Rural Municipality of Brokenhead

Municipal Standards

Last Revision: January 17, 2019

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RURAL MUNICIPALITY OF BROKENHEAD
MUNICIPAL STANDARDS

The following are municipal standards for the Rural Municipality of Brokenhead. These standards are to be considered as a guide outlining the minimal acceptable requirements that must be met or exceeded for developments in the Municipality.

REVISION HISTORY

DATE:	UPDATE:	BY:
January 2016	Original Copy	JRCC
May 18, 2016	Minimum Culvert Diameter from 450mm to 300mm	DM
January 17, 2019	Details and drawing added for Driveways, Culverts and Approaches	DM
June 6, 2019	Added times for mainline sewer and water work	DM

1.0 GENERAL

The Developer is advised that the specifications contained in the Municipal Services Standards shall apply to the services required for the planned area. In the case of conflict between the Development Agreement and Municipal Services Standards, the Development Agreement shall govern.

The following are the minimum Municipal Services Standards that must be met or exceeded for developments within the Rural Municipality of Brokenhead. The Municipality may impose a more stringent standard as Council deems necessary.

Designs for all municipal sewage collection systems and water distribution systems shall conform and comply with the most current Ten State Standards Guidelines. Design plans and specifications must be designed by a professional engineer registered to practice in the Province of Manitoba and submitted to the Manitoba Environmental Assessments and Licensing Branch and/or the Office of Drinking Water and the Municipality for approval. All road and drainage plans and specifications shall also be designed by a professional engineer registered to practice in the Province of Manitoba and submitted to Manitoba Conservation and Water Stewardship and the Municipality for approval. All plans are to include an APEGM certificate of authorization. In addition, the following is applicable:

Where it has been determined that the Developer has not followed the established standards, the Municipality reserves the right to implement any measures deemed necessary, including utilizing its own forces, at the expense of the Developer, to ensure that the services have been properly constructed and maintained. In any situation where the Municipality utilizes its own forces to complete or maintain services as deemed necessary, this action will not release the Developer of any maintenance or other requirements to fulfill their obligation.

Prior to the commencement of any construction or development within the planned area the Developer shall obtain written authority from the Municipality. Construction and development are deemed to include excavation, clearing and grubbing or stripping of top soil. This authority will only be provided after satisfactorily review of plans and all required approvals being obtained. Once all approvals have been obtained, an onsite meeting shall be held prior to construction of any works. Representatives of the Developer and the Municipality shall be present at the meeting. The Developer is encouraged to have their Engineer(s) and contractor(s) at the site meeting. The meeting will be used to review the construction schedule/sequence and outline inspection procedures and quality control measures.

The Developer is advised that their Engineer shall undertake all works necessary to complete design and contract administration, as-constructed plans and related certification of gravel gradation, gravel and subgrade densities, sewer pipe televising, etc. If the Municipality determines that construction supervision is not being completed on an ongoing basis the Municipal Engineer shall be employed to provide the required services, charges will be billed to the Developer's letter of credit.

The maintenance period as provided for in the development agreement will commence after the Municipality notifies the Developer in writing that the Municipality has provisionally accepted the works by endorsing the Construction Completion Certificate attached as Appendix A.

The development shall be inspected after the expiry of the maintenance period and any damage or deficiencies shall be remedied by the Developer before the Municipality finally accepts such service by endorsing the Final Acceptance Certificate that is in Appendix A.

Application for final certification shall be as per development agreement. All municipal services and additional facilities whether maintained in perpetuity by the Municipality or others must be completed in accordance to these standards prior to final certification application.

2.0 PRESSURE SEWER COLLECTION SYSTEM

The pressure sewer design shall conform to the standards outlined in this document. The Municipality reserves the right to increase or decrease the required standards as it relates to site specific cases. The developer shall submit pressure sewer design plans for the planned area completed by a Professional Engineer.

2.1 Approved Materials

2.1.1 Pressure Sewermain Pipe

1. Pipe:
    a. PVC 1120 SDR 26 Potable Water CSA certified B137.3. All pipes shall be certified by CSA as being made in accordance to their specifications and stamped accordingly with the CSA logo.
    b. High density polyethylene pipe SDR 17, certified for potable water use, made in accordance with AWWA C906.
2. Pipe: To be iron pipe sized, certified for potable water use, made in accordance with AWWA C906..
3. Valve: Gate Valves: to be epoxy coated AWWA C-509 resilient seat gate valves complete with valve box. For HDPE provide flanged ends, gaskets, 316 stainless steel bolts and nuts. Acceptable type Mueller 2360 Series Resilient Wedge Gate Valve or approved equal.
4. Clean outs to include:
    a. Tee on mainline
    b. Gate valve
    c. 90^{o} elbow to ground surface
    d. Blind flange on pipe at surface
    e. 600 mm dia. manhole riser section complete with frame and cover

2.1.2 Pressure Sewer Service Pipe

1. Pipe: shall be insert pipe sized, series 100 low density potable water polyethylene (type 1) CSA certified. For residential services the following are the maximum service line lengths for each pipe diameter, although every project should be evaluated on its own:

Length of Service Line	LP Sewer Size
0 - 80 m	32 mm
80 - 250 m	38 mm
250 - 400 m	50 mm

2. Pipe and Fittings: Meet or exceed all the requirements of ASTM Specification D2837 and CSA Standards B137.1
3. Curb Stop Valves: Sewer brass, ball type curb stop valves, acceptable type is Ford B11 Series, Mueller 300 Series or approved equal.
4. Corporation Stops: Use of corporation main stop valves is mandatory and shall be bronze, ball type with standard tapered threaded inlet suitable for tapping via service saddle to HDPE low pressure sewermain with compression type outlet, acceptable type Mueller or approved equal.

2.1.3 Sewer Service Connection to Main

1. Use stainless steel saddle clamps for all proposed lot services. Acceptable type is Robar 2606 Series Saddle or approved equal.

2.1.4 Septic Tanks

.1 All septic tanks shall be CSA approved and in accordance with the Manitoba Conservation guidelines.

.2 Concrete shall meet ASTM Standard C478M-85, minimum compressive strength of 27 MPa, with Type HS, high sulphate-resistant cement.

.3 For conduit connections through manholes, use a bulkhead or other type of fitting to provide a waterproof seal.

.4 For fibreglass tanks the first manhole riser section shall be bonded to the tank and all other riser sections made watertight.

.5 For concrete tanks all riser sections shall be made watertight by a bell and spigot type rubber gasket type fitting.

.6 For fibreglass tanks use 100% fibreglass without fillers.

.7 For fibreglass tanks use one piece assemblies without joints.

.8 Include 100-mm ABS DWV pipe complete with flexible coupling for connection to building main drain piping, 1- 32 mm x 150 mm long brass nipple and 1-32-mm brass 90^{o} elbow.

.9 Include an epoxy coated, cast iron body sewer check valve, 'Y' style rated for sewage effluent. Acceptable type is Flomatic 508 or approved equal.

.10 Provide a childproof cover for manhole cover.

.11 To accommodate the submersible pump tanks shall have a flat surface and sufficient space for pump installation. Size of control chamber shall be suitable for pump operation.

.12 Install tank in accordance with the current Manitoba Department of Conservation regulation and manufacturer's recommendations.

.13 Submersible pump shall be 1/2 horsepower, maximum 15 amps at open discharge. Provide a minimum of 182 kPa and a maximum of 203 kPa total dynamic shut-off head and minimum pump capacity of 56 L/min @ 149 kPa or as designed by a professional engineer.

.14 Where the discharge of the pressure sewermain system is lower than the septic tank, siphoning is possible and must be prevented with the use of an electric valve installed to open as the pump starts and close when the pump stops. A typical valve to be used is an EC Series TeeJet 2-Way Electric Valve with a 32 mm poly ball, model 346 series valve. A transformer from 11.5 volts to 12 volts DC is required.

2.2 Design and Construction

2.2.1 General

.1 Pressure sewer plans shall be submitted to the Manitoba Environmental Assessments and Licensing Branch for approval.

.2 Pressure sewer construction will be completed according to the latest revision of the Manitoba Water Services Board Construction Specifications.

.3 In the case of conflict the Development Agreement and associated standards will govern over the Manitoba Water Services Board Construction Specifications.

2.2.2 Pressure Sewer Piping Design

1. All mainlines shall have a minimum cover of 2.6 metres.
2. All pressure sewers shall be designed for peak flow conditions and based on friction loss calculations. (Design Flow = Peak Flow = Peaking Factor times Average Daily Flow).
3. Peaking factor shall be a minimum of 3.0.
4. Minimum pressure sewer mainline pipe diameter to be 100 mm.
5. Minimum flow for each residential septic tank to be 5 GPM.
6. Cleanouts shall be located at the dead ends to allow the piping to be flushed and at 500 m spacing along mainlines.
7. The placement of valves shall be such that any section of the system can be isolated (maximum 30 lots). Pressure sewer valves shall be installed in line with road allowance property lines.
8. Pressure sewer mainlines shall be located at a minimum of 3.0 metres from the property line.

2.2.3 Pressure Sewer Piping Construction

1. The pressure sewermain line pipe shall be bedded in and covered with sand bedding.
2. Swab all pressure sewermains prior to hydrostatic pressure testing.
3. A pressure test of the pressure sewermain line pipe shall be completed after installation works are complete.
4. Developer to cover the cost of all restoration to Municipal right of way.
5. Notify the Municipality 48 hours prior to requiring gate valve operation. Operation of the gate valve is not allowed on weekends or holidays. Mainline works cannot be done outside of typical business hours (8:30am – 4:30pm).
6. The Developer shall install sewer service lines to all lots within the development.
7. The Developer shall complete the Standard Chart for Service Connection Locations (See Appendix B) for all pressure sewer service lines

3.0 WATER DISTRIBUTION SYSTEMS

The watermain design shall conform to the standards outlined in this document. The Municipality reserves the right to increase or decrease the required standards as it relates to site specific cases. The developer shall submit watermain design plans for the planned area completed by a Professional Engineer.

3.1 Approved Materials

3.1.1 Watermain Pipe and Apparatuses

1. Pipe: PVC to be PVC 1120 Series 160 or HDPE DR 11.
2. Minimum watermain pipe size to be 150 mm. Water mainline sizes based on friction loss calculations and water demand for the specific size of development. Minimum watermain pipe size around cul du sacs to be 50 mm.
3. Pipe and Fittings: All pipe and fittings shall be certified by CSA and ULC as being made in accordance to their specifications and stamped accordingly with the CSA logo and ULC logo. Pipe to be made to CSA B137.3, ULC and NSF Standard 14 and 61.
4. Valves: To be epoxy coated AWWA C-509 resilient seat gate valves complete with valve box. All exposed bolts to be 304 or 316 stainless steel. Acceptable type Mueller 2360 Series Resilient Wedge Gate Valve or approved equal.
5. Hydrants: Conform to AWWA C-502. Standard for dry-barrel fire hydrants and be approved by the Underwriters Laboratory of Canada. Design for working pressure of 1,000 kPa with two 65 mm threaded hose outlets and one 112 mm pumper nozzle. Acceptable type McAvity Brigadier M67 or approved equal.

3.1.2 Water Service Pipe

1. Pipe: Minimum CTS SDR 11 series 160 or SDR cross-linked polyethylene PEX tubing suitable for potable water and CSA certified.
2. Fittings: To be Mueller compression couplers or approved equal
3. Wetted surfaces of plumbing products components: Wetted surfaces of fittings such as corporation stops, couplers, curb stops, and saddles shall use a low lead alloy that complies with ANSI/AWWA C800 (latest revision) for maximum lead content of the wetted surfaces to be $<$0.25% (by weight) lead.
4. Curb Stop Valves: Water brass, ball type curb stop valves, acceptable type Mueller 300 Ball Curb Valve or approved equal.
5. Corporation Stops: Use of corporation main stop valves is mandatory and shall be bronze, ball type with standard tapered threaded inlet suitable for tapping via service saddle to PVC watermains with compression type outlet, acceptable type Mueller or approved equal.

3.1.3 Water Service Connection to Main

1. Saddles: steel body with stainless steel straps and bolts, IPS threaded insert and gaskets. Acceptable products Robar 2606 Series Saddle or approved equal.

3.2 Design and Construction

3.2.1 General

1. Watermain plans shall be submitted to the Manitoba Office of Drinking Water for approval.
2. Watermain construction will be completed according to the latest revision of the Manitoba Water Services Board Construction Specifications and the Ten State Standards.
3. In the case of conflict the Development Agreement and associated standards will govern over the Manitoba Water Services Board Construction Specifications.

3.2.2 Watermain Piping Design

1. The Developer, at a minimum, shall design the mainline for domestic flow as directed and approved by the Municipality.
2. Distribution mains shall be continuous (looped) whenever possible. Clean-outs or fire hydrants will be required at dead ends for flushing purposes.
3. The placement of valves shall be such that any section of the system can be isolated (maximum 30 lots). Watermain valves shall be installed in line with road allowance property lines. Valves shall be resilient seat gate type.
4. The maximum distance between fire hydrants shall be 150 metres.
5. All mainlines shall have a minimum cover of 2.6 metres.
6. Water mainlines shall be located at a minimum of 3.0 metres from the property line.

3.2.3 Watermain Piping Construction

1. The watermain line pipe shall be bedded in and covered with sand bedding.
2. Swab all mains prior to hydrostatic pressure testing and disinfection.
3. Hydrostatic leakage testing of the watermain line pipe shall be completed after installation works are complete. Test results to be provided to the Municipality for acceptance.
4. Chlorination and disinfection of the watermain shall be completed after installation works are complete. Test results to be provided to the Municipality for acceptance.
5. Hydrostatic leakage testing and disinfection of watermains and water services to be in accordance with the latest revision of the Manitoba Water Services Board Construction Specifications.

6. Developer to cover the cost of all testing and re-testing if required.
7. The Developer shall install water service lines to all lots within the development.
8. Developer to cover the cost of all restoration to Municipal right of way.
9. Notify the Municipality 48 hours prior to requiring gate valve operation. Operation of the gate valve is not allowed on weekends or holidays. Mainline works cannot be done outside of typical business hours (8:30am – 4:30pm).
10. The Developer shall complete the Standard Chart for Service Connection Locations (See Appendix B) for all water service lines.

4.0 ROAD, SIDEWALKS, AND DRAINAGE

The road and drainage design shall conform to the road standards found in this document. The Municipality reserves the right to increase or decrease the required standards as it relates to site specific cases. The Municipality will determine whether existing road(s) leading to the planned area require widening and or upgrading. The developer shall submit a road plan for the planned area completed by a Professional Engineer.

The minimum road allowance width shall be 24.0 metres unless deemed otherwise by the RM. For feeder roads or where required as determined by drainage requirements and/or the Municipality the road allowance shall be 30.475 metres. The road right-of-way radius for a cul-de-sac shall be a minimum of 18.288 metres.

4.1 Approved Materials

4.1.1 Granular Base

1. Use Class "A" Granular Material as described in latest revision of the Manitoba Infrastructure and Transportation Standard Construction Specifications.

4.1.2 Granular Sub-Base

1. Use Class "C" Granular Material as described in latest revision of the Manitoba Infrastructure and Transportation Standard Construction Specifications.

4.1.3 Geotextile

1. Use non-woven synthetic fibre fabric supplied in rolls
2. Physical Properties based on MARV (Minimum Average Roll Values) determined in accordance with ASTM D4759:

Physical Property	Requirements	Test Method
Grab Tensile Strength	800 N – minimum	ASTM D4632
Puncture Strength	460 N – minimum	ASTM D4833
Trapezoid Tear	330 N – minimum	ASTM D4533
Apparent Opening Size	0.220 mm – maximum	ASTM D4751
Permittivity	1.5 sec^{-1} – minimum	ASTM D4491
U.V. Resistance	70% per 500 hrs – minimum	ASTM D4355

4.1.4 Concrete

1. Cement to be according to CAN3-A23.1-M77; type GU.
2. Minimum 28 day compressive strength to be 32 MPa.
3. Slump to range between 50 - 80 mm.

4. Entrained air by volume to be 5 - 8% for 20 mm aggregate.

4.1.5 Asphalt Concrete

1. To be in accordance with the City of Winnipeg Standard Construction Specification.
    a. Type 1A surface course shall be used.

4.1.6 Culverts

1. Culvert type:
    a. Corrugated Steel Pipe: to CSA CAN3-G401-minimum thickness of 1.6 mm
        i. Prefabricated end sections as indicated.
        ii. Couplers and Bolts: of same material as pipe.

4.1.7 Material Testing

1. All road material shall be available for inspection and testing by the Municipal Engineer and/or by the testing laboratory so designated.
2. The Municipal Engineer shall be afforded full access for the inspection and control testing, both at the site of work and at any plant or borrow pit used for the supply of the materials, to determine whether the material being supplied is in accordance to specification.
3. The Developer's Engineer shall submit approved test results to the Municipal Engineer.

4.2 Design and Construction

4.2.1 General

1. Road and drainage construction will be completed according to the latest revision of the Manitoba Infrastructure and Transportation Standard Construction Specifications.
2. In the case of conflict the development agreement and associated standards will govern over the Manitoba Infrastructure and Transportation Standard Construction Specifications.
3. The developer if requested by the Municipality shall submit a drainage study for the planned area completed by a Professional Engineer. The drainage study shall provide details of the impact the drainage water from the planned area will have on the drainage system and lands downstream from the planned area. The study shall outline all remedial works required to be completed by the Developer to provide proper drainage capacities downstream from the development. The Developer shall be responsible for the costs of the drainage study and remedial works required.

4.2.2 Roads

1. Gravel surface roads shall have a minimum top width of 8.60 metres. (See Appendix C, Drawing 1).
2. Asphalt surface roads shall have a minimum top width of 6.50 metres. (See Appendix C, Drawing 2).
3. Asphalt curb and gutter asphalt surface roads shall have a minimum top width of 9.10 metres from back of curb to back of curb (See Appendix C, Drawing 3)
4. The road traffic surface width for a cul-de-sac shall have a minimum radius of 12.00 metres.
5. If poor subgrade soil conditions are known prior to construction or are encountered during construction, a geotechnical investigation will be required to determine enhancements recommended to the minimum road cross-section listed below.
6. The minimum road cross-section listed below can be altered based on the recommendation of a Geotechnical Engineer upon completion of a geotechnical investigation and report for the development. The geotechnical report must be provided to the RM prior to approval.
7. Road Sections shall consist of a minimum asphalt (if required), base course and sub base course thickness as indicated
    - .a Residential (Urban)
        - .i 100 mm Asphalt
        - .ii 150 mm Base Course
        - .iii 300 mm Sub Base Course
        - .iv geotextile
    - .b Residential (Rural)
        - .i 150 mm Base Course
        - .ii 300 mm Sub Base Course
        - .iii geotextile
8. All roads shall be centered within the road allowance.
9. Minimum curb and gutter grades shall be 0.5%.
10. Minimum road cross fall shall be 3.0%.
11. The road right of way shall be cleared and grubbed as required for the construction of the roadways, ditches and utilities.
12. All topsoil and unsuitable material shall be removed.

13. Waste any organics or silty material that has a plasticity index of 20 or less, with more than 20% of the soil particles passing the No. 200 sieve.
14. Placement of subgrade shall be compacted, in layers not exceeding 150 mm in compacted thickness, to 95% of Standard Proctor Density at optimum moisture content for the full length and width of the road and side slopes.
15. Aggregate shall be graded and compacted in lifts not exceeding 150 mm.
16. Sub base course aggregate to be compacted to an average of 98% of Standard Proctor Density with no test less than 96% Standard Proctor Density.
17. Base course aggregate to be compacted to an average of 98% of Standard Proctor Density with no test less than 96% Standard Proctor Density.
18. Asphaltic Concrete to be compacted to an average of 97% of Standard Marshall Density with no test less than 95% Standard Marshall Density.
19. All the road side slopes, ditches and swales and non travelled portions of the right of way shall be sodded or hydro-seeded.

4.2.3 Drainage

1. The Developer shall obtain the necessary license under the Water Rights Act to connect drains and ditches within the planned area to existing drains external to the planned area and the Developer shall have obtained approval from all persons or authorities having authority over drainage works that will be affected by the run-off from the planned area prior to the commencement of any construction of the drainage works.
2. Where required, the developers shall ensure the subdivision design is in accordance with the Manitoba Infrastructure and Transportation requirements.
3. Some of the authorities having authority of drainage works are Water Resources Branch, Department of Fisheries and Oceans Canada, Railways, etc. All drainage works require approval of the Municipality.
4. All swale and ditch easements shall be indicated on the design plans.
5. The design storm frequency for ditches and culverts within the planned area shall be 20% (5 year return period) unless otherwise specified by the Municipality or approving authority.
6. For new subdivisions, storm water from a 1 in 25 year (1 in 50 year for MIT approval) storm event must be stored on-site and the run-off flow rate must be restricted to pre-construction flow rates for a 1 in 5 year storm event.
7. Drainage plan for the planned area to be completed by a Professional Engineer.
8. Minimum ditch grades shall be 0.10%.
9. Ditch slopes shall be at a 4:1 slope.
10. Minimum ditch bottom width shall be 0.6 metres.

4.2.4 Culverts, Driveways & Approaches

1. Municipal Road Crossing & private approach culverts shall be a minimum 300 mm diameter or as determined by flow capacities, whichever is greater. Gauge to be determined by depth of cover, loading and culvert diameter.
2. All culverts shall have a minimum slope of 0.2% or 30 mm drop, whichever is greater, from inlet to outlet. Invert of the culvert to be installed approximately 50 mm below proposed ditch bottom elevation.
3. All culverts shall have a minimum cover of 0.3 m from the surface to the top of the culvert.
4. The length of the culvert shall be sufficient to traverse required road surface width and side slopes. The culvert shall have a minimum length of 14.0 metres for Municipal roads, private approaches to be a minimum length of 7 metres.
5. Bedding to be compacted granular material up to the top of the culvert.
6. Private approach side slopes shall be a minimum of 3:1.
7. Private approach culverts shall be installed so the end of culvert is a minimum 2m to the nearest property line and minimum 6m to the nearest roadway intersection property line.
8. Properties in the L.U.D. of Tyndall/ Garson are permitted to have one approach per lot. Properties in the rural area must be given approval to install more than one approach.
9. Exceptions to driveway specifications will be reviewed by Public Works based on existing conditions.

4.2.5 Lot Grading

1. All lots shall be graded to provide positive drainage away from the building into a swale or ditch.
2. The lot grading shall also include a minimum of 250 mm of perching around the building so that run-off water is directed away from the house (see Appendix C, Dwg. No. 3 and 4).
3. Where required swales/ditches will be installed along common property lines to ensure runoff water does not flow from one lot and onto the next lot. Lot drainage shall be self-contained within the subdivision limits.
4. The developer shall be responsible for construction of all swales and ditches within the subdivision including perimeter swales/ditches and swales/ditches along common property lines. Exceptions to this policy will be reviewed by Council based on existing ground slope, trees, etc.
5. Plans to indicate ground elevation at house, at all lot corners and at grade break point of swales.
6. Urban residential yards to be ideally graded between 1.5% and 2.5%.
7. Maximum range of grades for urban residential yards to be 1.0% to 5.0%

8. Rural lots (large lots) to be graded at 2% from house down to existing ground elevation with allowance for perching.
9. Lots to be graded with either back to front or split lot drainage designs. (See Appendix C, Dwg. No. 4, 5 and 6).

4.2.6 Sidewalks

1. Sidewalks shall be a minimum of 2.0 m in width.
2. Sidewalks shall be a minimum of 125 mm thick concrete reinforced using 10M bars at 600 mm o/c poured on a minimum of 150 mm of granular material.
3. Sidewalks shall utilize a grade between 2-4%.
4. Sidewalks shall utilize a transverse joint at maximum horizontal distance of 1.5 m.
5. Sidewalks shall utilize ramp style connection to roads.
6. Sidewalks may be altered to 75 mm asphalt at the discretion of council.

5.0 REQUIREMENTS FOR SUBDIVISION PLANS AND CONSTRUCTION

This document provides a guide for minimum requirements for submitting design(s), plans and specifications to the Municipality.

.1 All engineering plans and specifications shall be designed, prepared, stamped, and signed by a qualified professional engineer registered in the Province of Manitoba.

.2 The developer shall provide the Municipality with one hard copy and one electronic copy of the legal plan for the development, which is entered and registered in the Winnipeg Land Titles Office, before construction commences.

.3 The developer shall provide the R. M. of Brokenhead with one hard copy and one electronic copy of the design plans and specifications. The development plans, as a minimum, shall bear the information outlined below.

.4 The developer shall provide the R. M. of Brokenhead with copies of approvals from any agency having jurisdiction and applicable approval authority i.e. Manitoba Infrastructure and Transportation, Department of Fisheries and Oceans Canada, Manitoba Conservation, Office of Drinking Water, etc.

.5 Plans shall be drawn on standard 24" x 36" sheets.

.6 Stationing shall be included on the plan view as well as the profile for all roads, water, and sewer plans.

.7 General plans shall include the following:

a. Topography of area.

b. An established geodetic benchmark, location and elevation.

c. An established temporary geodetic benchmark, location and elevation at the construction site.

d. Key plan, land location, road names.

e. Identification of physical features i.e. major drains, major roads, etc.

f. Test hole logs if applicable.

.8 Drainage plans shall include the following:

a. Existing topography of the subdivision, surrounding area and drainage ditch elevations.

b. Contours at 100 mm intervals

c. Existing and proposed drainage routing within and surrounding the subdivision.

d. All proposed and existing culvert elevations and sizes.

e. Typical drainage ditch and swale cross-section, slope and elevation.

f. Location of easements, if required, to accommodate ditches/swales on private property.

g. Expected capacity surface run-off discharging into the ditches and culvert flow capacity.

h. Drainage of lots and proposed ground level at buildings.

.9 Road plans shall include the following:

a. Typical road cross section to include:

i. Gravel thickness, class and compaction requirements.

ii. Subbase construction method.

iii. Traffic surface, shoulder width, side slopes, ditch bottom width, road slope (cross fall).

b. Plan/profile for road and drainage.

c. Road alignment within right of way.

d. Road grades and elevations at changes of grade.

e. Cul-de-sac turn around dimensions and offset.

.10 Sewer System plans shall include the following:

a. Invert elevation of existing pipe at connections.

b. Plan/profile of low pressure sewer piping.

c. Sewermain pipe sizes, invert elevations, grades, valve locations, clean-out locations, and offset dimensions.

d. Sewer service line location and invert elevation at termination for all proposed lots.

.11 Water System plans shall include the following:

a. Invert elevation of existing pipe at connections.

b. Plan/profile of watermain piping.

c. Watermain pipe sizes, invert elevations, grades, valve locations, fire hydrant locations, and offset dimensions.

d. Water service line location and invert elevation at termination for all proposed lots

.12 Plan review

a. The Developer shall submit to the Municipality, an electronic copy of the design plans stamped "preliminary", for all works required as outlined in the development agreement.

b. Upon review by the Municipality, the Developer shall respond to the written requests of the Municipality detailing the required revisions. The Developer shall address all required revisions indicated for the plans. All plans shall then be sealed by a Professional Engineer and resubmitted to the Municipality for approval.

c. The Municipality shall review all the sealed plans to ensure all previous revision requests have been properly addressed and to check if additional revisions are needed.

d. If the submitted sealed plans require further revisions the Developer shall have the plans revised according to the written request of the Municipality. All the sealed plans will then be resubmitted to the Municipality and shall have the proper revision number indicated on the plans.

e. Once all revision requests from the Municipality have been properly addressed and approved, the Municipality shall notify the Developer that all the plans have been approved.

.13 Specification Review

a. The Developer shall submit to the Municipality, one electronic copy of the tender and specification document for review.

b. Upon review by the Municipality the Developer shall respond to the written requests of the Municipality detailing the required revisions. Once the Developer has completed all the revisions as requested by the Municipality, the Developer shall resubmit the tender and specification document for review.

c. Upon review by the Municipality to determine if all revisions have been completed and if no additional revisions are required, written approval shall be submitted to the Developer indicating the tender and specification documents are accepted. If during the second review or any subsequent review, additional revisions are requested by the Municipality, the Developer shall abide by each revision request and resubmit the tender and specification document to the Municipality. This process shall continue until the Municipality provides the Developer with written approval that the Municipality has accepted the tender and specification document.

d. Upon receipt of written approval the Developer shall submit to the Municipality one electronic copy of the tender and specification document that have been sealed by a Professional Engineer.

.14 Construction

a. No construction shall start before all plans and the specification have been approved by the Municipality and the construction commencement certificate (included in Appendix A).has been signed

b. Prior to the start of construction works, if requested by the Municipality, an onsite meeting between the Developer and their representatives including the Contractor(s) and Engineer(s) and the Municipality and its representatives shall be arranged. The meeting will be used to determine the construction schedule/sequence and outline inspection procedures that will be implemented.

c. Prior to the start of construction the Developer's Engineer shall stake project works required for location and elevation.

d. The Developer's Engineer shall be responsible for the layout and inspection of all services to ensure conformance with the approved detailed drawings, plans and specifications. The Developer's Engineer or their authorized representative shall have a presence on site at critical or sensitive times during the installation of improvements.

e. The Developer's Engineer shall record all as-built grades, elevations, dimensions and locations of all works performed by the Developer's Contractor. Any changes to the plans as a result of the recorded as-built information shall be recorded for the completion of as-built plans.

f. During the course of construction any damaged or destroyed survey monuments shall be replaced prior to final acceptance of work. According to the Canada Land Surveys Act the person who

damages or destroys a survey monument is liable for payment of all cost in connection with the restoration or re-establishment of the monument(s) by a surveyor under instruction from the Surveyor General.

g. If the Developer's Engineer is not performing the above in a satisfactorily manner, as determined by the Municipality, the Municipality will utilize its Engineer to provide all works as deemed necessary. All such works shall be charged to the developer's letter of credit.

h. The Developer shall appoint an accredited material testing firm to carry out quality control and testing to ensure that construction is in accordance with the approved design. It shall be the responsibility of the Developer to provide material testing services during construction to ensure compliance with standards. The Developer's Engineer shall review all test results immediately once they become available. Where testing indicates that the required standards have not been met, the deficient areas shall be re-worked and subsequently re-tested on either side of the failed test until the standards have been met. A copy of all test results will be forwarded to the R. M. of Brokenhead and the Municipal Engineer as soon as the developer's Engineer receives them.

.15 Proposed onsite construction administration procedure includes:

a. Inspection schedule.

b. Staking procedures.

c. For roads and drainage - testing of subbase, base, granular material and grades.

d. For sewer - invert elevations and location of all valves and clean-outs, service line saddles and ends of services lines at the property lines.

e. For water – invert elevations and locations of all fire hydrants and valves, service line saddles and ends of service lines at the property lines.

.16 Construction Completion Certificate.

a. Upon substantial completion of

i. Roads and drainage.

ii. Sewer system and water system.

b. The Developer's Engineer shall submit one hard copy and an electronic copy of the "Record Drawing/As Built" plans to the RM for review prior to application for the Construction Completion Certificate. The Developer's Engineer shall also provide the "Record Drawing" in AutoCAD format.

c. The Developer shall apply for a Construction Completion Certificate which, when approved by the Municipality, will initiate the maintenance period of the completed project. Any and all deficiencies shall be corrected by the Developer during the maintenance period.

.17 Final Acceptance Certificate.

d. The Developer may apply for a Final Acceptance Certificate up to 60 days prior to the maintenance

expiration date indicated on the Construction Completion Certificate. The maintenance period shall be one year from the date of initiation of the Construction Completion Certificate. The Developer shall repair or make good all deficiencies found in the works prior to the expiration date indicated on the Construction Completion Certificate.

e. The Municipality will assume responsibility of the facility after approval of the Final Acceptance Certificate.

6.0 LETTER OF CREDIT

As indicated in the Development Agreement the developer shall provide to the Municipality an Irrevocable Letter of Credit covering the labour and material for all of the services to be installed by the developer pursuant to the development agreement. The value of the letter of credit shall be determined by the Municipality. The value of the letter of credit shall be in a form approved by the Municipality and shall be provided prior to the commencement of any constructions works with in the development area as outlined in the development agreement. The value letter of credit as determined by the RM shall stay in effect until final acceptance of the construction works has been certified.

7.0 MANITOBA WATER STEWARDSHIP – OFFICE OF DRINKING WATER AND MANITOBA ENVIRONMENTAL ASSESSMENT AND LICENSING BRANCH

Prior to the construction of a new or alteration of an existing wastewater (sewer) collection system or water distribution system including the construction, modification, upgrading or extension of sewer collection systems or water distribution systems the Developer shall obtain a permit from the Office of Drinking Water and/or the Environmental Assessment and Licensing Branch providing approval and forward the approval permit to the Municipality.

8.0 MATERIAL TESTING

Testing of the road material shall at a minimum be done to the following requirements. Copies of all test results are to be forwarded to the Municipality and their Engineer within 3 days of receipt of the test results. The RM shall be notified 48 hours in advance of any testing and RM or RM's representative shall be present during all material testing. Testing cannot be scheduled on weekends or holidays. The test shall include but not be limited to the following:

8.1 Road Subgrade Material

.1 Complete proctor density testing of all types of subgrade materials and provide acceptable representative gradation results and densities from a certified lab as approved by Engineer.

.2 Provide standard density testing with nuclear densometer of the road subgrade at a minimum of 50 metre intervals and staggered across road surface.

8.2 Granular Material

.1 Complete sieve analysis and proctor density testing of all types of granular materials and provide acceptable representative gradation results and densities from a certified lab as approved by Engineer.

.2 Provide standard density testing with nuclear densometer of the road sub base course at a minimum of 50 metre intervals and staggered across road surface.

.3 Provide standard density testing with nuclear densometer of the road base course at a minimum of 50 metre intervals and staggered across road surface.

.4 Provide additional testing as deemed necessary by the Engineer to verify quality control is being maintained.

8.3 Asphalt Material

.1 One test will be taken for each 500 tonnes or portion thereof of asphalt placed on day of operation.

.2 One "test" consists of an asphalt marshal analysis that is to include forming 3 briquettes, unit weight, stability, flow, A/C content, sieve analysis, maximum Theoretical specific gravity for void analysis

.3 Provide standard density testing with nuclear densometer of the asphalt at a minimum of 50 metre intervals and staggered across road surface and take one core sample every 150 m of road.

8.4 Concrete Material

.1 Concrete sampling and inspection is to be by the Contractor. Testing of cylinders for each pour is to be performed by an independent inspection agency that is CSA approved.

.2 One test will be taken for each individual placing operation that exceeds 7.5 m3 or at least one test for each 40 m3 of concrete placed on day of operation.

.3 One "test" consists of a slump test, air content test (for air entrained concrete) and compressive strength tests on three lab cured cylinders (one for 7 day break and two for 28 day breaks).

.4 Two additional site cured cylinders will be taken during cold weather concreting and be cured on job site under the same conditions as concrete it represents.

9.0 CONTRACT ADMINISTRATION

The Developer shall provide the Municipality five days notice prior to commencement of any construction work in the planned area.

The Developer shall file a copy of all "Record Drawing/As Built" plans with the Municipality for their review. Final "Record Drawing/As Built" plans shall be forwarded to the Municipality prior to transfer of ownership of services and property.

The Developer's Contract Administrator shall meet the minimum requirements listed below but shall not be limited to the following.

9.1 Underground Piping Works

The Developer's Engineer shall provide Resident Administration on a full time basis during the installation of all underground piping. At a minimum the resident administrator shall record the elevation and location of all pipes at all fittings, valves, appurtenances and pipe ends. Daily and weekly records of works completed shall be provided to the Municipality.

In addition the Developer's Resident Administrator shall witness the pressure testing of the piping to ensure that specification requirements are met. A copy of all records of the pressure test and disinfection test of watermains shall be provided to the Municipality.

9.2 Road and Drainage Works

The Developer's Engineer shall provide Resident Administration during the construction of the road(s) and drainage(s) to ensure all testing requirements outlined in Section 8 are adhered to and specification requirements are met. The Resident Administrator shall be onsite on a full time basis for concrete and asphalt works and at the discretion of the Developer's Engineer, shall provide spot checks for subgrade and granular works. In addition the elevation of the road subgrade, sub base course, base course, asphalt, gutter and drainage (cross-section) shall be recorded at minimum 10 m intervals and provided to the Municipality. A copy of all records of these tests and elevations shall be provided to the Municipality.

A summary of all weigh tickets for the granular and asphalt materials shall be provided to the Municipality if requested.

10.0 EASEMENTS

Any and all easements required for the development shall be legally registered prior to the sale of any lot(s) within the development area.

Appendix A

RURAL MUNICIPALITY OF BROKENHEAD

CERTIFICATE OF COMMENCEMENT

DEVELOPMENT LOCATION:_____

DEVELOPMENT NAME: _____

DEVELOPER: _____

Take notice that the Development Agreement made between the Rural Municipality of Brokenhead as governing body and _____ as Developer, dated _____ day of _____, 20___, in respect to required actions preceding commencement of construction as outlined in the Development Agreement have been completed to the satisfaction of the Rural Municipality of Brokenhead on the _____ day of _____, 20___, for the lands legally described in the Certificate of Title No. _____.

The following is a short description of the actions:

The Developer agrees to follow all requirements of the development agreement and schedule all required inspections at the Developers cost.

The undersigned hereby certify the above information is correct and that they are persons required or authorized to give this notice.

_____ Date:_____
DEVELOPER

_____ Date:_____
CHIEF ADMINISTRATIVE OFFICER

RURAL MUNICIPALITY OF BROKENHEAD

CONSTRUCTION COMPLETION CERTIFICATE

DEVELOPMENT LOCATION: _____

DEVELOPMENT NAME: _____

DEVELOPER: _____

CONTRACTOR: _____

SERVICES INSTALLED: _____

_____

_____

I _____

of the firm _____

hereby certify that the services noted herein are complete as defined by the Servicing Agreement for the above mentioned Development and constructed according to the RM of Brokenhead Municipal Standards. Copies of "As-Constructed" Plans and Designs and all test records for the above mentioned Services have been submitted to the RM of Brokenhead. I hereby recommend these Services for approval of this Construction Completion Certificate. Minor deficiencies indicated on the attached list shall be corrected as soon as possible and no later than

_____.

_____ Date: _____

DEVELOPERS ENGINEER

APPROVAL:

_____ Date: _____

MUNICIPAL ENGINEER

_____ Date: _____

RM OF BROKENHEAD

DATE Maintenance Period to Start: _____

DATE Maintenance Period to Expire _____

RURAL MUNICIPALITY OF BROKENHEAD

FINAL ACCEPTANCE CERTIFICATE

DEVELOPMENT LOCATION: _____

DEVELOPMENT NAME: _____

DEVELOPER: _____

SERVICES INSTALLED _____

_____

_____

WARRANTY EXPIRATION DATE: _____

This letter will serve as a **Certificate of Acceptance** for the works named above which were required to be constructed in accordance with the RM of Brokenhead Municipal Standards. There are no outstanding deficiencies in the works, and by this letter of acceptance, the RM of Brokenhead will now assume responsibility for maintenance of the works.

APPROVAL:

_____ Date _____
DEVELOPER

_____ Date _____
MUNICIPAL ENGINEER/PUBLIC WORKS SUPERVISOR

_____ Date _____
RM OF BROKENHEAD

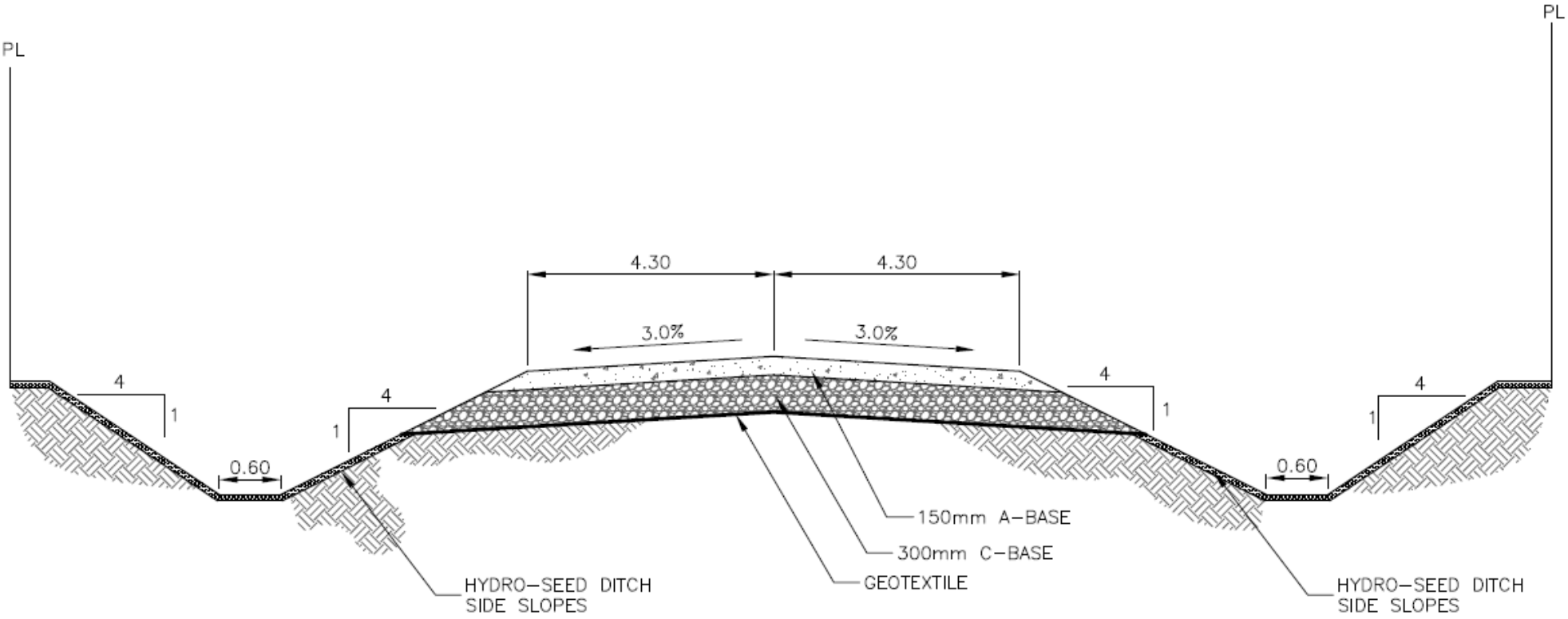
Appendix B

RM OF BROKENHEAD

STANDARD CHART FOR SERVICE CONNECTION LOCATIONS

	SEWER SERVICE DATA					WATER SERVICE DATA			
LOT DESCRIPTION	LOCATION OF CURB STOP BOX	LOCATION OF CORP. ON MAIN	INVERT AT PROPERTY LINE	SERVICE SIZE/TYPE		LOCATION OF CURB STOP BOX	LOCATION OF CORP. ON MAIN	INVERT AT PROPERTY LINE	SERVICE SIZE/TYPE
	LONG SHORT					LONG SHORT			
	L S					L S			
	L S					L S			
	L S					L S			
	L S					L S			
	L S					L S			
	L S					L S			

Appendix C



TYPICAL GRAVEL ROAD CROSS–SECTION

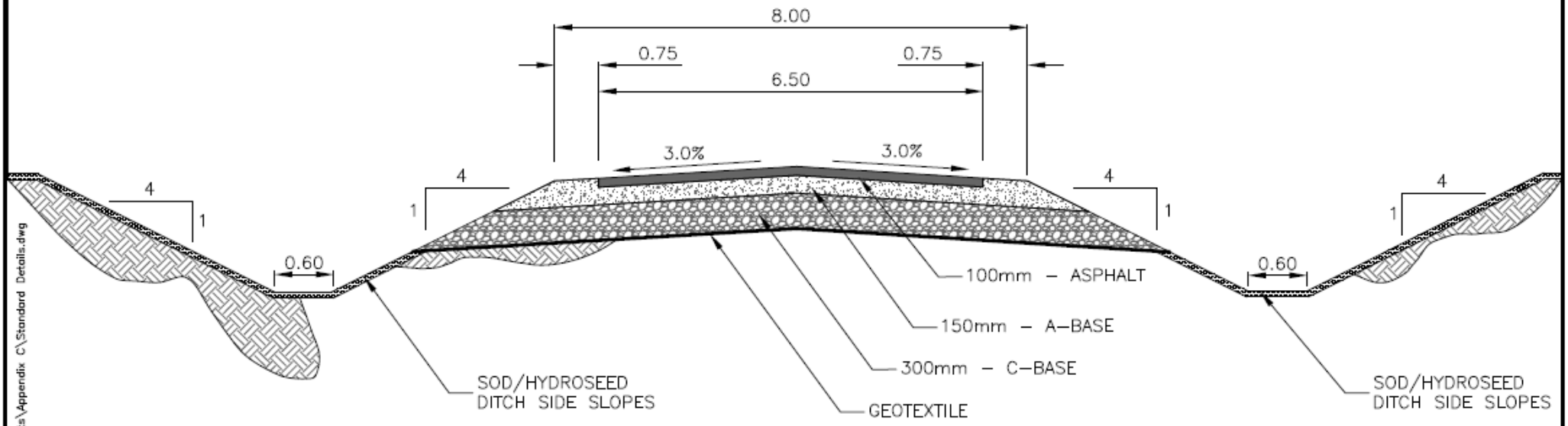
NOTE:

TOP SOIL AND ORGANICS TO BE REMOVED
FOR ROAD BED PREPARATION

JR Cousin Consultants Ltd.
91A Scurfield Blvd. Winnipeg MB R3Y 1G4
p. (204) 489-0474
f. (204) 489-0487
www.jrcc.ca
ENGINEERING EXCELLENCE SINCE 1981

DATE: 16/01/29	CLIENT: RM OF BROKENHEAD
SCALE: NTS	PROJECT: MUNICIPAL STANDARDS
PLAN NO.: 1	TITLE: TYPICAL GRAVEL ROAD CROSS–SECTION

Jan 29, 2016 - 3:21pm F:\200\246 Brokenhead RM\246.15 Municipal Standards\02 Reports\Appendix C\Standard Details.dwg



TYPICAL ASPHALT ROAD CROSS–SECTION

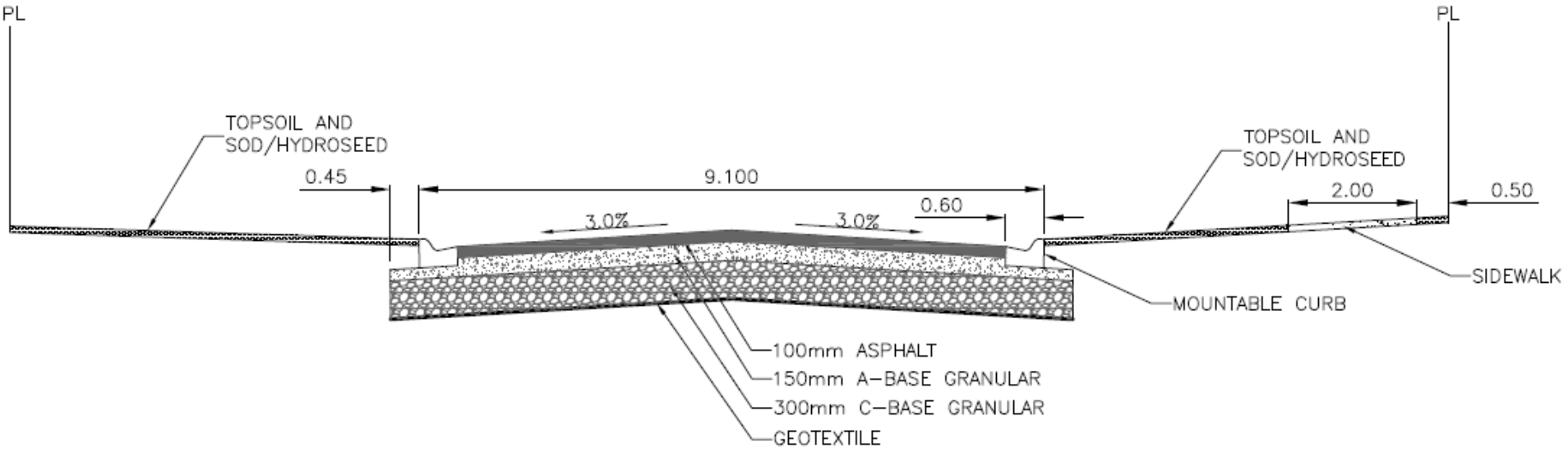
NOTES:

– TOP SOIL AND ORGANICS TO BE REMOVED FOR ROAD BED PREPARATION

JR Cousin Consultants Ltd.
91A Scurfield Blvd. Winnipeg MB R3Y 1G4
p. (204) 489-0474
f. (204) 489-0487
www.jrcc.ca
ENGINEERING EXCELLENCE SINCE 1981

DATE: 16/01/29	CLIENT: RM OF BROKENHEAD
SCALE: NTS	PROJECT: MUNICIPAL STANDARDS
PLAN NO.: 2	TITLE: TYPICAL ASPHALT ROAD CROSS–SECTION

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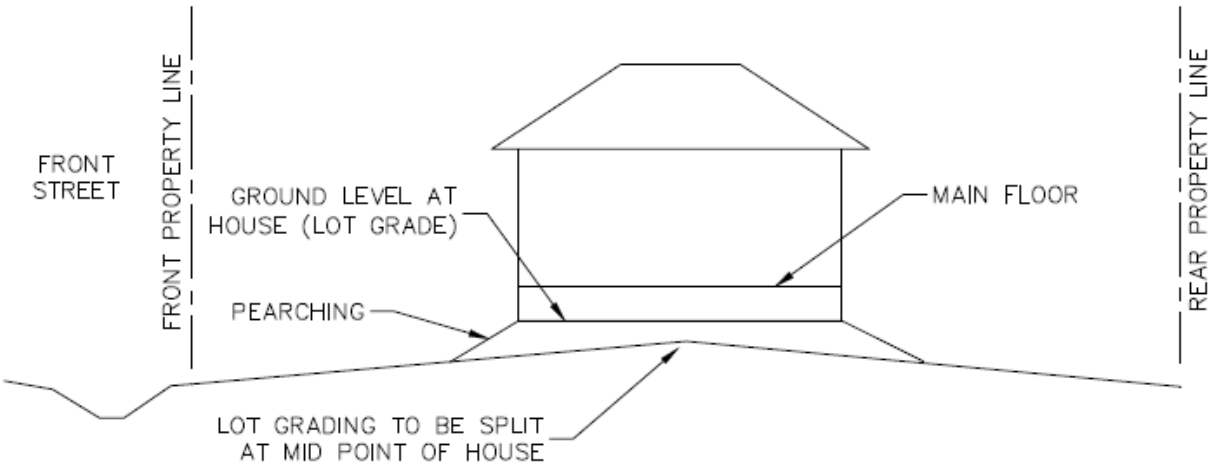
TYPICAL CURB AND GUTTER ROAD CROSS-SECTION

JR Cousin Consultants Ltd.
91A Scurfield Blvd. Winnipeg MB R3Y 1G4
p. (204) 489-0474
f. (204) 489-0487
www.jrcc.ca
ENGINEERING EXCELLENCE SINCE 1991

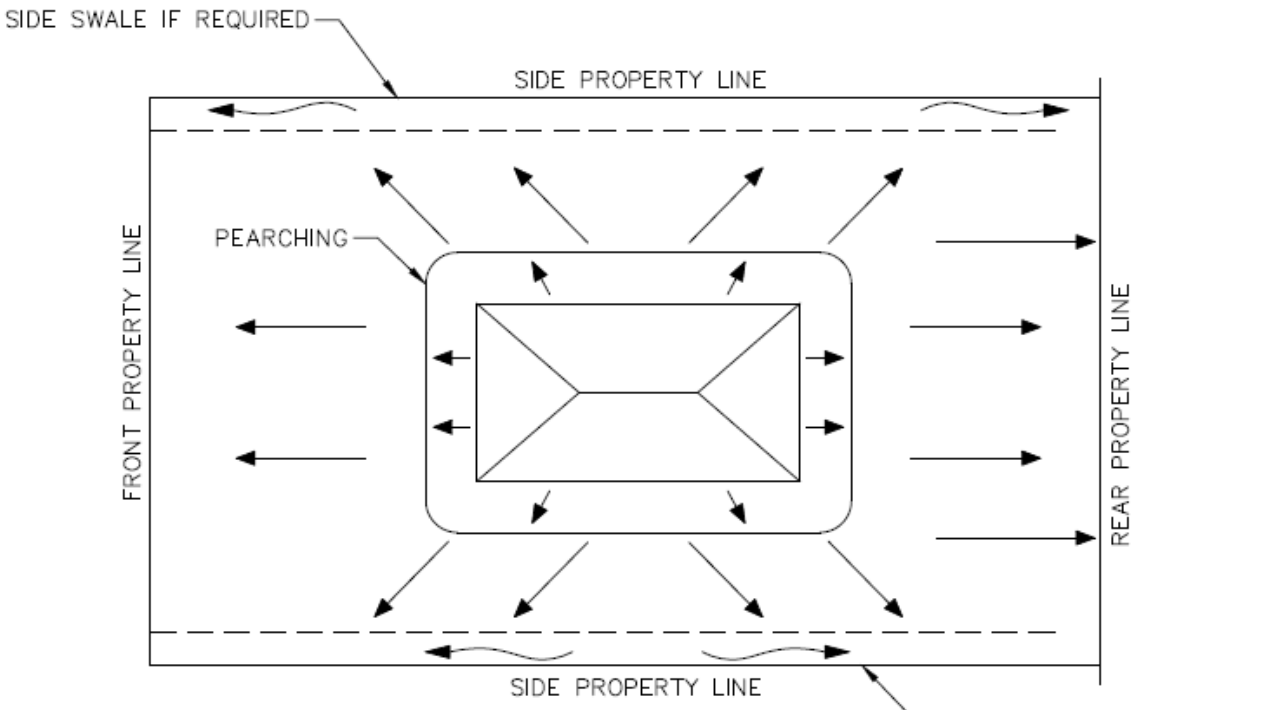
DATE: 16/01/29	CLIENT: RM OF BROKENHEAD
SCALE: NTS	PROJECT: MUNICIPAL STANDARDS
PLAN NO.: 3	TITLE: TYPICAL CURB AND GUTTER ROAD CROSS-SECTION

Jan 29, 2016 - 3:21pm F:\200\246 Brokenhead RM\246.15 Municipal Standards\02 Reports\Appendix C\Standard Details.dwg

TYPICAL LOT GRADING
TYPE I



PROFILE VIEW



PLAN VIEW

NOTES:

1. PERCHING TO EXTEND BEYOND FOUNDATION WALLS AS FOLLOWS:
   A) FRONT AND REAR – 2.0m (MIN.)
   B) SIDE – 1.0m (MIN.)

2. PERCHING TO BE ELEVATED 75mm (MIN.)

3. PERCHING SLOPE (FINISHED) TO BE AS FOLLOWS:
   A) FRONT & REAR – 5% (MIN.)
   B) SIDE – 5% (MIN.)

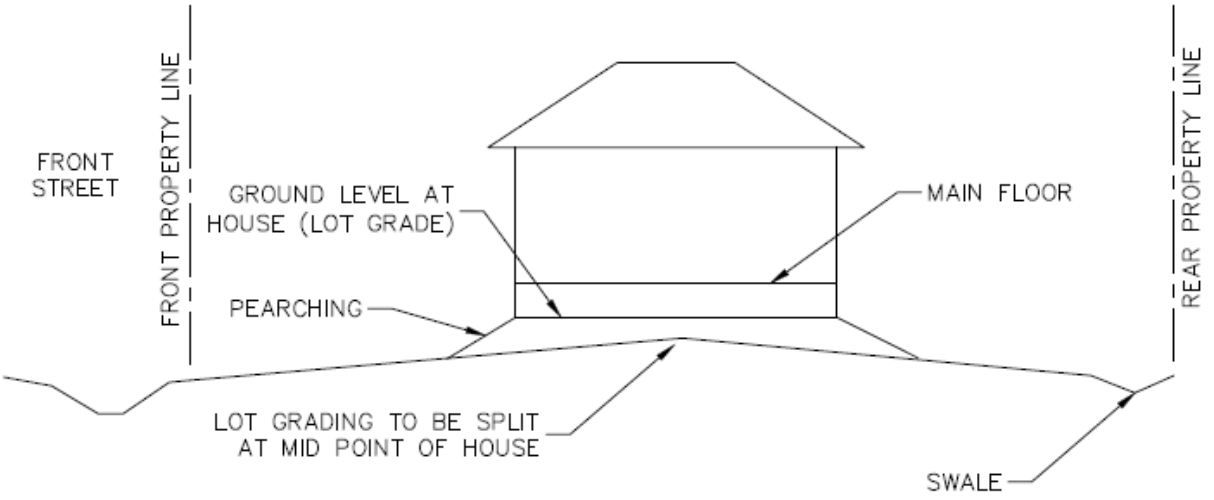
4. BUILDING LOT GRADE SHALL BE AS INDICATED ON THE LOT GRADE PERMIT

RURAL MUNICIPALITY OF BROKENHEAD
P.O Box 490
72013 Road 42E
Beausejour, MB
204-268-6700
admin@ruralofbrokenhead.ca
www.ruralofbrokenhead.ca

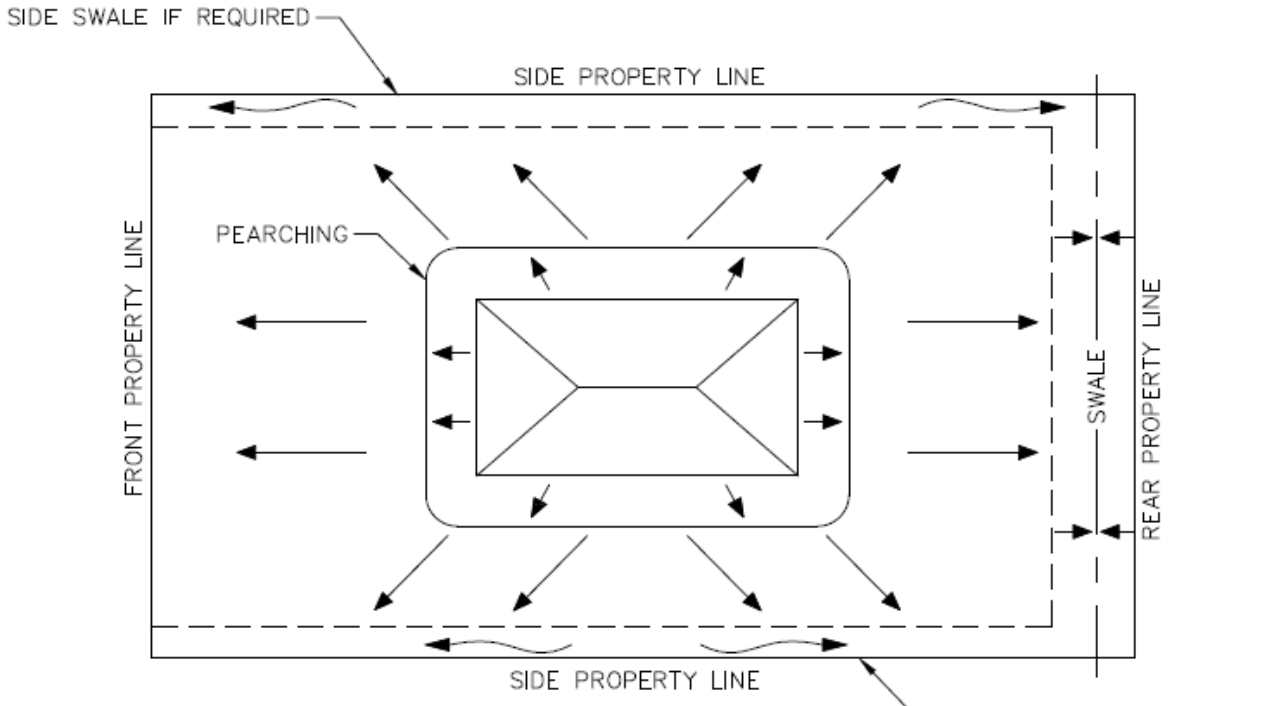
DRAWN ON: AUG 25/15 NOT TO SCALE

RESIDENTIAL SPLIT LOT DRAINAGE: REAR YARD DRAINS TO LANE

TYPICAL LOT GRADING
TYPE II



PROFILE VIEW



PLAN VIEW

NOTES:

1. PERCHING TO EXTEND BEYOND FOUNDATION WALLS AS FOLLOWS:
   A) FRONT AND REAR – 2.0m (MIN.)
   B) SIDE – 1.0m (MIN.)

2. PERCHING TO BE ELEVATED 75mm (MIN.)

3. PERCHING SLOPE (FINISHED) TO BE AS FOLLOWS:
   A) FRONT & REAR – 5% (MIN.)
   B) SIDE – 5% (MIN.)

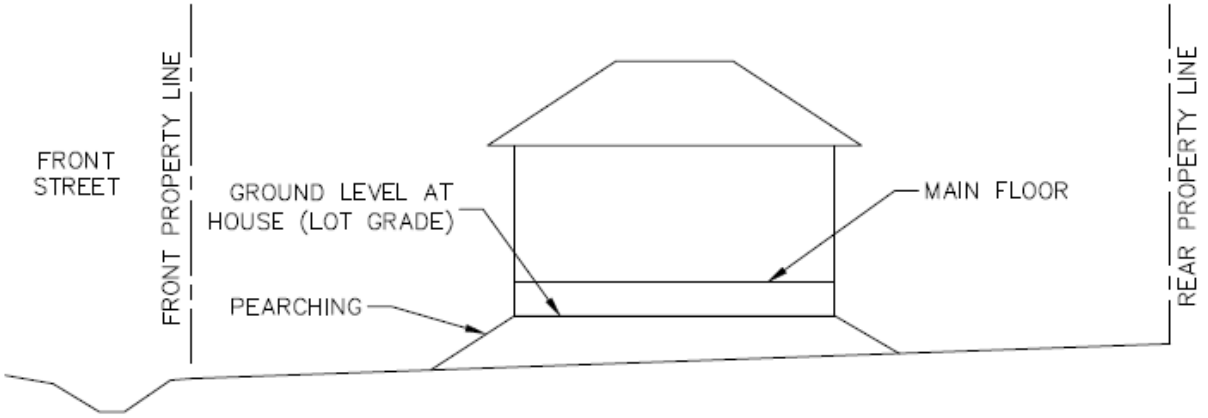
4. BUILDING LOT GRADE SHALL BE AS INDICATED ON THE LOT GRADE PERMIT

RURAL MUNICIPALITY OF BROKENHEAD
P.O Box 490
72013 Road 42E
Beausejour, MB
204-268-6700
admin@ruralbrokenhead.ca
www.ruralbrokenhead.ca

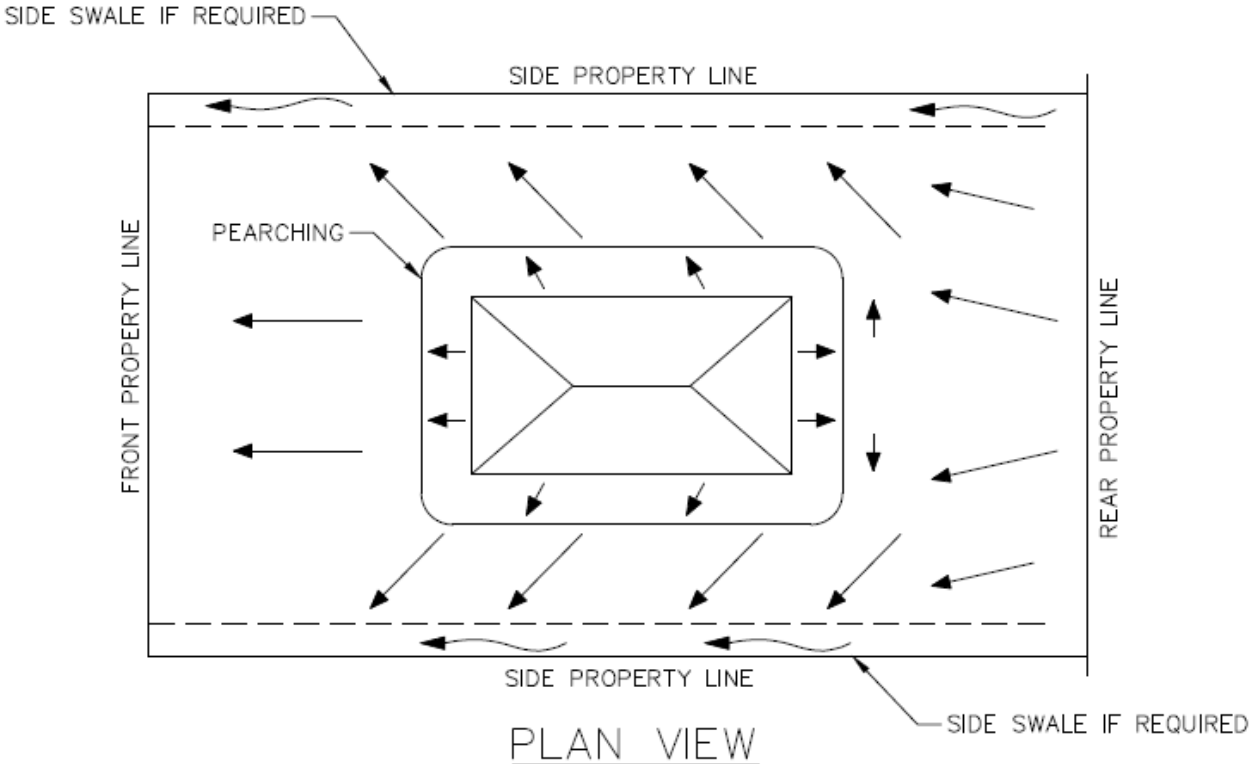
DRAWN ON: AUG 25/15 NOT TO SCALE

RESIDENTIAL SPLIT LOT DRAINAGE: REAR YARD DRAINS TO SWALE

TYPICAL LOT GRADING
TYPE III



PROFILE VIEW



PLAN VIEW

NOTES:

1. PERCHING TO EXTEND BEYOND FOUNDATION WALLS AS FOLLOWS:
   A) FRONT AND REAR – 2.0m (MIN.)
   B) SIDE – 1.0m (MIN.)

2. PERCHING TO BE ELEVATED 75mm (MIN.)

3. PERCHING SLOPE (FINISHED) TO BE AS FOLLOWS:
   A) FRONT & REAR – 5% (MIN.)
   B) SIDE – 5% (MIN.)

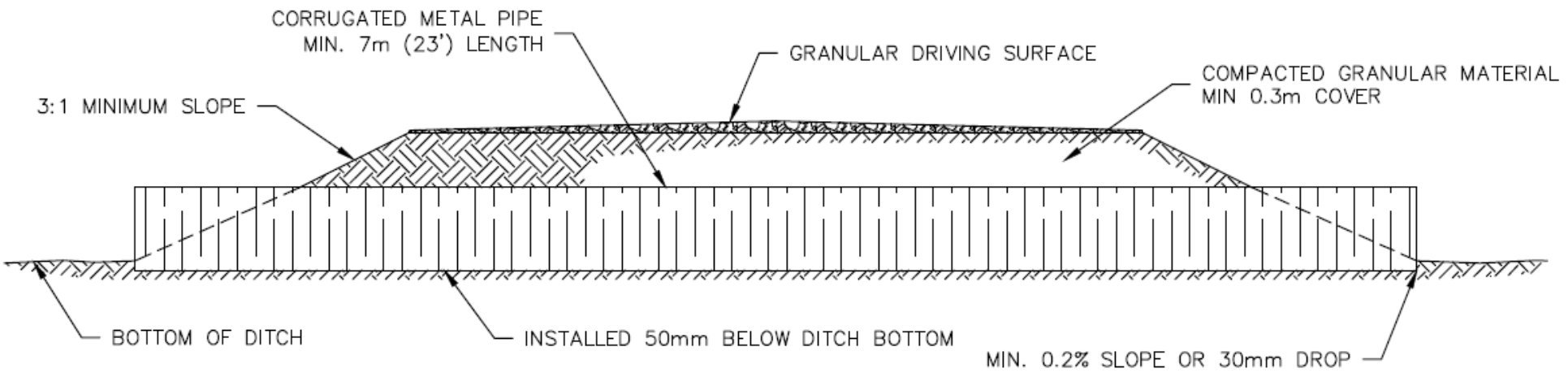
4. BUILDING LOT GRADE SHALL BE AS INDICATED ON THE LOT GRADE PERMIT

RURAL MUNICIPALITY OF BROKENHEAD
P.O Box 490
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Beausejour, MB
204-268-6700
admin@ruralofbrokenhead.ca
www.ruralofbrokenhead.ca

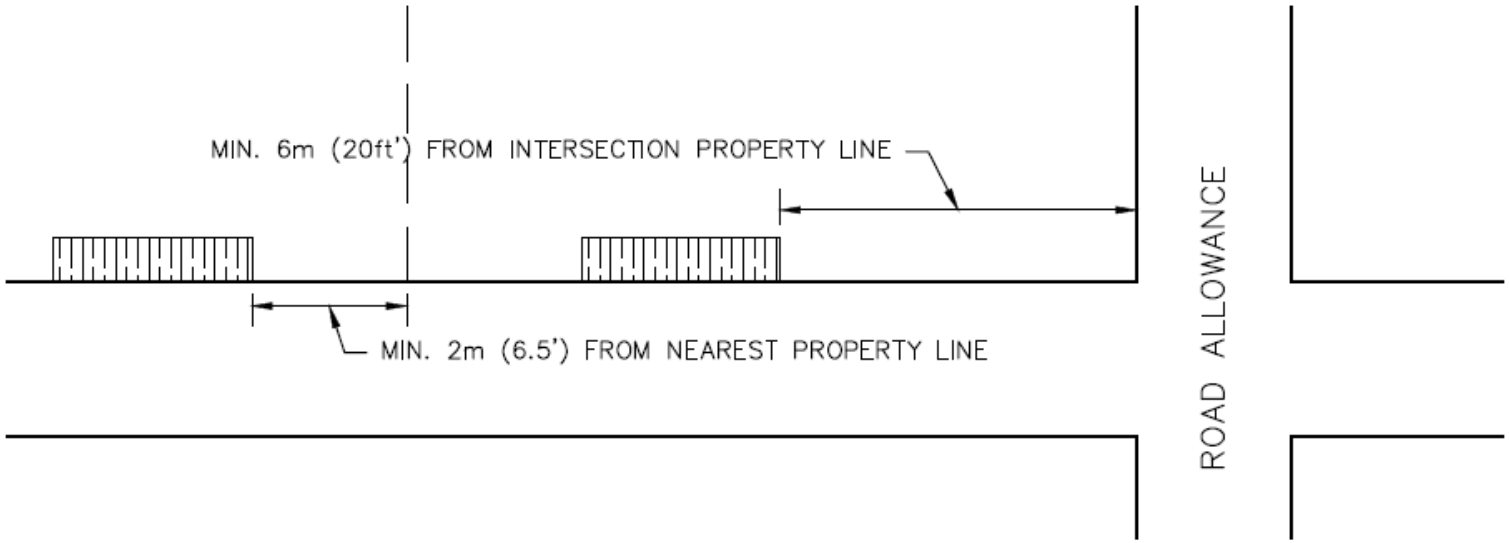
DRAWN ON: AUG 25/15 NOT TO SCALE

RESIDENTIAL BACK-TO-FRONT LOT DRAINAGE: REAR YARD DRAINS TO FRONT

CONSTRUCTION SPECIFICATIONS



LOCATION SPECIFICATIONS



NOTE:

- PROPERTIES IN THE L.U.D. OF TYNDALL/GARSON ARE PERMITTED TO HAVE ONE APPROACH PER LOT
- PROPERTIES IN THE RURAL AREA MUST BE GIVEN APPROVAL TO INSTALL MORE THAN ONE APPROACH

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www.ourhomeyourhome.ca

DRAWN ON: JAN 17/19 NOT TO SCALE

TYPICAL DRIVEWAY INSTALLATION SPECIFICATION