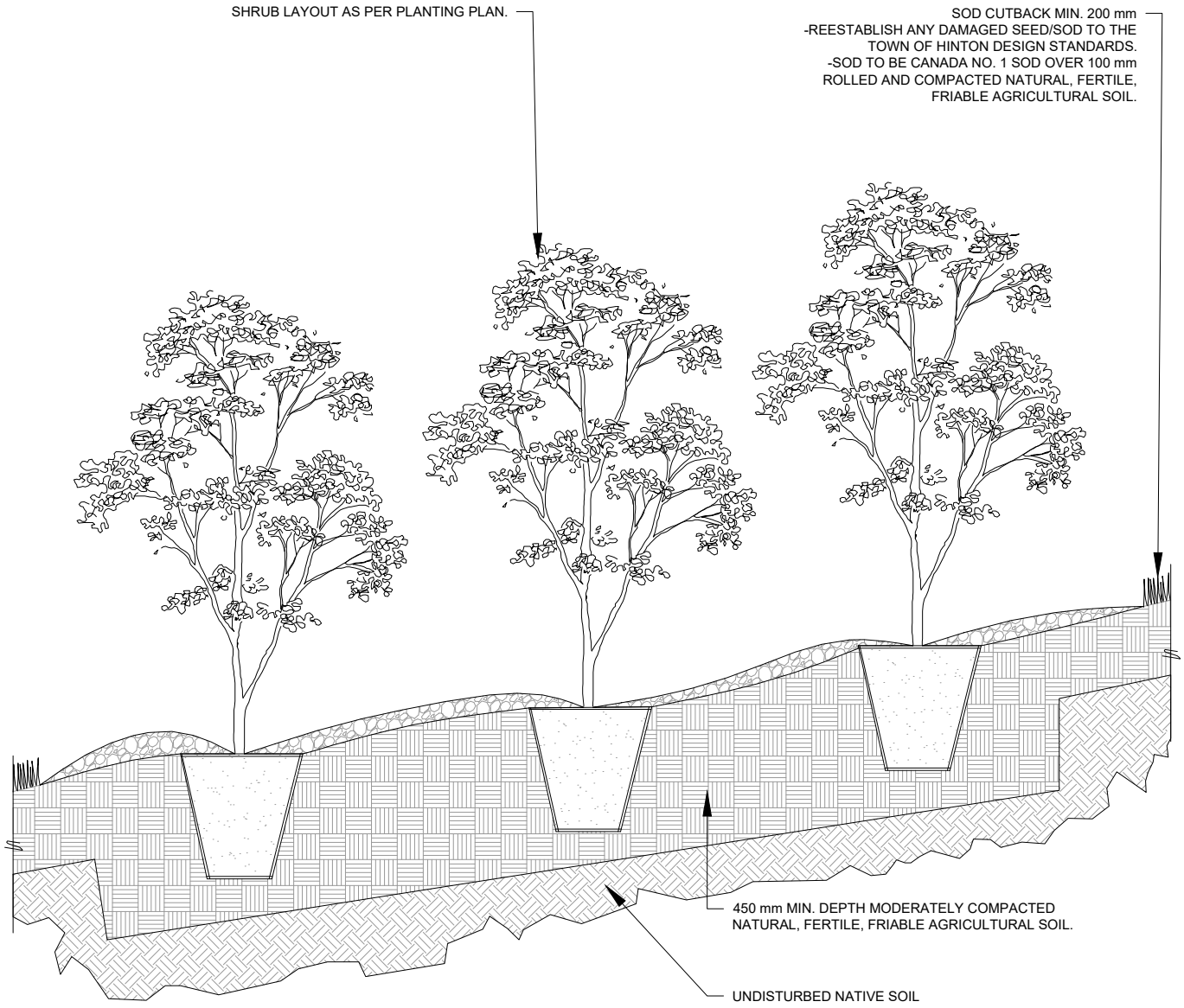
Gateway to the Rockies
HINTON

TOWN OF HINTON

Sod Installation

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_10-300.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	10-400	
Date:	NOV, 2020	Rev. 0



NOTES:

(1) SPECIFICATIONS: ALL COMPONENTS AND WORKMANSHIP CONFORM TO THE TOWN OF HINTON DESIGN STANDARDS.

(2) CONTRACTOR TO ALLOW FOR 20% SETTLEMENT WHEN PLACING SHRUB.

(3) CONTAINER IS TO BE REMOVED CAREFULLY FROM ROOT SYSTEM SO AS NOT TO DISTURB THE PLANT. SHRUB SHALL NOT BE PULLED FROM CONTAINER.

(4) PLANTING BED EDGERS ARE NOT REQUIRED, BUT MAY BE INCLUDED IF FLUSH TO THE GROUND.

(5) PRUNE ONLY DEAD, BROKEN OR DISEASED BRANCHES TO MAINTAIN PROPER SHRUB FORM (DECIDUOUS ONLY).

(6) ALL SHRUB BED HOLES TO BE DUG BY HAND WHEN CLOSER THAN 1.0m TO U/G POWER, TELEPHONE AND GAS ALIGNMENTS.

(7) ALL DIMENSIONS ARE IN MILLIMETERS.

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

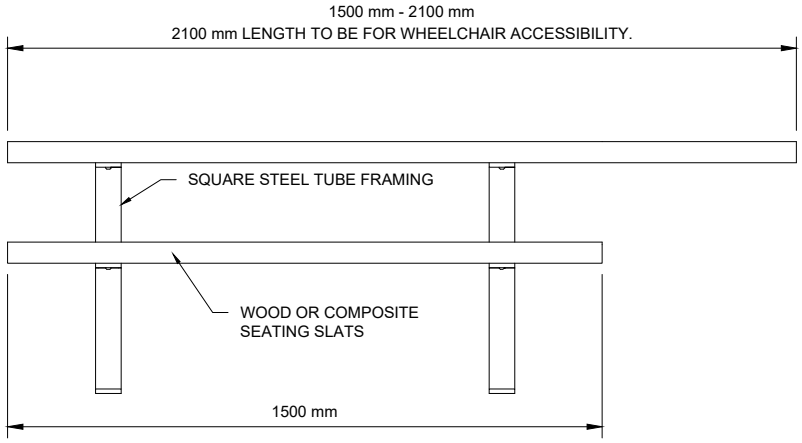
Gateway to the Rockies
HINTON

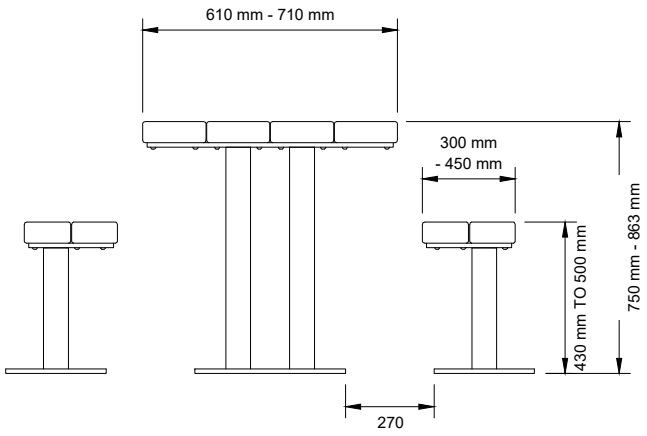
TOWN OF HINTON

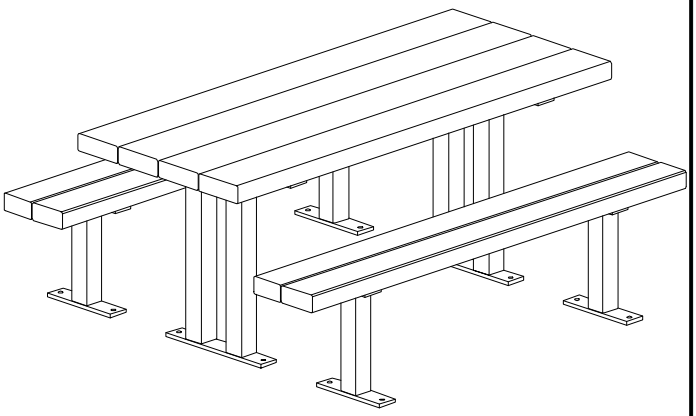
Shrub Planting on a Slope

File: \\s-edm-fs-01\working\2020-3749-00\civ\Standard Details\3749-00_10-400.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	10-500	
Date:	NOV, 2020	Rev. 0







NOTES:

(1) SURROUNDING AREA TO BE FINISHED PER DESIGN OR TO MATCH EXISTING

(2) ALL STEEL MEMBERS TO BE COATED WITH ZINC RICH EPOXY THEN FINISHED WITH BLACK POWDER COATING

(3) SEAT AND TABLE TOP TO BE COMPOSED OF INDIVIDUAL, SLATS TO ALLOW FOR DRAINAGE

(4) DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS NOTED OTHERWISE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

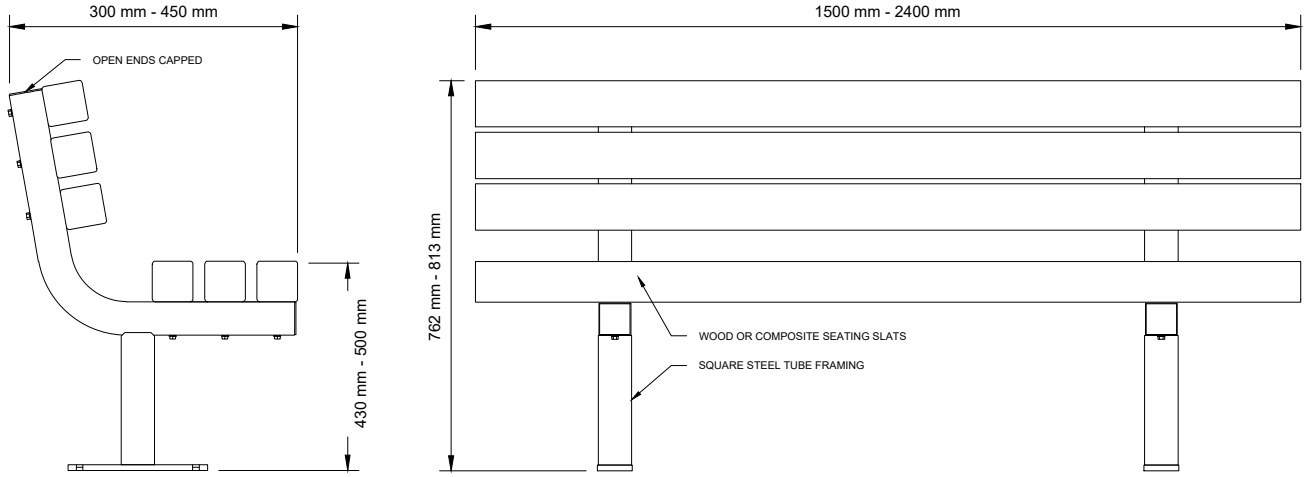
Gateway to the Rockies
HINTON

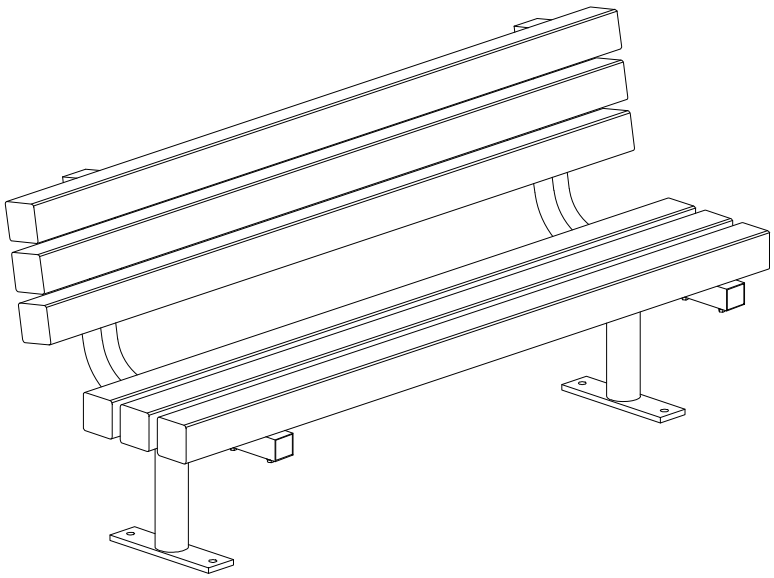
TOWN OF HINTON

TYPICAL PICNIC BENCH DETAIL

File: \\s-edm-fs-01\working\2020-3749-00\civil\Standard Details\3749-00_10-500.dwg by
Xrefs: TH-G-TTBL_8.5x11

STANDARD DETAIL	10-600	
Date:	NOV, 2020	Rev. 0





NOTES:

(1) SURROUNDING AREA TO BE FINISHED PER DESIGN OR TO MATCH EXISTING

(2) ALL STEEL MEMBERS TO BE COATED WITH ZINC RICH EPOXY THEN FINISHED WITH BLACK POWDER COATING

(3) SEAT AND BACKREST TO BE COMPOSED OF INDIVIDUAL SLATS TO ALLOW FOR DRAINAGE

(4) DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS NOTED OTHERWISE

Scale:	Not To Scale
Drawn By:	D.C.
Checked By:	K.M.
Approved:	K.M.
Date:	NOVEMBER 2020

Gateway to the Rockies
HINTON

TOWN OF HINTON

TYPICAL BENCH DETAIL

File: \\s-edm-fs-01\working\2020-3749-00\civl\Standard Details\3749-00_10-600.dwg by
Xrefs: TH-G-TTBL_8.5x11

11 TESTING PROCEDURES

11.1 General

It shall be the responsibility of the Developer and/or Developer's Representative to ensure that the Contractor adheres to the minimum testing requirements outlined in this section.

The Developer shall submit all test data performed by the accredited testing company to the Town as per the requirements outlined in Section 2. Failure to receive test results will be considered sufficient cause for not accepting such work.

11.2 Roadway Materials Testing

The requirements for roadway materials testing are outlined in Table 11-1.

Table 11-1
Specifications for Roadway Materials Testing

Location of Testing	Required Compaction	Frequency of Testing
Site Grading	97% of SPMDD under roadways at ±2% of OMC 97% of SPMDD under sidewalks at ±2% of OMC 95% of SPMDD in landscaped areas at ±2% of OMC	1 test every 1,000 m^2 per lift, or minimum 3 tests for small areas
Sand Bedding	Minimum of 95% of SPMDD	1 test every 100 m per lift, or minimum 3 tests for small areas
Trench Backfill	Minimum of 97% of SPMDD at ±2% of OMC Minimum of 100% of one-mould maximum dry density Maximum moisture content: PL + (PI/3) to a maximum of 5% above the PL	1 test every 100 m per every 2nd lift, or minimum 3 tests for small areas
Subgrade Preparation	Minimum of 100% of SPMDD at ±2% of OMC under pavement structures, concrete curbs, concrete gutters, concrete monolithic sidewalks, Commercial and lane crossings, and asphalt walkways. Minimum of 97% of SPMDD at ±2% of OMC under concrete separate sidewalks, curb ramps, slabs, and shared use trails made of concrete pavers, brick pavers, or granular materials.	1 test every 1,000 m^2 for roads 1 test every 100 m for sidewalks or curb / gutter Minimum 3 tests for small areas
Granular Base Course	Minimum of 100% of SPMDD under roads, curb, and gutters, Commercial and lane crossings, concrete monolithic sidewalks, curb ramps, and shared use trails. Minimum of 97% of SPMDD under asphalt or concrete separate sidewalks, and median or island strips.	1 test every 1,000 m^2 for roads 1 test every 100 m for sidewalks Minimum 3 tests for small areas *(See next page for continuation)*

Location of Testing	Required Compaction	Frequency of Testing
Asphalt Pavement	Pavement shall conform to Alberta Transportation's H, M, L, or S mix where practical. Refer to Table 4-4 for required density.	1 Mix Analysis every 1,000 tonnes (min. 1/day) Asphalt content and density every 500 tonnes 1 core every 1,000 m^2
Concrete	Compressive strength: 30 MPa Air: 5.5% to 8.0% Slump: 60 mm ± 20 mm Max. Aggregate Size: 20 mm	1 test every 50 m^3 (min. 1/day)

Notes:

1. SPMDD: Standard Proctor Maximum Dry Density
2. OMC: Optimum Moisture Content
3. PL: Plastic Limit
4. PI: Plastic Index
5. The above ±2% moisture content are for clay materials.
6. Moisture content for high plastic clay requires recommendation by a Geotechnical Engineer.

The Developer shall engage a qualified materials testing firm to take representative samples of all materials to be incorporated into the pavement structure, to prepare mix designs for acceptance by the Town, and to carry out quality control testing during construction.

11.3 Sanitary Sewer Testing

Testing of installed pipes shall depend on the elevation of existing groundwater and shall consist of at least one of the following tests:

11.3.1 Infiltration Test

1. This test shall be performed where the existing groundwater level is at least 1.0 m above the pipe crown in the upstream manhole.
2. Install a watertight plug at the upstream end of the pipeline test section.
3. Discontinue dewatering operations for at least 3 days before test measurements are to commence and, during this time, keep thoroughly wet at least one third of the pipe invert perimeter.
4. Prevent damage to pipe and bedding material due to floatation and erosion.
5. Place a 90° V-notch weir, or other measuring device acceptable to the Municipal Engineer, in invert of sewer at each manhole.
6. Measure rate of flow over a minimum of 1 hour, with recorded flows for each 5 min interval.
7. Allowable leakage: 4.6 L/day/ mm diameter/km of length for PVC pipe.
8. Repair and retest the sanitary sewers as required until the test results are within the specified limit.
9. Repair visible leaks regardless of test results.

11.3.2 Exfiltration Test

1. The test section shall be filled with water, allowing displacement of air in the line, and shall stand for 24 hours.
2. Prior to the test, add enough water to ensure a head of 1 m over the pipe crown in the upstream manhole. Pressures in excess of 7.6 m water head at the lowest point are not recommended.
3. The test duration shall be 2 hours.
4. The water level shall be measured at the beginning and end of the test in order to calculate the exfiltration.
5. Allowable leakage: 4.6 L/day/mm diameter/km of length for PVC pipe.
6. Repair and retest the sanitary sewers as required until the test results are within the specified limit.
7. Repair visible leaks regardless of test results.

11.3.3 Deflection Testing

1. Where CCTV inspections show evidence of excessive or non-symmetrical deflection, formal deflection tests shall be conducted.
2. A mandrel shall be pulled through the pipe in such a manner so as to ensure that excessive force is not used to advance the device through any deflected portion of the pipe.
3. Deflection testing shall be performed in conjunction with a CCTV inspection. The mandrel shall be located in front of, and in clear view of, the television camera. An appropriate distance is typically from 1.5 to 2.5 pipe diameters in front of the television camera.
4. The mandrel shall be cylindrical in shape, constructed with 9 evenly spaced arms.
5. Mandrels larger than 450 mm in diameter shall be constructed of special breakdown devices to facilitate entry through access manholes.
6. The barrel section of the mandrel shall have a contact length of at least 75% of the base inside diameter of the pipe.
7. The outside diameter of the mandrel shall not be less than 95% of the inside diameter of the sewer.
8. The mandrel material shall be steel.
9. If the mandrel is unable to pass through the pipe, the Contractor is to measure the exact inside diameter of the pipe with a deflectometer. If the pipe deflections are found to exceed 5% at FAC, the pipe is to be replaced.

11.3.4 Video Inspection Test

CCTV inspections of the sanitary sewer system, including services, shall be carried out by the Developer at the end of construction and at the end of the Warranty Period. One digital copy in colour format, and of acceptable clarity, quality, and colour, along with inspection reports and summaries of the CCTV inspection, shall be supplied to the Town prior to issuing the Construction Completion Certificate and Final Acceptance Certificate. The NASSCO PACP (Pipeline Assessment and Certification Program) pipe rating systems is to be used for all CCTV inspections.

The CCTV report shall also include the location of all service connections together with a statement of opinion as to whether the service connections are leaking.

Any deficiencies found during this test shall be promptly remedied by the Developer at their expense. Repair all defects which will impair the structural integrity or the performance of the sewer system including, but not limited to improper joints, cracked, sheared, or excessively deflected pipe, sags and rises which pond water in excess of twice the allowable deviation from grade, protruding service connections, and visible infiltration or exfiltration. Prior to undertaking any repairs, a meeting with the Town is required to review the proposed construction method.

Allowable deviation from grade: The invert of the pipe shall not deviate from the design grade by more than 6 mm plus 20 mm per metre of diameter and should not be consistently high or low.

11.3.5 Testing of Force Mains

Force Mains shall be tested as described for watermains.

11.4 Storm Sewer Testing

Testing of installed pipe shall consist of the following:

1. CCTV inspections of the entire storm sewer system, including catch basin leads, as per section 11.3.4.
2. Deflection testing as per section 11.3.3 (for PVC storm sewers and catch basin leads).
3. All testing and repair of deficiencies found during the testing shall be rectified by the Developer at their own expense. Prior to undertaking any repairs, a meeting with the Town is required to review the proposed construction method.

11.5 Watermain Testing

11.5.1 Filling and Flushing Strategies

11.5.1.1 Submissions

1. A filling strategy is required for all projects. The purpose of a filling strategy is to create an agreed upon plan for the staging and direction of fill for a new watermain.
2. A flushing strategy is required for all projects. The purpose of a flushing strategy is to create an agreed upon plan for the staging and direction and rate of flow of water for flushing a watermain prior to commissioning.
3. Filling and flushing strategies must be signed and sealed by an Engineer.

11.5.1.2 Requirements for Filling and Flushing Strategies

1. All source water must come from a clean, potable source.
2. There must be only one source valve for each stage of fill.
3. Valves should be planned such that unidirectional flows are achieved. The water should not loop back on itself.

11.5.1.3 Specific Requirements for Filling Strategies

1. The filling strategy must consist of a drawing indicating the following:
    - Air release locations;
    - High points on transmission mains;
    - Water source for each fill;

- Staging of fill:
  - Current fill highlighted
  - Completed fill highlighted
- All valve positions are to be indicated for each stage; and
- Legend clearly indicating the symbology on the drawing.

2. Air release locations should be at or near the high point of the watermain.
3. A copy of the accepted filling strategy must be on-site during filling activities.

11.5.1.4 Specific Requirements for Flushing Strategies

1. Flushing runs must be less than 450 m in length. The ideal flushing run length is 200 m.
2. Watermains less than or equal to 300 mm in diameter should have a flush velocity of 1.5 m/s.
3. Watermains greater than 300 mm in diameter should have a flush velocity of 0.9 m/s.
4. Water must be exchanged a minimum of 5 times to achieve a completed flush. Water quality sampling reports must confirm a completed flush.
5. During a flush, the source water should flow from larger pipe to smaller pipe, whenever possible.
6. The flushing strategy should include:
   - A written flushing procedure;
   - A spreadsheet indicating:
     - Order of flushing segments;
     - Water supply (source valve);
     - Discharge location;
     - All valve positions for each flushing segment;
     - Pipe details for each flushing segment;
     - Required discharge volume (to achieve 5 times the volume of the flushing segment);
     - Ideal flow velocity for the size of the watermain;
     - Ideal flow rate to achieve the velocity;
     - Type and size of ports to discharge the water;
     - Number of ports;
     - Estimated flow rate; and
     - Required flush time.
   - A drawing indicating the following:
     - Water supply (source);
     - Current flush;
     - Completed flush;
     - Opened valve;
     - Closed valve;
     - Discharge location; and
     - Legend clearly indicating the symbology on the drawing.
   - Each flushing segment should have its own drawing.
7. Use Table 11-2 to find the number of ports required to achieve the requisite velocity.

Table 11-2
Number of Ports Required to Achieve Velocity for Flushing

Pipe Diameter (mm)	Required Flow (L/s) for 0.9 m/s Velocity	Hydrant Nozzles Required [1,2]		Required Flow (L/s) for 1.5 m/s Velocity	Hydrant Nozzles Required [1,2]	
		63.5 mm	114 mm		63.5 mm	114 mm
200	N/A	N/A	N/A	47.1	1	N/A
250	N/A	N/A	N/A	73.6	2	1
300	N/A	N/A	N/A	106.0	2	1
350	86.6	2	1	N/A	N/A	N/A
400	113.1	2	1	N/A	N/A	N/A
450	143.1	2	1	N/A	N/A	N/A

Note:

[1] Assuming a residual pressure of 280 kPa.

[2] With a 280 kPa residual pressure, a hydrant flowing to atmosphere will discharge 63 L/s from a 63.5 mm nozzle and 158 L/s from a 114 mm steamer (Source: After AWWA C651-14).

11.5.2 Pressure and Leakage Test

1. Refer to AWWA C605 and AWWA M23 for information on pressure and leakage testing for PVC watermains.
2. Install all water services and air relief services.
3. Partially or completely backfill the excavation before testing.
4. Wait for concrete thrust blocks to cure: minimum of 3 days in the case of high early strength concrete or a minimum of 7 days in the case of normal concrete.
5. Ensure that main stops are open and curb stops are closed.
6. Inform the Municipal Engineer of the date, time, and location of the pressure and leakage tests at least 72 hours prior to the test time. Failure to notify the Town may result in tests being unacceptable.
7. Open all main valves in the test section.
8. Open all hydrant control valves in the test section and be sure hydrants are closed. All hydrant shall be inspected prior to pressure testing to ensure that they are properly installed and that nipples are threaded or locked in place.
9. Inform other construction crews or Contractors and check that no valves are being operated during the test.
10. Test duration shall be 2 hours.
11. Maximum length of distribution watermain test sections shall be 450 m.
12. Ensure air is expelled from the section of watermain by exhausting trapped air at high points and dead ends. Air content can be minimized through the following procedure:
    - Lay the pipeline to grade when possible
    - Bleed air from the pipe slowly
    - Fill the watermain at a velocity of less than 0.6 m/s

13. Test pressure will be 150% of the working pressure, or 1,035 kPa, whichever is greater, at the point of test but not less than 125% of normal working pressure at the highest elevation on the test section.
14. Raise the watermain pressure to the appropriate test pressure using either a hand or motor-powered pump located at a hydrant. The hydrant valve will be completely opened and the flow rate will be controlled by the valve at the pump.
15. Mark the gauge and the level of water in the storage barrel at the beginning if the test. Take care in these marks since they are the basis for calculating water loss.
16. Maintain the test pressure within ± 20 kPa of the specified test pressure for the duration of the test.
17. Pump the test section back to the test pressure at the end of the first 30 min. If the allowable leakage is exceeded, air may be trapped. Remove trapped air and repeat the test.
18. During the test, walk along the test section and check for signs of leakage or distress at all exposed appurtenances or fittings.
19. No allowance can be made for services or in-line valves. Watermain renewal projects may be exempt under some circumstances.
20. Allowable leakage shall be calculated based on the following formula:

$$Q_m = LDP^{0.5} / 795{,}000$$

Where: Q_m = quantity of make-up water (L/hr)
L = length of pipe section being tested (m)
D = nominal diameter of pipe (mm)
P = average test pressure (kPa)

No installation will be accepted if the quantity of make-up water is greater than that determined by the above formula. Record the leakage test results on the Leakage Test Form provided at the end of this section.

21. For testing HDPE sanitary force mains, adjust the procedure for PVC watermains as follows:

- Hydrostatic test pressure shall be 1.5 times the pressure class.
- Maintain 1.5 times the pressure class for 4 hours and add water as needed. Do not measure this volume. Hydrostatic pressure expands pipe.
- Begin Test: Reduce pressure to 10 psi (70 kPa) below 1.5 times pressure class. Monitor pressure for 1 hour.
- The pipe is acceptable is the pressure drop over 1 hour does not exceed 5%.

11.5.3 Flushing

1. Upon completion of pressure and leakage testing, watermains shall be thoroughly flushed to remove all foreign matter.
2. Water systems which will not provide watermain flushing velocities of at least 3.0 m/sec shall be flushed using foam pigs prior to disinfecting.

11.5.4 Disinfection

1. Provide at least 72 hours notice to the Municipal Engineer prior to disinfection. Perform disinfection in the presence of Town staff.
2. Complete flushing operations before beginning disinfection. Disinfection may be done with hydrostatic leakage testing.
3. New valves and hydrants are to be open to ensure they are disinfected.
4. Disinfect watermains and water services.
5. Disinfect using continuous-feed method with liquid chlorine, solution-feed chlorinator, and booster pump in accordance with AWWA C651. Introduce chlorine solution for disinfection at appurtenance used for initial flushing of test section.
6. Chlorine feed and discharge rates to be in accordance with Table 11-3. Discharge rate to be accepted by the Town. Ensure free chlorine residual of initial chlorine solution is between 25 mg/L and 75 mg/L. Chlorine gas will not be permitted for chlorination.
7. Open new hydrants and valves on section of watermain being tested. Supply water for chlorinator from hydrant on active system or water tank. Use pump to inject chlorine solution into pipe if using water tank.
8. Continue feeding chlorinate solution for the length of time indicated in Table 11-3 for pipe size, length, and discharge rate.
9. Isolate the watermain or water service containing chlorine solution and maintain for 24 hours.
10. Determine the chlorine residual after 24-hour retention time using the “drop dilution” method or the method indicated in AWWA C651 in the presence of the Town. Acceptable minimum free chlorine residual after 24 hours is 10 mg/L.
11. Ensure chlorine residual in hydrants used for introducing the chlorine solution does not exceed 75 mg/L at the conclusion of chlorination.
12. Perform final flushing of pipe with potable water using the appurtenance used for initial flushing once actual chlorine residual is acceptable. Continue flushing until chlorine residual is less than 2 mg/L. Test chlorine residual in the presence of the Town. The Developer’s Representative shall complete the Disinfection Report provided at the end of this section.
13. Chlorinated water flushed from the pipe shall be dechlorinated prior to discharging to the storm sewer or the environment. Ensure the flushing rate of chlorine does not exceed the allowable rate acceptable to the Town.
14. Disinfect watermains less than 5.5 m long and watermain repairs by swabbing or spraying with a maximum 5% solution of chlorine or a 1% hypochlorite solution either before or after installation.

Table 11-3
Disinfection Feed Rate

Nominal Size of Pipe (mm)	150	200	250	300	350	400	450
Litres of Water per 100 m of Pipe	1,827	3,248	5,075	7,308	9,948	12,993	16,444
10 mg/L	0.018	0.032	0.051	0.073	0.099	0.130	0.164
25 mg/L	0.046	0.081	0.127	0.182	0.249	0.325	0.411
50 mg/L	0.091	0.162	0.254	0.365	0.499	0.650	0.822
75 mg/L	0.137	0.243	0.381	0.548	0.746	0.974	1.233

Discharge Rate (L/min.)	mg / L				Approximate Flow Through Time for 100 m of Pipe (Hours – Minutes)						
	10	25	50	75							
	Feed Rate (kg/day)				150	200	250	300	350	400	450
100	1.4	3.6	7.2	10.8	0-18	0-32	0-51	1-13	1-39	2-09	2-44
150	2.2	5.4	10.8	16.2	0-12	0-21	0-33	0-49	1-06	1-29	1-50
200	2.9	7.2	14.4	21.6	0-09	0-16	0-25	0-37	0-50	1-05	1-22
250	3.6	9.0	18.0	27.0	0-07	0-13	0-20	0-29	0-40	0-52	1-06
300	4.3	10.8	21.6	32.4	0-06	0-11	0-17	0-24	0-35	0-43	0-55
350	5.0	12.6	25.2	37.8	0-05	0-09	0-15	0-21	0-28	0-37	0-47
400	5.8	14.4	28.8	43.2	0-05	0-08	0-13	0-18	0-25	0-32	0-41
450	6.5	16.2	32.4	48.6	0-04	0-07	0-11	0-16	0-22	0-29	0-36

11.5.5 Bacteriological Samples

1. Bacteriological testing shall be carried out by the Developer's Representative and the results shall be acceptable to the local Health Authority and the Town.
2. 2 sets of 2 samples shall be taken at least 24 hours apart from the end of the main section of pipe being tested. 1 set of 2 samples shall be taken from the end of each branch of pipe connected to the main section (where branches are more than 3 m long). Samples shall be taken from the discharge pipe used for leakage testing after adequate flushing time to replace water in the discharge pipe.
3. The Developer's Representative shall submit the samples to an accredited laboratory as soon as possible after obtaining. Samples that cannot be submitted within 1 hour after collection shall be stored in an iced cooler at 4 degrees Celsius during transport to the laboratory. Samples shall be submitted for processing no more than 30 hours after obtaining.
4. Disinfection shall be acceptable when bacteriological test results from both samples show total Coliform results are < 1 colony forming unit (cfu) per 100 ml, Heterotrophic Plate Count (HPC) does not exceed 500 cfu per ml and total chlorine residual does not exceed 2 mg/L after flushing.
5. The Developer's Representative shall enter the bacteriological test results, on the Disinfection Report provided at the end of this section, once received from the laboratory.
6. If either sample fails bacteriological testing, repeat flushing and the Developer's Representative shall take 2 new samples for testing. If either of the second set of samples taken fail bacteriological testing, repeat disinfection and flushing and the Developer's Representative shall take 2 new samples for testing. Repeat this procedure until acceptable results are obtained.

11.5.6 Test Results

1. All testing results shall be documented and submitted to the Town for acceptance prior to commissioning the system and the issuance of a Construction Completion Certificate.

11.6 Reservoir Testing

11.6.1 Water tightness

1. Prior to testing, all visible cracks shall be sealed in an acceptable manner.
2. All water tightness tests shall be conducted before placing backfill material. Tests shall be conducted as follows:
    1. Fill reservoir to overflow level.
    2. Allow water to stand for 72 hours to saturate the concrete.
    3. Top-up the water in the tanks to the original level at the end of the 72-hour saturation period, measure the water elevation, and begin the leakage test.
    4. Measure the drop in liquid elevation over the next 48 hours to determine the liquid volume loss for comparison with allowance leakage. Evaporative losses shall be measured or calculated and deducted from the measured loss to determine net leakage of the tanks.
    5. There shall be no persistently damp areas on the exterior walls or visible leakage at any point on the structure.
    6. The maximum allowable leakage over the duration of this test, after allowance for evaporation losses, is limited to 0.05% of the total liquid volume.

If any test shows leakage, or if leaks or persistently damp areas are visible, the structure shall be emptied, carefully examined, and all defects repaired and the test repeated until a satisfactory test has been achieved.

The water used for testing shall be clean and to an acceptable standard and shall be supplied at the Developer's cost.

11.6.2 Disinfection

Prior to disinfection, the structure shall be thoroughly cleaned of all dirt and loose material.

All equipment in contact with potable water shall be disinfected. Chlorine used in disinfection shall be either hypochlorite solution or liquid chlorine conforming to AWWA B300 and B301.

Combine hydrostatic testing with disinfection. Disinfection shall be in accordance with ANSI/AWWA C653.

Disinfect again those areas within the structure which have been repaired or otherwise contaminated subsequent to initial disinfection.

No disinfection shall be carried out until all measures to protect the reservoir against intrusion by insects, animals or unauthorized personnel have been satisfactorily completed.

LEAKAGE TEST FORM

The following form shall be prepared by the Developer's Representative for submission to the Town of Hinton.

Date: _____

Project: _____ Drawing No.: _____

Location: _____ From: _____ To: _____

Pipe Size: _____ Length of Test Section: _____

Pipe Type: _____ Number of Joints: _____

Allowable Leakage per Hour (L) _____ (for test pressure of: kPa)

Actual Leakage per Hour (L) _____ (for test pressure of: kPa)

Pump Start Time	Meter Reading	Pump Stop Time	Meter Reading	Total Loss (L)

High Pressure Water Meter Used (Brand name, model, and serial number)

_____

Date meter tested and calibrated: _____

Date complete: _____ Operator's Signature: _____

Company: _____ Company's Address: _____

Phone No: _____

Developer's Respresentative's Signture: _____

DISINFECTION FORM

The following form shall be prepared by the Developer's Representative for submission to the Town of Hinton.

CHLORINATION

Date: _____

Project: _____ Drawing No.: _____

Location: _____ From: _____ To: _____

Pipe Size: _____ Length (m): _____

Pipe Type: _____

Location of No. 1 Flush and Chlorinating Corp.: _____

Location of No. 2 Flush and Chlorinating Corp.: _____

Rate of Discharge: _____ L/min. Rate of chlorine feed: _____ kg/day

Flow through time: _____ hrs - mins. Residual at finish: _____ mg/L

FINAL FLUSHING

Date: _____

Time started: _____ Chlorine residual _____ mg/L

Time finished: _____ Chlorine residual _____ mg/L

SAMPLES FOR RESIDUAL CHLORINE TEST

Sample No.	Sample Location	Discharge Rate (L/min.)	Time Taken	Date Taken	Chlorine Residual

Operator's Name _____ Operator's Signature _____

Company Name _____ Address _____ Phone No. _____

SAMPLES FOR BACTERIOLOGICAL TEST

Sample No.	Location Taken	Time Taken	Date Taken	Total Coliforms	HPC

Testing Laboratory _____

Date Testing Submitted _____ Date Testing Completed _____

Consulting Firm: _____

Developer's Respresentative's Signture: _____