Municipality of Grey Highlands Policy

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1 Purpose

The Municipality of Grey Highlands Development Standards are intended as a guideline to provide for an engineering basis for subdivision and site plan design, to establish a uniform criteria of minimum standards, and to improve the processing of engineering design submissions for development related works. These standards are not intended to replace sound engineering principles or relieve the engineer of their responsibility for the design. These standards are to be read in conjunction with the current Ontario Provincial Standard Specifications and Drawings. Where there are any apparent conflicts or discrepancies, the Municipal Standards Specifications and Drawings will take precedence. Changes to these standards, which improve or maintain the quality of the design will be considered for acceptance subject to the approval of the Municipal Transportation & Environmental Services and Planning Departments.

If there are preliminary concerns not addressed in this Policy, the designer is to coordinate a pre-construction meeting with the Municipal Transportation & Environmental Services and/or Planning Services to resolve issues prior to the commencement of the design.

It is understood that these standards may be referred to as a schedule in a subdivision agreement and that the current revision of the standards are then considered to be part of the agreement.

2 Scope

This Policy applies to all of the Municipality of Grey Highlands

3 Policy

3.1 Engineer's Role

3.1.1 The design and all required engineering drawings and associated reports must be signed by a professional engineer, licensed to practice in the Province of Ontario. The proponent shall retain the services of an engineer who within this document shall be referred to as the Consulting Engineer. The Municipality may retain the services of an engineer to carry out peer review on the Municipality's behalf who within this document will be referred to as the Municipal Engineer.

3.2 Supporting Studies and Reports

The following studies and reports may be required to support the design. It should be noted that the information provided is the minimum requirement and the studies and reports may need to include further details depending upon site specific conditions. Additional reports or studies may be required at the discretion of the Municipality:

3.2.1 Soils Report by a qualified Geotechnical Consultant identifying site soil conditions, seasonal high groundwater table and cathodic protection requirements for watermains and appurtenances. Recommendations must be provided for pipe bedding and backfill materials, foundations, retaining walls, slope stabilization including stormwater management ponds and road sub-base as well as design criteria of the road base and surface material if conditions dictate requirements for greater than the minimum specified in the standards.

3.2.2 Hydrogeological Assessment to characterize the groundwater regime from a site specific and regional perspective in order to address issues related to (as applicable):

- Impacts to existing well water supplies within the project area;
- Soil permeability's and associated properties where the design of septic systems are concerned;
- Groundwater impact assessment to area aquifers from construction activities and/or discharge of waste or wastewater;
- Test wells and associated testing in accordance with MOE D-5-5 guidelines to address water taking impact sustainability;
- Impacts to nearby surface water bodies; and
- Specific technical review of well field or wellhead capture zones.

3.3 For general road and servicing construction, the report should consider depth of services and identify likely areas where dewatering will be required, the rate of dewatering, requirements for dewatering, permits, and the strategy to achieve the required groundwater levels. If dewatering is necessary, the report should contain sufficient data on groundwater quality and temperature of the receiving watercourse.

3.3.1 Stormwater Management Report addressing methods of stormwater runoff quality, quantity, siltation and erosion control.

3.3.2 Traffic impact Analysis Report will be require where new development or expansion of existing development will generate more than 50 trips during peak hour. The report is to permit the Municipality to assess the impact of the development on the transportation system and to identify improvements that may be required as a result of the development.

3.3.3 Water supply and Distribution Report providing calculations to support the design of the supply and distribution works including main sizes, fire flows and anticipated flows from domestic and other users.

3.3.4 Sanitary and Storm Sewer Calculations on standard design sheets.

3.3.5 Tree Preservation, Compensation and Landscaping Report prepared by a qualified professional.

3.3.6 Noise Report identifying existing and development noise sources and demonstrating how mitigating measures will be implemented to conform to MOE Guidelines.

3.4 Submissions

3.4.1 General

3.5 Engineering Drawings and associated support documentation shall be submitted to the Municipal Transportation & Environmental Services and Planning Departments.

The initial submission to the Municipality shall contain the following information:

a. A covering letter to address previous discussion;

b. Copy of the approved Draft Plan or legal plan of property;

c. Declaration from the Consulting Engineer showing that he/she has been retained to design and supervise the construction of the works;

d. A copy of the Supporting Studies and Report as set out Section 1.3;

e. General Plan of Services;

f. Lot Grading Plan;

g. Area Rough Grading Plan;

h. Storm Drainage Plan;

i. Storm sewer design sheets, computer printouts, and detail calculations for pipe strength and bedding;

j. Plan and profile drawings;

k. Detail drawings other than Municipality of Grey Highlands Standard Drawings; and

l. Any other drawing pertinent to the design.

3.6 Subsequent submissions of items (d) through (k) inclusive shall be made until the Engineering Drawings and design is acceptable to the Municipality. The respective authority shall complete the design of Hydro, Bell Telephone System, Cable T.V. and gas systems.

3.7 Ministry of Environmental Applications

After the Municipality of Grey Highlands approves the engineering design and drawings, three copies of the Ministry of Environment application forms for storm and sanitary sewer and watermains and one complete set of engineering drawings shall be submitted to the Municipality. These copies will be signed by the Municipality and then returned to the Consulting Engineer. The Consulting Engineer will then make application to the Ministry of the Environment.

3.8 Other Approvals

The Consulting Engineer is required to make all submissions and representations necessary to obtain approvals from all other authorities affected (Ministry of Natural Resources, Ministry of Transportation, Conservation Authorities, Department of Fisheries and Oceans, Canada Post Corporation, Fire Marshall, Medical Officer of Health, etc.). The Municipality of Grey Highlands shall be kept informed of the progress of these submissions by copies of all correspondence.

After all approvals have been received from all parties affected, the original drawings shall be submitted to the Municipality. These drawings shall be signed and dated by the Municipal Engineer where applicable and returned to the Consulting Engineer. A copy of the approved drawings shall be provided to the Municipality in electronic format - AutoCAD Version 14 or latest version required by the Municipality. Any subsequent changes must be formally submitted to the Municipal Engineer for approval.

If after one year the date of accepting the drawings by the Municipality, the Developer fails to enter into a Subdivision Agreement with the Municipality, the Municipality reserves the right to revoke any or all approvals related to the engineering drawings.

3.9 Construction Requirements

Prior to the commencement of construction, the Developer's Consulting Engineer shall submit the following information to the Municipality for approval (allow two weeks for approval):

m. Construction specifications;

n. The proposed contractor and subcontractors;

o. The contractor's list of suppliers;

p. A copy of the signed contract tender complete with prices;

q. All recommendations of the Erosion Control plan must be implemented;

r. The required Letter of Credit must be posted with the Municipality;

s. Any other information as required by the Municipality;

t. A detailed construction schedule.

The Developer's Consulting Engineer shall be responsible for full time inspection during construction. During construction, the Developer's Consulting Engineer shall submit the following information to the Municipality:

u. Any change orders to the contract;

v. Any revisions to the construction schedule;

w. Notice prior to placement of granular base, asphalt, sidewalk, curb and gutter;

x. Copy of geotechnical inspection reports;

y. Other items specifically noted in the following design criteria.

The Municipality reserves the right to retain independent testing and inspection of any work carried out on the development.

3.10 DRAFTING REQUIREMENTS

3.11 Quality

All original drawings and prints shall be neat, **legible**, and in ink using Leroy lettering system or AutoCAD Version 14 or later, Computer Drafting and shall be corrected for "record drawings" in the same manner. All information shall be neat, legible and original sheets shall be typed or completed in ink and reproducible by a white-printing or photocopy machine.

3.12 Drawing Sheet Size

Drawings shall be of a consistent size of 595 mm by 841 mm (metric size A1).

3.13 Scales

Standards metric scales to be used are 1:20, 1:50, 1:100 and any factors of 10. Scales shall be as follows and shown on drawings:

The key plan shall be shown on the cover sheet at a scale of 1:5000;

The General Service Plan and the Storm Sewer Plans shall be 1:1000;

The Lot Grading Plan and the Park Development Plan shall be 1:500 or 1:200 if required;

Plan and Profile Drawings shall be 1:500 (Horizontal) and 1:50 (Vertical).

3.14 Title Blocks

All drawings shall include a complete title block with a revisions block, design engineer's block, the lot and concession numbers, Municipal name and Municipal acceptance block, and a drawing number to the satisfaction of the Municipality.

3.15 Engineering Drawings

Engineering drawings shall consist of the following:

- Cover Sheet;
- Legal plan of subdivision;
- General Service Plan showing all structures, services and utilities;
- Storm Sewer Plan (including external drainage plan where applicable);
- Lot Grading Plan (including basement elevations);
- Park Development Plans;
- Plan and Profile drawings of all streets, easements and external works;
- Water Distribution Plan;
- Sanitary Sewer Plan;
- Including external sewer, water and storm water where applicable;
- Vegetation Preservation & Planting Plan;
- Landscape Plan;
- Plans for the following:
- Canada Post
- Hydro
- Bell Canada
- Cable T.V.
- Detail Sheets including standard and special details; and
- Other Plans as required such as site plan, retention pond plan, etc.

3.16 Basic Information

The following standards shall apply in preparation of the drawings:

3.16.1 All plans shall include a north arrow in the upper right hand quadrant. All east-west streets shall generally be drawn with the north arrow pointing to top, all north-south streets with the north arrow generally pointing to the right, and all cul-de-sacs or other roads where this does not apply shall be drawn with the stations numbered from left to right.

3.16.2 All elevation data shall be referred to geodetic datum and at least one benchmark shall be shown on each plan indicating a geodetic elevation.

3.16.3 The intersection of centre lines of streets shall be used as zero chainage. The centerline chainage is to be shown in ink from the outset, calculated from the final survey. When the plan must be broken because of curvature, etc., the profile shall be broken as well, so that insofar as possible, chainage points in plan and profile coincide vertically.

3.16.4 In general, east-west streets shall have zero chainage at their westerly limits and north-south streets shall have zero chainage at their southerly limits. Chainages on a plan-profile shall increase from left to right.

3.16.5 All existing utilities, structures and other features such as trees and hedges shall be shown and identified using a broken line.

3.16.6 The beginnings and ends of curves must be shown on a plan and profile with the radii of curvature shown on the plan. Chainages of points of curvature shall be calculated from the final plan. The chainage elevations and names of intersecting streets shall be shown in plan and profile.

3.16.7 The drawings shall be in ink at the outset, according to the final survey. Street names shall be kept clear of the road allowance.

3.16.8 The drawings shall show any required off-street drainage and separate profiles should be prepared for drainage easements.

3.16.9 The drawings shall show clearly the proposed profiles, road widths and cross-sections, ditches, ditch gradients, curb and gutter gradients, culvert sizes, gauges and gradients, existing and proposed services, and limits of the proposed work. All detail for intersecting streets including grades must be shown for a minimum distance of 30

metres from the intersection of the intersecting street. All street lines shall be shown as well as all easements for drainage or services.

3.16.10 The location of all traffic control and information signs is to be clearly shown. The drawings shall show the lot frontage distances and dimensions of easements and land to be dedicated to the Municipality.

3.16.11 The Municipal Transportation & Environmental Services and Planning Departments shall be consulted as to the manner of showing information not set out in these requirements.

3.16.12 A professional engineer shall stamp all engineering drawings. The engineer's stamp must be signed and dated prior to the issuance of drawings for tendering and final acceptance by Municipality.

3.17 Sewer Details

The standard abbreviations, sewer diameter, length and grade, diameter and size of manholes, inlets and connections to the sewer shall be shown on appropriate General Plans. This information plus sewer bedding, type and class of sewer pipe, manhole numbers and inverts, flow direction, grate elevations and drop structures shall be shown on Plan and Profile Drawings. Chainage of manhole locations shall be shown in profile.

3.18 Watermain Details

The standard abbreviations, watermain diameter, length, type and class of pipe, and the valves, services, hydrants and connections to the watermain shall be shown on appropriate General Plans and on Plan and Profile Drawings.

3.19 Road Details

3.19.1 Horizontal control data (beginning and end of curve, radius, length, etc.) shall be shown on appropriate General Plans and on Plan and Profile Drawings.

3.19.2 Vertical control data (proposed road grade, length of run and percent slope, beginning and ending of vertical curves) shall be shown on Lot Grading Plans and on Plan and Profile drawings. Existing and proposed centerline road grades shall be shown every 20 metres with stations shown measured in metres with kilometers separated by a + sign on long runs (e.g. - STAO+000, STA 0+020, STA 0+040...STA 1+020). Stations of interest (curve stations, intersections, end stations, etc.) shall be shown calculated to the nearest millimeter (e.g. -BVCSTA0+041.169, EVCSTA0+066.169, ENDSTA 0+069.124).

3.20 Miscellaneous Details

Other details shall be according to the Municipal Standard Drawings where applicable or if a Municipal Standard Drawing is not available in-accordance with Ontario Provincial Standards. Municipal Standards take precedence when available. All necessary details shall be included on sheets similar to other drawing sheets, if not on relevant drawings. Municipal Standard Drawings may be printed on these sheets directly. Municipal Standards may not be edited unless agreed to by the Transportation & Environmental Services Department.

3.21 Acceptance of Originals

3.21.1 When all outstanding comments have been addressed, the electronic and hard copy drawings shall be submitted to the Municipality for acceptance. All drawings must be sealed and signed by the Developer's Engineer.

3.21.2 The digital files shall be provided to the Municipality in Adobe Acrobat (.pdf) and AutoCAD (dwg) format, on two (2) CD's. Each CD is to be labeled identifying the description, developer's name, file name and date delivered. A self-extracting Zip file (.exe file) may be used to perform file compression if required. It is the Developer's responsibility to ensure that all drawing changes occurring throughout the approvals process are incorporated into the digital submission.

3.22 Individual Service Record Sheets

Prior to issuance of building permits, sewer and water service record sheets for each lot must be forwarded to the Municipality for review and comment. Each sheet must clearly identify the registered plan number, lot number and municipal street address together with the size and location of the service.

The final sheets will be forwarded to the Municipal Building Department.

3.23 Construction Record Drawings

3.23.1 Prior to the issuance of the Certificate of Substantial Completion (Full Services), "Record" drawings must be provided and accepted by the Municipality Engineer.

3.23.2 Revisions must be made to the drawings to reflect any changes to the line and/or grade of the roadways and services, and incorporate all the grading modifications resulting from final lot grading. All valves and terminations shall be properly tied into fixed reference points.

3.23.3 When all revisions and/or corrections have been made a complete hard copy set of "Record" drawings shall be submitted to the Municipality for review and approval. After a final review by the Transportation & Environmental Services Department, three (3) complete hard copy sets as well as two (2) digital copy CDs shall be submitted to the Municipality. Each CD shall contain digital copies of the Record Drawings in Adobe Acrobat (.pdf) and AutoCAD (.dwg) format.

3.24 ROADWAYS

3.25 Provincial Standards

Ministry of Transportation Geometric Design Standard, Ontario Provincial Standard Specifications (O.P.S.S.) and Ontario Provincial Standard Drawings (O.P.S.D.) shall apply together with these Municipal Standards. Where there are any apparent conflicts or discrepancies, the Municipal Standards and Standard Drawings shall take precedence.

3.26 General

All roadways situated in primary settlement areas which are served by a sanitary sewer system shall be constructed to an urban standard as per the Municipality of Grey Highlands Standard Drawing. The Municipality may consider a semi-urban cross section in the recreation areas, in the secondary settlement areas (hamlet), in developments where lot frontage excess 25 metres or in the rural environment where the development is not served by a sewage collection system.

Where road improvements are required in rural/agricultural areas, a rural cross section may be considered.

The following are general requirements for the design of roads and rights-of-way:

3.26.1 Street allowances shall be a minimum 20 metres wide. Where the subdivision adjoins or incorporates an existing County Road or Municipal arterial road as shown on the Official Plan, the Developer shall deed to the County or Municipality the required widening(s).

3.26.2 Minimum day lighting at intersections of Municipal roads and County or Provincial roads shall be 3.0 metres x 3.0 metres.

3.26.3 The edge of the roadway's paved surface shall have a minimum radius of 10 metres at intersections.

3.26.4 The minimum grade on any roadway shall be 0.3 percent and the maximum grade shall be 6 percent with an open ditch section and 8 percent with a curb and gutter section.

3.26.5 Finished roadways shall have a cross fall of 2 percent from the centre line to each outside edge of shoulder.

3.26.6 On all streets, horizontal and vertical sight distances conforming to O.P.S.S. geometric design standards shall be provided.

3.26.7 On all fill sections requiring guide rails the shoulder widths shall be 0.6 metres wider than the specified on the standard drawing.

3.26.8 All roads are to be extended to the limit of the subdivision boundary and shall terminate at a turning "T" or cul-de-sac (at discretion of the Municipality) when not connecting to an existing road.

3.26.9 Cul-de-sacs shall have a minimum radius of 23.0 metres to property line and a minimum radius in accordance with the Standards for asphalt.

3.26.10 The road design for industrial and/or commercial developments shall take into account the type of traffic anticipated on the development. Granular base thicknesses, asphalt type and thickness, shoulder width, cul-de-sac radii shall be designed specifically for the development utilizing these standards as minimum requirements.

3.26.11 The configuration on entrance roads for subdivisions and entrance roads for commercial, industrial and institutional developments shall conform to O.P.S.D. 300.01 and 300.02 unless otherwise approved by the Municipality.

3.26.12 Where new roads are to connect to existing roads the design shall extend along the existing road for a sufficient length to verify a satisfactory transition.

3.26.13 Provisions shall be included in the road design for communal mailboxes. The Developer shall be responsible for providing parking areas, structural concrete foundations, etc. all as required by the Municipality for communal mailboxes in locations designated by the Municipality.

3.26.14 Driveway entrances within cul-de-sacs are to be located on the adjoining sides of property.

3.26.15 (i) Where it has been determined that a 26m ROW is required, the Municipality will require sidewalks on both sides of the ROW.

3.26.16 (ii) Sidewalks will be required on at least one side of the street in all new developments having municipal water or sewers.

3.26.17 All points of grade in excess of one percent shall be designed as outlined in the current Ministry of Transportation of Ontario Standards.

3.26.18 The minimum visibility curves shall be in accordance with the Ministry of Transportation Geometric Standards.

3.26.19 Location of utilities within the road allowance shall be as detailed on the standard drawings.

3.26.20 Community mail box sites shall be placed in locations approved by the Municipality.

Note: Any road development shall always consider existing social, economic and environmental conditions. Any negative impacts to existing social, economic and environmental conditions will not be considered for road development.

3.27 Clearing and Grubbing

Trees shall be removed so that the specifications for sight distances, grading, ditching, etc., may be met. All stumps, logs, brush, boulders, debris, etc. shall be removed from the entire street allowance and deposited off the site of the subdivision to a disposal area approved by the Municipality and the Ministry of Environment.

Unless noted otherwise, all healthy trees behind the back slope of ditches and not obstructing visibility or installation of services shall be preserved. The Transportation & Environmental Services Department may give special permission to leave trees on the street allowance, providing that they are situated more than 1.2 metres behind the curbs.

3.28 Grading

Where curb and gutter is required:

The boulevard area from the curb to the property line shall be graded to provide positive drainage toward the roadway if possible, with a minimum grade of 2%.

All side slopes, ditches and boulevards to the street line shall be protected with 75 mm of topsoil and nursery sod.

Where the curb and gutter is not required:

The area between the edge of the road shoulder and the street line shall be graded and the ditches cut with side slopes of 3:1 from the edge of the shoulder to the bottom of the ditch and from the bottom of the ditch to the original ground. In fills over 1.5 metres, measured vertically from the edge of shoulder to the toe of slope, the fill slope shall not be steeper than 2:1. The ditch shall be located at the toe of the fill slope. In fills over 3.0 metres, measured vertically from the edge of boulevard to the toe of slope, guide rails shall be installed conforming to the Ontario Provincial Standard Drawings and Ministry of Transportation Ontario protection warrants.

All side slopes, ditches and boulevards to the street line shall be protected with 75 mm of topsoil and nursery sod.

3.29 Base Construction

The sub-grade shall be excavated or filled to the required grade for the required width of surface plus shoulders or curbs plus the additional width necessary for the required depth of granular road base. Where earth fill is required, it shall be placed in lifts not exceeding 150 mm in depth and each lift shall be thoroughly consolidated.

All vegetation, boulders over 150 mm in diameter, topsoil and organic or frost heave susceptible materials, shall be removed from the road base to a depth of at least one metre below finished grade and replaced with suitable material. In swamp or other areas where the material at this depth is unsuitable, such treatment as required by the soils report, or as the Municipality may direct, shall be carried out.

The sub-grade shall be shaped to conform to the required longitudinal grade and cross-section and shall have a cross fall of 3% from the centerline of roadway to each side.

The sub-grade shall be compacted with suitable mechanical compaction equipment as required to produce a solid base for the road gravel. All soft spots shall be excavated and backfilled with granular base material.

The granular base shall be laid on dry, smooth, properly graded sub-grade, and shall be spread for the required width of surface plus shoulders and tapered at the edges to meet the edge of sub-grade.

The granular road base shall consist of a bottom course of 300 mm minimum Granular "B" full width across the roadway and shoulders and a top course of 150 mm minimum Granular "A" full width across the roadway

and shoulders conforming in all aspects to the Ontario Provincial Standard Specifications.

The granular base depths are minimum requirements of the Municipality. The Soils Report shall address the adequacy of these minimum depths and make recommendations for additional granulars as appropriate.

The granular materials shall be spread in layers of 150 mm maximum compacted depths, and each layer shall be thoroughly compacted to the satisfaction of the Municipality. No granular base or surface material shall be placed until the grade on which it is to be laid has been inspected and approved by the Municipal Transportation & Environmental Services Department.

3.30 Roadway Surface Asphalt

3.30.1 As soon as the granular base has been completed it shall be thoroughly compacted and shaped and the base course asphalt placed. The base course shall consist of 40 mm minimum thickness of HL4 base course asphalt.

3.30.2 Upon approval of the Municipal Transportation & Environmental Services Department which shall not be given for at least one year from the date of placement of the base course or until 75 percent of the houses have been constructed the surface course asphalt may be placed. A tack coat shall be applied ahead of the surface course as per OPSS. The surface course shall consist of 50 mm minimum thickness of HL3 surface course asphalt.

3.30.3 In rural cross-sections, a single 50 mm lift of HL4 shall be required. Timing of the placement of the single asphalt lift shall be in accordance with the conditions of the Subdivision Agreement for the development. The Municipality shall determine the suitability of a rural cross-section on a site-specific basis.

3.30.4 Asphalt work shall conform in all respects to Ontario Provincial Standard Specifications.

3.31 Driveways

3.31.1 The maximum grade for access driveways shall be 8% (shown on drawings) except in site-specific cases. This maximum grade is not recommended and should be employed only in exceptional cases where conditions prohibit the use of lesser grades. The minimum grades permissible are 2% on boulevards and 1% on lots. Maximum

grade change shall be 4% at curb or sidewalk and 1% per 2.0 metres average. All grades are to be shown on as built drawings.

3.31.2 The location of driveways in cul-de-sacs shall be adjacent to each other and detailed on the engineering drawings for approval by the Municipal Transportation & Environmental Services Department.

3.31.3 Cement end treatments or peers at driveway ends are not allowed.

3.31.4 All access driveways shall be located a minimum of 1.5 metres from utility poles, hydro transformers, catch basins, hydrants, watermain valves, Bell manholes, Bell and Cable T.V. junction boxes, water service valve boxes, side jot lines and other driveways. Where frontage limitations interfere with standard locations, site-specific solutions shall be detailed in the Plan and Profile and Lot Grading Plans.

3.31.5 Between the edge of curb and property line, the driveway entrance shall have a 150 mm thickness of Granular "A" and 50 mm thickness HL3 asphalt surface.

3.31.6 In areas with roadside ditches, the Developer shall install driveway entrance culverts for each lot. Culverts shall be minimum 450 mm diameter, minimum 1.6 mm thickness and minimum length of 7.5 meters.

3.31.7 Entrances will be restricted to one per residential property within a plan of subdivision.

3.32 Concrete Curb and Gutter

3.32.1 Concrete curb and gutter conforming to Ontario Provincial Standard Drawing O.P.S.D. 600.10 shall be installed along all edges of roadway's paved surface as required by the Municipality. The curb shall be dropped at all entrances. Terminations at the limits of the subdivision shall be either joined to existing concrete curbs or terminated as per O.P.S.D. 608.01.

3.32.2 Pipe sub-drains shall be provided under all curb and gutter unless it is deemed unnecessary by a qualified soils consultant to the satisfaction of the Municipality. Sub-drains shall be perforated, corrugated, plastic pipe with geotextile and a minimum length of 5.0 m upstream of each catch basin must be provided. Sub-drains shall be bedded in a 300 mm x 300 mm trench below and at each edge of the sub-grade and shall conform to O.P.S.S. 405.

3.32.3 Concrete shall conform to Ontario Provincial Standard Specification for mix-design, placing concrete and curbing. Curb construction shall conform to O.P.S.S. 353. Concrete shall have a minimum compressive strength of 30 MPa at 28 days and air entraining agent to provide 7% air entrainment.

3.32.4 Curbs shall be bedded on the granular base construction and upon completion of the curbs, Granular "A" backfill shall be placed behind the curb and thoroughly compacted to prevent the displacement of the curb by the subsequent Granular "A" and asphalt operations.

3.32.5 Asphalt gutters are to be used on rural roads when the road grade is greater than 5%.

3.33 Ditches and Culverts

Ditches and culverts shall be sized to take the total expected storm run-off calculated by a recognized design method.

Ditches shall be constructed as follows:

a) Depth below finished centerline grade

Maximum - 1.20 metres

Minimum - 0.75 metres

b) Ditch Grade

Maximum - 6.0%

Minimum - 0.5%

Where the groundwater table is at or above the proposed ditch grade, at any time of the year, a perforated drainage tile (minimum 100 mm diameter) with filter fabric protection shall be provided. 100 mm drainage tile will be inspected post-utility installation.

c) Where considered necessary by the Municipality, ditches shall be piped.

d) Where drainage is conveyed from the roadside ditch to a suitable outlet through an easement it shall be piped using ditch inlets and grates. Storm sewer pipe material shall be concrete, PVC or PE, minimum size 300 mm diameter. Concrete pipe

material must be ES or Class III. PVC or PE pipe material must be 320 kPa pipe stiffness complete with bell and spigot connections.

e) The minimum ditch protection on all ditches shall be 75 mm of topsoil and sod. All topsoil shall be from a source approved by the Municipality, Transportation & Environmental Services and Planning Departments.

f) Normal ditch-to-ditch road culverts shall be installed where required as follows:

i) Minimum Length:	as required from centre of ditch to centre of ditch
ii) Minimum Size:	600 mm diameter
iii) Material:	standard galvanized corrugated pipe
iv) Gauge:	as recommended by manufacturer forH20 highway loading, minimum 2.0 mm thickness
v) Cover:	300 mm minimum at the shoulder of the road for road crossings and all entrance culverts
vi) Bedding:	culverts to be bedded and backfilled with granular material in accordance with Ontario Provincial Standard

Specifications

vii) End Protection:

- In subdivisions and areas where the posted speed is 50

km/hr., all road driveway and walkway culverts shall have the ends protected with precast interlocking paving stones as per Municipal Standard Drawing STD-D1

- In areas where the posted speed limit is greater than 50 km/hr., culverts shall have sufficient lengths to provide a minimum 5.0 m entrance width plus stable side slopes (minimum 2:1).

g) Where it is necessary to construct culverts under roadways or driveways larger than the minimum size, the cross-sectional end area required shall be calculated in accordance with a method recognized by the Ministry of Transportation Ontario. The culverts shall be of reinforced concrete or corrugated metal and detail drawings and calculations shall be submitted for approval to the Municipality.

h) The Municipality may require guide markers to be placed to mark the ends of the culverts. Driveway entrance culverts for each lot shall be installed by the Developer, minimum size 450 mm diameter, minimum 1.6 mm thickness and minimum length 7.5 metres. No driveway or culvert shall be placed closer than 1.5 metres to any water valve, curb stop, lot line, transformer or utility pole.

i) Where culvert ends are spaced less than 3 m, they shall be joined as one, having regard for maximum length of pipe.

j) Where culvert ends are spaced more than 3 meters, they shall not be joined as one.

k) Culverts are to be installed at all fire hydrants in semi urban areas.

3.34 Sidewalks

The location requirements of sidewalks in new subdivisions shall be confirmed with the Municipality prior to commencing the detailed design. In general, sidewalks are required on both sides of all arterial and collector roadways and at least one side of all local urban streets.

The sidewalk shall conform in details and dimensions to the current Municipality of Grey Highlands Standard Detail Drawings and shall be installed at locations as shown on the typical road cross sections. The width

of sidewalks for streets is 1.2 metres on 20 m R.O.W.'s and 1.5 m on 26 m R.O.W.'s.

The sidewalks shall be increased in thickness from 125 mm to 150 mm at all driveway locations as shown on the standard drawings.

At street intersections the curb and the sidewalk shall be depressed to meet the roadway elevations as shown on the standard drawings.

The Municipality of Grey Highlands requires that all concrete sidewalks be constructed as indicated on the approved Engineering Drawings, prior to preliminary acceptance.

The boulevard area between the curb and sidewalk shall be finished with grass.

3.35 GRADING

3.36 General

Lot grading shall conform to the following specifications subject to the requirements of the major drainage system and limits on the depth of street flow.

3.37 Grades

3.37.1 Generally, all lots shall be excavated or filled so that the whole of the lot area from the street line to the building envelope shall have positive drainage to the street and shall have an elevation not less than 0.45 metres and not more than 1.5 metres higher than the finished crown of the road opposite the centre of the lot.

3.37.2 Lots are to be designed with a 5% grade for 1.5 m to 3.0 m from the house foundation. Foundations and associated drains are entirely located a minimum of .3 meters above the seasonal high ground water elevation.

3.37.3 The slope from the curb to the rear of the building shall be a minimum of 2% and maximum of 5%.

3.37.4 Yard areas shall be designed with 1 to 5% grades. Non-yard areas shall have maximum grade of 30%. A soils stability report is required if slopes steeper than 30% are proposed.

3.37.5 Any lot with a 10% average grade may require split level dwellings and cross-sections may be required.

3.37.6 Swales shall be designed with 1% to 5% grades depending on flow and shall generally be 2% where possible.

3.37.7 Private lot catch basins shall be allowed where necessary and located where all structures "(or buildings)" are protected from flooding if the inlet is blocked or surcharged by a major storm event.

3.37.8 Connections for catch basins serving a single lot shall be regarded as service connections and shall be the responsibility of the lot owner to maintain.

3.37.9 Where several lots drain to a catch basin on private property, an easement shall be provided. The catch basin drain lead and easement shall be located along the rear yard lot line and have minimum easement width of 3.0 m; 1.5 m each side of the property line. Grades are to be consistent with adjacent properties.

(i) The piping system will be offset within the easement where deemed necessary.

(ii) Where the inverts of the storm pipe are lower a wider casement may be necessary. Where more than 4 homes require lot drainage a storm/pipe system will be required where curbing is present on the ROW.

3.38 Lot Grading Plan

A lot grading plan, which may incorporate the information required for the drainage plan, shall be submitted to and approved by the Municipality, Transportation & Environmental Services and Planning Departments.

Grades of the subdivision shall meet grades of the adjacent lands for a minimum distance of 3 meters.

The plan shall show existing elevations for each lot corner along with contours plotted at 0.5 m intervals. Contours should be extended 30.0 m outside of the development area.

Proposed elevations for the street centerline at 20 m intervals, lot corners, building lines, break points in side yard swales and first floor of each house shall be shown. Minimum specified house grades should be shown as per the standard detail drawings.

3.39 Sodding and Seeding

Each lot is to receive 75 mm topsoil and be sodded from the street line to the rear building line of the dwelling. The remaining area is to be seeded or

sodded. Seed and sod must be of a quality satisfactory to the Municipality.

3.40 LOT DEVELOPMENT PLANS

3.41 Basic Requirements

After approval of the general lot grading plan and prior to the issuance of building permits, the Consulting Engineer may be required to submit to the Municipality for approval three (3) sets of the proposed lot development plan for those particular lots for which a building permit is desired. That submission would be accompanied by a letter, which would express the Consulting Engineer's approval. The details and content of the lot development plan and the design criteria for lot grading and drainage are outlined in the following section.

It is expected that the majority of proposed lot development plans would conform to the general lot grading plan. All deviations, which are certified by the Consulting Engineer and subsequently approved by the Municipality, will require a revision to the general lot grading plan.

3.42 House Plans

House plans shall be submitted with the lot development plans to verify locations and elevations of the following:

Footing, basement floor, first floor and garage floor;

Top of foundation wall;

Window sills;

Doorways;

Patios and walkouts;

Retaining walls;

Bench mark.

3.43 Grading and Detail

The lot development plans shall show the following grading and miscellaneous detail:

Existing and proposed elevations at lot corners;

Driveway location and elevations of sidewalk(s) and percent grades for

sidewalks and driveways

Direction of surface flow;

Location, grade and inverts of swales;

Centre line elevation of roadway adjacent to lot;

- Location of all catch basins and elevation of grates;
- Hydrants, utility poles, transformers, telephone pedestals, and sidewalks;
- Proposed ground elevations adjacent to the building and at corners;
- Water and sewer service locations and elevations;
- Limit of seeding and sodding;
- Septic/well locations & grades where applicable.

3.44 STORM DRAINAGE SYSTEM

3.45 General

Generally, storm water run-off shall be accommodated by a system of catch basins, manholes and storm sewers or by roadside open ditches and culverts. Storm Sewers will be required unless otherwise approved by the municipality. Storm sewers will be required when the roadside ditches are not able to convey the five year return frequency storm, when the ditch exceeds the maximum depth, or when the ditch grades exceed 6%, or less than 0.5%. The storm drainage system is to be designed to limit flood damage and hazards for non-frequent storm conditions, to provide a reasonable level of convenience and safety for pedestrian and traffic use by removal of lot and street surface run-off during frequent storm conditions and to prevent the impairment of water quality and disturbance to natural streams.

3.46 Service Areas

The system shall be designed to service all areas within the subdivision to their maximum future development in accordance with the Official Plan Section 7.3.1. Allowance shall be made for inflows from the appropriate adjacent drainage area and outlets to the appropriate adjacent sewer or watercourse. The exact location for connecting sewers or channels to

adjacent sewers or areas shall be approved by the Municipality.

3.47 Easements

If the required drainage works from municipal lands or lands to be dedicated to the municipality result in drainage through other lands, all such work shall be carried out by means of a storm drain and appurtenances of sufficient size for the drainage requirements of the area. The design shall be based on the run-off to be expected from the area when completely developed with buildings, pavement, sidewalks, and parking areas, and such design shall be approved by the Municipality.

The Developer will obtain at no expense to the Municipality by deed or grant of easement in a form approved by the Municipal Solicitor, any necessary rights in land for drainage through lands other than its own. The Municipality shall be protected or indemnified by the Developer from all claims or actions of any nature or kind whatsoever arising from the use of such lands until such time as the services installed therein become vested in the Municipality in the manner herein before provided.

3.48 Drainage and/or Stormwater Management Report

The Drainage and/or Storm water Management Report setting out the existing and proposed drainage system shall be submitted for approval to the Municipal Transportation & Environmental Services Department. The report may also have to be approved by the Ministry of Environment and Energy, and the Ministry of Natural Resources, and the Conservation Authority. This report among other things shall pay particular attention to the following:

a) Possible areas within the subdivision not having suitable drainage outlets.

b) The possible obstruction of natural drainage patterns by development and buildings.

c) Details of a suitable drainage outlet(s) from the subdivision.

d) Natural watercourses entering the subdivision and adjacent lands draining to the subdivision.

e) Accumulated flows at all proposed drainage structures.

The report shall include a plan showing the major overland system design. When the Rational Method is used, the relevant

figures are to be entered on Storm Sewer Design Sheets. When computer modeling is used, the report shall indicate model parameters and assumptions used to give outflow hydrographs and hydraulic grade line levels where applicable.

This report shall provide recommendations for dealing with all drainage that affects the design of drainage works for the development, and such recommendations, when approved by the Municipality shall be incorporated into the Engineering Drawings.
Design Flows

Potential increases in run-off rates resulting from new development shall be controlled as required by the Municipality. Where downstream constraints exist such as those established by the Municipality or the Conservation Authority, the drainage report shall demonstrate how run-off rates will be controlled to satisfy those constraints. In the absence of such constraints, the post-development flows from a 5-year return frequency storm generally shall not exceed the flows for pre-development conditions for the same storm at the outlet for the minor system unless it is demonstrated to the satisfaction of the Municipal Transportation & Environmental Services Department that uncontrolled flows will have no adverse effects. Similarly, for the major system, post-development run-off from a 100-year return frequency storm generally shall not exceed the pre-development run-off for the same storm.

3.49 Methods of Computation

Pre-development peak flows shall be computed by a method such as the Rational Method or by an approved computer model. Watershed definition and pre-development flows must be approved by the Municipal Transportation & Environmental Services and Planning Departments.

Preliminary estimates of post-development flow rates may be computed using a method such as the Rational Method.

For all systems and for the design of surcharged sewers and detention facilities, the latest version of the computer model OTTHYMO is recommended. Other hydrograph methods may be considered if it is demonstrated that the results are comparable to those from OTTHYMO. Post-development design flows may be determined using the Rational Method only where the design area is less than 40 hectares and run-off control facilities are not considered.

Rainfall intensity-duration-frequency equations or their curves and design

storm hydrographs must be approved by the Municipal Transportation & Environmental Services and Planning Departments.

Where the first leg of a residential storm sewer system is sized using the Rational Method, the initial inlet time shall be 15 minutes for the 5-year storm and 5 minutes for the 2-year storm.

This shall apply where the upstream drainage area does not include large open space areas. Where peak flows from external areas enter a subdivision sewer system, the more critical case based on either the time of concentration including the external area or the time of concentration excluding the external area shall be used. Actual velocities of computed peak flows shall be used to estimate time of concentration.

A design evaluation of inlet times must be submitted to justify inlet times different from those specified above, especially in the cases where the sewer is designed for certain surcharge levels for larger storms and where the sizing is optimized for both situations. Such an evaluation should be approved by the Municipality prior to submission of design drawings.

Run-off co-efficients for the Rational Method are given by component of surface treatment and by Land Use. The Land Use values provided are intended as a guide only. The designer is encouraged to develop an appropriate co-efficient using a composite calculation, which is subject to the approval of the Municipality.

Description	**R**
Sodded area under 7% slope	0.25
Sodded area over 7% slope	0.35
Paved Area with Storm Sewer	0.90
Paved Area with Sodded Swales	0.30 - 0.85
(Dependent on Relative Area of Swale	
To Paved Area and On Type of Swale)	
Gravel Area	0.75
Roof Area	0.90
Flat Roof Area with Detention Hoppers	0.10 - 0.50
Foundation Connection	0.075 L/s/unit

Residential Lots	0.40 - 0.55
Commercial Lots	0.40 - 0.85
Park, Recreation Centre, Cemetery	0.25
With Any Roof Leaders or Pavement	
To Sodded Areas	
Unimproved Open Space Under 7% Slope	0.25
Unimproved Open Space Over 7% Slope	0.30

For estimating flows from storms larger than the 5 year return storm the run-off co-efficients should be increased to account for the increase in run-off due to saturation of the soil, with the estimate becoming less accurate for larger storms. Co-efficient for the larger storms can be derived as follows:

C10 = (0.8xc5) + 0.2

C25 = (0.7xc5) + 0.3

C50 = (0.6xc5) + 0.4

C100 = (0.5xc5) + 0.5

Manning's Formulae shall be used to determine the capacity of the sewers. For concrete and PVC sewers, a roughness co-efficient of 0.013 shall be used. For corrugated pipe used as culverts, not storm sewers, an appropriate roughness co-efficient shall be used.

In general, a storm sewer system shall be designed to convey not less than the 5-year return frequency storm without surcharge. Surcharged design may be considered for higher design levels where suitable methods are used, or where foundation drains are not connected to the storm sewer, subject to the approval of the Municipality.

3.50 Design Levels

The system is to be designed to provide convenience drainage for frequent storms (minor system) and flood protection from rare events (major system).

3.51 Minor System

Storm sewers and culverts are to be designed for at least a 5-year return frequency storm without surcharge where adequate overland drainage capacity exists to satisfy the major system requirements.

Exceptions to this may be considered under the following circumstances and subject to approval by the Municipal Transportation & Environmental Services Department:

When the major system is inadequate either because there is no outlet for overland flows or there is insufficient surface detention potential, the sewer system shall be designed to carry as much flow as necessary to achieve the minimum 100-year level of protection for the major system as specified below.

3.52 Major System

Run-off rates in excess of the design capacity of the minor system shall be conveyed via streets and swales to a safe outlet. The combination of overland flow system and minor system shall be designed for a minimum 100 year return frequency storm, to prevent flooding of private property with maximum level of road flooding and surface detention as defined below.

Street grading must provide a continuous gradient to direct street flows to a safe outlet at low points. Outlets can be walkways or open sections of roadway leading to parks, open spaces or river valleys.

3.53 Outfalls

Outfall structures to existing channels or watercourses shall be designed to minimize potential erosion or damage in the vicinity of the outfall from maximum design flows.

3.54 Detention and Retention Facilities

Where deemed necessary by the Municipality to reduce run-off increases and to meet identified downstream flow constraints, detention and/or retention facilities shall be provided for both the major and minor systems.

Land area set aside expressly for storm water management facilities where it is not part of a privately owned facility (i.e. roof top storage or otherwise incorporated into industrial/commercial lands) shall be designated as a "storm water detention/retention site" and dedicated by the Developer to the Municipality. It shall not be considered as part of the park system. A structural engineer must approve ail roof top detention facilities.

All storm water management facilities shall be provided with an outlet (overflow spillway) designed to accommodate a 100-year return frequency storm flow without failure. Suitable erosion protection shall be provided downstream of the outlet for all flow conditions. Operation during spring snow melt or freezing conditions shall be investigated and any required changes shall be incorporated.

If a SWM facility contains a permanent pool, a minimum 4 foot chain link fence will be required for the **"Block"** that the facility is located within.

3.55 Water Quality

The potential use of storm water management facilities for water quality control shall be investigated as directed by the Municipal Transportation & Environmental Services and Planning Departments.

3.56 General Design Criteria for Piping

Generally, storm sewer systems shall be designed in accordance with the Ministry of Environment and Ministry of Transportation Guidelines.

3.57 Downstream Size

Except for special cases, the downstream pipe diameter shall always be greater than or equal to the upstream pipe diameter.

3.58 Roof Leaders

Leaders are to be discharged to rear yards onto the ground surface to splash blocks and flows be directed away from the building in such a way as to prevent ponding or seepage into weeping tile. Flows must be directed as to not impact adjacent properties. Where flat roofs are used, as in commercial or industrial sites, detention roof hoppers requiring smaller or fewer roof leaders may be used as part of the storm water management design. No connections are to be installed directly to storm sewers without the appropriate backflow prevention system.

3.59 Foundation Drainage

Foundation drains connected to a storm sewer system will only be permitted when it can be demonstrated to the Municipal Transportation & Environmental Services and Planning Departments that an acceptable level of protection against basement damage will be provided under major storm conditions (i.e. backflow preventers). **Foundation drains shall not be connected to sanitary sewers.**

3.60 Other Connections

All other connections to the storm sewers shall be made as approved by the Municipal Transportation & Environmental Services Department.

3.61 Materials

Sewer pipe material shall be concrete, PVC or PE, minimum size 300 mm diameter. Catch basin leads shall be 250 mm for single catch basins, 300 mm for double catch basins. Concrete pipe material must be ES or Class III. PVC or PE pipe material must be 320 kPa pipe stiffness complete with bell and spigot connections.

3.62 STORM SEWER LAYOUT DETAILS

3.63 Trunk and Local Sewers

Storm sewers shall generally be located as per the standard detail drawing for storm sewers.

Where storm sewers are located on easements, the easement width shall be 4.0 m minimum.

A minimum depth of 1.5 metres to the spring line from the finished road or ground surface elevation, or a sufficient depth for any foundation drains or other connections shall be provided

.Minimum clearance between services shall be provided in accordance with the Ministry of Environment and Energy Guidelines.

3.64 Manholes

Manholes shall be placed at the end of each sewer, at changes in size and material, and at abrupt changes in grade and alignment. Curved or properly deflected sewer lines are allowed with the approval of the Municipal Transportation & Environmental Services Department.

The maximum spacing between manholes shall generally be according to the following:

90 m for 200 mm up to 600 mm diameter

150 m for 600 mm diameter and greater

Drop manholes shall be provided for all sewer junctions having an invert elevation difference in excess of 0.9 metres that cannot be eliminated by changing sewer grades.

Where manholes are located in areas to be flooded by the major storm design and surcharged sewer design is not used, manhole covers shall be of the sealed variety. In all other areas, standard manhole covers shall be used.

3.65 Catch basins

Catch basins are to be located at low points (doubles), upstream of pedestrian crossings and not within 1.0 metres of curb depressions. Preferably, catch basins where required, shall be located at lot lines.

The maximum allowable spacing shall be 90 metres where catch basins are not used as inlet controls. Where catch basins are designed for inlet controls, spacing shall be determined by design.

Catch basin capacities shall be determined in conjunction with the overall storm water management system. On roadways, catch basins shall have a minimum capacity to collect the run-off from the 5-year return frequency storm, sufficient catch basin capacity shall be provided to permit the design flows to enter the sewer system inlet control devices may be used where the hydraulic grade line needs to be strictly controlled i.e. - to prevent surcharging of the sewer line.

Catch basin leads shall be minimum 250 mm at 0.7% grade for single catch basins and 300 mm at 0.7% grade for double catch basins. Leads shall connect to manholes where possible. Where catch basins are designed for inlet controls, restrictive outlets will be permitted subject to the approval of the Municipal Transportation & Environmental Services Department.

Rear yard catch basins and outlet pipes are to be located entirely on the same lot and shall be located 1.0 metres from the lot line.

3.66 SANITARY SEWER SYSTEM

3.67 General

For subdivisions in which sanitary sewers are required, the sewer system shall be designed to carry domestic, commercial and industrial sewage for each area or subdivision under consideration. Flow is to be by gravity and pumping will be considered only where other alternatives are not possible and only with the approval of the Municipal Transportation & Environmental Services Department.

If a pumping station is approved by the Municipality, it shall be designed in accordance with the MOE guidelines with standby power and to the

satisfaction of the Municipal Transportation & Environmental Services Department.

3.68 Service Area

The system shall be designed to service all areas within the subdivision to their maximum future development in accordance with the Municipal Official Plan. Allowance shall be made for inflows from the appropriate adjacent subdivisions or areas and shall meet with the approval of the Municipal Transportation & Environmental Services and Planning Departments. Discharges of the system are to be into appropriate sewers and are to be approved by the Municipal Transportation & Environmental Services Department.

The exact location for connecting to sewers in adjacent subdivisions or areas shall be as approved by the Municipal Transportation & Environmental Services and Planning Departments.

3.69 Drains

All floor drains are to be connected to the sanitary sewer. Foundation drains, sump pumps, and roof water leaders **are not** to be connected to the sanitary sewer.

3.70 Design Flows

The sewers are to be sized for maximum design flows plus an allowance for infiltration. Minimum velocities and slopes are to be determined for maximum design flows without infiltration.

The average daily domestic flow is to be taken as 450 liters/capita/day.

Equivalent domestic flows for areas intended for uses other than residential shall be calculated on an area basis and reviewed with the Municipal Transportation & Environmental Services and Planning Departments prior to design.

Maximum design flows are to be determined using average daily flows and the Harmon Peaking Factor.

A wet weather infiltration rate of 20,000 liters/hectare per day = 0.23 liters per second per gross hectare is to be used. To satisfy self-cleansing requirements in sanitary sewers, assume dry weather infiltration reduces to zero for several days during dry months.
Sewer Design

Manning's Formulae shall be used for determining the capacity of the sewer. A roughness coefficient of n = 0.013 shall be used for all types of pipe.

Pipe strength design calculations shall be provided by the Municipal Transportation & Environmental Services Department for approval.

Sewer pipe shall be PVC-SDR 35 with rubber gasket joints as approved for use by the Ministry of Environment and Energy and shall be a minimum diameter of 200 mm.

The minimum velocity for sewers operating partially full shall result in a self-cleansing equivalent to that produced by flows in the sewer operating full at a velocity of 0.6m/s.

The maximum velocity shall be 3.0 m/s at full flow.

The maximum and minimum grades for pipes shall be the grade necessary to meet the maximum and minimum velocity requirements; however the grade for the minimum velocity requirement shall not exceed 2% or the road grade where the road grade exceeds 2%.

A sufficient drop shall be provided across each manhole to offset any hydraulic losses, the inverts of inlet pipes shall not be lower than obverts of outlet pipes, and drop structures shall be used only when drops of more than 0.9 metres are necessary.

Except for special cases, the downstream pipe diameter shall always be greater than or equal to the upstream pipe diameter.

3.71 Trunk and Local Sewers

3.71.1 Sanitary sewers shall generally be located as per the standard detail drawing for sanitary sewers.

3.71.2 Where sanitary sewers are located in easements, the easement width shall be 3.0 m for sewers at a depth less than 2.0 m and 6.0 m for sewers greater than 2.0 m depth.

3.71.3 A minimum cover of 2.8 metres below the centre line road elevation or sufficient depth for basement floor drains and frost cover shall be provided. Where sewers are located within an easement a minimum frost cover of 1.5 meters may be used provided such sewers cross below watermains.

3.71.4 Minimum clearances between services shall be provided in accordance with MOEE guidelines.

3.72 Manholes

3.72.1 Manholes shall be placed at the end of each line, at changes in size and material, and at abrupt changes in grade and alignment. Curved or properly deflected sewer lines are allowed with the approval of the Municipal Transportation & Environmental Services and Planning Departments.

3.72.2 Manhole types and sizes shall be in accordance with MOEE guidelines. All manholes are to be benched to the satisfaction of the Municipal Transportation & Environmental Services and Planning Departments and frost straps are to be provided between the upper through to the base manhole section.

3.72.3 The maximum spacing between manholes shall be generally according to the following:

3.72.4 110 m for 200 mm up to 900 mm diameter

3.72.5 180 m for 975 mm diameter and greater

3.72.6 Drop manholes shall be provided for ail sewer junctions having an elevation difference in excess of 0.9 metres that cannot be eliminated by changing sewer grades.

3.72.7 Where manholes are located in areas to be flooded by the major design storm, manhole covers shall be of the sealed variety and the manhole is to be suitably vented.

3.73 Service Connections

3.73.1 Single connections for residential and industrial use, shall generally be located at least 2.5 metres right of water service connections, which are located at the centre line of the lot. Connections for commercial, institutional or multiple uses will be considered on an individual basis if similar locations cannot be used. Non-standard locations must be detailed on Plan and Profile and Lot Grading Plans.

3.73.2 Service connections shall be located at a minimum depth of 2.6 metres, or sufficient depth for basement floor drains and frost cover. Service connections should cross under any watermains and be marked with a 50 x 100 mm wooden post painted green. All connections to the sanitary main shall be pre-manufactured approved tees.

3.73.3 Single residential sanitary connections shall be minimum 125 mm diameter PVC-DR 28 with an end cap braced at the property line. The minimum slope shall be 2%. Connections for commercial, industrial and institutional will be considered separately and generally be 150 mm minimum diameter with an end cap.

3.73.4 Upon completion of the work, Sanitary Sewer Service Record Sheets (one for each lot) shall be prepared by the Developer's Engineer and turned over to the Municipality. The sheets shall show clearly:

- Lot, lot number and street lines;
- Tie from the end of the service to the lot lines;
- North arrow;
- Type, diameter and depth below grade at the end of each service; and
- Any other pertinent information.

3.74 Testing of Sewers and Manholes

The complete sewer system including service connections to the property line and manholes shall be tested in accordance with MOEE guidelines. Before the expiration of the maintenance period the complete system shall be inspected by an approved video camera testing company and the Municipal Transportation & Environmental Services Department shall be provided with a copy of the appropriate data prior to final approval. Any sections of sewer or service connections, which fail to meet the requirements, shall be repaired or replaced at the direction of the Municipal Transportation & Environmental Services Department. Only chemical pressure grouting repair techniques will be considered acceptable.

3.75 Water Supply System

3.76 General

For subdivisions that require new communal water supply, the developer shall have discussions with the Municipality to determine the adequacy of the water supply and requirements of the Transportation & Environmental Services Department.

3.77 Water Distribution

3.78 General

Watermains and service connections shall be provided to serve the entire subdivision to the limits of the Plan of Subdivision. A general servicing plan of the subdivision shall show the complete water distribution system for the development. The detailed plan and profile drawings, which must be prepared by a Professional Engineer, shall show plans and profiles for all watermains drawn to the same scales as for the roads (1:500), and typical details of service connections, hydrants, valves and all fittings together with detailed drawings of the proposed water supply system all to a scale of not less than 1:50. Preliminary design of the proposed work should be submitted to the Municipal Transportation & Environmental Services Department for approval.

3.79 Watermain Locations

Watermains shall be in accordance with the Municipal Typical Road Cross-section.

Watermain bedding shall be constructed with beddings as per OPSD 802.010 (Granular "A" embedment material) for flexible pipes and OPSD 802.030 or 802.031 Class "B" (Granular "A" bedding material, Granular "A" or select native cover material) for rigid pipe unless otherwise approved by the Director of Engineering, or alternative embedment material. Alternative embedment material shall be sand meeting gradation requirements of OPS 1004.05.05 compacted to 95% Standard Proctor Density. Geotechnical certification of alternative material must be provided every 150 metres. The compaction testing must include the entire envelope (haunches, bedding and top of pipe).

3.80 Extra Mains and Extra Fittings

No roadway leading out of the subdivision shall be completed by the Developer and accepted by the Municipality until connecting watermains are installed complete to the subdivision limits. Extra fittings shall be installed at any point on the watermains as requested by the Municipal Public Utilities Department to provide for future connections.

3.81 Watermain Size

Watermains shall be adequately sized to ultimately give fire protection. The minimum size shall be 150 mm diameter for residential areas and 200 mm diameter where the abutting properties plan to be used for industrial or commercial purposes. The Municipality may also require a larger main on a subdivision street for circulation or other reasons.

3.82 Watermain Pipe

Watermain pipe shall be C900 Class 150/DR18 rated polyvinyl chloride (PVC) pipe with rubber gasket joint fittings. All PVC watermain is to be installed with a tracer wire brought up at watermain valve locations, placed through the upper section of the valve box so the wire is accessible by removing the valve box lid as noted on the standard drawings. Push-on PVC rubber gasket joint fittings are not to be used on any hydrant lead, elbow or tee.

3.83 Services

Each housing unit shall have a minimum separate 25 mm 1,103.2 kPa rated polyethylene water service. Water service connections are to be located at the centre line of the lots. Service connections to watermains shall be broadband stainless steel saddles on PVC. Tracer wire to be included.

Water services on private property shall be installed on the property to be serviced and, in no case, cross a property line or pass through other private property.

Water services shall be installed to the property line with a Mueller main stop, Mueller self draining curb stop and Mueller A-726 service box or approved equals to the centre of the property line. All water services shall be- installed in conjunction with watermain construction and in advance of road construction.

3.84 Cover on Watermain and Services

The minimum cover on watermains, water services, and hydrant branches under ditches shall be 1.7 metres.

In areas where the Municipal Representative allows a watermain to be installed with less than a minimum cover, the Contractor is to supply and install Styrofoam SM insulation or Urecon insulation as directed by the Municipal Representative to protect watermains, hydrant leads and appurtenances.

3.85 Hydrants

Hydrants shall be Canada Valve “Century” Compression type with Storz pumper port. Hydrant leads shall be 150 mm diameter and shall have a shut-off valve placed 900 mm from the hydrant. Hydrants shall be spaced at a maximum distance of 150 metres. A hydrant shall be placed at the end of any dead end watermain. Wherever possible, hydrants shall be located at corners a minimum of 4.5 metres back from the street line intersections. Hydrants shall maintain an absolute minimum of a 1.5 metre clearance from the edge of all driveways, utilities or any other above grade obstacles. Hydrant flange elevation should be set at a grade that will give a final flange

elevation of 50 mm to 100 mm above final grade. Hydrants shall be bedded in 20 mm clear stone and braced with poured concrete thrust blocking and restraining devices to the satisfaction of the Municipal Transportation & Environmental Services Department.

Hydrant markers, consisting of a black hydrant on yellow background reflectorized galvanized steel sign or approved hydrant symbol shall be mounted on a 4 m length "U" flanged steel post located at 4 o'clock approximately 600mm from the hose nozzle.
Valves

Generally, gate valves shall be installed at the intersections of street lines in a minimum of two (2) directions from a tee and three directions from a cross. Where streets extend for greater than normal distances without intersections the Municipal Transportation & Environmental Services Department may require an extra valve in the main at an intermediate point. Valves shall be Mueller Resilient Wedge Gate-Valves.

All valves at points of termination of a stage of construction shall be braced with (2) additional lengths of watermain pipe beyond the gate valve and a temporary fire hydrant installed. Where watermain valves are located under traveled road surfaces, the top of the operating box shall be set 50 mm below road grade for gravel surfaces and flush with road grade for paved surfaces.

3.86 Specifications

The following specified materials are required for the supply and distribution systems:

- Valves: Mueller Resilient Wedge Gate Valves, AWWA C509-80
- Saddles: Mueller or approved equal
- Main Stop: Mueller or approved equal
- Curb Stop: Mueller or approved equal (self draining)
- Service Box: Mueller A726
- Valve Box: Canada Valve Darling 1322
- Hydrants: Canada Valve “Century Compression” with Storz pumper port

Hydrants are to be painted red. All hydrants, valves elbows or tees are to have sacrificial zinc caps on every second bolt of the mechanical Joint fittings. In addition to thrust blocks, restraining devices are required at all hydrant leads, elbows and tees. Push-on PVC rubber gasket joint fittings are not to be used on any hydrant lead, elbow or tee.

3.87 Testing, Disinfecting, Swabbing and Flushing

Testing of the system shall conform to the following sequence: temporary connection, remove swabs/charge the watermain, pressure test, chlorinate the system, flush the system, take water sample(s) for bacteriological analysis, tracer wire continuity and complete final tie-ins. The Municipal representative shall be on-site for all testing. No tie-ins to the existing water distribution system shall be allowed until all parties have signed the Subdivision Agreement. Final tie-in will not be permitted until all testing and sampling has been completed to the satisfaction of the Municipality. When all the above conditions are met, the new system shall be connected to the existing system.

3.88 Temporary Connection

At the discretion of the Director of Public Utilities or designate, a Contractor may be permitted a temporary connection to the existing water system. This connection will be made from an existing hydrant through a double check valve assembly to the new watermain.

3.89 Swabbing

Swabs shall be new and be supplied by the Contractor. The swabs shall be numbered and the Municipal Representative is required to witness the installation of swabs by the Contractor. A swabbing schedule shall be prepared by the Developer's Consultant and approved by the Municipal Representative. The swabbing schedule shall indicate where the swabs are to be installed and removed. All swabs shall be accounted for and removed from the system prior to pressure testing the system. Any swabs that are not accounted for must be located and removed, including material, labour, equipment and excavation, with no cost to the Municipality.

3.90 Pressure Test

The pressure test will be for a two hour period at 150 psi zero leakage and zero pressure drop. If the pressure test meets this criterion, the system as a whole, shall be accepted.

If the above criterion is not met, the system will be divided into sections no greater than 305m in length. Each section will be tested individually and will be required to meet the allowable leakage and test pressure criteria, as outlined in the AWWA Specification C-600-99: Section 4 "Hydrostatic Testing" and Section 4.1 "Pressure and Leakage Test".

3.91 Chlorination

The system shall be chlorinated with an initial concentration of 50 mg/L available chlorine and allowed to remain in the new system for a minimum

of 24 hours. After 24 hours the free chlorine residual must remain over 2 mg/L. If the free chlorine residual is below 2 mg/L the Chlorination procedure shall be repeated. If the free chlorine residual is above 2 mg/L the system shall be flushed and de-chlorinated using Sodium Thiosulphate or equivalent.

It is the responsibility of the Contractor, during charging, swabbing, chlorination and flushing of the system, to supply a means for the water to escape without causing damage/erosion to the existing grade of the property or any adjacent property.

3.92 Continuity Test

The Municipal Representative shall do a continuity test on the watermain or tracer wire during the test procedures. Should the Municipal Representative find a problem with continuity or installation of the tracer wire, the Contractor will not be allowed a final tie-in to the system. The Contractor/Developer shall be responsible for the repair, at no cost to the Municipality.

3.93 Sampling

A Municipal Representative (certified Water Distribution Operator) shall take water samples from all newly installed watermains for bacteriological analysis. These samples will be taken 24 hours after flushing is complete. A second set of samples will be taken between 24 and 48 hours after the first. Once two (2) consecutive sets of samples confirm there are no bacteria in the system, the Contractor will no longer operate any valves and final tie-in will be permitted.

3.94 Tie in

When all testing has been completed to the satisfaction of the Municipal Representative, the final tie-ins may be scheduled. At the discretion of the Municipal Representative, the Contractor may be permitted to do the tie-in. A Municipal Representative (certified Water Distribution Operator) must be present when the Contractor performs the final tie-in. When the Contractor is not granted permission to do the tie-in, the Contractor shall provide all materials, excavation, labour, equipment, necessary safety devices and restoration for the Municipal Representatives to complete the actual tie-in. The Contractor shall provide assistance as required by the Municipal Representatives.

3.95 Construction Sequence

All water services, hydrants and other works on any section of-watermain

shall be installed in conjunction with watermain construction at a time stipulated by the Municipality and shall be completed prior to construction of finished roads and ditches.

Backfill to watermains and services across roadways shall be approved granular material thoroughly compacted. The mains and services shall not be backfilled until approval from the Municipality has been given.

3.96 Acceptance of Water System

Generally, the Municipality shall accept the watermains as soon as the supply and distribution system has been constructed, tested and disinfected to the satisfaction of the Municipality. The Certificate of Substantial Completion and Acceptance for the water system shall then be issued.

Notwithstanding the above, assumption of the water system by the Municipality shall be subject to and in accordance with the Subdivision Agreement for the Development.

3.97 MISCELLANEOUS

3.98 Water Meters

The Municipality will supply a water meter with radio frequency capability for each service connection. The cost of the meter and installation shall be the Developer/Owner's expense. Water meters located in a crawl space or other inaccessible areas will not be accepted. The Developer/Owner shall keep the water meters accessible, clean, dry, and protected from freezing.

3.99 UTILITIES

3.100 General

The General Service Plan shall indicate the proposed location of Bell and television facilities, hydro transformers, streetlights and gas facilities.

All locations must be established and resolved by the Developer's Engineer in conjunction with the utility companies and following the locations shown on the typical cross-section.

Utility crossings for new roads shall be placed prior to placement of granular road base materials. Utility crossing on existing roads shall not be carried out until approved by the Municipality. Utility crossings for existing roads shall have the asphalt surface saw-cut and removed for the width of the trench plus a minimum of 0.3 metres out from each side of the trench wails.

Frost tapers with a 10:1 slope to the 1.5 m depth frost line shall be

constructed. The frost tapers shall begin at a point 0.3 metres out from each side the trench wall.

Compaction of backfill for utility trenches with boulevards shall be 95% Standard Proctor Density and 100% for driveways and traveled roads. Granulars shall be reinstated and properly compacted. An asphalt binder shall be applied to saw-cut edges prior to the final layer of asphalt.

For non-trenching installations, a minimum 1.5 m boring depth must be provided for utilities under roadways where possible.

3.101 Telephone

Telephone service shall be underground and shall be installed by Bell Canada or an approved Contractor. The Developer must bear the cost of any surcharges for underground installation made by Bell Canada and must grant Bell Canada any necessary easements for their services.

3.102 Hydro

Hydro service shall be underground and shall be installed by Hydro One or an approved Contractor. The Developer must bear the cost of any surcharges for underground installation made by Hydro One and must grant Hydro One any necessary easements for their services.

3.103 Gas

Gas services shall be underground on the opposite side of the street to the watermains and shall be installed by the Gas Company or an approved Contractor. The Developer must bear the cost of any surcharges for underground installation made by the Gas Company and must grant the Gas Company any necessary easements for their services.

3.104 Cable T.V.

Cable T.V. services shall be underground and shall be installed by the Cable T.V. Company or an approved Contractor. The Developer must bear the cost of any surcharges for underground installation made by the Cable T.V. Company and must grant the Cable T.V. Company any necessary easements for their services.

3.105 Street Lighting

For residential subdivisions, local street and collector roads, the Municipality of Grey Highlands standard is LED luminaires on 9.14 metre Sectional Steel Poles or concrete poles. All luminaires must be approved by the Municipality.

All light levels are to conform to Illuminating Society of North America's (ISONA) RE-8-00 Guidelines for Roadway Lighting.

LED Specifications shall conform to the following:

- Colour temperature shall be 4,500K ±500 nominal;
- Housing shall contain measures that prevent the entry of birds;
- Photocells shall be the twist lock type, long life and consist of solid state design;
- LES life rating data shall be determined in accordance with IESNA LM-80 and luminaires shall be tested for photometric and electrical performance in accordance with the IESNA LM-79.

Approved luminaires shall be as follows:

<u>Cobra Head</u>

- LED: General Electrical ERX Series, LED Roadway Lighting "M"/"S" Series, Cooper Lighting NAV/XNV2 Series or equivalent.

<u>Architectural</u>

- LED: King Luminaire K601 Series, Sternberg Lighting Carson City Series, Cooper Lighting Springdale Series or equivalent.

Each light shall be controlled by a dusk to dawn photoelectric cell. Power feed shall be completely underground. The maximum allowable spacing along the street between the lights shall be 75 meters; however, the poles must be located on lot lines. Particular care shall be taken to adequately illuminate intersections, where a high watt lamp and/or different spacing may be required.

Street lighting standards are to be installed no closer than 3 m (10') to pad mount transformers.

Power Pedestals are required for streetlights.

All cable required for street lights will be supplied and installed by the Developer (including the cable from transformer to the first supply point). The acceptable conductor type in order of preference is any of the following:

NMW-10

Twisted assembly or TWU or TWHU or RWU-75 or RWU-90 USE-90

Minimum conductor size is # 12 AWG and the maximum allowable voltage drop is 5%.

Each connection at a supply transformer shall be fused at maximum 20 Amps. All materials must be CSA-approved.

All street lighting cabling, power supply, layout and installation shall be in accordance with the Ontario Electrical Safety Code.

The proposed street lighting layout shall be submitted to the Municipality Transportation & Environmental Services and Planning Departments for approval prior to commencement of any installation.

Aluminum Bracket Arm shall be a minimum 2.4 metres length with minimum arm member size of 100 mm. Acceptable products: Valmont, Series 50 Tapered Elliptical.

3.106 SIGNS

3.107 General

3.107.1 A plan of all street and traffic signs shall be submitted to the Municipal Transportation & Environmental Services and Planning Departments for approval.

3.107.2 Where applicable, street name signs and posts shall conform to the municipal 911 standards.

3.108 Traffic Signs

3.108.1 Traffic signs shall be provided and installed by the Developer at the cost of the Developer. The signs are to be of a standard type approved by the Ministry of Transportation Ontario and shall be located as required by the Municipality, following the passing of a by-law for their installation.

3.108.2 The shape, colour, height and location of traffic signs shall be in accordance with the Manual of Uniform Traffic Control Devices as published by the Ministry of Transportation. All Regulatory traffic signs shall be manufactured using "High Intensity" sheeting conforming to ASTM D4956-90 Type lll or Type IV material.

3.108.3 Traffic signs are typically to be located in the intersection as follows:

- 2.0 metres offset from edge of asphalt of approach road.
  5.0 metres offset from edge of asphalt of through road.

3.109 Street Name Signs

3.109.1 At each intersection there shall be erected a double unit street name sign. The signs shall be typically located in the intersection as follows:

3.109.2 3.0 metres offset from edge of asphalt or approach road. 5.0 metres offset from edge of asphalt of through road. -In boulevard, on opposite side of road from traffic sign.

3.109.3 Street Name Blades are to be manufactured with extruded aluminum, 16 centimeters in width, with white letters on a green background. The shape, colour, height and location of traffic signs shall be in accordance with the Manual of Uniform Traffic Control Devices as published by the Ministry of Transportation. All Regulatory traffic signs shall be manufactured using "High Intensity" sheeting conforming to ASTM D4956-90 Type III or Type IV material.

3.110 Traffic and Street Sign Posts

3.110.1 Sign posts for street name signs and traffic signs are to be "U-Flange" steel posts manufactured form 80,000 psi high carbon steel with hot-dipped-galvanizing around the pre-punched holes.

3.110.2 Posts are to be 3.6 metres in total length and are to be buried 1.2 metres in the ground. "U-flange" section shall be 32 mm x 50 mm.

3.110.3 Hardware for sign mounting to conform to the following specifics by Clemmer Industries Limited or approved equivalent:

3.110.4 Post Cap, B-2Cross Mounting Bracket, D-1 U Flange Post Adaptor, E-2

3.111 Street Names**: Proposed street names shall be subject to the approval of the Municipality.**

3.112 Walkways

3.112.1 The Developer shall construct all walkways shown on the plan of subdivision. Walkways shall be constructed with 150 mm minimum depth of Granular "A" on a properly constructed foundation. Walkways between residential lots shall be paved with 50 mm of bituminous paved surface, minimum width 3.0 metres, and fenced with 1.2 metre high chain link fence along both sides from property line to property line.

3.112.2 Gates for walkways shall be installed at the street line in accordance with Municipal Standard Drawing STD-WG1 and a walkway culvert properly sized with suitable end protection shall be installed.

3.113 Mailboxes

3.113.1 An area is to be provided in a location approved by the Municipality for Canada Post Community Mailboxes. The area shall be beyond the edge of shoulder or back of curb with provision for structural concrete bases when required.

3.113.2 Where the area is provided on a semi-urban roadway, it will consist of 50 mm HL3 asphalt on a granular base. The asphalt shall extend from the edge of the paved portion of the road to the back of the mailboxes. The location of the mailbox area is to be indicated on the General Service Plan.

3.114 Public Open Space Development

3.115 General

3.115.1 The Developer or its representative shall prepare and submit plans and detailed drawings, where required, to the Municipality for approval.

3.115.2 Public open space areas shall be developed in accordance with the following requirements.

3.116 Site Preparation

3.116.1 Unless otherwise directed, all Open space sites are to be left in a natural state. Site-specific works may be required by the Municipality with Open Space natural areas.

3.116.2 Developer is responsible to protect all existing healthy trees from any damage from the drip line of their root zones, inward. This protection shall remain during the entire construction phase.

3.116.3 Underbrush less than 50 mm in diameter to a height of 1.0 metre above ground shall be removed by the Developer.

3.116.4 All dead, diseased or damaged trees shall be removed by the Developer.

3.116.5 All dead, diseased or damaged wood in live trees shall be removed by the Developer, utilizing all proper pruning practices.

3.116.6 Any other trees that the Municipality deems necessary for removal shall be removed by the Developer.

3.116.7 Any fallen limbs, trees, litter and debris shall be removed from the Open Space site by the Developer.

3.116.8 Any stumps that the Municipality deems necessary for removal shall be removed and disposed of by the Developer.

3.116.9 The existing topsoil shall not be removed from the Open Space site. Existing topsoil may be stockpiled in an area designated by the Municipality to allow for grading.

3.116.10 The stockpiling or the burial of litter and debris on the Open Space site shall not be permitted.

3.117 Grading

3.117.1 The Developer shall do all rough grading and filling where required establishing the sub grade to a depth to allow the placing of 150 mm of topsoil over the sub grade to reach the desired finished grade. The existing grade shall be maintained around trees, and fill shall not be placed over tree root areas.

3.117.2 Again note that the Developer is responsible to protect all existing healthy trees from the drip line of their root zones, inward. This protection shall remain in place during the entire construction phase.

3.118 Topsoil or Sand Surface

3.118.1 Where designated, screened organic loam topsoil or screened sand shall be placed over the sub grade to a uniform depth of 150 mm.

3.118.2 Topsoil shall be free of chemical contaminants and shall have an acidity range between 6.0 pH and 7.5 pH.

3.118.3 The Developer shall remove and dispose of any contaminated soil or sand from the site.

3.119 Mechanical Seeding, Hydro-Mulching or Sodding

3.119.1 Seeding, hydro-mulching or sodding shall be done by the Developer in areas designated by the Municipality.

3.119.2 Application equipment and procedures shall meet the acceptance of the Municipality.

3.119.3 Grass seed shall be a Canada No. 1 Seed Mixture for park or athletic turf. Seed mixture shall be approved by the Municipality.

- e.g. 20% Kentucky Bluegrass 20 % Chewing Fescue 20% Hard Fescue 15% Tall Fescue 10% White Clover 15% Perennial Ryegrass or 50/50 mixture of Bluegrass and Perennial Ryegrass

3.119.4 The recommended seeding rate is approximately 140 kg/hectare.

3.119.5 No area shall be seeded, hydro-mulched or sodded until the Municipality has approved the surface preparation.

3.119.6 Sod shall be No. 1 Bluegrass-Fescue sod, be uniform in texture, free of weeds and in a good healthy condition, and contain sufficient moisture to maintain its vitality during transportation and placing.

3.119.7 In designated slope areas, sod will require pegging by a system acceptable to the Municipality.

3.119.8 The Developer shall be responsible for proper turf maintenance up to the time of Substantial Completion of Open Space areas, to the acceptance of the Municipality.

3.120 Additional Woody Plant Material Required

3.120.1 The Developer shall be responsible for the supply, delivery, planting and after-planting maintenance up to the time of Substantial Completion of Open Space areas to the acceptance of the Municipality.

3.120.2 The planting and the plant material required shall be designated by the Municipality and planted and maintained by procedures acceptable to the Municipality.

3.120.3 Plant material shall consist of 2.5 m high deciduous hardwood trees or 2.5 m high conifers suitable for shade, buffer or specimen planting.

3.120.4 Plant material shall be balled and burlapped.

3.120.5 A clean wood chip mulch shall be placed 100 mm deep over root areas and the Municipality must approve staking and tying procedures.

3.121 Securities for Construction and Maintenance

The Developer shall pay the securities required by the Municipality for the construction and maintenance of these works. The value of the required securities shall be determined by the Municipal Transportation &

Environmental Services and Planning Departments, and shall be included in the Subdivision Agreement, Schedule "D".

3.122 Completion

The Developer shall be required to complete all the Open Space works prior to the issuance of more than 25% of the Building Permits for the first phase of the development. This shall be included in the Subdivision Agreement.

3.123 Guarantee

The Developer shall guarantee all materials, equipment and works, with the exception of plant materials, for a period of two years following acceptance. Plant materials shall be guaranteed for a period of one year following acceptance. This shall be included in the Subdivision Agreement.

3.124 Special Provisions

Notwithstanding the above engineering standards, the Developer agrees to provide whatever additional or alternative services which may be determined by the Municipality particularly with respect to the water supply and distribution systems, and the sanitary sewer system, all subject to the approval of the Municipal Public Utilities and Planning Departments.

3.125 Standard Drawings

Ontario Provincial Standard Drawings shall apply together with the attached Municipal Grey Highlands Standard Drawings:

DRAWING: MG 04 6732-U	TYPICAL URBAN SECTION-20.0M R.O.W.
DRAWING: MG 04 6732-SR	TYPICAL SEMI-URBAN SECTION – 20.0M R.O.W
DRAWING: MG 04 6732-R	TYPICAL RURAL SECTION – 20.0M R.O.W
DRAWING: MG 04 6732-TA	TYPICAL TURNING BASIN – 20.0M R.O.W OPEN DITCH AND CURB & GUTTER

131120 Grey Highlands Development Standards 2013 Standards

4 Definitions

5 References and Related Documents

Design Specifications as attached:

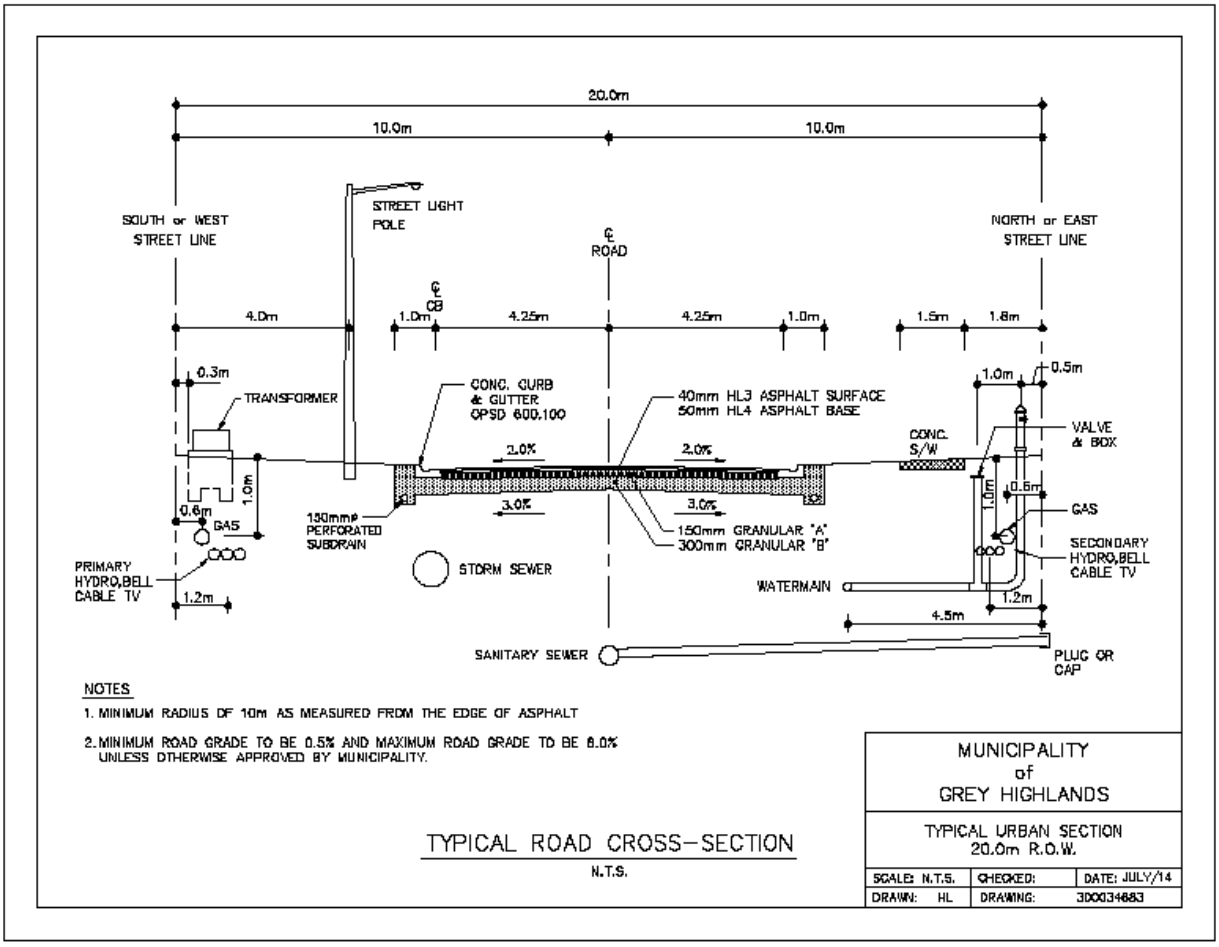
5.1 Typical Urban Section

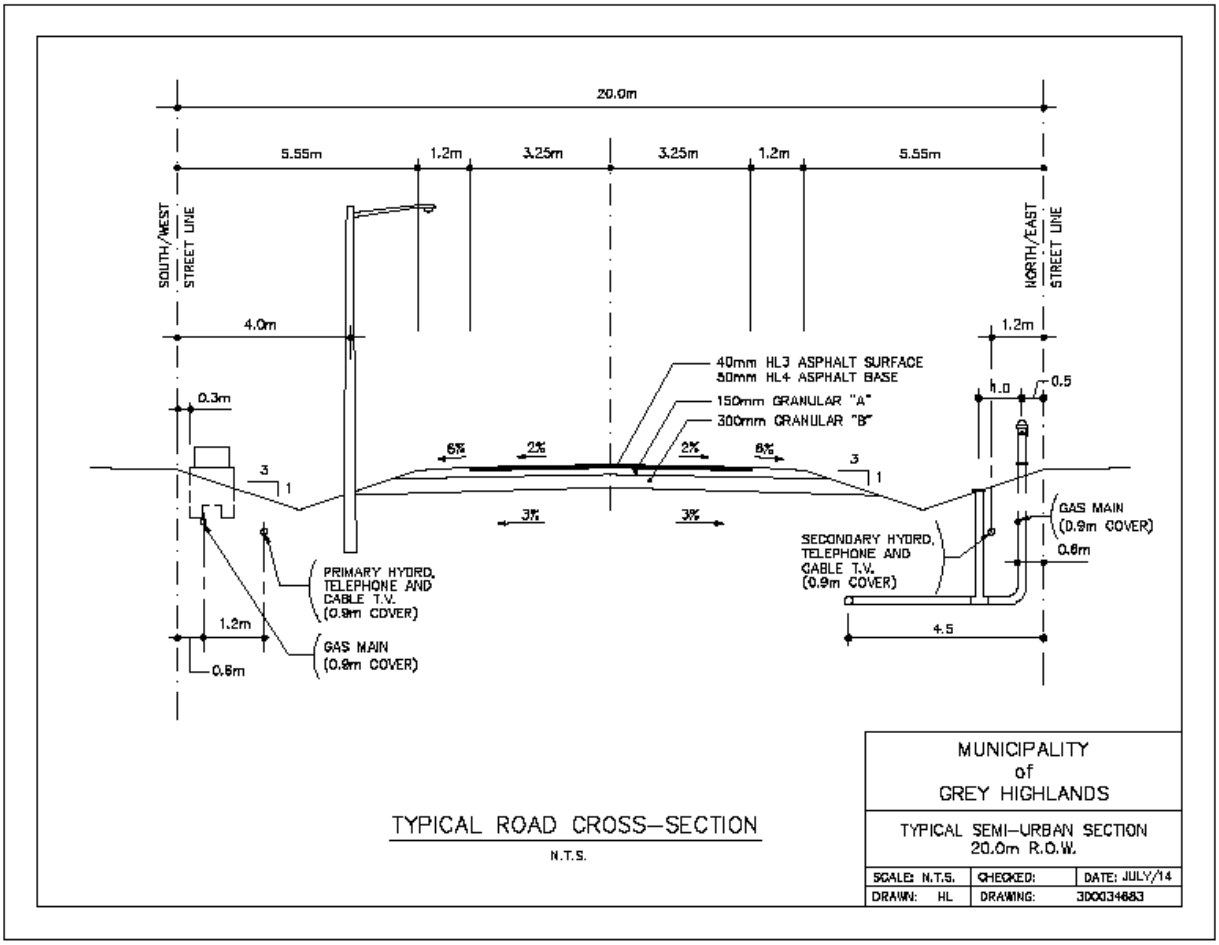
5.2 Typical Semi-Urban Section

5.3 Typical Rural Section

5.4 Typical Road Turning Basins & Open Ditch and Curb & Gutter

5.5 Typical Road Cul-de-sac


20.0m
10.0m
10.0m
SOUTH or WEST
STREET LINE
STREET LIGHT
POLE
℄
ROAD
NORTH or EAST
STREET LINE
℄
CB
4.0m
1.0m
4.25m
4.25m
1.0m
1.5m
1.8m
0.3m
TRANSFORMER
CONC. CURB
& GUTTER
OPSD 600.100
40mm HL3 ASPHALT SURFACE
50mm HL4 ASPHALT BASE
CONC.
S/W
VALVE
& BOX
1.0m
0.5m
2.0%
2.0%
3.0%
3.0%
0.6m
1.0m
GAS
150mmø
PERFORATED
SUBDRAIN
150mm GRANULAR 'A'
300mm GRANULAR 'B'
STORM SEWER
SECONDARY
HYDRO,BELL
CABLE TV
PRIMARY
HYDRO,BELL
CABLE TV
WATERMAIN
1.2m
1.2m
4.5m
SANITARY SEWER
PLUG OR
CAP
NOTES
1. MINIMUM RADIUS OF 10m AS MEASURED FROM THE EDGE OF ASPHALT
2. MINIMUM ROAD GRADE TO BE 0.5% AND MAXIMUM ROAD GRADE TO BE 6.0% UNLESS OTHERWISE APPROVED BY MUNICIPALITY.
TYPICAL ROAD CROSS-SECTION
N.T.S.
MUNICIPALITY
of
GREY HIGHLANDS
TYPICAL URBAN SECTION
20.0m R.O.W.
SCALE: N.T.S.
CHECKED:
DATE: JULY/14
DRAWN: HL
DRAWING: 300034883


20.0m
5.55m
1.2m
3.25m
3.25m
1.2m
5.55m
SOUTH/WEST STREET LINE
NORTH/EAST STREET LINE
4.0m
1.2m
0.3m
40mm HL3 ASPHALT SURFACE
50mm HL4 ASPHALT BASE
150mm GRANULAR "A"
300mm GRANULAR "B"
1.0
0.5
6%
2%
2%
6%
3
1
3
1
3%
3%
GAS MAIN
(0.9m COVER)
0.6m
SECONDARY HYDRO, TELEPHONE AND CABLE T.V. (0.9m COVER)
PRIMARY HYDRO, TELEPHONE AND CABLE T.V. (0.9m COVER)
1.2m
GAS MAIN
(0.9m COVER)
0.6m
4.5
TYPICAL ROAD CROSS-SECTION
N.T.S.
MUNICIPALITY of GREY HIGHLANDS
TYPICAL SEMI-URBAN SECTION 20.0m R.O.W.
SCALE: N.T.S.
CHECKED:
DATE: JULY/14
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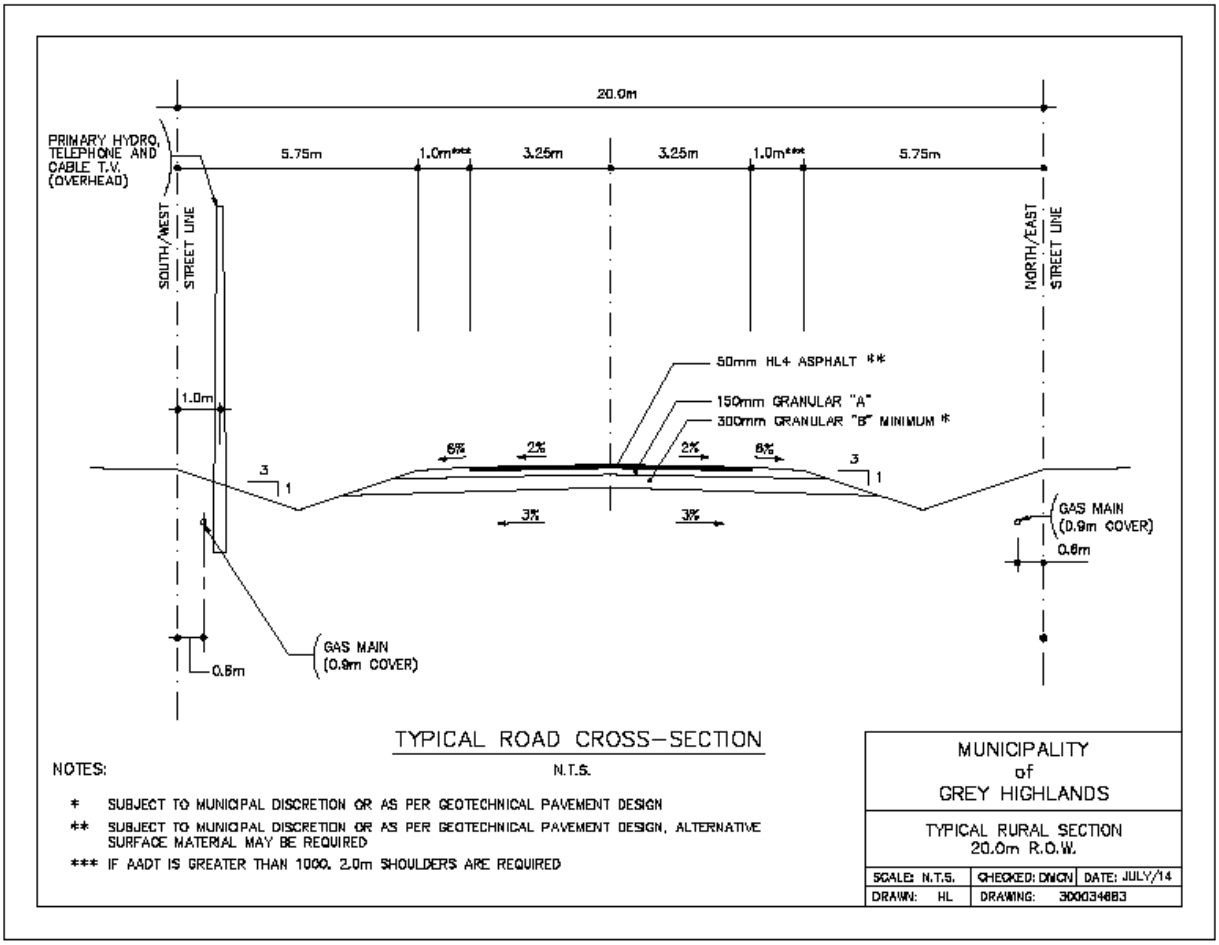
20.0m
PRIMARY HYDRO, TELEPHONE AND CABLE T.V. (OVERHEAD)
5.75m
1.0m***
3.25m
3.25m
1.0m***
5.75m
SOUTH/WEST STREET LINE
NORTH/EAST STREET LINE
50mm HL4 ASPHALT **
150mm GRANULAR "A"
300mm GRANULAR "B" MINIMUM *
1.0m
6%
2%
2%
6%
3
1
3
1
3%
3%
GAS MAIN (0.9m COVER)
0.6m
GAS MAIN (0.9m COVER)
0.6m
TYPICAL ROAD CROSS-SECTION
N.T.S.
NOTES:
* SUBJECT TO MUNICIPAL DISCRETION OR AS PER GEOTECHNICAL PAVEMENT DESIGN
** SUBJECT TO MUNICIPAL DISCRETION OR AS PER GEOTECHNICAL PAVEMENT DESIGN, ALTERNATIVE SURFACE MATERIAL MAY BE REQUIRED
*** IF AADT IS GREATER THAN 1000, 2.0m SHOULDERS ARE REQUIRED
MUNICIPALITY of GREY HIGHLANDS
TYPICAL RURAL SECTION 20.0m R.O.W.
SCALE: N.T.S.
CHECKED: DWCN
DATE: JULY/14
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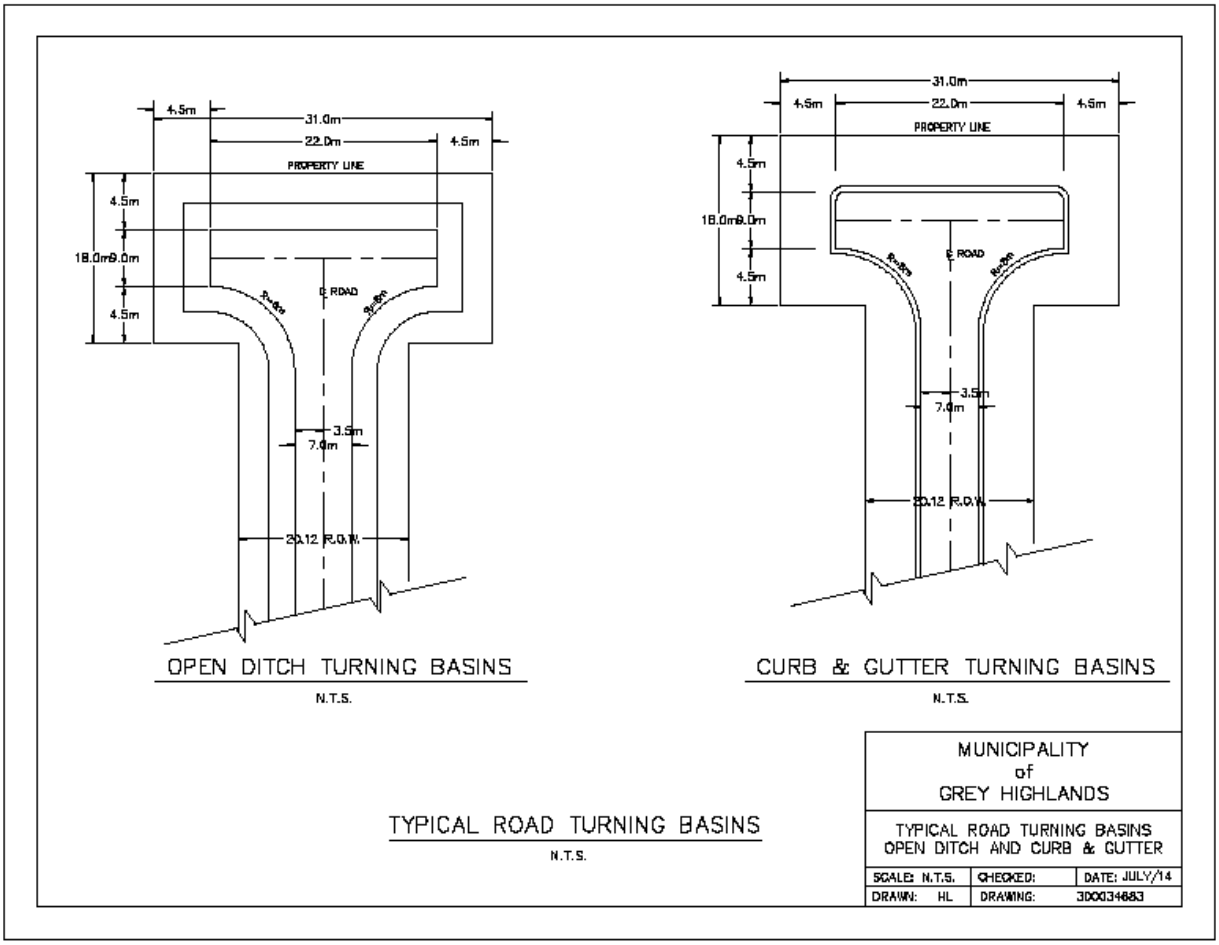
4.5m
31.0m
22.0m
4.5m
PROPERTY LINE
4.5m
18.0m
9.0m
4.5m
℄ ROAD
3.5m
7.0m
20.12 R.O.W.
OPEN DITCH TURNING BASINS
N.T.S.
31.0m
4.5m
22.0m
4.5m
PROPERTY LINE
4.5m
18.0m
9.0m
4.5m
℄ ROAD
3.5m
7.0m
20.12 R.O.W.
CURB & GUTTER TURNING BASINS
N.T.S.
TYPICAL ROAD TURNING BASINS
N.T.S.
MUNICIPALITY
of
GREY HIGHLANDS
TYPICAL ROAD TURNING BASINS
OPEN DITCH AND CURB & GUTTER
SCALE: N.T.S.
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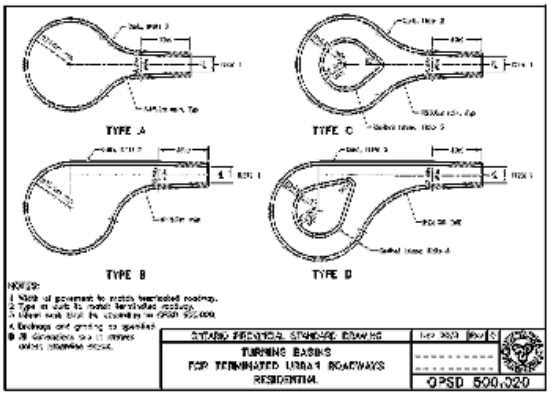

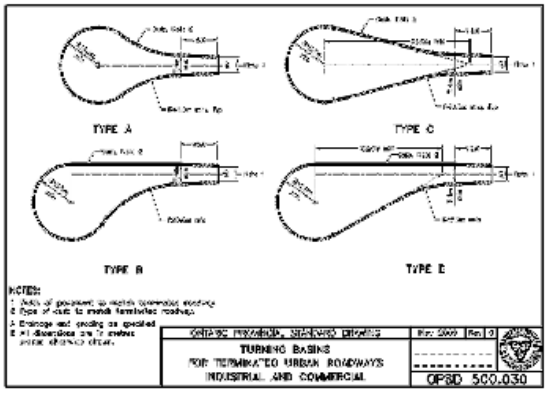

TYPICAL ROAD CUL-DE-SAC

N.T.S.

MUNICIPALITY of GREY HIGHLANDS		
TYPICAL ROAD CUL-DE-SAC		
SCALE: N.T.S.	CHECKED:	DATE: JULY/14
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