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C1. GENERAL

Road classification and designation shall generally be in accordance with the classification system outlined in the Transportation Association of Canada (TAC) Manual – Geometric Design Standards for Canadian Roads and Streets and the Urban Supplement to the Geometric Design Guide for Canadian Roads.

Generally, individual road classification is to be based on Lacombe County Standards as determined by the Operations Department. Utility lines will not be allowed in the road structure. Utility rights-of-way or utility easements adjacent to the road rights-of-way will normally be required.

The Developer and the Engineer must ensure that the roadway infrastructure is designed and constructed to achieve full design life expectations consistent with good engineering and construction practices.

C2. DESIGN

All design shall be based on Alberta Transportation’s *Highway Geometric Design Guide* latest edition.

Developers are responsible for restoration and densification to Alberta Transportation standards for all survey control markers and legal pins removed or disturbed during construction.

C2.1 Traffic Analysis/Traffic Assessments

The Developer is responsible for a traffic assessment when required by the County. At a minimum, the traffic assessment **shall include the following:**

1. Amount of daily traffic generated by the development at the full development stages, and if the development is staged, then at the end of each consecutive development stage.
2. Layout of the internal road system.
3. Location of all proposed access points.
4. Sight distance assessments at the proposed access points.
5. Review of the proposed access points to determine whether or not intersectional improvements are required.

6. This traffic assessment will be used by the Engineer in addition to the County's minimum guidelines to establish a safe, viable access (es) and road system within the County rights-of-ways.

C2.2 Street Classification

Table C1-1 (following page) indicates the required road cross sections for each street/road classification.

C2.3 Vertical Alignment

1. The minimum grade shall be 0.6%.
2. The maximum grade shall be 6.0% and at intersections the maximum gradient shall be 2%.
3. All other requirements will be to current Alberta Transportation Standards.

C2.4 Vertical Curves

1. All vertical curves shall be designed per Alberta Transportation Standards.
2. The minimum length of a vertical curve shall be 30 meters on local roads and greater than or equal to the design speed in km/h on main roads.
3. Vertical curves are not required where the algebraic difference of the grades is less than 1.5.

ROAD CLASSIFICATION	MINIMUM DEEP STRENGTH PAVEMENT EQUIVALENT	MAXIMUM SIDESLOPE RATIO	GRADE SLOPE	MAXIMUM BACKSLOPE RATIO	MINIMUM RIGHT-OF-WAY WIDTH (meters)	PAVED SURFACE (meters)	SIGHT DISTANCE (meters)
Main Asphalt Road Drawing C-1	500mm	4:1	4:1	6:1	40.23	9.4	200 meters
Industrial Subdivision Road Drawing C-2	500mm	4:1	4:1	6:1	40.23	9.4	150 meters
Residential Subdivision Main Access Road Drawing C-3	500mm	4:1	4:1	6:1	30.48	8.5	150 meters
Residential Subdivision Road Drawing C-4	450mm	4:1	4:1	6:1	30.48	8.5	150 meters
Local Roads Drawing C-5	N/A	4:1	4:1	4:1	20.12	8.0	150 meters
Access Roads Drawing C-6	N/A	3:1	3:1	3:1	20.12	7.0 (NOT PAVED)	150 meters
Farm Machinery Roads Drawing C-7	N/A	3:1	3:1	3:1 Preferred	20.12	6.1 (NOT PAVED)	150 meters

C2.5 Horizontal Alignment

Wherever possible the alignment should be as directional as possible and consistent with topography. The use of winding alignment should be avoided.

1. The minimum degree of curvature of the centerline of the roadway is dependent on the road classification and its design speed. The use of minimum radius of curvature should be avoided.
2. All horizontal curves shall be designed to meet the minimum design requirements as noted in the following chart:

Classification	Minimum Radius of Curve (meters)	Maximum Gradient %	Minimum Tangent Lengths (Meters)	Intersection Spacing (meters)
Local Road	300	6	30	60
County Main Road	450	5	60	400

3. See Alberta Transportation Highway Geometric Design Guide for super-elevation requirements

C3. APPROACHES

All country residential subdivision lots and private properties will require one approach constructed to the property from the accessing roadway according to the following requirements and specifications.

Industrial approaches shall be constructed to the same requirements and specifications as private approaches with the exception that the width of the approach must be increased to accommodate the type of development and anticipated traffic.

Road approaches shall be located and designed to access the parcel at most desirable building location. These specifications are the minimum standards to be followed. **The County must approve the final location and construction.**

Where a culvert is required the following minimum culvert sizes will be used:

Residential Approach Culvert	400 mm diameter
Roadway Cross Culvert	500 mm diameter
Industrial Approach Culvert	600 mm diameter

C3.1 Industrial Lot Entrances geometric requirements

1. Light Industry
 - a) Minimum turning radius 12 – 15 meters
 - b) Minimum road surface width 11.5 meters
 - c) Gradient must be no greater than 2%
2. Heavy Industry
 - a) Minimum turning radius 15 meters
 - b) Minimum road surface width 15 meters
 - c) Gradient must be no greater than 2%

C3.2 Residential Lot Entrances geometric requirements

1. Minimum turning radius 12 – 15 meters
2. Minimum road surface width 6 meters
3. Maximum road surface width 10 meters
4. Gradient must be no greater than 2%

C3.3 Residential Shared Lot Entrances geometric requirements

1. Minimum turning radius 12 – 15 meters
2. Minimum road surface width 9 meters
3. Maximum road surface width 10 meters
4. Gradient must be no greater than 2%

If pavement is required, all asphalt approaches must have a structure equivalent to that of the adjoining road with the width of the surface extending to the property line. Refer to County Policy OP (29) for additional information.

C4. CLEARING AND GRUBBING

All work shall be done within the limits of rights-of-way, permanent and working easements and shall include the complete disposal of all buildings, fences, vegetation and other debris. All work shall be in accordance with existing Provincial and County fire and public safety regulations and laws and be done in accordance with the “approved” drawings and specifications.

C5. EARTHWORK**C5.1 Topsoil Stripping and Stockpiling**

Topsoil shall be stripped to its full depth on all road rights-of-way and excavation areas and stockpiled for use in final grading and/or landscaping purposes.

C5.2 Common Excavation

All excavation shall be done within the limits of the proposed work to the lines, grades and dimensions as shown on the engineering plans, noted in the plan documents or as specifically approved otherwise. Surplus or unsuitable material shall be disposed of as approved by the County.

C5.3 Embankment Construction

All material below 300 mm from the finished grade shall be placed in maximum 300 mm (loose) successive uniform layers, each compacted to a minimum of 98% Standard Proctor Density at +/- 1% of optimum moisture content unless stated otherwise. Material in the top 300 mm shall be constructed in two (2) 150 mm (compacted) lifts to a minimum of 100% Standard Proctor Density. Only “approved” native or imported material shall be used.

Side-slopes and back-slopes shall not be steeper than 4:1. Where, in the opinion of the Engineer, such slopes are not sufficient for the native soil condition; the Engineer shall provide a suitable slope acceptable by the County.

C5.4 Equipment

All proposed routes for hauling equipment other than trucks must be approved by the County prior to commencement of the work. Rubber-tired motor scrapers shall not be used to haul over improved streets. Traffic must be controlled by flagmen and sufficient warning signs to ensure the safety of the public. Any road closures and detours must be submitted to and approved by the County a minimum of forty-eight (48) hours prior to the scheduled work. Haul routes must be kept clear and free from dust by grading and watering. Trucks must be loaded in such a manner that no spillage occurs.

C5.5 Borrow

Where sufficient quantity of suitable fill material is not available from excavation on the site, additional fill may be borrowed from other sources. The Developer will be responsible in securing borrow sites.

C6. CULVERT SPECIFICATIONS

1. Culverts within the County will be constructed and installed as per Alberta Transportation Standard Specifications.
2. Unless otherwise approved by the County, roadway centerline culverts shall be a minimum diameter of 500 mm.
3. Unless otherwise approved by the County approach culverts shall be a minimum diameter of 400 mm.
4. Culvert material shall be constructed to produce a typical 4:1 sloped end section on each end of the pipe.
5. Culverts shall be installed 0.10 meters below elevation of drainage profile unless otherwise directed by the Engineer or the County.

C7. SUBGRADE CONSTRUCTION

C7.1 Excavated Areas

The areas excavated to sub-grade elevations shall be scarified to a minimum depth of 150 mm below the surface and compacted to a minimum of 100% of Standard Proctor Density. The cut shall conform to the lines, grades and dimensions required.

C7.2 Fill Areas

That portion of any fill more than 300 mm below the top of sub-grade shall be placed in successive horizontal layers not exceeding 300 mm loose depth and compacted to a minimum of 98% of Standard Proctor Density. The top 300 mm shall be placed in two (2) 150 mm compacted lifts and compacted to a minimum of 100% of Standard Proctor Density.

C7.3 Drainage Working Areas

All work shall be carried out by the Developer so that excavated areas will drain to a natural drainage course during construction or by pumping.

C8. GRANULAR BASE COURSE

C8.1 Materials

Granular material shall consist of crushed 20 mm gravel free from vegetation, clay or other extraneous material and meet Designation 2, Class 20 specifications.

C8.2 Construction

1. **Surface Preparation** – The sub-grade shall be finished to conform to the required section, grade and density prior to the placement of base course material.
2. **Placement** – The material shall be placed on the sub-grade or preceding course in a uniform manner to ensure the ultimate planned compacted thickness. Crushed gravel shall be mixed and placed in horizontal layers of not more than 150 mm compacted thickness. Pit run gravel (75 mm) shall be mixed and placed in uniform layers, not exceeding 150 mm in compacted thickness, without segregation.
3. **Water** – If the material requires water to attain the specified density, water shall be added and the material bladed continually until a uniform mixture is obtained. If the gravel contains an excessive amount of moisture, it is to be scarified and aerated until the optimum moisture content specified is obtained.
4. **Composition** - Not less than 100% of maximum density shall be obtained in compaction tests. Compaction shall be reached by the use of pneumatic tire rollers, vibrating drum packers or other approved types of compaction equipment.
5. **Testing and Inspection – County Representative to be Present for Testing**
 - a) **Densities** – Field density tests shall be carried out for each 2,000 m² (per layer) of granular base course or at least one test per day of placing operations
 - b) **Grade** - The surface shall be such that when tested with a straight edge, the maximum deviation of the surface from the edge of the straight edge shall nowhere exceed 13 mm.
 - c) **Appearance** – No segregation of rock or fines material shall exist in the completed base. The gravel base shall be free of all loose or deleterious material.
 - d) **Thickness** – Areas suspected of being deficient or excessive in thickness shall be cored at the rate of three (3) cores per 1000 m².

- e) **Base Course** – deficiencies in the base course less than 6 mm in thickness will not be penalized. Areas deficient by more than 6 mm but less than 20 mm shall be paid for at an adjusted rate; the ratio of the average thickness divided by the design thickness. **Areas deficient by more than 20 mm shall be refused.**

C9. ASPHALTIC CONCRETE PAVEMENT

C9.1 Pavement Design

The Asphalt Institute method of pavement design using maximum 8165-kg axle loads shall be employed in the design of all paved roadways. All design parameters [e.g. traffic counts, percentage of types of vehicles, California Bearing Ratio (CBR)] are to be provided to the County.

A geotechnical firm is to be engaged to perform testing on the completed roadway to confirm the adequacy of the pavement design. Asphalt materials, mixing, spreading and rolling shall conform to the Asphalt Institute Standards for methods of construction. The pavement structure shall be designed to carry the anticipated loading and traffic capacity for a minimum twenty (20) year life. All roadways shall be paved with Full Depth Asphalt or a structure with an equivalent strength. Asphalt concrete mix designs shall be prepared by a recognized testing laboratory. Mix designs shall be forwarded to the County for approval.

No paving shall be allowed until the sub-grade has been tested, inspected and approved by the County.

Stage construction for any asphalt work is an acceptable method of construction with the final lift of asphalt placed during the construction season prior to the FAC issuance.

C9.2 Materials

Asphaltic concrete pavements (surface and base courses) shall consist of mineral aggregate, filler and asphaltic binder, and shall be laid and compacted to the specified thickness, conforming to the approved lines, grades and typical cross-sections.

All materials are to meet current Alberta Transportation Standards and be approved by the County.

C9.3 Composition and Proportioning

All mix designs and tolerances are to meet current Alberta Transportation Standards and be approved by the County.

C9.4 Construction Methods**1. Weather Limitations**

Mixture shall not be placed during:

- a) Periods of rain or when there is an imminent danger of rain
- b) Excessive winds
- c) Air temperatures 2° C or cooler, except in specific situations where, in the opinion of the Engineer and with approval from the County, conditions warrant the risk involved.

2. Base Preparation

The prepared base shall be dry and clean of all loose or foreign materials.

Where tack coat or asphalt sealer is applied, it shall be thoroughly cured prior to placing the mixture.

Where existing pavements are to be overlaid, a leveling course of hot mix asphaltic concrete shall be placed if required prior to placing the surface course. Unless otherwise approved by the Engineer and the County, this course shall be laid with a paver and shall meet all of the requirements of the Section.

3. Transportation of Mixture

The mixture shall be transported in vehicles equipped with protective covers and clean, tight, smooth-sided boxes. The inside surface of the box may be lubricated with a light coating of soap or detergent solution. Petroleum derivatives shall not be permitted.

Any accumulation of asphaltic material, which has collected in the box, shall be thoroughly cleaned before loading with hot mix.

Trucks shall have an easily accessible 12 mm hole in the side of the box at a distance of 300 mm from the bottom for the purpose of checking temperatures of the mixture.

Trucks shall be maintained perfectly clean of mud or any substance, which could contaminate the working area.

4. Spreading

Mixtures shall be spread at temperatures which, when measured in the hopper of the paver, are not lower than 125° C or higher than 150° C.

Unless otherwise permitted by the County, the mixture shall be spread by a mechanical self-powered paver, with an automatic leveling device, capable of spreading the mix without segregation or tearing, in thicknesses varying from 12 mm to 100 mm and widths from 2.5 to 4.2 meters, and to true line, grade and cross-section as shown on the approved plans.

5. Surface Requirements

The surface shall be checked prior to roller compaction and inequalities adjusted. Areas found to have fat spots; sandy accumulation, etc. shall be removed and replaced with satisfactory material.

Irregularities in alignment and grade shall be corrected by the addition or removal of mixture before rolling. Before the addition of material to any mat, the surface shall be broken with the tines of a rake to ensure proper bonding.

Edges against which additional pavement is to be placed shall be straight and approximately vertical. A lute or rake shall be used immediately behind the paver, when required, to obtain a true line and vertical face.

6. Hand Spreading

In small areas where the use of mechanical finishing equipment is not practical, the mix may be spread and finished by hand, if so directed by the Engineer and approved by the County. Placing by hand shall be performed carefully with the material distributed uniformly to avoid segregation of the coarse and fine aggregates. Broadcasting of material shall not be permitted.

During the spreading operation, all material shall be thoroughly loosened and uniformly distributed by lutes or rakes. Material that has formed into lumps and does not break down readily shall be rejected. Following placing and before rolling, the surface shall be checked with templates and straight edges and all irregularities corrected.

Heating equipment used for keeping hand tools free from asphalt shall be provided. Caution shall be exercised to prevent high heating temperature, which may burn the material. The temperature of the tools, when used, shall not be greater than the temperature of the mix being placed.

7. Joints

The mixture shall be laid so that all longitudinal joints are made while the first mat of the two being laid is still hot.

A narrow strip along the edge of a mat, which is joined with another asphalt mat, shall be left without rolling until the adjoining mat has been placed against it. The joint, which is formed, shall be rolled immediately after the adjacent mat has been placed to ensure a bonding of the material while the asphalt is still hot.

Transverse joints shall be carefully constructed and thoroughly compacted to provide a smooth riding surface. Joints shall be straight-edged or string-lined to assure smoothness and true alignment and shall be offset at least one meter from joints of adjacent mats.

In order to ensure that the surface shall not cool prior to laying an adjacent “run”, the spreader shall not advance beyond the limits shown in the following table:

Air Temperature °C	Maximum Length of Advancement (meters)
27	250
15 – 27	190
7 – 15	125
7	90

When the surface course is being laid and the air temperature is below 7° C, an infra-red generator shall be used in front of the spreader to heat the abutting joint. The infra-red generator shall be used on both the longitudinal and transverse joints. The generator shall be located so as to heat 100 mm of the previously laid surface course and 100 mm of the new course. Output of the heat generator shall be at least 120,000 KJ per hour, with a minimum 850° C face temperature in one meter of exposed unit. The infra-red generators shall provide heat energy with the complete absence of flame. Oxidized or carbonized bituminous material shall not be accepted.

Transverse joints shall be similarly heated using a portable infra-red generator with an output of 60,000 KJ per hour with a minimum 850° C face temperature in 500 mm of exposed joint.

Where directed by the Engineer and agreed to by the County, joints shall be painted with hot asphalt cement or equivalent tack coat material.

Where previously laid asphalt is to be abutted, it shall be cut back to a point where the vertical face is the depth of the previously laid mat. The exposed edge of the existing pavement shall be painted with an approved bituminous material and the freshly laid mixture raked against it, tamped with hot tampers and rolled.

8. Testing and Inspection

The following tests shall be carried out for **each 1000 tonnes of asphalt pavement** or at least once during each placing shift:

- a) Marshall Stability (ASTM D1559)
- b) Sieve Analysis (ASTM C136 & C117)
- c) Bulk Specific Gravity (ASTM D2716)
- d) Bitumen Content (ASTM D2172)
- e) % Voids in the Mineral Aggregate (VMA) (ASTM D 2726)
- f) Air Voids (ASTM D3203)

C10. PRIME COATS AND TACK COATS

a) Prime Coat (Over Sub-grade or Cement Stabilized Base)

The asphalt types may vary from M.C. 30 to M.C. 250; from SS-1 to SS-1h or an emulsified asphalt primer to suit the conditions of the base. The rate of application may vary from 0.50 to 1.50 l/m². The materials temperature at application shall fall within the following limits:

Medium Curing Asphalt	Emulsified Asphalt
M.C. 30 (50 – 70° C)	S.S. 1 (24 – 54° C)
M.C. 70 (75 – 90° C)	S.S. 1h (24 – 54° C)
M.C. 250 (100 – 110° C)	Emulsified Asphalt Primer (15 – 50° C)

b) Tack Coat (Over Asphalt Base):

The asphalt for the tack coat may vary from SS-1 to SS1h; from R.C. 30 to R.C. 250, depending on conditions to suit the base. The rate of application shall be 0.25 to 0.90 l/m². Temperatures of application shall fall within the following limits:

Rapid Curing Asphalts
R.C. 30 (50 – 70° C)
R.C. 70 (75 – 98° C)
R.C. 250 (100 – 110° C)

C11. SEAL COATS AND FOG COATS

Seal coats shall be applied during daylight hours when the shade temperature is 10° C or higher. No bituminous material shall be applied when the roadway surface is damp or wet, or when weather conditions are such that the bitumen will become chilled before the cover aggregate can be spread and rolled. Work shall not be started without consent of the County or the Engineer and shall be promptly terminated in the event of unfavorable road or weather conditions.

When a seal coat is applied without cover then it shall be referred to as a “Fog Coat” a light application of slow-setting asphalt emulsion diluted with water.

Refer to current Alberta Transportation Standards for application rates and material specifications for all seal coating.

C12. RE-CYCLED ASPHALT

Any surface re-cycling must be approved by the County. For application rates and material specifications refer to current Alberta Transportation Standards.

C13. ROAD GRAVELLING

Upon the County and the Engineer’s approval of the roadway construction, the Developer shall supply and place the first lift of gravel in accordance with the specified gradation and rate of application. No graveling shall be permitted on the finished sub-grade until the sub-grade has been tested, inspected and approved.

The stockpile source of gravel shall be approved by the County. The size and gradation shall conform to the recommended standards.

1. Rate of Application

The rate of gravel application shall be as outlined below:

- a) All entrances to lots shall be graveled at a minimum rate of 15t per entrance, as measured from the shoulder of the road to the property line.

	Local Industrial	Industrial Collector	Minor Arterial	Major Arterial
	RCU 80	RCU 80	Rau 100	RAD 100
Widths	11.5 m	13.5 m	17.0 m	21 m
1 st Lift	600 mm	700 mm	900 mm	1100 mm
2 nd Lift	500 mm	600 mm	800 mm	950 mm

2. Surfacing Gravel

Surfacing gravel shall be applied to the completed road bed surface at the rates as outlined below. These applications rates may be increased or otherwise varied by the County as required to suit the roadbed conditions:

Access Road	600 t/km
Local Road	850 t/km
Industrial Road	As determined by the County/Engineer at time of development
All Private Approaches	Minimum 15 t per approach

C14. TRAFFIC CONTROL DEVICES

A traffic control device is a sign, signal, marking, barrier or other device, placed upon, over or adjacent to a roadway which is intended to regulate, warn, or guide the road users. All such traffic control devices shall be installed in accordance with the “Uniform Traffic Control Devices for Canada” Manual, latest revision thereof, distributed by the Transportation Association of Canada (TAC) and with the new “Alberta Highway Signing Policy Manual”, latest revision thereof.

All traffic control devices must be authorized and approved by the County prior to placement. No traffic control device, nor its support, shall bear any commercial advertising.

It is the intent that these devices be kept serviceable for the safe movement of traffic in daylight and darkness, 365 days per year.

C14.1 Traffic Signs

Signs inform road users of traffic regulations, roadway characteristics and road hazards, and provide information necessary for route selection. Simplicity in design, care in placement and a standard of maintenance are essential. Signs are to be used only when necessary and justified. All sign materials shall conform to the Canadian Standards Association (CSA) specifications.

1. Materials:

- a) Signs – signs made of treated ferrous and non-ferrous metal and waterproof resin bonded plywood are suitable for use in permanent signs (certain wood fibrous materials, when properly fabricated, are also acceptable). Wooden boards may be used for large signs and for temporary and seasonal signs.
- b) Sign Panels – information signs shall be constructed with high intensity (or better) reflective panels. Regulatory and Hazard signs shall be constructed with diamond grade reflective panels.
- c) Sign Posts – sign post shall be made of treated 4” x 4” (100mm x 100mm), 4” x 6” (100 mm x 150 mm), 6” x 6” (150 mm x 150 mm) or other approved dimensions, as required and approved by the County.
- d) Fasteners – Non corrosive fasteners shall be used to attach signs to their supports.

2. Installation and Maintenance:

Signs are to be placed with the posts vertical and the signs level. All sign posts shall be located horizontally 3m from the shoulder of the adjacent road and the bottom of the sign shall be 1.5m above the shoulder elevation of the road. Stop signs or yield signs shall be positioned in line with the near property line of the intersecting road allowance or otherwise approved by the County. Signs are to be positioned with the best possible road visibility in mind. All signs shall be kept clean, in proper position and legible. Damaged signs are to be repaired or replaced as soon as possible. No vegetation, construction materials, snow or other items or materials are to be allowed to obscure the sign.

C14.2 Pavement Markings

Pavement markings are traffic control devices placed on roadway surfaces to delineate and clarify traffic and pedestrian movement by regulating, warning and conveying information to individuals without diverting attention from the roadway.

All materials specifications are to meet with current Alberta Transportation standards and be approved by the County.

1. **Color** – yellow (solid) lines should be used to delineate the separation of opposing traffic flows. White lines delineate the separations of traffic flows in the same direction. All lateral pavement markings are to be white in color.
2. **Pattern** – broken longitudinal lines are to indicate that lane changing is permitted and solid longitudinal lines indicate that lane changing is not permitted. The line to gap ratio for separator lines is to be 3m:6m. Lateral pavement marking may be parallel or “zebra” lines and are to be used to indicate the limits of the drivers’ right-of-way concerning stopping, pedestrian crosswalks, no parking areas and the like.

Refer to the “Uniform Traffic Control Devices for Canada” Manual which details the requirements for pavement markings.

C14.3 Temporary Signage

Temporary signage and devices shall be located as to provide motorists and pedestrians with adequate warning of construction or unusual conditions. A plan showing signage location, spacing and types shall be submitted to the County for approval a minimum of seventy-two (72) hours prior to disruption. Refer to “Uniform Traffic Control Devices for Canada” manual, section ‘D’.

C15. STREET LIGHTING

All street lighting layouts and location of the buried and the overhead lines shall be approved by the County. The location, type and frequency of street lights shall be such as to provide the minimum lighting levels in accordance with Lacombe County’s *Guide to Dark Sky Principles*.

Unless otherwise approved by the County, street light cables shall be installed underground. Cables crossing all roadways or driveways shall be placed in direct-burial-type rigid plastic pipe using one pipe per individual cable unless noted otherwise by the County.

Corrosive resistant street light poles complete with fixtures and concrete pedestals only shall be used unless approved otherwise.

Street lights shall be so located as to not interfere with proposed driveways, lanes and motorist’s lines of vision and shall be located in line with the extension of common property lines wherever possible.

C16. MAILBOXES (Super-Mail Boxes)

Prior to the installation, erection, relocation or removal of any community or individual mailboxes within the County, approval shall be obtained from the County. Further approvals will have to come from Canada Post as outlined in **Section A12 – Community Mailboxes**.

Boxes shall be placed in the most aesthetic manner possible while addressing concerns of safety and municipal and franchise utility operations. They shall conform to the following criteria site selection:

C16.1 Design Criteria

Sighting considerations should minimize visual intrusion and address traffic and pedestrian conflicts, traffic lines of sight, buried services, proximity to intersections, access to abutting properties and site maintenance, including snow removal operations. Specific requirements for the Community Mailboxes are:

1. Refer to Drawing – C-12 Mailbox –Subdivision Pullout
2. All locations are to be shown on the appropriate Construction As-Built Drawings.
3. The access is to be a minimum of 3m wide with 4:1 side-slopes and have a structure equivalent to that of the adjoining road.

C16.2 Installation

All installations shall be accomplished as quickly and with the least amount of disruption as possible.

1. Sub-Grade Preparation – The sub-grade shall be finished to conform to the required section, grade and density prior to the placement of the pad.
2. Forming – All forms shall be well staked and braced to the established line and grade.
3. Placing Concrete – Concrete shall be placed only after the sub-base and forming have been inspected and approved by the County.
4. Precast Pads – Such pads shall be constructed to the sizes and dimensions shown on the approved drawings and conform to CSA standard A251 and contain reinforcing steel.

5. Leveling – The boxes shall be installed to the requirements noted in the drawings.

C16.3 Other

A toll free emergency telephone number for Canada Post is to be made available on a 24-hour basis

C17. VEHICULAR BARRIERS

All materials are to conform to the standards and specifications contained in this Manual unless otherwise approved by the County in writing.

Vehicular barriers should be constructed at the following locations:

1. Across the end of a walkway which terminates in a lane
2. Across the end of a lane cul-de-sac which abuts a roadway
3. Along a lane which parallels an adjacent roadway
4. Near permanent bodies of water
5. At areas showing a large difference in grade separation
6. Bridge abutments
7. Retaining walls
8. As a longitudinal divider on narrow medians

While vehicular barriers are designed to reduce the hazard of errant vehicles leaving the road surface, they themselves must also be considered as hazards. Installation is warranted only where the severity of an accident is greater than that with the traffic barrier. Their purpose is to shield those hazards which cannot be eliminated.

C18. BACKFILLING UTILITY TRENCHES ON COUNTY RIGHT-OF-WAYS

All utility installations shall conform to CSA S250 Mapping of Underground Utility Infrastructure standard.

All ditches, trenches and cuts on County rights-of-way (adjacent to the roadway) shall be done with a minimal amount of disturbance. The backfill must be with an approved material placed in uniform lifts not exceeding 150mm of loose depths to a density of not

less than 98% of the maximum density of a Standard Proctor. No excavation shall be closed until the compaction has been approved by the County.

C19. HORIZONTAL DIRECTIONAL DRILLING (HDD)

Directional drilling is the installation of a pipe by drilling a pilot bore from the entry pit to a pre-determined exit location. The drilling head is then replaced with a reamer and the drilling string is pulled back to the entry hole, enlarging the hole. One or more reaming passes may be completed to enlarge the hole to the required size prior to pulling the pipeline product into place

C19.1 Regulatory Requirements

1. The Contractor shall perform all work in accordance with all applicable Bylaws and with the laws and regulations of Canada and the Province of Alberta.
2. The Contractor shall abide by all regulatory agency restrictions/requirements.
3. In order to reduce the potential of the spread of Whirling Disease in fish, all equipment and machinery that has been used in the United States shall be washed clean of all mud and dirt before being used in any activities in or near streams in Alberta.

C19.2 Work Content

Include all Engineering Services, plant, labour, materials and services for the following:

1. Field locate and protect all utilities.
2. Confirm the minimum required site area and advise the Engineer if it is substantially different from that shown on the drawings.
3. Complete a detailed drilling plan including a contingency “frac-out” containment plan, if necessary.
4. Preparation of the site including removal of vegetation, excavation of entry, exit, and slurry containment pits and installation of conductor barrels.
5. Drill a horizontal bore and ream holes as needed.
6. Contain all drilling mud, if used, and ensure no spillage enters any water body.

7. Monitor horizontal and vertical location of the drill path.
8. Install carrier pipe as defined as economical for this installation.
9. Testing of installed sections and restoration of all affected surfaces to their preconstruction conditions or as outlined in the contract.

C19.3 Constraints

1. No mud drilling will be allowed unless approved by the Engineer
2. Existing gas mains parallel to pipe assembly area.
3. Traffic access must remain open throughout the duration of the contract. If road closures are required, detours must be provided.
4. Schedule work to minimize interruption to existing services and local traffic.
5. Abide by all permits and authorizations to carry out construction activities near or across all buried pipelines and conduits.

C19.4 Pre-Commencement

1. All utilities along and on either side of the proposed drill path are to be located. Notify owners of subsurface utilities along and on either side of the proposed drill path of the impending work through the one-call program.
2. All utility crossings shall be exposed using hydro-excavation, hand excavation or another approved method to confirm depth.
3. The proposed drill path shall be determined and documented, including its horizontal and vertical alignments and the location of buried utilities and substructures along the path.

C19.5 Execution

1. Only trained operators shall be permitted to operate the drilling equipment and manufacturer's operating instructions and safety practices shall always be followed.
2. Drilling mud pressure in the borehole shall not exceed that which can be supported by the overburden to prevent heaving or hydraulic fracturing of the soil ("Frac-out").

3. Entrance and exit angles of the drill string shall be as per the submitted methodology. Any deviation from these values shall first be approved by the Engineer.
4. If a drilled hole must be abandoned, the hole shall be filled with grout or bentonite to prevent future subsidence.
5. The Contractor shall maintain the site and surrounding properties in as clean a condition as possible during execution of the Work. The work area shall be organized and cleaned at the end of each working day.

C19.6 Cleanup and Material Disposal

1. The Contractor shall have available at the site containment equipment, such as silt fencing, pumps, geotextiles, etc., necessary to contain any inadvertent release of drilling fluid to the environment. The containment equipment shall be onsite at all times when work is ongoing. The Contractor shall be aware that the County may implement a monitoring program to monitor water quality in nearby watercourses.
2. Abide by requirements of statute, bylaw and regulations respecting disposal of wastes.
3. Disposal of drilling wastes shall be in accordance with all requirements of the Alberta Energy and Utilities Board.
4. Burying of rubbish and waste onsite shall not be permitted.
5. Disposal of waste, volatile materials or water containing silt in suspension into waterways, storm or sanitary sewers shall not be permitted.
6. All waste materials shall be removed and disposed by the Contractor at a disposal site located by the Contractor and approved by the Engineer. Obtain required permits for waste disposal. Provide copies to the County.