

1.1 GENERAL

The following design standards sections apply to any and/or all of the respective services:

Section 1:	General Conditions
Section 2:	Engineering Plans and Drawings
Section 3:	Water Distribution Systems
Section 4:	Sanitary Sewer Systems
Section 5:	Service Connections
Section 6:	Storm Drainage Systems
Section 7:	Roadway Systems
Section 8:	Miscellaneous Requirements
Section 9:	Landscape Requirements
Section 10:	Standard Detail Drawings

The standards outlined here are intended to be the minimum requirements for the construction and delivery of civil engineered infrastructures in Parkland County. It is the Developer's responsibility to develop subdivisions that meet or exceed the standards following with good engineering practices, specific site condition requirements, and as may be required by the General Manager of Infrastructure Services, Policies and; local, provincial and federal Codes, Acts and Regulations.

In addition to these Engineering Design Standards, the developer and Developer's Engineer must be familiar with Parkland County following planning documents prior to undertaking the design of a specific subdivision or project:

- 1.1.1** The Municipal Development Plan puts forward general policies and guidelines with respect to land development within the Parkland County.
- 1.1.2** The Area Structure Plans represent the next level of planning. However, not all works and development fall under an existing area structure plan.
- 1.1.3** The Land Use Bylaw puts forward a list of permitted and discretionary uses for each land use district in addition to defining numerous design parameters.

1.2 DEFINITIONS

In these standards, the following words shall have the meaning here after assigned to them:

1.2.1 Applicant

A person or entity who has applied for approval of a Proposed Subdivision or Development Permit, for servicing an existing parcel of land, whether as the owner or an agent for the owner of the land included therein.

1.2.2 Construction Completion Certificate (CCC)

A certificate authenticated by the Developer's Engineer that certifies that the construction and installation of identified local improvements have been completed in accordance with

the Engineering Design Standards, Plans and Specifications approved by the County and that all deficiencies have been resolved to the satisfaction of the County.

1.2.3 Contractor

A person, persons, or corporation whom shall undertake the construction of Municipal Improvements on behalf of the Developer.

1.2.4 County

Municipal district or rural municipality within the Province of Alberta governed by elected councils with the mandate to administer rural areas that can include farmlands, resource areas and unincorporated hamlets and rural subdivisions.

1.2.5 Developer

A person or entity who has executed a Development Agreement with the County; in which the Developer has undertaken to develop those lands described by a tentative plan of subdivision, with such development to be in compliance with the Parkland County Engineering Design Standards as set out here and the Development Agreement.

1.2.6 Developer's Engineer

A qualified Professional Licensee (Engineering) - P.L.(Eng.), Professional Technologist (Engineering) - P.Tech.(Eng) or a Professional Engineer – P.Eng. who is licensed to practice engineering in the Province of Alberta with membership with ASET or APEGA. The Developer's Engineer is appointed and engaged by the Developer to be responsible for the design and preparation of drawings and specifications, and for provision of engineering supervision during the construction of the Municipal Improvements for the subdivision development area.

1.2.7 Final Acceptance Certificate (FAC)

A certificate authenticated by the Developer's Engineer that certifies that the construction and installation of identified local improvements have been completed in accordance with the Engineering Design Standards, Plans and Specifications accepted by the County and that all deficiencies and maintenance work have been resolved to the satisfaction of the County.

1.2.8 General Manager

Parkland County employee designated by the title General Manager of Infrastructure Services, or his designated representative.

1.2.9 Municipal Improvements

Underground and surface structures including, but not necessarily limited to water mains, sewer systems, storm drainage systems, roadways, walkways, park areas, shallow utilities,

signage, fencing, street lighting, and other improvements as required by the County, all of which shall become the property of the County to operate and maintain.

1.2.10 Warranty Period

A minimum one year for all works including complete road structure from the time commencing with the execution of a Construction Completion Certificate and ending with the execution of a Final Acceptance Certificate.

1.3 ENGINEERING DESIGN

1.3.1 These Standards apply to the preparation and submission of engineering drawings for municipal services in both residential and industrial developments and include without being limited to the following:

- Water distribution systems, fire protection systems, and lot service connections.
- Sanitary sewage systems and lot service connections.
- Storm collection systems and related appurtenances, lot grading, and lot service connections.
- Facilities including sewage lift stations and storm water management facilities.
- Roadways, sidewalks, curb and gutter, and lane improvements.
- Shallow utilities (i.e. gas, power, lighting, telephone and cable T.V.).
- Landscaping requirements, including hard and soft elements and walkway systems.

1.3.2 The Developer shall retain the services of a qualified Developer's Engineer, registered and licensed to practice in the Province of Alberta, who shall be responsible for the design and preparation of drawings and specifications for all Municipal Improvements to be constructed within and/or related to the proposed development area. All required Municipal Improvements shall be designed in accordance with accepted engineering practices and shall meet or exceed the Parkland County Engineering Design Standards as set out here.

1.3.3 It shall be the responsibility of the Developer's Engineer to establish the location and alignment of all existing and proposed Municipal Improvements including coordination with the shallow utilities. Unless approved otherwise by the General Manager, the location of all underground utilities shall generally conform to the Utilities Layout as illustrated in the Standard Detail Drawings.

Refer to Standard Detail Drawings No. 7.1 to 7.7.

1.3.4 The Developer's Engineer shall be responsible for carrying out all surveys and investigations necessary to prepare the design. It shall further be the responsibility of the Developer's Engineer to identify the need for any easements or additional rights-of-way that may be required within or outside of the development area. Where such easements or rights-of-way are required, the plans and related documents shall be prepared by a qualified licensed Alberta Land Surveyor at the Developer's expense.

- 1.3.5** While the Developer's Engineer may arrange to have certain portions of the work carried out by other qualified persons, he shall remain responsible for the coordination of the work and the certification of its quality and accuracy.

1.4 GEOTECHNICAL REPORT

- 1.4.1** As part of the Subdivision Application, the Developer shall submit a geotechnical engineering report, prepared by a qualified Professional Geotechnical Engineer, which identifies and evaluates the subsurface ground characteristics of the subdivision development area.
- 1.4.2** If the source of water supply is groundwater, testing to establish quantity and quality of groundwater shall be conducted.
- 1.4.3** If sewage disposal system is an in-ground system, soil percolation tests shall be conducted.
- 1.4.4** Such report shall identify soil types and conditions including frost susceptibility, soil stability, water table elevations, sulfates, etc., as well as any potential difficulties that could be encountered during the construction of the Municipal Improvements.
- 1.4.5** Recommendations for setbacks, foundations, road structure and pavement design, trenching and bedding for utilities, storm drainage/storage facilities, weeping tile discharge (foundation drains), compaction requirements, and any special construction requirements should be made.
- 1.4.6** At the requirement of the General Manager, additional geotechnical information (a report) may be requested outlining recommended design and construction requirements and techniques that may have to be followed to satisfactorily develop the subdivision, particularly as related to water and sewer main construction and roadway structures.

1.5 SUBMISSION OF ENGINEERING DESIGN

- 1.5.1** Two (2) complete sets of plans and specifications and one PDF copy of the proposed subdivision area shall be submitted to the General Manager for review. A print of the approved tentative plan(s) of subdivision shall be included as well as the design calculations for water distribution analysis as specified in Section 3, sanitary and storm sewer capacity and pipe loading as specified in Sections 4 and 6.
- 1.5.2** Engineering drawings, diagrams, and reports must be sealed by a Developer's Engineer registered in the Province of Alberta. Landscape plans are to be submitted with the Engineering Drawings and be signed by the Landscape Consultant, who is a member in good standing of the Alberta Association of Landscape Architects.
- 1.5.3** Other information that may be required to be submitted during the approval process:
- design calculations;
 - a copy of required approvals from Alberta Environment and Sustainable Resource Development;
 - approvals from all other regulatory authorities;

- tender documents and specifications;
- traffic impact analysis; and
- construction drawings and contract documents.

- 1.5.4** All proposed roadways and streets shall be named on the drawings with the names, where applicable, as approved by the County. In addition, all lots shall be numbered consistent with the rural addressing system employed by the County.
- 1.5.5** The design drawings, specifications, and relevant data shall be reviewed by the General Manager who shall return one (1) marked up set to the Developer's Engineer, within three (3) weeks of the date of receipt, identifying any required revisions.
- 1.5.6** The Developer's Engineer shall incorporate the required revisions and submit four (4) sets of the Contract Documents to the General Manager for final review and acceptance prior to be authorized to construct.
- 1.5.7** Two (2) sets of the Contract Documents, stamped "Reviewed and Accepted", will be returned to the Developer's Engineer within two (2) weeks of the date of their receipt once the drawings are deemed acceptable. The General Manager's review and acceptance of the Contract Documents acknowledge compliance to the County's Engineering Design Standards; it is not meant to remove the professional obligations of the Developer's Engineer design authentication.
- 1.5.8** No work shall commence until the subdivision is approved, the Development Agreement has been executed, and the General Manager's review of the drawings and plans has been completed.

1.6 EROSION AND SEDIMENT CONTROL MEASURES

- 1.6.1** In accordance with the Alberta Soil Conservation Act, every landholder shall take appropriate measure to prevent soil loss or deterioration from taking place. Furthermore, the landholder must stop the loss or deterioration from continuing.
- 1.6.2** All new development and redevelopment that include land disturbing activities such as clearing, grading, filling, and excavation will require an Erosion and Sediment Control (ESC) plan and Best Management Plan (BMP).
- 1.6.3** The objective is to control erosion and prevent sediment from leaving the site. The ESC plan should provide for the interception and treatment of all potential silt-laden runoff that could occur during clearing, grading, construction, and site stabilization.
- 1.6.4** The site plan for an ESC plan shall be prepared by the Developer's Engineer and include the following: location of clearing limits and easements, setbacks, water quality sensitive areas and their buffers, locations and descriptions of all erosion and sediment control measures for each phase of construction, and cross-sections of fill or excavations.
- 1.6.5** All ESC shall be in place prior to any site material disturbance.

1.7 ENGINEERING SUPERVISION

- 1.7.1** For the construction of Municipal Improvements, the Developer's Engineer shall be responsible for:
- Inspecting and approving of all materials to be used;
 - Carrying out all necessary construction survey layout to ensure the finished construction conforms to the lines and grades shown on the approved plans;
 - Carrying out all necessary construction supervision to ensure all construction is carried out to meet the requirements to the approved plans and specifications and any supplementary standards required by the County;
 - Communicating with the County on proposed changes to the accepted drawings;
 - Recording of all "as-built" information;
 - Authenticating changes to the accepted drawings; and
 - Authenticating the record drawings.
- 1.7.2** A complete set of all approved drawings and specifications shall be maintained at the construction site at all times.
- 1.7.3** In addition to the supervision carried out by the Developer's Engineer, the General Manager may periodically inspect the work to ensure conformance with the standards. The General Manager may also assist in the coordination of subdivision works with any other related municipal works.
- 1.7.4** The General Manager shall bring the use of any unacceptable materials, or practices, in particular matters related to safety, to the attention of the Developer's Engineer or Contractors. If remedial action is not taken to the satisfaction of the General Manager, he may stop the work until such time as the required corrective action has been taken.
- 1.7.5** If the Developer's Engineer wishes to make any changes to the design prior to or during the execution of the work, he shall first submit a marked print (drawing) showing the proposed revision(s) to the General Manager. If acceptance is granted for the revision, the original drawing shall be immediately revised and new prints issued.

1.8 TESTING

- 1.8.1** It shall be the responsibility of the Developer's Engineer to ensure that testing of all materials called for in the specifications are carried out by an accredited testing firm. Copies of all test results and testing summary signed by the Developer's Engineer shall be forwarded to the General Manager without delay. The cost of all testing shall be borne by the Developer.
- 1.8.2** Underground Municipal Improvements shall not be permitted to operate or be operated as part of the existing municipal systems until the respective subdivision services have been inspected, tested, and accepted in writing by the General Manager.

TABLE 1.1 – Test Frequency

Specification	Type of Test	Recommended Test Frequency	Remarks
Trenching, Backfilling and Compaction for Deep Utilities	Trench Longer than 15 m	2 density tests per 600 mm of depth for every 100 m of trench length	Testing will vary with location of project and consequences of trench settlement
Trenching, Backfilling & Compaction for Electrical Installation	Trench shorter than 15 m	3 density tests per trench	
Roadway Excavation, Backfill & Compaction	Grading/Fill Compaction	1 density test per 2000 sq. m.	
	Subgrade Preparation	1 density test per 1000 sq. m.	
	Proof Rolling	Entire Project	
Aggregate: General	Source Sampling	1 sieve analysis per 1000 tonnes of asphalt aggregate	Required 2 weeks prior to commencing work
Granular Sub-base	Compaction	1 sieve analysis per 1000 tonnes of base and sub-base aggregate	
Granular Base	Source Sampling (aggregate)	1 density test per 1500 sq. m. of granular	
	Proof Rolling	Entire Project	
Stabilization: Lime	Source Sampling Test Area	400 sq. m. to establish and demonstrate work methods and timing.	Required 2 weeks prior to commencing work
	Proof Rolling	At completion of curing period	
Soil Cement	Source Sampling (aggregate) Mix Design	1 sieve analysis per 1000 tonnes	Required 2 weeks prior to commencing work. Area suspected to have inadequate thickness
	Thickness Test	1 core sample per 1000 sq. m in	
	Compaction Test	1 density test per 1000 sq. m in place	
	Strength Test	17-day compressive strength test per 1000 tonnes	
Topsoil	Topsoil Analysis On-site Sources	1 analysis report for each topsoil source	Required 4 weeks prior to commencing work
	Contractor Supplied	Contractor to supply 1 litre sample of each topsoil type for testing	
Asphaltic Concrete Paving	Mix Design Density/Thickness Test	3 cores per 1000 sq. m. of asphalt pavement	Required 2 weeks prior to commencing work
	Mix Proportions	1 Marshall core per 1000 tonnes mix, with a minimum of 1 test from each full day's production	
Hydrants	Pressure/Leakage Test * Flow Test	Minimum of one hydrant per development	Provide County at least 24 hours notice
Water Main	Hydrostatic/Leakage Test * Bacteria/Chlorine Test *	Test section not to exceed 365 m in length	Provide County at least 24 hours notice
Storm Sewer Sanitary Sewer	Television and Photographic Inspections	Upon completion of sewer installation, after backfilling	Performed by Contractor
Forcemains	Hydrostatic/Leakage Test *	Test section not exceed 365 m in length	Provide County at least 24 hours notice
Concrete Curbs & Gutters, Walks, Medians, Driveways & Swales General Concrete Slip Formed Concrete	Mix Design	1 per 60 cu. m for each class of concrete poured, min. 1 per day	Required 2 weeks prior to commencing work
	Slump Test and Air Content Test	1 per 60 cu. m for each class of concrete poured, min. 1 per day	Every truck until consistency is established
	Strength Test	1 per 60 cu. m for each class of concrete poured, min. 1 per day	Every truck until consistency is established

* Test to be witnessed by Parkland County

1.9 RECORD DRAWINGS

- 1.9.1** After satisfactory completion of the Municipal Improvements and as a condition of the execution of the Construction Completion Certificate (CCC), the Developer shall submit to the General Manager the following information:
- 1.9.1.1 Certification by the Developer's Engineer that all work has been completed in accordance with the plans and specifications, the Engineering Design Standards, and that all work and deficiencies have been completed.
 - 1.9.1.2 Within 120 days from the issuance of the CCC submit record drawings fully authenticated by a Developer's Engineer. This shall include one set of prints, and an electronic copy compatible with Parkland County CADD and GIS systems as outlined in the Parkland County Digital Plan Submission Standards and Procedures.
 - 1.9.1.3 Materials inspection certificates, asphalt mix designs, deflection testing, concrete strength tests, compaction tests, infiltration tests, exfiltration tests and video inspection tests.
 - 1.9.1.4 Operation and Maintenance Manuals, spare parts, and lubricants.
 - 1.9.1.5 Developer may request a construction completion inspection fifteen (15) working days following the release of the above mentioned deliverables for the execution of the Construction Completion Certificate.

1.10 MUNICIPAL ACCEPTANCE

- 1.10.1** Upon the satisfactory completion of the Municipal Improvements in the development and after all the identified deficiencies have been corrected, a Construction Completion Certificate (CCC), signed by the Developer's Engineer, shall be issued by the General Manager to the Developer, noting acceptance of the work and the duration of the maintenance period. The Developer shall be responsible, at his own expense, to remedy any defect, fault or deficiency in the completed work during the maintenance period, all in accordance with the terms and conditions of the Development Agreement.
- 1.10.2** Upon completion of the maintenance period and after a final inspection and correction of all deficiencies thereof, a Final Acceptance Certificate (FAC), signed by the Developer's Engineer, will be issued to the Developer.