Town of Fairview
Engineering and Design standards

The Engineering and Design Standards will be used for:

- All New Development
- As direction for proposed developers
- As direction for engineering and design
- As direction for Public Works
- Companion document for the Land Use Bylaw

Contents

1. Water Services:

Introduction:

The Town of Fairview takes it raw water from the Peace River and pumps it 22 km with a lift of 39.2 meters. The water is pumped into three Raw water storage reservoirs with a total of 48,888,888 m3. The water is then gravity fed to the water treatment plant, which is a conventional plant. The treated water is then piped to the users which include Town of Fairview, Rural Water Co-op and Bluesky.

All new subdivision must be designed by an engineer, with reference to the Utility Master Plan, and approved by the Towns Engineers before construction starts

1.1) **Pipe size and capacity**:

- The piping material shall be PVC quality with a pressure rating of 150 PSI.
- This pipe material is called Blue Brute.
- The minimum size that will be allowed is 200mm in diameter in residential
- 250mm in commercial or industrial. Anything lower than that will not provide adequate fire flows.
- All lines will be looped as per the utility master plan.

1.2) **Water valves:**

- Shall be of approved quality from the AWWA and are commonly Muller valve.
- The valve size will be the same as the piping size.
- All valves in the shall be located every 100 m so that in the case of a water break it can be isolated to affect a minimum amount of residents.
- All water valves must have stainless steel bolts with a minimum rating of 516 ss factor.
- All valves will be denso taped and have an anode pack attached to them with a minimum of a 15 lb. rating to provide corrosion protection

1.3) **Fire Hydrants:**

- Shall have an isolation valve located between the main line and the fire hydrant.
- Valves have to be a minimum one meter away from the hydrants.
- All hydrants must be approved by the town Engineers and are commonly supplied by Muller Canada Valve company.
- Hydrants must have stainless steel bolts rated the same as water valves.
- Hydrants shall be located every 100meters radius within a residential area single family identified as R1 or R2.and shall be a minimum of 150mm.
- All hydrants located in other areas will have a 75 meter radius.
- All hydrants shall have at least one 15 lb. anode pack attached.

1.4) **Service saddles:**

- shall be made of Brass and have approved stainless steel clamps

- service saddles shall be rated to the size of the pipe and shall have a minimum of ¾ of an inch (20mm) main stop located on the main line.
- All service saddle shall have a minimum 5 lb. anode pack attached to them.

1.5) Clamps:

- If Required, the town uses hymax coupling and Robar repair clamps
- To fix water breaks these must have SS bolts and be densol taped with an anode pack attached.

1.6) Service Connection:

- Must be a minimum of ¾ of an inch (20mm) for residential and be proper sized for all commercial application.
- Copper Pipping is preferred for connections between residential and main line
- For service connections over 100', public works, in consultation with engineers, may approve municipal tubing and IPEX.

1.7) CC Curb Stops:

- Will be located at the property line of each property and must be an approved CC.
- Will not be shared or located on the adjacent property

1.8) Water Meters:

- The Town will install one water meter into each new resident at the Town's expense.
- Must be the approved meter and must meet all requirements of the Town's utility department.
- If the resident or commercial property owner wishes to upsize the water meter they shall pay the difference.

1.9) Instillation:

- All infrastructure that is put into the ground must be backed filled within the approved guidelines set out by the engineers on the project.
- All infrastructure main lines will be located within the road allowance

2. Sanitary Services

Introduction:

The town of Fairview has a variety of sanitary systems. The most common is the gravity system which collects the waste through collection arteries and transfers it to the trunk line which carries it to a main sewer trunk line that drains into the lagoon system. The other system is located in our country residential. This system has a septic tank that pumps into a force main which then empties into one of our residential trunk lines. The third system is located at our industrial area that has a gravity system draining into a lift station that then has a force main that drains into the main trunks line. All new sanitary infrastructures must have approved "as-built" drawings and an engineer's stamp is require with any new development.

2.1) Pipe size and Capacity:

- must be PVC SDR35 rated
- be a minimum of 200mm in diameter
- Must be slope in accordance to the size as set out tin table 4.2 of the utility master plan as outline in AESRD2013 Standard and Guideline for municipal water works, wastewater and Storm Drainage Systems.
- IE sewer diameter 200mm Minimum design slope (m/110m) 0.40

2.2) Manholes:

- Must be located every 90 m in residential areas.
- 70 m in commercial areas as set outline in the AESRD2013 standards.
- Purpose is for easy cleaning and inspection of the lines
- Must be approved by an engineer and all manholes must meet OHS standard's and confine spaces regulations.

2.3) Service Connection:

- All single detached dwellings must have a minimum 100 mm line.
- 2% slope from the residence to the main line.
- All commercial connections shall have the engineer rated service line attached to the main line with the proper approved slope.
- All service lines must be connected to the main line via a fernco saddle, or greater, as specified by the engineers.

2.4) Fernco Saddles:

- Shall be made of rubber with SS clamps saddles come in various sizes.

2.5) **Country residential:**

- When required the country residential may have to install a low pressure system that consist of a septic tank with an approved pump, as determined by the engineering firm.
- The pump must have a check valve in the lower pressure line from the resident to the collector line in the road.
- There must be a curb stop located at the property line that is sized to the service line and rated for a sanitary system.
- The low pressure collection line will be sized for that area with flush point located throughout the system.
- For ease of cleaning, the line should be fusible and installed by a qualified installer.
- The town may require an audit of the proposed low pressure sewer system to ensure proper sizing in order to mitigate odors.

3. Storm Sewer

Introduction:

The storm sewer shall be designed as a separate system and consider both minor and major draining. There shall be sufficient capacity to carry the storm sewer runoff from the ultimate catchment areas as identify in the Utility master Plan. The design must also account for the interception, conveyance and storage requirements to accommodate runoff flows from development areas. Control shall be provided to minimize sediment discharge into the storm sewers from streets. Sediment control will be provided via grades of properties, streets and lanes. Landscaping control structures will be incorporated at ponds and pond inlets. The Storm system must be approved by municipal engineers and Environment & Parks. A flow rate of 5L/s per hector is to be used as a guideline for raw land development and predevelopment evaluations.

3.1) **Design Formula:**

- Storm sewer mains shall be designed in accordance with the Rational Method of Storm Sewer Design and according to the formula below:
- Q = CIA;
- Where Q = Discharge in cfs
  A = area in Acres / Hectares
  I = Rainfall intensity

C= Runoff Co-efficient

- The intensity of rainfall shall be calculated on the basis of a five year storm with consideration of a 100 year storm event.
- The Runoff co-efficient for residential areas shall be a minimum of 0.30

3.2) Collection system:

- Location of storm sewer mains shall general be located within the travelled right –of-way but outside roadways and sidewalks.
- There must be at least 2.4 m horizontal separation from the edge of any proposed side walk curb or pavement to the center line of sewer.
- The trench shall be backfilled with approved native back fill material to 92% Standard Proctor Density and backfill shall be tested for compaction.
- If mains are required within pavement the back fill shall be approved native or granular material, compacted to 98% standard Proctor Density.

3.3) Mains:

- Minimum size shall be 300mm
- Mains shall be installed to provide a minimum depth cover of 1.8 meters.
- Mains shall be sand bedded where soil condition or trench conditions dictate.

3.4) Manholes:

- Please refer to sanitary manholes section.

3.5) Weeping Tile Connection:

- Weeping tile from residential, apartment and commercial buildings shall discharge to a grassed area or other approved drainage area via sump pump
- Sump pump connections shall not be tied into the septic system
- Weeping tile from single detached and duplex dwellings may discharge to the Town's storm sewer system.
- Storm sewer connections shall be approved by development officer

3.6) Service Connection:

- All developments are required to provide a detail site grading plan to identify storm drainage patterns on-site.
- Site design shall include detention, storm sewer , manholes and catch basins.
- For single detached and duplex developments, a storm sewer and storm service stub shall be provided when the seasonally corrected ground water level is within 3.5m of the center line of the road design grades.

3.7) Roof Drainage:

- Roof drainage from residential, apartments, commercial and industrial buildings shall discharge to grassed or sloped drainage areas.

4. Subdivision Grading

Plans shall include

a) Proposed Gutter Elevation opposite each corner of the lot
b) Existing proposed lot corner grades
c) Minimum ground elevation
d) Invert of sanitary sewer service
e) Location of service connection GPS for use on the GIS
f) Direction of Drainage
g) The proposed and existing grades for the public Lands (Reserves, buffers and boulevards)

A common drawing (Lot Grading Plan). May be used to consolidate this information

5. Lot Design

Introduction

In general the lots shall be graded to achieve a minimum slope of 2% (Preferably 4%), away from the house and a minimum slope along the lot lines of 1% (preferably 2%). In a case where the backyard slopes towards the house, provisions are required to keep the runoff at least 3 meters away from the house, with the possibility of draining the surface water along the lot onto the street. Reserves and public lands shall be graded to drain towards developed streets, lanes and or storm sewer catch basins.

5.1) Retaining Walls:

- Will be required when there are extremes in elevation of abutting lots. (i.e. greater than a 10% gradient between the proposed development lot and the existing neighboring lot).
- Such shall be indicated on the plan and no development permit will be issue without a commitment by either owner to construct a retaining wall as part of the landscaping plan.

6. Road ways

Minimum road way width from property line to property line is 18.9 m.

6.1) Curbs:

- Residential areas shall be of a low profile roll curb with a minimum gutter drainage of .60% and 0.80% on curves with the radii less than or equal to 20 meters.
- Downtown core shall be a barrier curb with a standard height of 150mm and drainage of a minimum 0.60%

6.2) Pavement and Subgrade:

- Subgrade will be compacted to a minimum of 98% using Standard Proctor Density on residential areas and must us engineers.
- A minimum depth of one meter of gravel at the above standard is required.
- In commercial truck routes the compaction must be over 100 %.
- If expectation cannot be met, soil cement or fabric cloth may be accepted and approved by the town's engineers.
- Pavement shall be constructed with the Alberta Road Builders standards with a minimum of 300 mm of asphalt on a new construction or as designed by the Towns engineers.

6.3) Sidewalks:

New or rehabbed sidewalks shall follow the following specifications:

a) **Downtown 110 street:**

- Sidewalks will be 2.9 meters wide with a color contour design that is 0 .9 of a meter dark grey or slate. The rest of the side walk will be the standard color. All sidewalks in the downtown core will be doweled into the existing building with a membrane separation between the building and side walk.
- The grey contour will be located next to the barrier curb, all sidewalks in the down town core will have wheel chair accessible ramps as per Alberta road builders. Para Ramps must be at a 12-1 ratio.

b) **Residential:**

- All other areas shall be a width of 1.5 meters.

c) **All Sidewalks:**

- Depth shall be a minimum of 100mm
- Sidewalks will have rebar located in 3 bars located in a 1 lineal meter
- Relief cuts shall be every 3 slab at a I meter slab
- Will have a minimum of standard of 35MPA and sulfate resistant. The side walk will be tested by a Standard Proctor Density test at the request of the Town of its engineering firm.

Appendix A

The following are the specifications that are followed by the Public works department

1) Hydrants are currently 95 % Canada valve we have about 8 Macaivities but are currently phasing them out to Canada valve hydrants.
2) Blue Brute PVC for all water lines with a at least a minimum rating of 150 Psi.
3) Sewer lines must be SDR35 rated PVC.
4) All service connections to water lines shall be either hot tapped in or require a service saddle which has stainless steel bolt that are 516 or greater rated.
5) All main and curb stops shall be brass.
6) Water services shall be copper line unless the service line is over 100 feet, then the town will review the application.
7) Sewer saddle and fernco have to be made of Rubber with stainless steel clamps.
8) Sidewalks shall be 35 mpa sulfate resistant.
9) Residential curbs are low profile rolled curbs