



SECTION

“B”

ENGINEERING PLANS

&

DRAWINGS



INDEX

	PAGE
B1. GENERAL	1
B1.1 Drawing Size, Material & Layout:.....	1
B1.2 Scales:.....	1
B1.3 Dimensions:.....	1
B1.4 Drawing Technique:.....	1
B1.5 Elevations:.....	1
B2. DESIGN DRAWINGS	2
B2.1 General:.....	2
B2.2 Cover Sheet:.....	2
B2.3 Legal Plans:.....	3
B2.4 Overall Plans:.....	3
B2.5 Roads, Sidewalks and Walkways Plan:.....	3
B2.6 Sanitary Sewer, Storm Sewer and Water Main:.....	3
B2.7 Franchise Utilities Plan:.....	4
B2.8 Overland Drainage Plan:.....	4
B2.9 Lot Grading Plan:.....	4
B2.10 Plan Profiles:.....	4
B3. DETAILS & TYPICAL SECTIONS	5
B3.1 Standard Details:.....	5
B3.2 Typical Cross-sections:.....	5
B4. RECORD DRAWINGS	6
B4.1 Record Drawings:.....	6
B4.2 Digital File Specifications:.....	6
B4.3 Information Requirements:.....	6
ABBREVIATIONS	7



B1. GENERAL

All detailed engineering plans submitted to the County of Lethbridge for review and approval must comply with the following standards and specifications or a pre-approved project specific standard submitted by the Consulting Engineer. Regardless of standards used all drawings must be legible and contain sufficient information to the satisfaction of the County to permit a full review of the proposed work and survey lay-out in the field.

B1.1 Drawing Size, Material & Layout:

A standard A-1 drawing size of 600 mm x 850 mm will be used, with the profile located at the bottom of the sheet. The plan will not extend onto the profile section and the profiles must be shown only on the profile section. Originals will be prepared in ink on paper and identified appropriately, with the County being provided with a digital AutoCad copy as required by the County.

B1.2 Scales:

Type	Scale	
Overall Plans	1:1000	
Plan/Profile	Horizontal 1:500	Vertical 1:50
Cross Sections	Horizontal 1:100	Vertical 1:50

For rural developments, it may be appropriate to provide overall plans to a scale of 1:2000 with plan/profiles at 1:1000. This will require the approval of the County.

B1.3 Dimensions:

Dimensions must be given from an iron pin, lot line, chainage station, a center line or any other reference that can be readily established. All dimensions and elevations will be in the SI system.

B1.4 Drawing Technique:

Points of drawing technology that are significant to the preparation of drawings and plans are:

- care in ensuring a balanced distribution of detail throughout the drawing;
- legible letters and figures, two (2) mm (0.08") size or larger, well spread, properly formed and proportioned (Leroy or equivalent); and
- lines will be uniform in density and weight.

A north arrow (oriented towards the top of the plan where possible), adjacent lots and plan numbers, street names and the legal description of the parcel being developed will be shown on all drawings submitted.

B1.5 Elevations:

All elevations will be relative to a Geodetic Datum, with all reference benchmarks and elevations clearly identified on the drawing.



B2. DESIGN DRAWINGS

B2.1 General:

All engineering plans submitted for review and approval must comply with the specifications herein stated.

1. Street names and subdivision names approved by the County must appear on the drawings.
2. Clarity and legibility will be the governing criteria when preparing drawings.
3. All plans will show the legal subdivision, including lot and block numbers.
4. All plan sets will be bound along the left hand margin.
5. All drawings must clearly show the following in the title block:
 - developer/owner's name;
 - consultant's name;
 - subdivision name, including staging and/or phasing;
 - drawing name;
 - drawing number and job number if applicable;
 - revision number and description;
 - horizontal and vertical scales;
 - space for signature of the designer, draftsman, checker and approving authority;
 - space for the number, date, description, designer and approving authority for all revisions and drawings issued including preliminary, approval, tender, construction and record drawings;
 - space for professional stamps, permit stamps and preliminary acceptance for construction stamp;
 - date issued;
 - legend; and
 - notes.
6. The number and type of drawings required will depend on the type of development and the nature of the local improvements. Requirements must be confirmed with the County.

B2.2 Cover Sheet:

A cover sheet and index sheet may be combined at the discretion of the Consultant. The information provided will include:

- subdivision's name;
- developer/owner's name;
- consultant's name;
- a drawing index;
- project location plan (key plan) with Legal Description;
- drawing legend; and
- list of symbols and abbreviations.



B2.3 Legal Plans:

The following plans will be provided:

- plan of survey;
- utility right-of-way/easements;
- drainage easement plan; and
- plan showing access easements, walkways, mutual drives, fences.

B2.4 Overall Plans:

Separate overall plans will be submitted for each of the following, as applicable:

- roads, sidewalks and walkways;
- sanitary sewer, storm sewer and water mains;
- franchise utilities;
- overland drainage plan; and
- lot grading plan and Municipal addresses.

B2.5 Roads, Sidewalks and Walkways Plan:

This plan will include the following:

- base plan including easements;
- whole site and proposed roadway system;
- access onto existing roadway system;
- road names where required, existing and proposed;
- approaches;
- drainage easements, utility right-of-way, lot configuration;
- sidewalks, curbs and walkways;
- roadway and right-of-way alignment with dimensions;
- roadway traffic signing;
- easements with dimensions; and
- drainage features including waterways, lakes, ponds, canals, swales, ditches and culverts, noting direction of flows.

B2.6 Sanitary Sewer, Storm Sewer and Water Main:

This plan will include the following:

- legal base plan;
- easements/right-of-way, streets and lanes;
- sewer mains and water mains;
- crossings, hydrant locations, valve locations, plugs and other appurtenances;
- manhole locations;
- service to each lot, including inspection chambers;
- special details, such as inverted siphons, weirs, protection for high velocities, etc;
- off-site connections; and
- service details.



B2.7 Franchise Utilities Plan:

This plan will include the following:

- typical line assignments within utility right-of-way;
- off-site connections; and
- easements required.
- Drawings for crossing permits for any oil, power, gas or other transmission lines or railways.

B2.8 Overland Drainage Plan:

This plan will include the following:

- legal base plan including easements;
- original contours at 1 m intervals;
- proposed roadway system;
- drainage easements;
- proposed retention ponds;
- culverts;
- major drainage system;
- proposed site grading contours and elevations;
- direction of proposed drainage.

B2.9 Lot Grading Plan:

This plan will include the following:

- legal base plan including easements;
- original contours at 1 m intervals;
- proposed lot elevations and building grades;
- direction of proposed drainage; and
- Municipal addresses.

A Lot Grading Plan is a requirement for an Urban Development. For rural developments, a plan may only be required if the municipal improvements warrant re-grading of the lots from the pre-development conditions.

B2.10 Plan Profiles:

1. Plan Portion. The following information will be shown on the plan portion of the drawing:
 - all of the items listed for the Overall Plans are applicable with some additional details and dimensions;
 - locations and dimensions of lot approaches and culverts;
 - station location and dimension of road culverts;
 - direction of storm drainage flow and location of control feature such as ditch blocks and swales;
 - horizontal curve data including chainages of BC and EC, delta angle, radius and arc length for centerline;
 - alignment and dimensions of sewer mains and water mains, lot services, manholes, hydrants, valves and water system facilities;
 - indicate edge of pavement line assignment where curbs are not proposed;
 - dimension all corner radii;
 - indicate all tie-ins to existing utilities;



- indicate all traffic signage;
 - bench marks;
 - right-of-way width;
 - utility right-of-way/easements;
 - road drainage patterns;
 - existing buildings;
 - road names; and
 - overland drainage swales.
2. Profile Portion. The following information will be shown on the profile portion of the drawing:
- a vertical scale indexing the survey datum;
 - a horizontal scale of the project chainage;
 - profile chainage must be aligned with the plan view;
 - existing ground profiles along centerline and both property lines;
 - proposed design profiles for centerline and ditches including all slope grades;
 - vertical curve data, including chainage and elevations of BVC, PVI, and EVC; length of curve; k values;
 - approach locations;
 - location of all culverts complete with dimensions and invert elevations;
 - ditch checks;
 - sewer main and water main profiles;
 - size, type and class of sewer main and water main pipe as well as class of bedding;
 - consistent stationing (i.e. 0+900 m); and
 - stationing must start from 0+000 for each new section of roadway.

B3. DETAILS & TYPICAL SECTIONS

B3.1 Standard Details:

Standard detail drawings may include typical road cross-sections, trenching details, pipe bedding, valves, hydrants, pavement structure, etc. The details will be included on a standard A-1 size sheet or may be bound into project specifications on 8^{1/2}" x 11" sheets. The scale of individual details will be commensurate with the amount of information to be shown, along with clarity and legibility.

B3.2 Typical Cross-sections:

A minimum of one typical roadway cross-section will be included within the standard detail drawings. Additional cross-sections will be provided for roadway sections requiring over 1.0 m of cut or 2.0 m of fill. Details on the cross sections will include:

- width of right-of-way;
- finished width of roadway surface;
- width of subgrade;
- slope ratios of side slope and back slope;
- depth of ditches;
- surface crown slope; and
- pavement structure details including depth, class, designation and grade of materials.



B4. RECORD INFORMATION

B4.1 Record Drawings:

Within four (4) months of submitting for a Construction Completion Certificate, the Developer will include two complete sets of record drawings for review. The plans will show the “as-constructed” locations, profiles and details of the constructed utilities and surface improvements. All record drawings must be received by the County prior to issuance of a Final Acceptance Certificate. Once the drawings are approved, the Developer will submit two bound sets drawings, and the digital files, as stipulated by in Section A.

Record drawings must be signed and sealed by a Professional Engineer registered in Alberta.

B4.2 Digital File Specifications:

The digital file will be in AutoCAD 2000 or later and NAD83, geo-referenced. This method of data storage is required by the County. Digital file specifications are to be confirmed with the County.

B4.3 Information Requirements:

Record drawings must contain, at a minimum, the information contained on the project design drawings. They will also include:

- All hydrant, valve, plugs, bends, crosses, tees, reducers, manholes, and other fittings dimensioned in two directions.
- Completion date of all mains noted on each plan profile.
- Detailed description of all fittings.
- Any revisions made to construction drawings to create record plans will be made on all plans that indicate the area of the revision. (i.e. revisions shown on detail plans and profiles, will be shown also on overlapping detail drawings where they appear, as well as on the composite plan.)
- The pipe manufacturer, material and the class of pipe installed.
- All streets and avenues will be identified according to the name or number shown on the registered plan of that particular subdivision. Lanes shown on detail plans where there is no identifying avenue and/or street shown on the detail, will be identified as the lane east or west of a street, or as the lane north or south of an avenue, (i.e. L.W. 103 Street and/or L.N. 99 Avenue).



TABLE B.1

ABBREVIATIONS

Term	Abbreviation	Term	Abbreviation
Access Manhole	AMH	Right-of-way	R.O.W.
Abandoned	Ab	Sanitary	San.
Adaptor	Ad	South Property Line	SPL
Asphaltic Concrete Pavement	ACP	Sprinkler	Spr.
Asphaltic Stabilized Base Course	ASBC	Station	Sta.
Begin Horizontal Curve	BC.	Steel	Stl.
Begin Vertical Curve	BVC	Storm	ST.
Bench Mark	BM	Street	St.
Block	Blk.	Survey Monument	SM
Cast Iron	CI	Tangent	Tan.
Catch Basin	CB	Tapping Valve & Sleeve	TVS
Catch Basin Lead	CB Lead	Test Hole	TH
Catch Basin Manhole	CBMH	Vertical	Vert.
Centre Line	Centre Line	Vertical Curve	VC
Class	Cl.	Vitrified Clay Tile	VCT
Concrete	Conc.	West Property Line	WPL
Copper	Cu		
Corrugated Steel Pipe	CSP		
Curb Cock	CC		
Curb Face	CF		
Deflection Angle	DA		
Degree of Curve	D of C		
East Property Line	EPL		
Elevation	Elev.		
End Horizontal Curve	EHC		
End Vertical Curve	EVC		
Horizontal	Hor.		
Hydrant	Hyd.		
Invert	Inv.		
Iron Pin	I.P.		
Length of Curve	LC		
Main Stop	MS		
Manhole	MH		
North Property Line	NPL		
Not to Scale	NTS		
Point of Intersection	PI		
Point of Intersection Vertical Curve	PIVC		
Polyvinyl Chloride	PVC		
Pressure Reducing Valve	PRV		
Property Line	PL		
Radius	R		