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B1. GENERAL

All detailed engineering plans submitted for review and approval must comply with the following standards and specifications and shall be submitted to the County a minimum of sixty (60) days before the start of construction.

B1.1 Changes to Design Drawings

For any reason, if changes to the design drawings must be made after they have been approved, three (3) prints of each of the original drawings affected shall be submitted with the proposed changes shown in red, accompanied by a letter outlining the reasons for the required changes. If the proposed changes meet with the County's approval, one copy will be signed and returned, accompanied by a letter authorizing the changes to be made on the original.

No work can proceed until approved by the County.

B1.2 Digital File Specifications

The digital file shall be in AutoCAD R14 or later and NAD83, geo-referenced or as approved by the County.

B1.3 Dimensions

Dimensions should be given from an iron pin, a lot line, a center line or any other reference that can be readily established.

B1.4 Elevations

All elevations shall be relative to a Geodetic Datum with all reference benchmarks and elevations shown on the drawing.

B2. DRAWING AND PLAN GUIDELINES

B2.1 General

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

1. Plan size shall be the standard A-1 drawing (594 mm x 841 mm) with the profile located at the bottom of the sheet. The plan shall not extend onto the profile section and the profiles must be shown only on the profile section.

2. Drawing details shall be in metric measure.
3. Clarity and legibility shall be the governing criteria when preparing drawings. Care must be taken to ensure a balanced distribution of detail throughout the drawing. Lines will be uniform in weight and density.
4. Letters and figures will be clearly legible, 2 mm size or larger, well spread, properly formed and proportioned.
5. Elevations shall be referenced to Geodetic Datum and be in metric measure. Locations and elevations of the permanent bench marks used must be clearly identified on the plans.
6. A north arrow shall be shown on each drawing, directed towards the top of the plan.
7. Plans shall be drawn to the following scales:

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

8. All plans shall show adjacent lots and plan numbers, legal description of the parcel being developed and all relevant registered plan numbers including lot and block numbers.
9. County approved street and subdivision names must appear on the drawings.
10. All plan sets shall be bound along the left hand margin.
11. All drawings must clearly show the following in the title block:
 - a) Developer/owner's name
 - b) Engineer's name
 - c) Lacombe County
 - d) Subdivision name including staging and/or phasing
 - e) Drawing name

- f) Drawing number and job number, if applicable
- g) Revision number and description, if applicable
- h) Horizontal and vertical scales
- i) Space for signature of the designer, draftsman, checker and approving authority
- j) Space for the number, date, description, designer and approving authority for all revisions and drawings issued including preliminary, approval, tender, construction and record drawings
- k) Space for professional stamps, permit stamps and preliminary acceptance for construction stamp
- l) Date issued and revision number if applicable
- m) Legend
- n) Notes

B2.2 Standard Details

Standard detail drawings may include typical road cross-sections, trenching details, pavement structure, etc. The details shall be included on a standard A-1 size sheet. The scale of individual details will commensurate with the amount of information to be shown along with clarity and legibility.

B2.3 Cover Sheet

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

1. Subdivision's name
2. Developer/owner's name
3. Engineer's name
4. Lacombe County
5. A drawing index
6. Project location plan (key plan) with legal description
7. Drawing legend
8. List of symbols and abbreviations (refer to abbreviations table at B2.5)

B2.4 Typical Cross-sections

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

1. Width of rights-of-way
2. Finished width of roadway surface
3. Width of sub-grade
4. Slope ratio of side slopes and back slopes
5. Depth of ditches
6. Surface crown slope
7. Pavement structure details including depth, class, designation and grade of materials

B2.5 Abbreviations

Abbreviation	Term	Abbreviation	Term
Ab	Abandoned	LC	Length of Curve
AC	Asphaltic Concrete	NPL	North Property Line
BHC	Begin Horizontal Curve	NTS	Not to Scale
BVC	Begin Vertical Curve	PI	Point of Intersection
BM	Bench Mark	PIVC	Point of Intersection Vertical Curve
Blk	Block	PL	Property Line
Cl.	Class	R	Radius
Conc.	Concrete	R.O.W.	Right-of-Way
CSP	Corrugated Steel Pipe	SPL	South Property Line
DA	Deflection Angle	Sta.	Station
D of C	Degree of Curve	Stl.	Steel
EPL	East Property Line	St.	Street
Elev.	Elevation	SM	Survey Monument
EHC	End Horizon Curve	Tan.	Tangent
EVC	End Vertical Curve	TH	Test Hole
Hor.	Horizontal	Vert.	Vertical
Inv.	Invert	VC	Vertical Curve
I.P.	Iron Pin	WPL	West Property Line

B3 DRAWING AND PLAN TYPES**B3.1 Construction Management Plan**

The Construction Management Plan is mandatory for all subdivision developments. Industry best practice should be adhered to. Below is a list of the minimum requirements:

1. Project legal land locations
2. Map of project location
3. Site map
4. Developer's name and contact numbers
5. Subdivision name
6. Consulting engineers name and contact numbers
7. Project Manager's name and contact numbers
8. Project boundaries
9. Equipment to be used
10. Proposed hours of operation
11. Contractors and subcontractors names and contact numbers for site personnel
12. Project schedule
13. Traffic accommodation plan
14. Signed road use agreement with the appropriate road authority
15. Verification that adjacent landowners have been contacted
16. Brief description of the works to be undertaken by the various contractors
17. Emergency plan and contact numbers (police, ambulance, etc.)
18. Proposed site works and emergency incident documentation
19. Nuisance minimization plan (dust, noise, etc.)
20. Other information as required or requested by the County

B3.2 Environmental Construction Operations (ECO) Plan

The ECO Plan is mandatory for all subdivision developments. All relevant federal and provincial legislation and industry best practices must be adhered to. This plan can be

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combined with the Construction Management Plan if all the information is provided. Below is a list of the minimum requirements:

1. Project Setting and Site Activities
 - a. Project Description- A brief description of the project and its legal land location, subdivision name and project boundaries.
 - b. Project Contacts- Name and contact details for the Developer, Engineer, Project Manager, contractors, subcontractors and site personnel.
 - c. Environmental Sensitivities- Site specific sensitive or protected features that could be impacted as a result of the Contractor's activities as described.
 - d. Site Activities- A scope of work and a list of all construction or related activities to be undertaken during the project are provided, including:
 - Equipment to be used
 - Proposed hours of operation
 - Brief description of the works to be undertaken by the various contractors
 - Equipment maintenance and storage on site (fueling procedures and spill containment, etc.)
2. Project Schedule and Site Drawings
 - a. Project Schedule- A project schedule is provided, including scheduled shut-downs and restricted work periods due to environmental requirements.
 - b. Site Drawing(s)- One or more site drawings are provided, indicating:
 - Map of project location
 - Site map
 - Office and facilities placement
 - Erosion and sediment controls
 - Environmental sensitivities
3. Potential Environmental Impacts and Conflicts
 - a. Permits, approvals, authorizations and notifications- List the file name, number and environmental conditions of all required project permits, approvals and notifications. Copies of all project permits, approvals, authorizations and notifications (and their associated applications, which referenced in approval) are appended to the ECO Plan.

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- b. Regulatory Compliance- Specific regulatory requirements (other than those listed in 3a) that directly impact or restrict this construction period are described.
 - c. Mitigation Strategies- Procedures, controls or best management practices (BMPs) to prevent or reduce adverse impacts on the environment are provided.
 - d. Erosion and Sediment Control- Controls provided as appropriate for the project.
 - e. Environmental construction practices for top soil and subsoil removal and replacement.
 - f. Reclamation plan.
4. Waste Management and Hazardous Materials
- a. Waste management and hazardous materials- List hazardous materials that will be used/stored on site. Expected hazardous and non-hazardous waste materials along with proper handling, containment, storage, transportation, disposal and spill cleanup methods are listed. As appropriate for the project, estimated waste quantities and specific handling procedures are also provided.
5. ECO Plan Implementation
- a. On-site Representative- Name and contact details for the person(s) who will be the onsite representative(s).
 - b. Training and Communication- Documentation of employee training for environmental emergencies.
 - c. Monitoring and Reporting- Monitoring inspection procedures including a schedule of monitoring activities and reporting procedures.
 - d. Documentation- Information and/or records that will be maintained relating to the ECO Plan and environmental matters on the project site are described. Documentation of environmental nonconformance, preventative and corrective actions.
 - e. ECO Plan Update- Provide ECO Plan review and update procedures and append a table summarizing all changes

6. Environmental Emergency Response Procedures
 - a. Environmental Emergency Response Procedures- Potential adverse environmental impacts are identified and emergency response procedures to prevent and respond to incidents are provided. An emergency response contact list is provided.

B3.3 Traffic Impact Analysis

Information required in this plan is listed below

1. Methodology
2. Existing land use, existing roadway system, traffic growth history, current traffic volumes and conditions (AADT)
3. Trip generation from proposed development, trip distribution and assignment (AADT)
4. Intersectional analysis
5. Capacity analysis (levels of service) including adjacent road system and intersections
6. Recommendations and estimated costs for road and intersection improvements

B3.4 Legal Plans

The following plans shall be provided:

1. Plan of survey
2. Utility rights-of-way plan
3. Drainage easement plan
4. If an access easement is required, it is usually shown on a right-of-way plan showing rights-of-way for access and for utilities. The other features mentioned will appear on the plans referred to in B3.2

B3.5 Overall Plans

Separate overall plans shall be submitted for each of the following:

1. Roads
2. Franchise utilities
3. Overland drainage plan
4. Lot grading plan

5. County addresses
6. Reserve Improvements which shows trails (walkways) and other recreational facilities and amenities, as well as landscaping details

B3.6 Road Plan

This plan shall include the following:

1. Base plan with lot configuration
2. Proposed roadway system
3. Access onto existing roadway system
4. Road names where required, existing and proposed
5. Approaches
6. Utility rights-of-way with dimensions
7. Walkways
8. Roadway and rights-of way alignment with dimensions
9. Roadway traffic signing
10. Drainage features including waterways, lakes, ponds, canals, swales, ditches and culverts, noting direction of flows

B3.7 Franchise Utilities Plan

This plan shall include the following:

1. Typical line assignments within utility rights-of-way
2. Proposed assignments within utility rights-of-way
3. Off-site connections
4. Easements required

B3.8 Overland Drainage Plan

This plan shall include the following:

1. Legal base plan including easements
2. Original contours at 1 meter intervals
3. Proposed roadway system
4. Drainage easements
5. Proposed Stormwater Management Facilities
6. Culverts

7. Major drainage system
8. Proposed site grading contours and elevation
9. Direction of proposed drainage

B3.9 Lot Grading Plan

This plan shall include the following:

1. Legal base plan including easements
2. Original contours at 1 meter intervals
3. Proposed lot elevations and building grades
4. Direction of proposed drainage

B3.10 Landscaping Plan

This plan shall include the following:

1. Reserve Improvements which shows trails (walkways) and other recreational facilities and amenities, as well as landscaping details

B3.11 Plan Profiles

All of the items listed for the Overall Plans are applicable with some additional details and dimensions.

1. **Plan:**
 - a) Locations and dimensions of lot approaches and culverts
 - b) Station location and dimension of road culverts
 - c) Direction of storm drainage flow and location of control feature such as ditch blocks and swales
 - d) Horizontal curve data including chainages of BC and EC, delta angle, radius and arc length for centerline
 - e) Edge of pavement line assignment
 - f) Dimension all corner radii
 - g) All tie-ins to existing utilities
 - h) All traffic signage
 - i) Bench marks
 - j) Rights-of-way width

- k) Utility rights-of-way
- l) Road drainage patterns
- m) Existing buildings
- n) Overland drainage

2. **Profile:**

- a) A vertical scale indexing the survey datum (metric)
- b) A horizontal scale of the project chainage
- c) Profile chainage must be aligned with the plan view
- d) Existing ground profiles along centerline and both property lines
- e) Proposed design profiles for centerline and ditches including all slope grades
- f) Vertical curve data including chainage and elevations of BVC, PVI, and EVC, length of curve and k values
- g) Approach locations
- h) Location of all culverts complete with dimensions and invert elevations
- i) Ditch checks
- j) Consistent stationing (i.e. 0+900 meters)
- k) Stationing should start from 0+000 for each new section of roadway

B3.12 Record Drawings

When submitting for a Construction Completion Certificate (CCC), the Developer shall include three complete sets of as-built drawings for review. The plans show the “as-constructed” locations, profiles and details of the constructed utilities and surface improvements necessary to ensure that the development has been constructed as designed. All record drawings must be received by the County prior to issuance of a CCC. Once the drawings are approved, the Developer shall submit one set of reproducible drawings and the digital files in a format acceptable to the County.

Any deviation between design drawings and as-built drawings must be highlighted in red, with the deviation detailed, on the as-built drawings submitted to the County.