

## R.M. of Lumsden No. 189 Road Development Policy

### Policy:

#### 1.0 Background:

Pursuant to the RM of Lumsden No.189 Zoning Bylaw and Official Community Plan, a Development Permit shall not be issued unless the site intended to be used, or upon which a building or structure is to be erected, abuts, or has frontage on a graded all-weather registered road. Therefore, for subdivision applications or development applications that are situated along a seasonal or undeveloped road, applicants will be required to enter into a Road Development Agreement with the Municipality to upgrade the road/right-of-way.

**If a new road is to be built/upgraded on RM right of ways or other approved roads and streets, then the responsibility of incurring the initial cost of the road build is to be borne by the Applicant.**

#### 2.0 Objective:

To provide a uniform approach for specifications and requirements for roads constructed as a condition of subdivision or issuance of a Development Permit.

#### 3.0 Conditions:

- a) The road design guidelines herein generally follow the most recent Transportation Association of Canada (TAC) and Saskatchewan Ministry of Highways and Infrastructure design standards. The Municipality may consider alternate design variations from these standards to accommodate unique site circumstances, provided that public safety and the Municipality are not at risk. It is the Applicant's responsibility to ensure that the design, construction, and performance of all infrastructure constructed under the Development or Servicing Agreement meets or exceeds these standards/guidelines.
- b) Good engineering practice and design is required for all road construction situations.
- c) All road design and construction must be certified by and performed under the supervision of a qualified professional engineer registered to practice in the Province of Saskatchewan. Prior to construction of a new road\*, an engineered road design must be approved by the Municipal Engineer and Public Works Manager. The cost of the Municipal Engineer's review of the submitted engineered road design shall be borne by the Applicant. The design guidelines in this policy are minimum requirements and the Applicant's Engineer must certify that an adequate roadway structure is provided to the Municipality, both in design and as constructed. Where required, a complete traffic analysis may dictate the need for additional engineering.

\* Upgrades to existing gravelled roads may not require an engineered design prior to construction. However, all road upgrade work done to an existing road shall still be inspected by the Municipal Engineer and Public Works Manager in accordance with the policy. The cost of any Municipal Engineer inspection and/or re-inspection (if required), is solely to be borne by the applicant.

- d) Design and construction practices shall take into consideration site specific conditions which might cause deviation from standard practice. Such deviations must be approved by the Municipality prior to entering into a Development or Servicing Agreement.
- e) All roadways constructed within the Municipality shall be constructed according to the design requirements appended to this policy based upon the rural road classifications provided below.
  - (i) Main Farm Access Road (MFA) - Appendix A
  - (ii) Grid Road (G) - Appendix B
  - (iii) Primary Grid Road (PG) - Appendix C
  - (iv) Heavy Haul/High Volume Road (HH/HV) - Appendix D
  - (v) Internal Commercial/Industrial Subdivision Road (ICS/IIS) - Appendix E
  - (vi) Internal Residential Subdivision Road (IRS) - Appendix F
  - (vii) Alternative Main Farm Access Road (AMFA) - Appendix G
- f) Prior to initiating construction, the Applicant shall be required to submit a formal written request to Council indicating the location and the length of roadway construction being requested; and subject to receiving written approval from Council, the Applicant shall be required to enter in a Road Development Agreement or Servicing Agreement defining the financial security required by the Municipality as well as the staged release (where applicable) of the security. Generally, the security shall be calculated based upon 125% of the construction cost estimated prepared by a certified engineer in support of the development.
- g) Gravel incorporation shall be consistent with the Gravel Incorporation Standards attached as Appendix 'H'.
- h) Where performance security is required, it shall be provided in the form of a Continuous (automatic renewal) Unconditional/Irrevocable Letter of Credit from a local branch of a chartered bank or Credit Union.
- i) Upon completion of construction and submission of as-built drawings, a Construction Completion Certificate Inspection shall be undertaken by the Municipal Engineer and Public Works Manager and if no deficiencies have been identified, a Construction Completion Certificate (CCC) shall be issued. The cost of the CCC Inspection shall be borne by the applicant.
- j) If deficiencies are identified during the CCC Inspection, the applicant will be required to remediate such deficiencies prior to the issuance of a CCC. Upon completion of the remediation of the deficiencies identified in the initial CCC Inspection, the applicant shall notify the Municipality of the completion of the remediation of the deficiencies, so the Municipal Engineer and Public Works Manager may re-inspect and verify that the deficiencies have been satisfactorily remediated. The cost of any re-inspections by the Municipal Engineer shall be borne by the applicant. Upon verification by the Municipal Engineer that all identified deficiencies have been remediated by the Applicant, the Municipality shall issue a CCC.
- k) Upon issuance of a CCC, the maintenance period for a paved road development is two years.
- l) Upon issuance of a CCC, the maintenance period for a gravel road development is one year.

- m) The Municipality will retain financial security of sufficient amount to ensure repair to any deficiencies which might arise during the maintenance period. At the end of the maintenance period, the Municipal Engineer and Public Works Manager will provide a Final Acceptance Certificate Inspection to verify that no deficiencies have arisen during the maintenance period. If no deficiencies are identified during the Final Acceptance Certificate Inspections, the Municipality shall issue a Final Acceptance Certificate (FAC). The costs of the FAC Inspection shall be borne by the applicant.
- n) If deficiencies are identified during the FAC Inspection, the applicant will be required to remediate such deficiencies prior to the issuance of a FAC. Upon completion of the remediation of the deficiencies identified in the initial FAC Inspection, the applicant shall notify the Municipality of the completion of the remediation of the deficiencies, so the Municipal Engineer and Public Works Manager may re-inspect and verify that the deficiencies have been satisfactorily remediated. The cost of any re-inspections by the Municipal Engineer shall be borne by the applicant. Upon verification by the Municipal Engineer that all identified deficiencies have been remediated by the applicant, the Municipality shall issue a FAC.
- o) Financial Security shall not be required for condominium road developments, but a building permit(s) shall not be issued until a FAC has been issued confirming the roadway has been properly constructed.
- p) CCC's and FAC's applied for after October 1<sup>st</sup> of a calendar year may not be considered for an inspection and issuance until the following spring after snow thaw.
- q) In the event the purchasing of the additional right-of-way is not practical, Council may at its sole discretion execute easement agreements with surrounding landowners that would allow for road construction on their land in accordance with the specifications stated in this policy.
- r) New subdivisions that require road building or upgrading shall ensure that any road allowance adjacent to the entire frontage of the subdivision is built or upgraded in accordance with the applicable specification from this policy unless alternative arrangements are approved by Council.
- s) At Council's sole discretion, new single parcel residential development/subdivision located along an established gravelled, seasonal road which requires upgrading may have the alternative main farm access road specification applied.

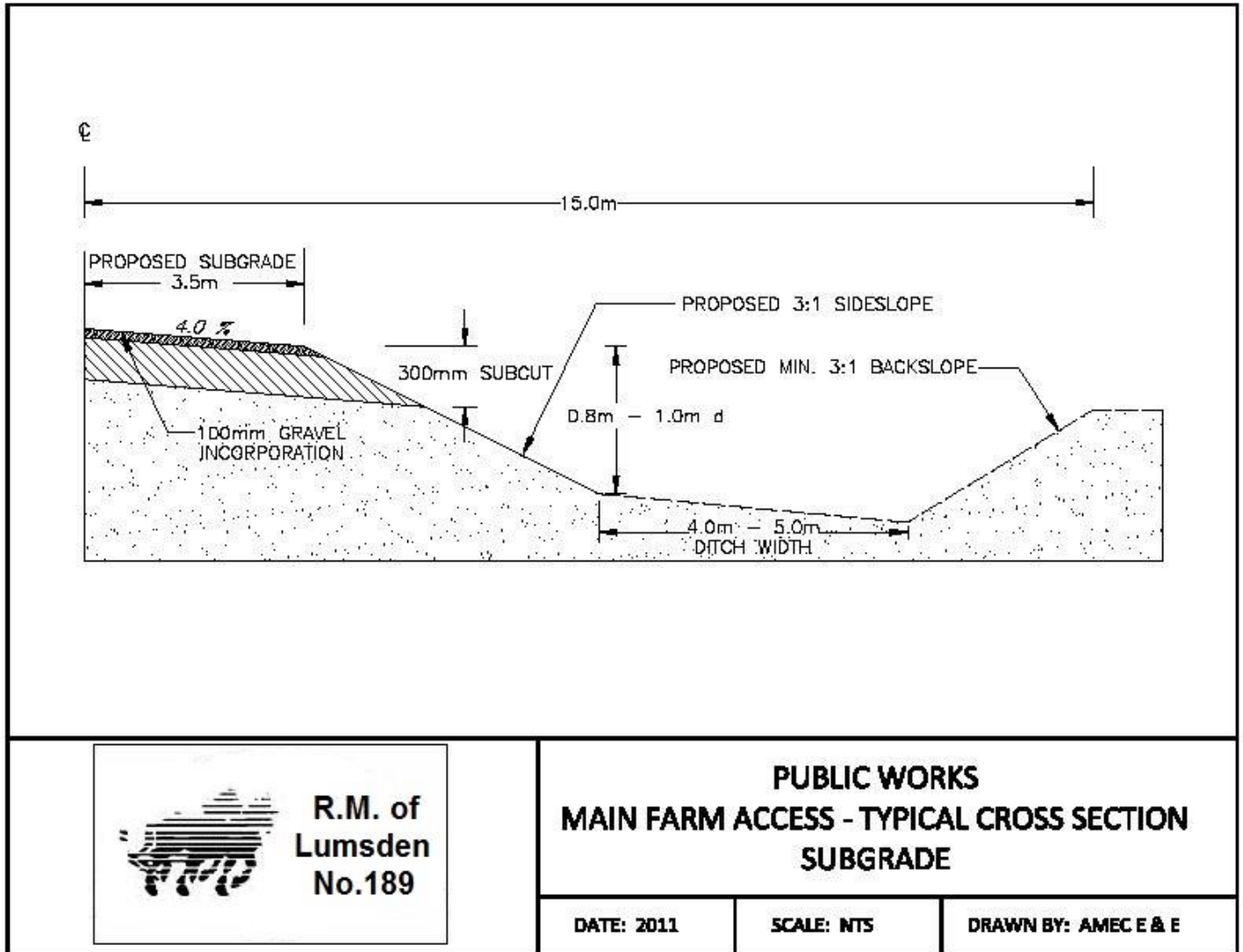
**Appendix 'A':**  
**Main Farm Access Road (gravel) Construction Standards**

SUMMARY OF BASIC STANDARDS

1. Right-of-way width = 30 metres
2. Right-of-way width for cul-de-sac and turnabouts = 60 metres with 15 metre radius on driving surface
3. Full width of right-of-way shall be cleared
4. Finished top width = 7 metres, 7.6 metres for curve (if applicable)
5. Backslopes = 5:1, with maximum of 3:1.  
5:1 backslope is to be maintained until top of backslope reaches the edge of the right-of-way.  
The backslope will remain at the edge of the right-of-way to a maximum of 3:1.
6. Side slopes = 3:1  
Fills 2-3 metres = 7.6 top width  
Fills over 3 metres = 8.0 metre top width.
7. Ditch width = 4 metres to 5 metres
8. Maximum gradient = 9% (in unusual circumstances, 11%)
9. SSD =140 metres minimum for 80 km/hr design
10. Minimum curve radius = 250 metres
11. Clear vision at road intersection = minimum of 140 metres from the point of intersection on municipal roads and grid intersections using an 80 km/hr design speed.
12. Snow clearance = When shoulder grade elevation is 0.3 metres or less above natural surface at 15 to 20 metres from center line then the backslope must be flattened using a variable slope of 5:1 to a maximum of 3:1.

## REQUIRED CONSTRUCTION STANDARDS

1. Shall include the installation of all necessary drainage structures and construction of drainage ditches. Culverts should be designed for at least a  $Q^{25}$  flow, with a minimum culvert size of 500 mm diameter. Riprap only where necessary to avoid undue erosion. All culverts will be constructed of steel gauge 12. Compaction around culverts shall be to a density of 98% and utilize Type 108 gravel (minimum 50% fracture).
2. Construction shall include all road connections and approaches. See attached plan – Standard Approach.
3. The average shoulder elevation of the road surface to be approximately 0.5 metres above the adjacent ground surface, except in cuts.
4. Objectionable organic material shall be subcut where the fill of subgrade is less than 0.3 metres in depth.
5. The subgrade surface shall not be less than 1 metre above high water level on the ground water table. (i.e. level to which free water would rise in a hole sunk in the ground).
6. Road surface, side slopes, ditches and backslopes shall be bladed smooth to conform to the typical cross-section.
7. Where necessary to provide a smooth, stable driving surface, the road shall be capped with a layer of clay material. The depth of the clay cap shall be a minimum of 0.3 metres. If the subgrade is to be surfaced, clay material should be avoided if possible and a granular subgrade should be constructed. Gravel shall be incorporated in the top 100 mm of the subgrade prior to traffic gravel being applied. Gravel incorporation shall be at a rate of 500 mt/mile. The gravel specification for incorporation is Type 31 Base.
8. Gravel surfacing for the subgrade required at the rate of 500 mt/mile for the first application, 500 mt/mile for the year following construction, and additional applications as required. The required gravel specification for traffic gravel is Type 108 (minimum 50% fracture).
9. Alignment- curves must be constructed with the proper super-elevation using 80km/hr design speed and  $e_{max}$  equal to 0.08. The minimum radius of the curvature shall be 250 metres. The preferred radius is 300 metres.



**Appendix 'B':**  
**Grid Road (gravel) Construction Standards**

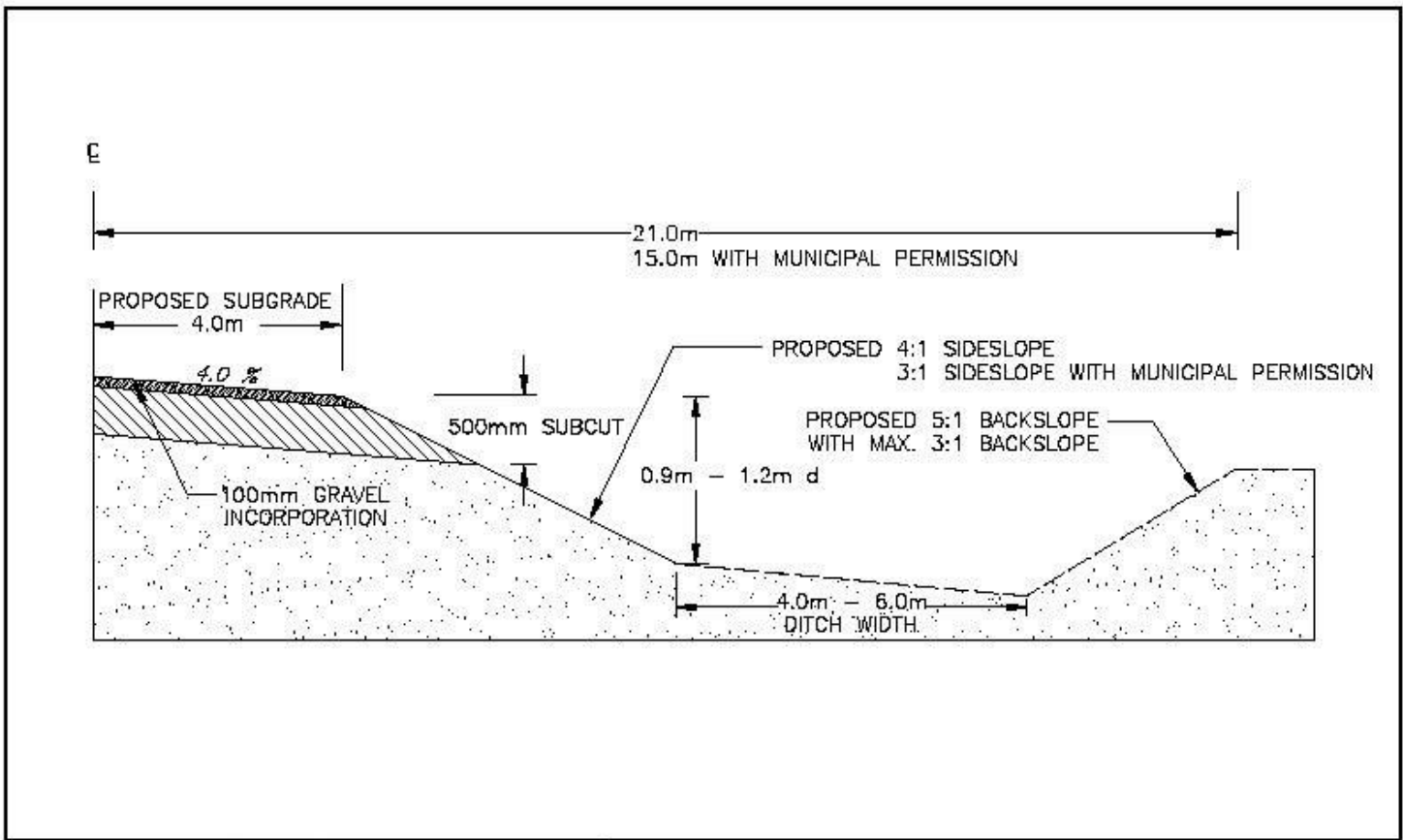
SUMMARY OF BASIC STANDARDS

1. Right-of-way width = 42 metres. With municipal approval, 30 metres.
2. Right-of-way width for cul-de-sac and turnabouts = 60 metre with 15 metre radius on driving surface
3. Full width of right-of-way shall be cleared.
4. Finished top width = 8 metres
5. Backslopes = 5:1 with maximum 3:1.  
5:1 backslope is to be maintained until top of backslope reaches the edge of the right-of-way.  
The back slope will remain at the edge of the right-of-way to a maximum of 3:1.
6. Side slopes = 4:1  
Fills 0-3 metres = 4:1  
Fills 3-4 metres = toe of slope to be 12 metres from shoulder  
Fills over 4 metres = 3:1
7. Ditch width = 4 metres to 6 metres
8. Maximum gradient = 9% (in unusual circumstances 11%)
9. SSD = 140 metres minimum for 80 km/hr design
10. Minimum curve radius = 300 metres
11. Clear vision at road intersection = minimum of 140 metres from the point of intersection on municipal roads and grid intersections using an 80 km/hr design speed.
12. Snow clearance = When shoulder grade elevation is 0.3 metres or less above natural surface at 15 to 21 metres from center line then the backslope must be flattened using a variable slope of 5:1 to a maximum of 3:1.

## REQUIRED CONSTRUCTION STANDARDS

1. Shall include the installation of all necessary drainage structures and construction of drainage ditches. Culverts should be designed for at least a  $Q^{25}$  flow, with a minimum culvert size of 500 mm diameter. Riprap only where necessary to avoid undue erosion. All culverts will be constructed of steel gauge 12. Compaction around culverts shall be to a density of 98% and utilize Type 108 gravel (minimum 50% fracture).
2. Construction shall include all road connections and approaches. See attached plan – Standard Approach.
3. The average shoulder elevation of the road surface to be approximately 0.5 metres above the adjacent ground surface, except in cuts.
4. Objectionable organic material shall be subcut where the fill of subgrade is less than 0.5 metres in depth.
5. The subgrade surface shall not be less than 1 metre above high water level on the ground water table. (i.e.: level to which free water would rise in a hole sunk in the ground).
6. Road surface, side slopes, ditches and backslopes shall be bladed smooth to conform to the typical cross-section.
7. Where necessary to provide a smooth, stable driving surface, the road shall be capped with a layer of clay material. The depth of the clay cap shall be a minimum of 0.3 metres. If the subgrade is to be surfaced, clay material should be avoided if possible and a granular subgrade should be constructed. Gravel shall be incorporated in the top 100 mm of the subgrade prior to traffic gravel being applied. Gravel incorporation shall be at a rate of 500 mt/mile. The gravel specification for incorporation is Type 31 Base.
8. Gravel surfacing for the subgrade required at the rate of 500 mt/mile for the first application, 500 mt/mile for the year following construction, and additional applications as required. The required gravel specification for traffic gravel is Type 108 (minimum 50% fracture).
9. Alignment- curves must be constructed with the proper super-elevation using 80km/hr design speed and  $e_{max}$  equal to 0.08. The minimum radius of the curvature shall be 300 metres.





**PUBLIC WORKS  
 GRID ROAD - TYPICAL CROSS SECTION  
 SUBGRADE**

DATE: 2011

SCALE: NTS

DRAWN BY: AMEÇE & E

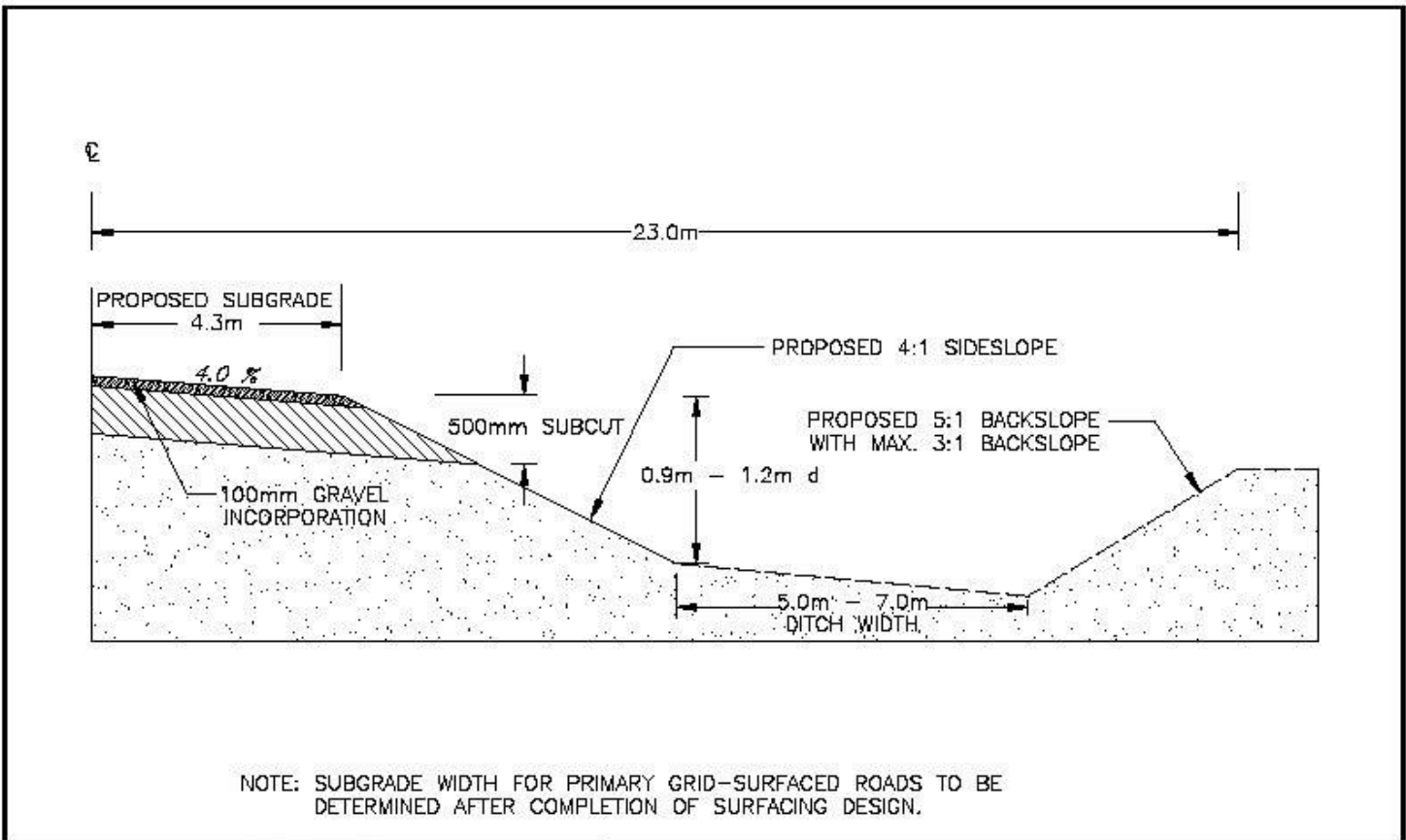
**Appendix 'C':**  
**Primary Grid Road Construction Standards**

SUMMARY OF BASIC STANDARDS

1. Right-of-way width = 46 metres
2. Right-of-way width for cul-de-sac and turnabouts = 60 metres with 15 metre radius on driving surface.
3. Full width of right-of-way shall be cleared.
4. Finished top width = 8.6 metres for gravel surface and 8 metres for asphalt.
5. Backslopes = 5:1 with maximum of 3:1  
5:1 backslope is to be maintained until top of back slope reaches the edge of right-of-way.  
The backslope will remain at the edge of the right-of-way to a maximum of 3:1.
6. Side slopes = 4:1  
Fills 0 -3 metres = 4:1  
Fills 3-4 metres = toe of slope to be 12 metres from shoulder  
Fills over 4 metres = 3:1
7. Ditch width = 5 metres to 7 metres
8. Maximum gradient = 6% (in unusual circumstances 7%)
9. SSD =140 metres minimum for 80 km/hr design
10. Minimum curve radius = Per Ministry of Highways and Infrastructure Standard
11. Clear vision at road intersection = minimum of 140 metres from the point of intersection on municipal roads and grid intersections using an 80 km/hr design speed.
12. Snow clearance = When shoulder grade elevation is 0.3 metres or less above natural surface at 21 metres from center line then the backslope must be flattened using a variable slope of 5:1 to a maximum of 3:1.

## REQUIRED CONSTRUCTION STANDARDS

1. Shall include the installation of all necessary drainage structures and construction of drainage ditches. Culverts should be designed for at least a  $Q^{25}$  flow, with a minimum culvert size of 500 mm diameter. Riprap only where necessary to avoid undue erosion. All culverts will be constructed of steel gauge 12. Compaction around culverts shall be to a density of 98% and utilize Type 108 gravel (minimum 50% fracture).
2. Construction shall include all road connections and approaches. See attached plan – Standard Approach.
3. The average shoulder elevation of the road surface to be approximately 0.5 metres above the adjacent ground surface, except in cuts.
4. Objectionable organic material shall be subcut where the fill of subgrade is less than 0.5 metres in depth for gravel surfaces and 0.6 metres for asphalt surfaces.
5. The subgrade surface shall not be less than 1.5 metres above high water level on the ground water table. (i.e.: level to which free water would rise in a hole sunk in the ground).
6. Road surface, side slopes, ditches, and backslopes shall be bladed smooth to conform to the typical cross-section.
7. Where necessary to provide a smooth, stable driving surface, the road shall be capped with a layer of clay material. The depth of the clay cap shall be a minimum of 0.3 metres. If the subgrade is to be surfaced, clay material should be avoided if possible and a granular subgrade should be constructed. Gravel shall be incorporated in the top 100 mm of the subgrade prior to traffic gravel being applied. Gravel incorporation shall be at a rate of 550 mt/mile. The gravel specification for incorporation is Type 31 Base.
8. Gravel surfacing for the subgrade required at the rate 550 mt/mile for the first application, 550 mt/mile for the year following construction, and additional applications as required. The required gravel specification for traffic gravel is Type 108 (minimum 50% fracture).
9. Alignment - curves must be constructed with the proper super-elevation as per the Ministry of Highways and Infrastructure Standards.
10. Asphalt surface for Primary Grid - soil testing is required to determine surface design. Along with soil testing, traffic volume and vehicle configurations must be considered when selecting the surface structure.



NOTE: SUBGRADE WIDTH FOR PRIMARY GRID-SURFACED ROADS TO BE DETERMINED AFTER COMPLETION OF SURFACING DESIGN.



**PUBLIC WORKS  
 PRIMARY GRID - TYPICAL CROSS SECTION  
 SUBGRADE**

**DATE: 2011**

**SCALE: NTS**

**DRAWN BY: AMEC E & E**

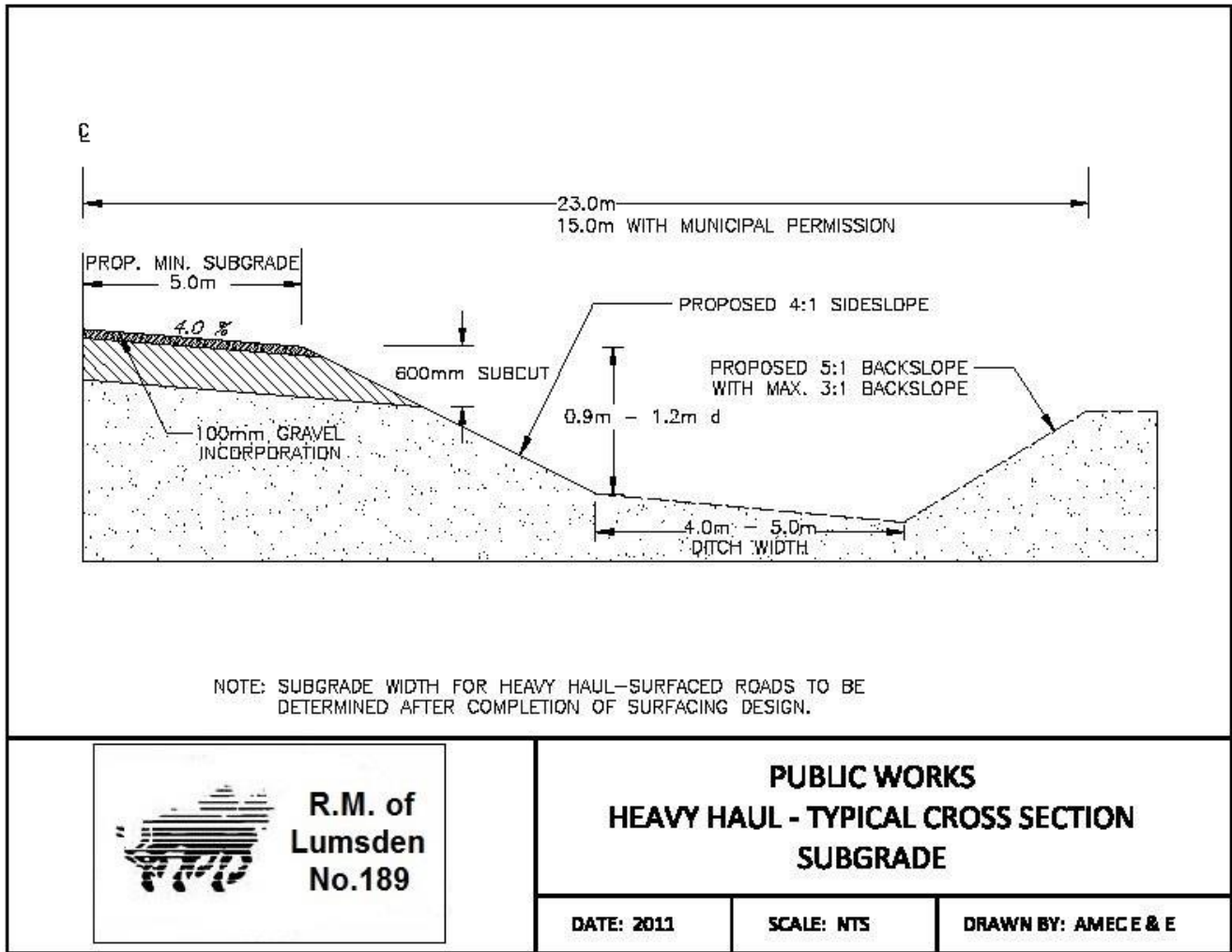
**Appendix 'D':**  
**Heavy Haul/High Volume Road Construction Standards**

SUMMARY OF BASIC STANDARDS

1. Right-of-way width = 30 metres to 46 metres
2. Right-of-way width for cul-de-sac and turnabouts = 60 metres with 15 metre radius on driving surface
3. Full width of right-of-way shall be cleared.
4. Finished top width = 10 metres for gravel surface and 9 metres for asphalt.
5. Backslopes = 5:1 with a maximum of 3:1.  
5:1 backslope is to be maintained until top of backslope reaches the edge of the right-of-way.  
The backslope will remain at the edge of the right-of-way to a maximum of 3:1.
6. Side slopes = 4:1  
Fills 0-3 metres = 4:1  
Fills 3-4 metres = toe of slope to be 12 metres from shoulder.  
Fills over 4 metres = 3:1
7. Ditch width = 4.0 metres to 5.0 metres
8. Maximum gradient = 5% (in unusual circumstances 6%)
9. SSD = 200 metres minimum for 100 km/hr design.
10. Minimum curve radius = Per Ministry of Highways and Infrastructure Standard
11. Clear vision at road intersection = minimum of 140 metres from point of intersection on municipal roads and grid intersections using 80 km/hr design speed and 200 metres for a highway on another heavy haul road using 100 km/hr design speed.
12. Snow clearance = when shoulder grade elevation is 0.3 metres or less above natural surface at 23 metres from the centerline then the backslope must be flattened using a variable slope of 5:1 to a maximum of 3:1.

## REQUIRED CONSTRUCTION STANDARDS

1. Shall include the installation of all necessary drainage structures and construction of drainage ditches. Culverts should be designed for at least a  $Q^{25}$  flow, with a minimum culvert size of 500 mm diameter. Riprap only where necessary to avoid undue erosion. All culverts will be constructed of steel gauge 12. Compaction around culverts shall be to a density of 98% and utilize Type 108 gravel (minimum 50% fracture).
2. Construction shall include all road connections and approaches. See attached plan – Standard Approach.
3. The average shoulder elevation of the road surface to be approximately 0.6 metres above the adjacent ground surface, except in cuts.
4. Objectionable organic material shall be subcut where the fill is less than 0.6 metres in depth.
5. The subgrade surface shall not be less than 1.5 metres above high water level on the ground water table. (i.e.: level to which free water would rise in a hole sunk in the ground).
6. Road surface, side slopes, ditches and backslopes shall be bladed smooth to conform to the typical cross-section.
7. Where necessary to provide a smooth, stable driving surface, the road shall be capped with a layer of clay material. The depth of the clay cap shall be a minimum of 0.3 metres. If the subgrade is to be surfaced, clay material should be avoided if possible and a granular subgrade should be constructed. Gravel shall be incorporated in the top 100 mm of the subgrade prior to traffic gravel being applied. Gravel incorporation shall be at a rate of 700 mt/mile. The gravel specification for incorporation is Type 31 Base.
8. Gravel surfacing for the subgrade required at the rate of 700 mt/mile for the first application, 700 mt/mile for the year following construction, and additional applications as required. The required gravel specification for traffic gravel is Type 108 (minimum 50% fracture).
9. Alignment- curves must be constructed with the proper super-elevation as per the Ministry of Highways and Infrastructure Standards.
10. Asphalt surface for Heavy Haul/High Volume Roads - soil testing is required to determine surface design. Along with soil testing, traffic volume and vehicle configurations must be considered when selecting the surface structure.



**Appendix 'E':**  
**Internal Commercial/Industrial Subdivision Road**  
**Construction Standards**

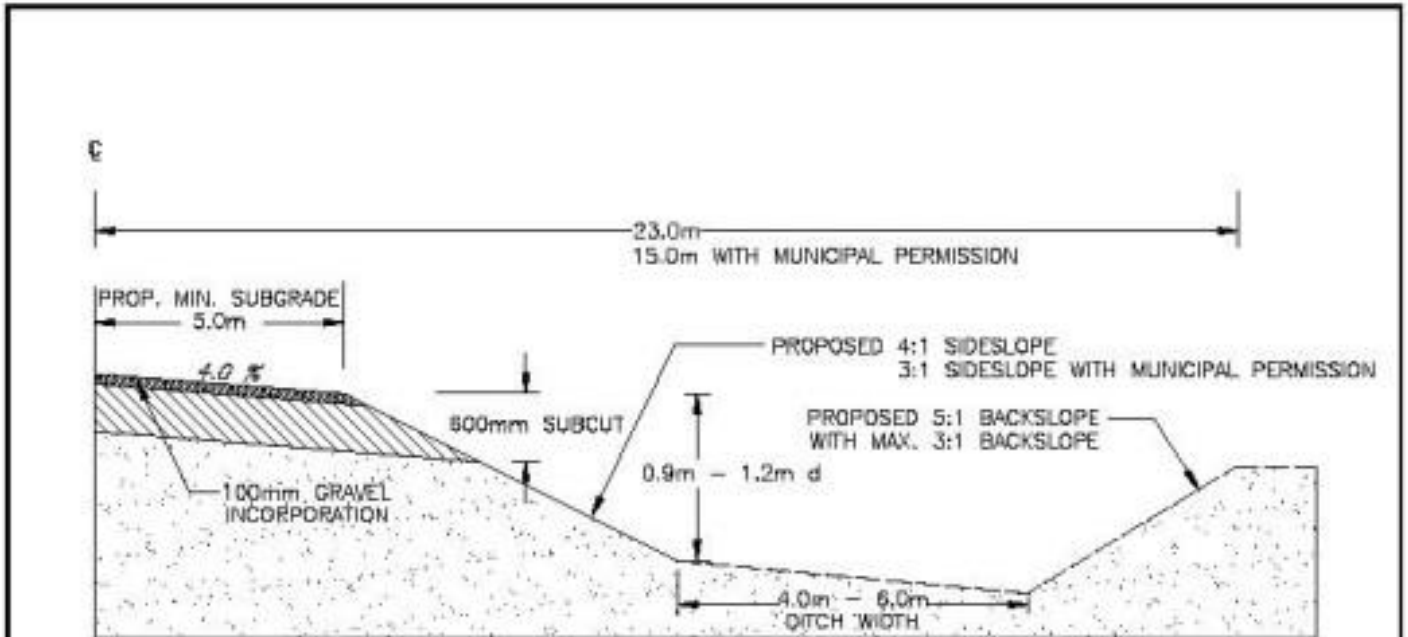
SUMMARY OF BASIC STANDARDS

1. Right-of-way width = 30 metres to 46 metres
2. Right-of-way width for cul-de-sac and turnabouts = 60 metres (purchased) with 15 metre radius on driving surface.
3. Full width of right-of-way shall be cleared.
4. Finished top width = 10 metres for gravel surface and 9 metres for asphalt.
5. Backslopes = 5:1 with a maximum of 3:1  
5:1 backslope is to be maintained until top of backslope reaches the edge of the right-of way.  
The backslope will remain at the edge of the right-of-way to a maximum of 3:1.
6. Side slopes = 4:1  
Fills 0-3 metres = 4:1  
Fills 3-4 metres = toe of slope to be 12 metres from shoulder.  
Fills over 4 metres = 3:1
7. Ditch width = 4.0 metres to 6.0 metres
8. Maximum gradient = 5% (in unusual circumstances 6%)
9. SSD = 140 metres minimum for 80 km/hr design
10. Minimum curve radius = Per Ministry of Highways and Infrastructure Standard
11. Clear vision at road intersection = minimum of 85 metres from point of intersection on municipal road and grid intersections and to a maximum of 140 metres on primary grid roads using 80 km/hr design speed and 200 metres for a highway on another heavy haul road using 100 km/hr design speed.
12. Snow clearance = when shoulder grade elevation is 0.3 metres or less above natural surface at 15 metres from the centerline then the backslope must be flattened using a variable slope of 5:1 to a maximum of 3:1.

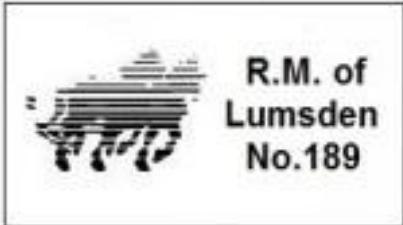


## REQUIRED CONSTRUCTION STANDARDS

1. Shall include the installation of all necessary drainage structures and construction of drainage ditches. Culverts should be designed for at least a  $Q^{25}$  flow, with a minimum culvert size of 500 mm diameter. Riprap only where necessary to avoid undue erosion. All culverts will be constructed of steel gauge 12. Compaction around culverts shall be to a density of 98% and utilize Type 108 gravel (minimum 50% fracture).
2. Construction shall include all road connections and approaches. See attached plan – Standard Approach.
3. The average shoulder elevation of the road surface to be approximately 0.6 metres above the adjacent ground surface, except in cuts.
4. Objectionable organic material shall be subcut where the fill is less than 0.6 metres in depth.
5. The subgrade surface shall not be less than 1.5 metres above high water level on the ground water table. (i.e.: level to which free water would rise in a hole sunk in the ground).
6. Road surface, side slopes, ditches and backslopes shall be bladed smooth to conform to the typical cross-section.
7. Where necessary to provide a smooth, stable driving surface, the road shall be capped with a layer of clay material. The depth of the clay cap shall be a minimum of 0.3 metres. If the subgrade is to be surfaced, clay material should be avoided if possible and a granular subgrade should be constructed. Gravel shall be incorporated in the top 100 mm of the subgrade prior to traffic gravel being applied. Gravel incorporation shall be at a rate of 700 mt/mile. The gravel specification for incorporation is Type 31 Base.
8. Gravel surfacing for the subgrade required at the rate of 700 mt/mile for the first application, 600 mt/mile for the year following construction, and additional applications as required. The required gravel specification for traffic gravel is Type 108 (minimum 50% fracture).
9. Alignment - curves must be constructed with the proper super-elevation as per the Ministry of Highways and Infrastructure Standards.
10. Asphalt surface for Internal Commercial/Industrial Roads - soil testing is required to determine surface design. Along with soil testing, traffic volume and vehicle configurations must be considered when selecting the surface structure.



NOTE: SUBGRADE WIDTH FOR INTERNAL COMMERCIAL-SURFACED ROADS TO BE DETERMINED AFTER COMPLETION OF SURFACING DESIGN.



**PUBLIC WORKS  
INTERNAL COMMERCIAL INDUSTRIAL ROADS  
TYPICAL CROSS SECTION  
SUBGRADE**

DATE: 2011

SCALE: NTS

DRAWN BY: AMECE & E

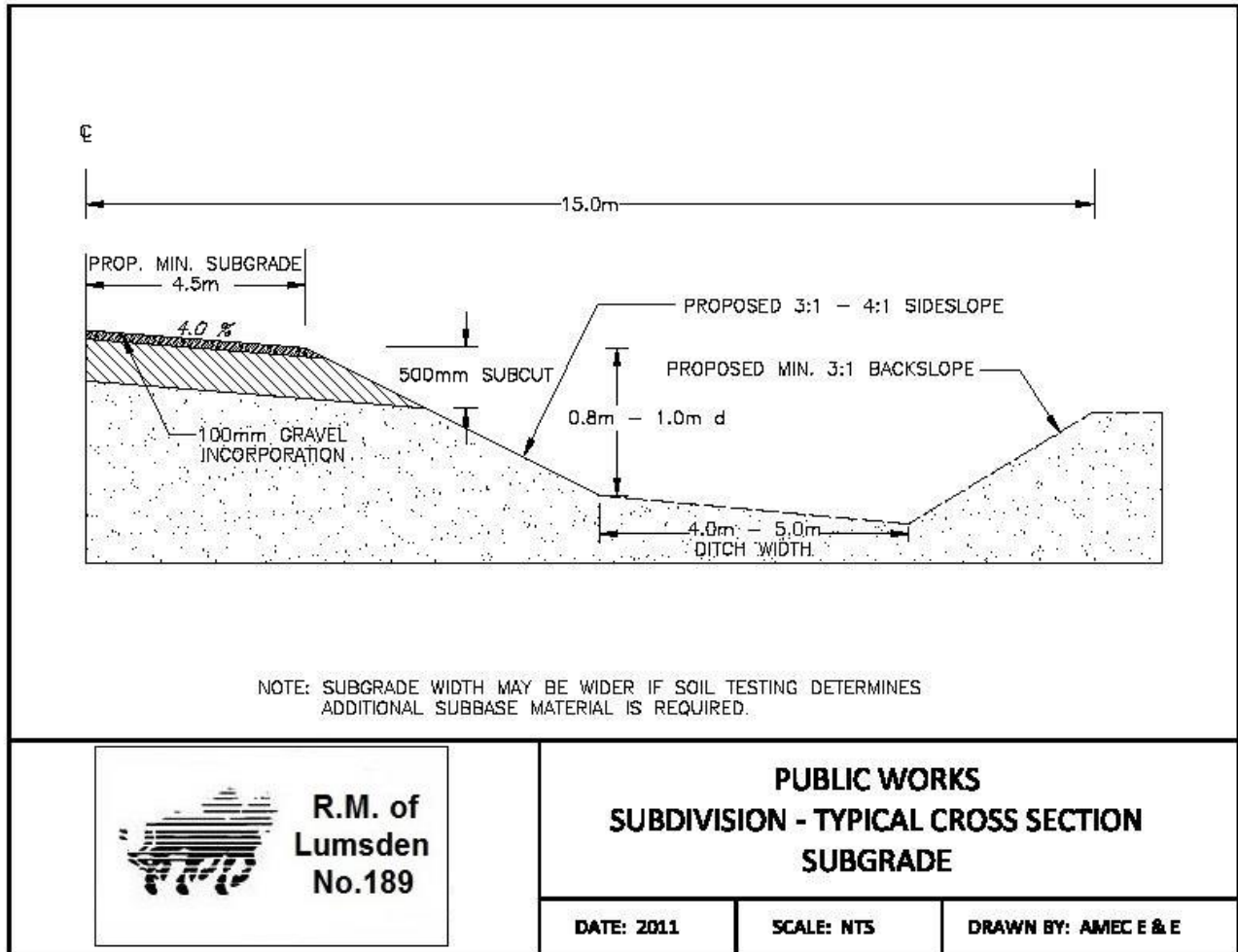
**Appendix 'F':**  
**Internal Residential Subdivision Road**

SUMMARY OF BASIC STANDARDS

1. Right-of-way width = 30 metres
2. Right-of-way width for cul-de-sac and turnabouts = 60 metres with 15 metre radius on driving surface.
3. Full width of right-of-way shall be cleared.
4. Finished top width = 7.4 metres. On fills over 3 metres in height, the top width is to be a minimum of 0.6 metres wider than the basic top width.
5. Top widths should be widened as follows:  
Fills 0-3 metres = 7.4 metre finished top width  
Fills over 3 metres = 8 metre finished top width
6. Backslopes = 5:1 with maximum of 3:1  
5:1 backslope is to be maintained until top of backslope reaches edge of right-of-way.  
The backslope will remain at the edge of the right-of-way to a maximum of 3:1.
7. Side slopes = 4:1 (preferred), 3:1 (with permission from municipality)  
Fills 0-3 metres = 4:1  
Fills 3-4 metres = toe of slope 12 metres from shoulder.  
Fills over 4 metres = 3:1
8. Ditch width = 4.0 metres to 5.0 metres
9. Maximum gradient = 5% (in unusual circumstances 6%)
10. SSD = 140 metres minimum at 80 km/hr design.
11. Minimum curve radius = with proper super elevation.
12. Clear vision at road intersection = minimum of 85 metres from point of intersection on municipal road and grid intersections and to a maximum of 140 metres on primary grid roads using 80 km/h design speed.
13. Snow clearance = when shoulder grade elevation is 0.3 metres or less above natural surface at 15 metres to 20 metres from center line then the back slope must be flattened to using a variable slope of 5:1 to a maximum of 3:1.

## REQUIRED CONSTRUCTION STANDARDS

1. Shall include the installation of all necessary drainage structures and construction of drainage ditches. Culverts should be designed for at least a  $Q^{25}$  flow, with a minimum culvert size of 500 mm diameter. Riprap only where necessary to avoid undue erosion. All culverts will be constructed of steel gauge 12. Compaction around culverts shall be to a density of 98% and utilize Type 108 gravel (minimum 50% fracture).
2. Construction shall include all road connections and approaches. See attached plan – Standard Approach.
3. The average shoulder elevation of the road surface to be approximately 0.5 metres above the adjacent ground surface, except in cuts.
4. Objectionable organic material shall be subcut where the fill is less than 0.5 metres in depth.
5. The subgrade surface shall not be less than 1 metre above high water level on the ground water table. (i.e. level to which free water would rise in a hole sunk in the ground).
6. Road surface, side slopes, ditches and backslopes shall be bladed smooth to conform to the typical cross-section.
7. Gravel shall be incorporated in the top 100 mm of the subgrade prior to traffic gravel being applied. Gravel incorporation shall be at a rate of 500 mt/mile. The gravel specification for incorporation is Type 108 (minimum 50% fracture).
8. Gravel surfacing for the subgrade required at the rate of 300 mt for the first application, 300 mt/mile for the year following construction, and additional applications as required. The required gravel specification for traffic gravel is Type 108 (minimum 50% fracture).
9. Alignment - curves must be constructed with the proper super-elevation.



**Appendix 'G':**  
**Alternative Main Farm Access Road (gravel) Construction Standards**

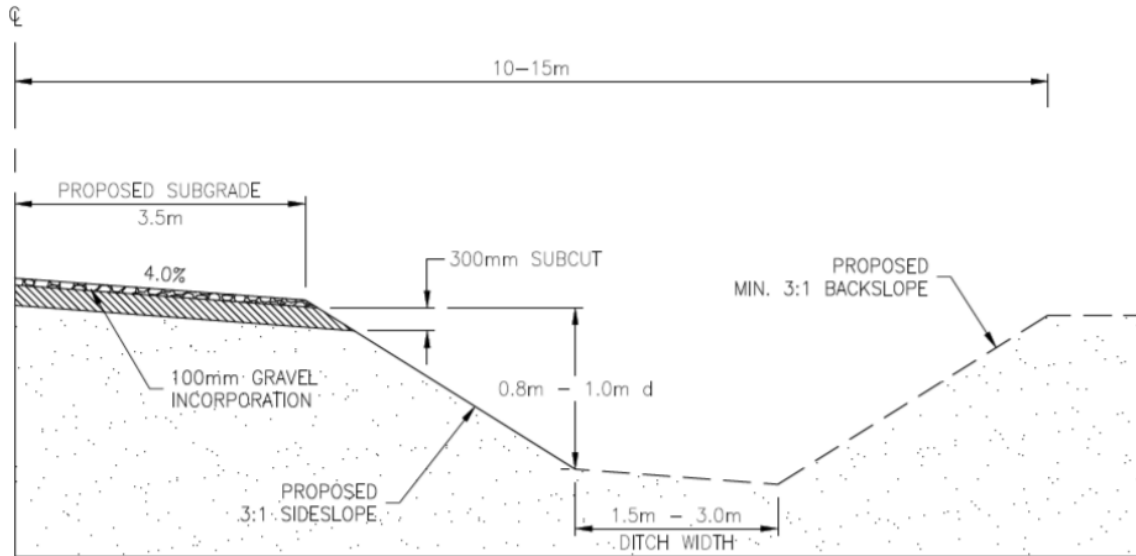
SUMMARY OF BASIC STANDARDS

1. Right-of-way width = 20 metres
2. Right-of-way width for cul-de-sac and turnabouts = 60 metres with 15 metres radius on driving surface
3. Full width of right-of-way shall be cleared
4. Finished top width = 7 metres, 7.6 metres for curve (if applicable)
5. Backslopes = 3:1
6. Side slopes = 3:1  
Fills 2-3 metres = 7.6 top width  
Fills over 3 metres = 8.0 metre top width.
7. Ditch width = 1.5 metres to 3.0 metres
8. Maximum gradient = 9% (in unusual circumstances 11%)
9. SSD =140 metres minimum for 80 km/hr design
10. Minimum curve radius = 250 metres
11. Clear vision at road intersection = minimum of 140 metres from the point of intersection on municipal roads and grid intersections using an 80 km/hr design speed
12. Snow clearance = When shoulder grade elevation is 0.3 metres or less above natural surface at 15 to 20 metres from center line then the backslope must be flattened using a variable slope of 5:1 to a maximum of 3:1

## REQUIRED CONSTRUCTION STANDARDS

1. Shall include the installation of all necessary drainage structures and construction of drainage ditches. Culverts should be designed for at least a  $Q^{25}$  flow, with a minimum culvert size of 500 mm diameter. Riprap only where necessary to avoid undue erosion. All culverts will be constructed of steel gauge 12. Compaction around culverts shall be to a density of 98% and utilize Type 108 gravel (minimum 50% fracture).
2. Construction shall include all road connections and approaches. See attached plan – Standard Approach.
3. The average shoulder elevation of the road surface to be approximately 0.5 metres above the adjacent ground surface, except in cuts.
4. Objectionable organic material shall be subcut where the fill of subgrade is less than 0.3 metres in depth.
5. The subgrade surface shall not be less than 1 metre above high water level on the ground water table. (i.e.: level to which free water would rise in a hole sunk in the ground).
6. Road surface, side slopes, ditches and backslopes shall be bladed smooth to conform to the typical cross-section.
7. Where necessary to provide a smooth, stable driving surface, the road shall be capped with a layer of clay material. The depth of the clay cap shall be a minimum of 0.3 metres. If the subgrade is to be surfaced, clay material should be avoided if possible and a granular subgrade should be constructed. Gravel shall be incorporated in the top 100 mm of the subgrade prior to traffic gravel being applied. Gravel incorporation shall be at a rate of 500 mt/mile. The gravel specification for incorporation is Type 31 Base.
8. Gravel surfacing for the subgrade required at the rate of 500 mt/mile for the first application, 500 mt/mile for the year following construction, and additional applications as required. The required gravel specification for traffic gravel is Type 108 (minimum 50% fracture).
9. Alignment - curves must be constructed with the proper super-elevation using 80km/hr design speed and  $e_{max}$  equal to 0.08. The minimum radius of the curvature shall be 250 metres. The preferred radius is 300 metres.

### Alternative Farm Access Road Cross Section.





## Appendix 'H': Gravel Incorporation Specification

### DESCRIPTION

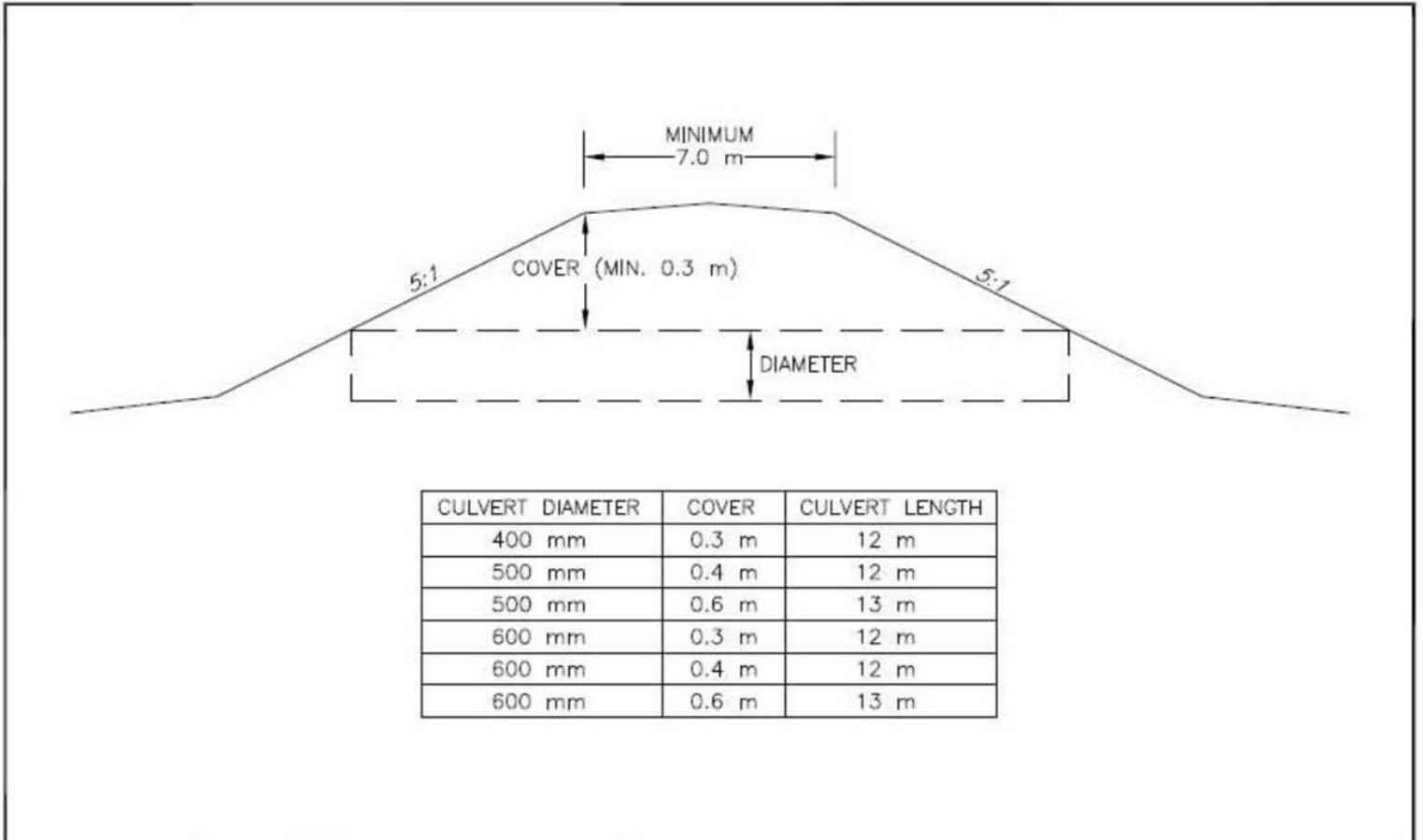
The work will consist of traffic gravel uniformly mixed with the insitu material in the top of the subgrade.

### MATERIALS

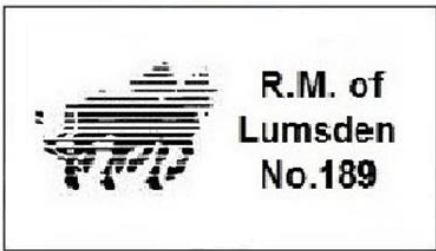
1. The gravel will be supplied, hauled and placed on the road by the Applicant.
2. The gravel will meet Type 31 Base or Type 108 (min 50% frac) specifications, as required in Appendix F.
3. The gravel will be mixed with insitu material from the top of the subgrade.
4. A water source will be supplied by the developer.

### CONSTRUCTION

1. The contractor may use any machine, combination of machines or equipment that will result in the gravel being uniformly mixed with the subgrade material in the top **100 millimetres** of the finished road top. The mixture of gravel and subgrade material shall be packed enough to produce a smooth firm surface that will support normal road traffic without rutting or becoming unstable.
2. The amount of gravel to be blended into the subgrade will be determined by the Road Construction Standards, Appendices A to H. The width and depth of subgrade material scarified or loosened up may also vary as designated by the Engineer, however, the width will normally be two metres less than the subgrade road top width and the depth will be between 75 to 100 millimetres.
3. Adding water to the mixture will be directed by the Engineer if there is insufficient moisture to produce a stable driving surface.
4. All surplus rock (80 millimetres and larger) shall be removed from the surface and disposed of as directed by the municipality. All small rocks from thirty millimetres (30 mm) to eighty millimetres (80 mm) shall be bladed off the road top into the ditch or onto the sideslope.
5. The subgrade of all RM roadways shall be compacted to a 100% density.



CULVERT DIAMETER	COVER	CULVERT LENGTH
400 mm	0.3 m	12 m
500 mm	0.4 m	12 m
500 mm	0.6 m	13 m
600 mm	0.3 m	12 m
600 mm	0.4 m	12 m
600 mm	0.6 m	13 m



**PUBLIC WORKS  
TYPICAL CROSS SECTION  
STANDARD APPROACH**

DATE: 2011

SCALE: NTS

DRAWN BY: AMEC E & E