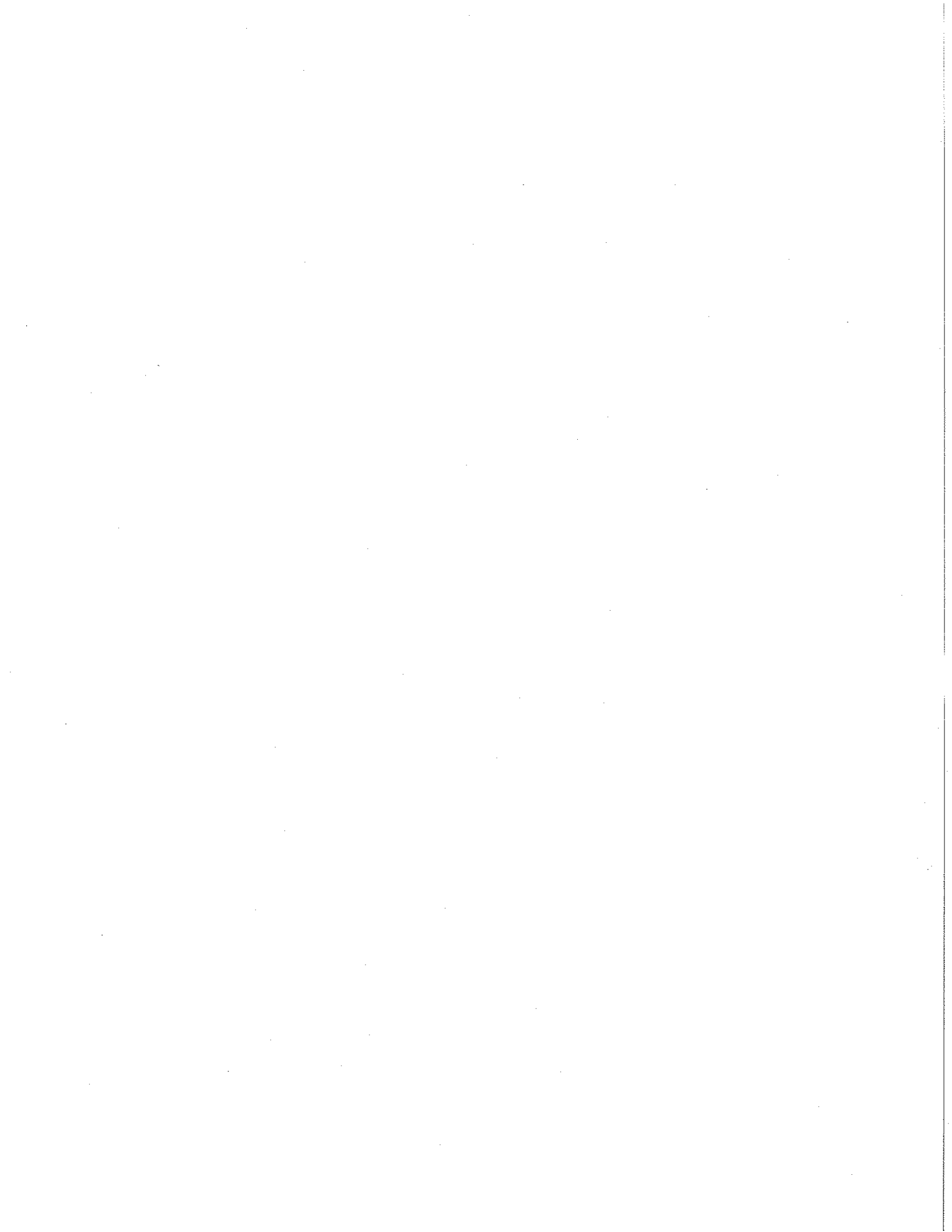




Town of Erin

MUNICIPAL SERVICING STANDARDS

Adopted by Council April 3, 2007



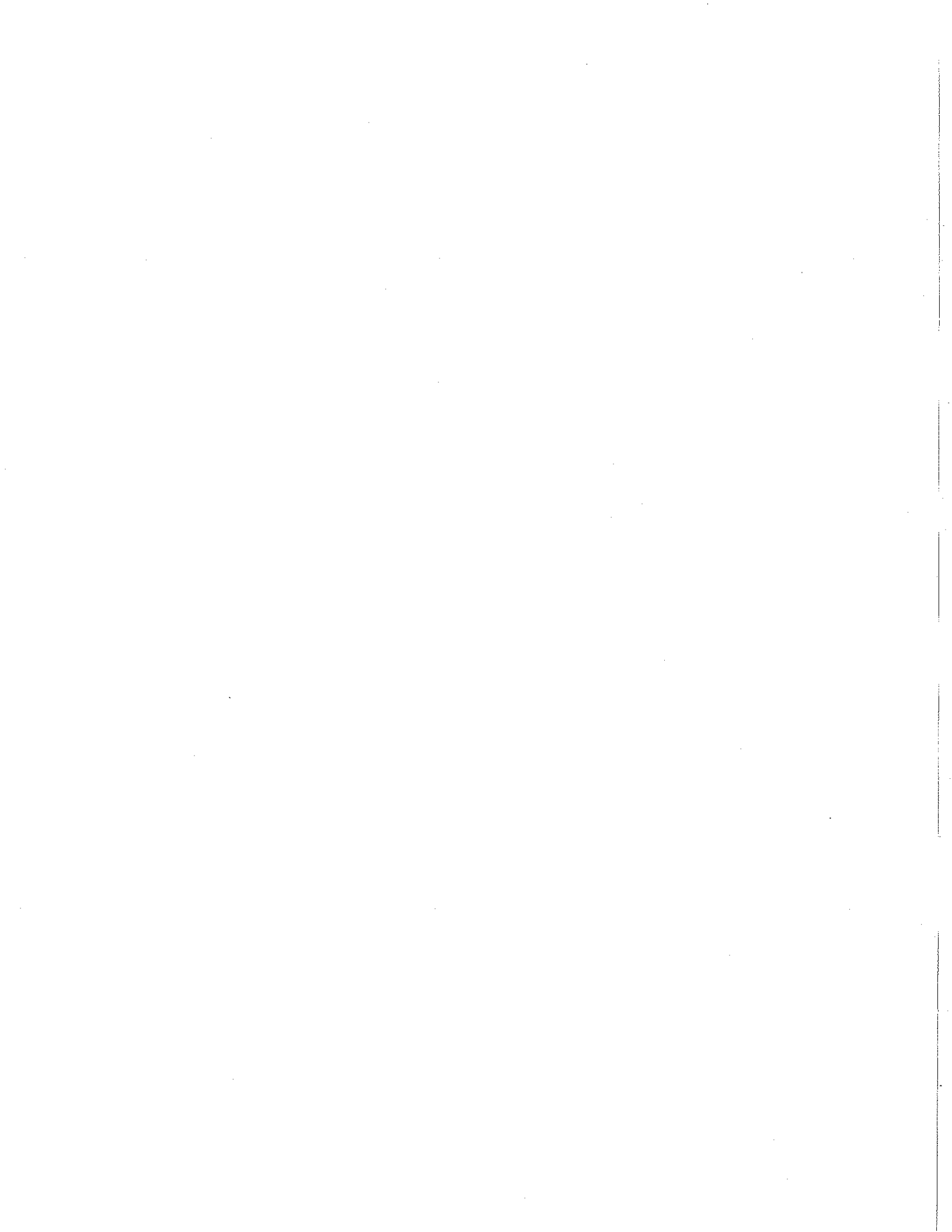


MUNICIPAL SERVICING STANDARDS

March 2007

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TOWN OF ERIN

DEVELOPMENT PROCEDURE

SECTION "A"

A) DEVELOPMENT PROCEDURE

To assist in the regulation of private development, the Town of Erin has prepared a recommended development procedure which will act as a guideline in the development process. The procedure along with the requirements of the Official Plan, are to be incorporated in the review of all private developments. Applicants must meet with the Town Staff in advance of submitting a development application to discuss design standards to be used, availability of municipal piped water supply, environmental sensitivity of surrounding land uses and requirements of supporting information needed to assess the application.

Upon submission of a development application to the Town of Erin the application will be presented to Council prior to the 30 day period of acceptance of completeness of the application. Consultation in advance of submission ensures that the applicant is aware at the time of submission on what the Town of Erin considers a complete application.

Urban/Suburban: for urban and hamlet settings. All developments with Municipal water systems shall be developed in accordance with the Urban Suburban standards. The Urban/Suburban standards are to be used in urban and hamlet settings where the minimum lot size is 0.18 ha with a minimum frontage of 24.4m.

The following is a list of typical accompanying information that is required by the Town to consider a development proposal such as an Official Plan Amendment, Zoning Amendment, Draft Plan of Subdivision or Condominium;

1. Completed Application Form & Fees, including a cash deposit in accordance with the Town's current tariff of fees By-Law.
2. The pre-servicing report shall address the proposed servicing standards to be employed in the development including but not limited to the following.
 - a) Water supply and distribution.
 - b) Sewage collection and disposal system to be used throughout the Development.
 - c) Storm drainage and storm water management including proposed outlet locations.
 - d) Road construction standards to be used.
 - e) Trunk servicing requirements for storm drainage, sanitary sewage collection and water distribution.
3. Hydrogeological Assessment to comment on the impacts on the existing ground water regime relative to the proposed storm water management facilities and water supply system; capabilities of the soils to provide for the proposed sewage disposal systems; the capacity of existing water supply, distribution, and storage systems; the location of proposed water supply and storage facilities; trunk water main locations; the effects of the new development on existing sewage disposal and potable water supply systems; and the impacts of the groundwater table on house construction and foundation design.

4. Preliminary Storm Water Management to address provisions for various storm intervals up to and including the regional storm, existing outlet capacities, and location of storm water detention and/or retention facilities.

Response to the approval authority regarding Draft Plan approval and authorization to proceed with the final design of the services will be granted when the Town is satisfied that the development is in accordance with the Town's current planning requirements and Servicing Standards, the existing sewage and the water supply systems will not be adversely affected by a new development and existing water supply, distribution and storage facilities will accommodate new development, or it is demonstrated how they can be expanded or new facilities constructed in order to provide for additional development. The Conditions of Draft Plan Approval have to be issued by the appropriate approval authority, before the Town will approve preparation of the design drawings and Subdivision Agreement. Additional background studies, as identified in the Official Plan, such as Planning, Environmental or Traffic Impact, may be required at this time. Upon submission of a complete application the application will be circulated and a public meeting date will be set by Council

5. Draft Approval

Upon approval of the Draft Plan by the Town and the approval authority, the Town will provide the developer with a list of the technical requirements for development which will include:

- a) Conditions of Draft Approval.
- b) Financial contributions to be paid by the owner including development charges together with any specific charges for trunk services, external road construction and water supply and/or treatment facilities.
- c) A list of the Town's current tariff of fees for reviewing the applications.
- d) A summary of any outstanding taxes or local improvement charges on the property.
- e) Requirements with respect to the owner providing financial guarantees and liability insurance.
- f) A copy of the Town's current Municipal Servicing Standards and Design Criteria.
- g) Any special servicing requirements that are related to the development.
- h) Easements and other lands to be dedicated to the Town.
- i) A copy of the Town's current Subdivision Agreement.

6. Design Drawing Submission

Preparation and submission of plans, design calculations and specifications by the Developer's Registered Professional Engineer for the municipal services to be provided in accordance with the Town's current servicing standards. All plans are to be A1 size and shall bear the seal of the registered Professional Engineer responsible for the design.

All plans shall have a title block and a revisions block. All revisions to the plans shall be properly noted in the revisions block with the revision number and date revised.

All General Plans shall be a minimum scale of 1:1000. The Plans shall include:

- a) Plan for Registration.
- b) General Plan of the development showing all proposed and existing municipal services.
- c) A Grading Control Plan showing all existing and proposed elevations for the development boundaries, road, lots, and recreational areas including fencing and landscaping details. Typical grading details for various lot drainage types should be provided on separate detail drawings. All grading plans shall be a minimum scale of 1:500.
- d) A Storm Sewer Drainage Area Plan with 1 m contours for the proposed development and all external drainage areas.
- e) A Sanitary Sewer Drainage Area Plan if the development is to have a communal sewage system.
- f) Composite Utility Plan showing the location of hydrants, trees, entrances, poles, street lights, transformers, water shut-offs, etc.
- g) Plan and Profile Drawings of all streets, service easements, drainage channels and outlets at a minimum scale of 1:500 horizontal and 1:50 vertical.
- h) Detail Plans showing typical road sections, drainage channel sections and proposed servicing details and standards.
- i) Cross-sections of the property and roadways if requested by the Town 's Engineer.
- j) Plans showing the details of all storm water management facilities including fencing and landscaping.
- k) Plans of all proposed Municipal Water Supply Facilities.
- l) Plans of all proposed Sewage Treatment Facilities.
- m) A Sediment and Erosion Control Plan.

The design calculations and reports shall include:

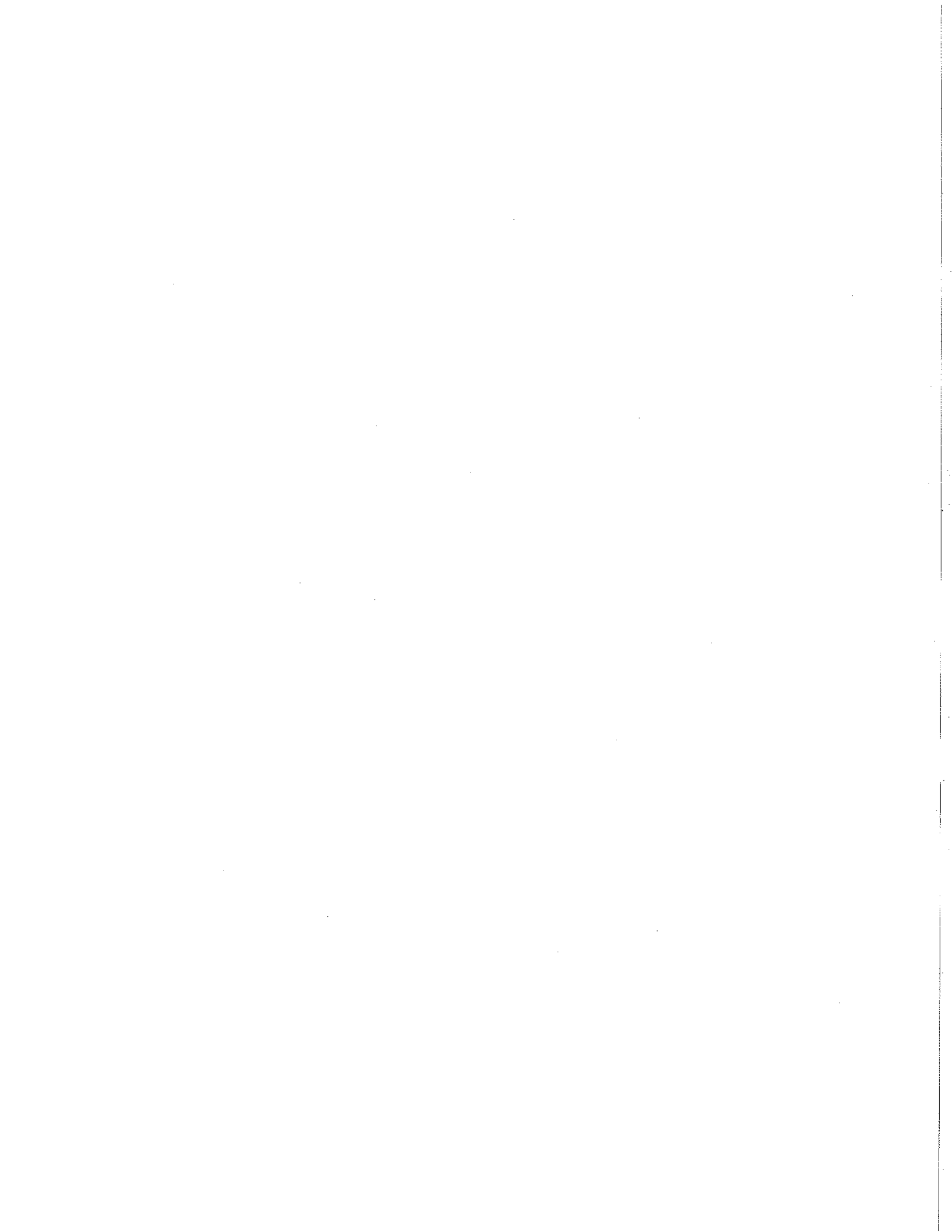
- a) A Storm Water Management Report and Storm Sewer Design Sheet.
- b) Design notes and calculations for the proposed Sewage Treatment Facilities and a Sanitary Sewer Design Sheet for developments with communal sewage systems.
- c) Hydrogeological Study.

- d) Design notes for pipe strength and bedding requirements.
 - e) Soils Report, with road pavement design notes, cathodic protection requirements and specific requirements for installation of the municipal services, foundation and house construction.
 - f) Detailed cost estimates of all municipal services to be provided.
 - g) Design notes and hydraulic calculations related to municipal water supply and distribution system that is to be provided for the development.
 - h) An Environmental Appraisal of the site may be requested by the Town in areas that are particularly sensitive to development.
7. Comments on the 1st submission of plans, reports, specifications and design calculations to the Developer with any required revisions.
 8. Resubmission of plans, specifications and design calculations to the Town for final approval, together with applications for submission to all regulatory agencies and authorities, and draft deeds for all lands and easements to be conveyed to the Town .
 9. Provided that the final submission is satisfactory, the deeds for conveyances/easements are finalized and registered, and after receiving all regulatory agencies and authorities' approval, the Developer shall satisfy the financial requirements of the Town after which the Town shall execute the Subdivision Agreement and authorize registration of the plan of subdivision.
 10. Construction by the Developer or a Contractor on his behalf, of all municipal services in accordance with the approved Subdivision Agreement, plans and specifications, and supervised by the Developer's Engineer. No construction shall proceed until the requirements of Section 8 have been satisfied. No operation of, connection to, or use of existing municipal services will be permitted without prior approval from the Town of Erin. The Developer shall submit all utility designs and layout to the Town of Erin for their review and approval before the installation of any utilities. Gas mains are to be provided on both sides of the street.
 11. Submission to the Town of service testing reports and construction reports together with a request for preliminary acceptance of the services.
 12. Subject to any deficiencies being corrected by the Developer, granting of Preliminary Acceptance by the Town.
 13. Beginning of the maintenance period during which the Developer maintains all of the municipal services and pays for all operating charges or cost until the date the services are assumed by the Town.

14. Correction by the Developer of any final deficiencies in the services at the end of the maintenance period, and application for Final Acceptance. The Town will not grant Final Acceptance for part of the services. Final Acceptance will only be granted by the Town when all the services to be constructed in accordance with the approved Subdivision Agreement have been completed.

The application for Final Acceptance shall include the Mylar Record Drawings and Certification from the Developer's Engineer and Ontario Land Surveyor.

15. Assumption of all municipal services by the Town and discharge of the Developer's responsibilities as set out in the Subdivision Agreement.



TOWN OF ERINURBAN AND SUBURBAN SERVICING STANDARDSSECTION "B"**B.1 WATER SUPPLY SYSTEM**

Municipal water supply systems shall be designed in accordance with current Ministry of the Environment Guidelines.

The pre-servicing report shall address the requirements for water supply to service the Development. Should the existing supply system not have sufficient capacity to provide for new development, the Developer's Engineer shall provide a Hydrogeological Report commenting on proposed sources for additional water supply and how any impacts on the existing ground water regime will be mitigated.

Fire flow protection and storage provisions shall be reviewed with the Town of Erin for each development during the initial stages of Draft Plan Approval. Any expansions to the existing water systems, together with the requirements for additional wells, storage facilities and/or trunk mains will be resolved at that time.

Where the development is not connected to an existing municipal system, two wells will be required. Where connections are to be made to an existing municipal system, the capacity of existing wells and storage facilities will be considered when reviewing the requirements for new source wells and storage facilities. All water supply systems shall incorporate provisions for standby power, metering, chlorination, fire storage, precharged tanks to buffer the well pumps and security fencing of the site.

B.2 WASTEWATER TREATMENT

The requirements for wastewater disposal shall be discussed in the pre-servicing report. Prior to the Town approving the Draft Plan and the issuance of Conditions of Draft Approval by the approval authority, the method for disposing of wastewater will be determined for the Development either by means of a municipal, communal sewage or individual sewage systems. In keeping with the Provincial Policy Statement 2005 all urban/suburban development will eventually be connected to a municipal sewage system. Within the urban boundaries, development shall be required by agreement to connect to municipal servicing when it becomes available adjacent to development.

All new development within the urban boundaries as shown in the Official Plan will agree to connect to municipal water and sewage systems once water and sewage services are provided to the property line. This agreement will be registered on title as a condition of any approval.

Municipal and communal sewage collection and treatment systems shall be designed in accordance with current Ministry of the Environment Guidelines and Town of Erin standards. Individual sewage systems shall be designed in accordance with the Ontario Building Code Regulation No. 403197 as amended

A Report outlining the soils capabilities of the site for sewage disposal shall be submitted with the Draft Plan. Additional soils testing required by the Town or The Ministry of the Environment will be completed as part of the design and any special requirements for construction or restricted areas shall be identified prior to Draft Plan Approval.

B.3 SANITARY SEWERS

Sanitary sewers with service connections to each lot or block shall be provided in accordance with the Ministry of the Environment Guidelines and the following Town of Erin design criteria.

All sanitary sewers shall be designed so that the hydraulic gradeline under peak flow condition is equal to or below the obvert of the pipe. Velocities shall be sufficient for self-cleansing in the mains.

- Capacity: Manning's Formula (full flow) at peak discharge with "N" variable with depth.
- Population: Based on Official Plan and Zoning By-Law maximum densities.
Residential - Maximum Densities from Official Plan or Zoning By-Law or other criteria as determined from capacities of existing trunk services and facilities.
- Domestic Flows: 450 L/cap.d. (litres per capita per day)
- Extraneous Flows: 0.15 L/ha.s. (litres per hectare per second). Foundation drainage and roof leaders to be excluded.
- Peaking Factor: a) Commercial peaking factor of 1.0
b) Residential (Harmon Formula)
$$M = 1 + \frac{14}{4 + \text{Pop.}^{0.5}}$$

c) Industrial: Taken from Appendix "B" of The Ministry of the Environment Guidelines.
- Minimum Velocity: 0.6 m/s based on actual flow with "N" variable with depth.
- Maximum Velocity: 3 m/s
- Pipe Roughness: Manning's "n" value 0.013 for concrete and PVC pipes.

- Minimum Size: 200 mm (trunk or collector)
 135 mm or match existing (residential services)
 150 mm (industrial, commercial or multiple residential services)
 Decreases in pipe size from upstream to downstream will not be permitted.
- Pipe Bedding: In accordance with O.P.S.D. and soil type, generally Granular 'A' bedding and 300 mm sand cover.
- Pipe Materials: P.V.C. SDR 35
 Concrete CSA # A257.1/A257.2
- Minimum Depth of Cover: 2.8 m
- Maintenance Hole Spacing: 90 m desirable 120 m maximum. No maintenance hole is to be located in the curb line.
- Maintenance Hole Diameter: Minimum of 1200 mm dia. or as manufacturer's specifications.
 Pre-benched structures to be used where possible.
- Maintenance Hole Pipe Connections: Approved "Kor-N-Seal" pipe adaptors shall be used for the connection of all pipes at maintenance holes.
- Maintenance Hole Drop Structure: Required where the inlet and outlet inverts differ by more than 0.9 m.
- Invert Drops: Determined by hydraulic calculations for all junction and transition maintenance holes.
- For all others:
- | | |
|----------------|-------|
| 0o Turn | 20 mm |
| 10o - 45o Turn | 50 mm |
| 46o - 90o Turn | 80 mm |
- Maintenance Hole Adjustment: Precast concrete adjustment units to be used.
 Minimum 150 mm adjustment allowance.
 Maximum 300 mm adjustment allowance.
 No brick, block or steel lift rings permitted.
- Service Connections: Minimum Diameter - 135 mm or match existing
 Minimum Grade - 2%
- All services to be connected to the main with a prefabricated tee and provided with a test fitting at the property line.
- Single service connections shall be provided to each housing unit.

Testing and Inspection:

All sewers shall be tested for infiltration or exfiltration following completion. Sewers shall be tested in accordance with current O.P.S. and Ministry of the Environment standards.

A camera inspection shall be conducted of all sewers and a copy of the video provided to the municipality. The sewers shall be video inspected prior to Preliminary Acceptance and again prior to Final Acceptance.

The construction and material standards for sanitary sewers shall be in accordance with O.P.S. or as specified by the Town of Erin.

All design submissions shall include pipe strength and bedding calculations.

B.4 STORM SEWERS

Storm drainage systems with catchbasins for street and rear lot drainage shall be designed using the Rational Method, based on the following criteria:

Rainfall Intensity:	Fergus Shand Dam, or Malton Rainfall Data.	
Design Storm:	Minor System: 1/5 year storm local sewers 1/10 high value commercial development downtown business and trunk collectors.	
Major System:	Regional Storm expressed as "Hurricane Hazel" or 1/100 year (whichever generates greater runoff values).	
Rainfall Distribution:	3 Hour Chicago.	
Inlet Time:	As calculated; 10 minutes minimum	
Runoff Coefficients:	Open Space	0.20 - 0.35
	Single Family Residential	0.40 - 0.50
	Semi-Detached	0.50 - 0.60
	Multiple Family Residential	0.55 - 0.75
	Apartments and Industrial	0.75 - 0.80
	Central Business District	0.90 - 0.95
Pipe Material:	375 mm Diameter or less	
	- P.V.C. SDR 35	
	- IPEX Ultra Rib	
	- Loc Pipe "Loc P.V.C."	
	- Concrete - CSA A257.1 (Non-reinforced)	
	- CSA 257.2 (Reinforced)	
	- HDPE Boss 2000, 320 Kpa Stiffness	
	c/w Ultra Stab 75 Joint	
	- Royal Rib "Koriflo"	

	<p>450 mm Diameter or greater</p> <ul style="list-style-type: none"> - Concrete - CSA 257.1 (Non-reinforced) - CSA 257.2 (Reinforced) <p>All rear yard catchbasin connections are to be encased in concrete where they are adjacent to the building envelope.</p>
Capacity:	Manning's Formula, flowing full at peak discharge with "N" variable with depth.
Minimum Size:	<p>250 mm catchbasin leads</p> <p>300 mm mains</p> <p>675 mm radius pipe</p>
Minimum Cover:	Storm Sewers 1.2 m
Minimum Velocity:	0.75 m per second
Maximum Velocity:	4.5 m per second
Maintenance Hole Diameter:	Greater of 1200 mm or sewer diameter plus 0.60 m
Maintenance Hole Spacing:	<p>90 m or less desirable</p> <p>120 m maximum</p> <p>No maintenance holes are to be located in the curb line.</p>
Drop Maintenance Hole:	Required where inlet and outlet differ by more than 0.9 m
Catchbasin Spacing:	<p>Road Grade 0.5-3.0% - 105 m</p> <p>Road Grade 3.0-4.5% - 90 m each direction</p> <p>Road Grade 4.5% + - 75 m</p> <p>Double catchbasins are required at all sag points</p> <p>Double catchbasins are not to be located on horizontal curves.</p> <p>Catchbasins or catchbasin manholes are not to be located at driveways.</p> <p>All catchbasin leads shall be connected to the sewer run with a prefabricated tee if not connected to a maintenance hole.</p>
Catchbasin Sump:	<p>0.60 m deep in 0.60 x 0.60 m catchbasins</p> <p>0.30 m deep in 1.20 m x 1.20 m catchbasins, and catchbasin maintenance holes.</p> <p>All catchbasin weepholes, lift holes and unused subdrain knockouts are to be plugged with mortar.</p>
Invert Drops:	<p>Determined by hydraulic calculations for all junction and transition maintenance holes.</p> <p>For all others use</p> <p>0° turn 20 mm</p> <p>10° - 45° turn 50 mm</p> <p>46° - 90° turn 80 mm</p>

Inspection and Testing: All storm sewers shall be visually inspected and a video inspection will be required prior to Preliminary Acceptance and again prior to Final Acceptance. Infiltration or exfiltration tests will be required in accordance with current O.P.S. and Ministry of the Environment standards if so requested by the Town.

Storm Sewer Outlets: Suitable bank and stream bottom erosion protection must be provided. ie. headwalls, rip rap, CSP end section, etc.

Subdrain: Continuous 100 mm dia. geotextile wrapped subdrain.

Catchbasins shall be designed depending on road cross-section, road grade, percent of flow intercepted, grate open area and depth of flow at grate. Based on street layouts, the distance between catchbasins shall be at a maximum of 75 m on steep grades (4.5-8%) and a maximum of 90m - 105m on flat grades (0.5-4.5%). Closer spacing may be required on arterial roads or in densely built areas.

Depressing catchbasins below the normal gutter grade, or constructing asphalt basins around catchbasins will not be permitted by the Town. All catchbasin frames and grates are to be set squarely on the structure. Overhang of the frame into the roadway or boulevard will not be permitted. Should overhang of the frame occur, the catchbasin shall be reset to the correct alignment.

Where rear lot or side yard ditches are used, a minimum grade of 1.0% with catchbasins at 105 m intervals is required. In no case will an overland run exceeding the above limits be allowed unless it is on a major drainage channel in an easement of a sufficient width to provide access for maintenance by the Town of Erin. The use of rear lot catchbasins is to be discouraged and overland swales draining to the roadway are to be used wherever possible. Easements for rear yard catchbasins are to be located within the boundaries of one lot and shall not straddle lot lines.

All design submissions shall include pipe strength and bedding calculations. In general, Granular "A" or 20 mm crushed stone shall be used for bedding with sand cover for a minimum of 300 mm above the pipe. Depending on the soils and pipe strength calculations, bedding types that differ from the above may be approved.

The construction and material standards for storm sewer systems shall be in accordance with O.P.S. or as specified by the Town of Erin.

B.5 WATERMAINS

Watermains with single services to each lot or housing unit shall comply with the following criteria:

Connections:	New watermains are not to be connected to existing mains until they have been tested, chlorinated, swabbed and water samples have been received. All connections to existing mains shall be supervised and approved by the Town. The Developer's contractor shall not operate any hydrant or valve on the existing water distribution system without the prior approval of the Town of Erin.
Capacity:	Hazen-Williams formula; C = 130 for polyvinyl-chloride in accordance with current Ministry of the Environment design criteria.
Population:	Based on current Official Plan and Zoning By-Law maximum densities.
Design Flow:	All water distribution systems shall be designed in accordance with current Ministry of the Environment Design Criteria. The requirements for fire flows shall be reviewed with the Town on submission of the Preliminary Draft Plan. A hydraulic analysis of the distribution system is required for all extensions to existing distribution systems. Trunk main locations and main sizes will be provided by the Town.
Peaking Factor:	In accordance with current Ministry of the Environment Design Criteria.
Operating Pressure:	350 KPa minimum 550 KPa maximum
Minimum Size:	150 mm diameter mains.
Depth:	1.8 m minimum to 2.2 m maximum cover.
Location:	4.8 m from south or east street line.
Materials:	Polyvinylchloride, C900, Class 150, (DR 18) with Ring-Tite joints.

All P.V.C. mains to be installed with a tracer wire, not welded to the hydrant.

Bedding:

In accordance with O.P.S. with Granular 'A' bedding and a minimum of 300 mm of sand backfill over the pipe.

Fittings:

Ductile Iron, fully cement lined, mechanical joint complete with mechanical joint restraints.

Hydrants:

Canada Valve Century Type as specified by the Town with 150 mm lead and valve and Stortz pumper nozzle. Hydrant thread to be reviewed with the Fire Department before ordering.

Hydrants shall be colour-coded in accordance with NFPA 291-1977, "Fire Flow Testing and Marking of Hydrants". All hydrants shall be flow tested by the Developer prior to Final Acceptance of the municipal services by the Municipality. A copy of the flow testing report shall be provided to the Fire Chief as well as the Town Engineer.

All hydrants to be counter clockwise opening.

All hydrants to be painted red by the manufacturer with silver caps prior to delivery to the site.

Hydrant flanges to be 100 mm to 200 mm above finished grade at the hydrant.

All hydrant extensions are to be installed on the bottom of the of the hydrant.

All hydrant leads to be installed with Anchor Tees and the valve shall be anchored so the hydrant can be removed with the main in service.

Hydrant Spacing:

150 m maximum or as specified by Fire Department.

All dead end mains are to be provided with a hydrant setting located beyond the last house service.

- Valves:** All valves to be resilient seated gate valves unless otherwise approved by the Town.
- One less valve than streets at intersections
250 m spacing on straight lines
300 m spacing on trunk lines
Chamber for all valves over 300 mm diameter.
All valves to be counter clockwise opening.
- Valve boxes located in the traveled portion of the roadway shall have screw type boxes.
- Valve boxes located in grassed boulevards shall have slider type boxes.
- A restrained valve shall be provided at all dead end mains. The valve shall be located beyond the last hydrant and 4 m from the end plug and blocking. A blow-off is to be provided on all dead end mains and is to be installed between the valve and plug. All dead end mains to be provided with a dedicated sampling station.
- Services:** 20 mm diameter single located at the centre of each lot
Type K copper pipe.
- Water services are not to be located in driveways.
Curb and main stops to be compression type fittings.
Main stops to be connected to mains with threaded saddle fittings.
Curb stops to be provided with a stainless steel rod.
All services shall be provided with a backflow valve installed by a certified plumber in conjunction with the water meter.
- Cathodic Protection:** Cathodic protection shall be provided in accordance with the recommendations in the soils report.
- Inspection and Testing:** All watermains and service connections are to be pressure tested, swabbed, chlorinated and water quality samples taken prior to putting the main in service. All testing chlorination and sampling shall be completed in accordance with current O.P.S. and Ministry of the Environment standards.
- As noted above, new mains shall not be connected to existing water distribution systems until such time as all the testing, chlorinating, swabbing and sampling has been completed and approved by the Town of Erin. The connection to existing water infrastructure shall be completed under the supervision of the Town of Erin in accordance with current Ministry of the Environment Regulations and the Town of Erin Water Connection Requirements.

The construction and material standards for water distribution systems as specified by C.S.A., O.P.S., or the Town of Erin.

B.6 ROADS

Local Streets (Urban/Suburban)

- 20 m Road Allowance.
- 50 KPH Design Speed.
- Minimum Stopping Sight Distance 65 m.
- 8.0 m Asphalt Surface.
- 90 mm Asphalt Depth Applied in two Lifts.
 - 50 mm H.L.8 Base, 40 mm H.L.3 Surface Course. Asphalt base must have been in place for one winter maintenance period before surface course is placed.
- 150 mm Minimum Granular "A".
- 300 mm Minimum Granular "B".
 - Granular depths to be increased in accordance with the recommendations in the Soils Report.
- Maximum 8% Road Grade.
- Minimum 0.5% Road and Curb Grade.
- Radii
 - 9 m Minimum Intersection, Property and Curb Radius.
 - 22 m Minimum Cul-De-Sac Property Radius.
 - 19 m Minimum Cul-De-Sac Outside Asphalt Radius.
 - 11 m Maximum Interior Asphalt Radius
 - 17 m Minimum Curb and Property Radius on the inside of all 90o corners.

Cul-de-Sacs

- Constructed to an Urban Standard with concrete curbs in accordance with O.P.S.D. 600.060 on the outside radius and OPSD 600.090 on the inside radius. Topsoiled and sodded boulevards and centre island.
 - Minimum 8.0 m wide asphalt driving lane.
 - Minimum 30 m throat radius at both the limit of the right-of-way and curb.
 - Minimum 2% slope from the centre of the island to the edge of the concrete curb.
 - Minimum 0.5% curb gutter slope.

- Vertical Curves
- 8 K Crest
 - 12 K Sag - 5 K in Illuminated Areas.

Horizontal Curves - 60 m Minimum.

- Concrete curb and gutter both sides in accordance with O.P.S.D. 600.060 for developments with single and semi-detached housing, O.P.S.D. 600.040 for multiple family developments.
- Storm Sewers and Catchbasins required on all streets.
- 1.5 m Sidewalk on one side of all local streets. 1.5 Sidewalk on both sides of the street for collector and arterial streets. Ramps are to be provided in accordance with O.P.S.D. 310.030.

The requirements for Pedestrian Walkways will be reviewed with the Developer at the time of Draft Plan approval. The standards for the walkway will be reviewed on an individual basis considering the use and maintenance requirements.

- 9 m Radius Daylighters at all intersections.
- Topsoil and Sodded Boulevards. Seeding within the municipal right-of-way is not permitted.
- Continuous Sub-Drains both sides of the road if required due to soils conditions.
- Crescent Corners or Corners with less than a 90° interior angle are not permitted.
- Street Name and Traffic Control signs in accordance with T.A.C. recommended standards.
- All areas to be excavated or filled shall be stripped of topsoil and the topsoil stockpiled on site for re-use during final grading and sodding operations. A Soils Report will be required for any engineered fill areas within the right-of-way.
- The length of cul-de-sacs will be reviewed with the Town at the time of the Draft Plan submission. Long cul-de-sacs with no emergency access are to be discouraged.

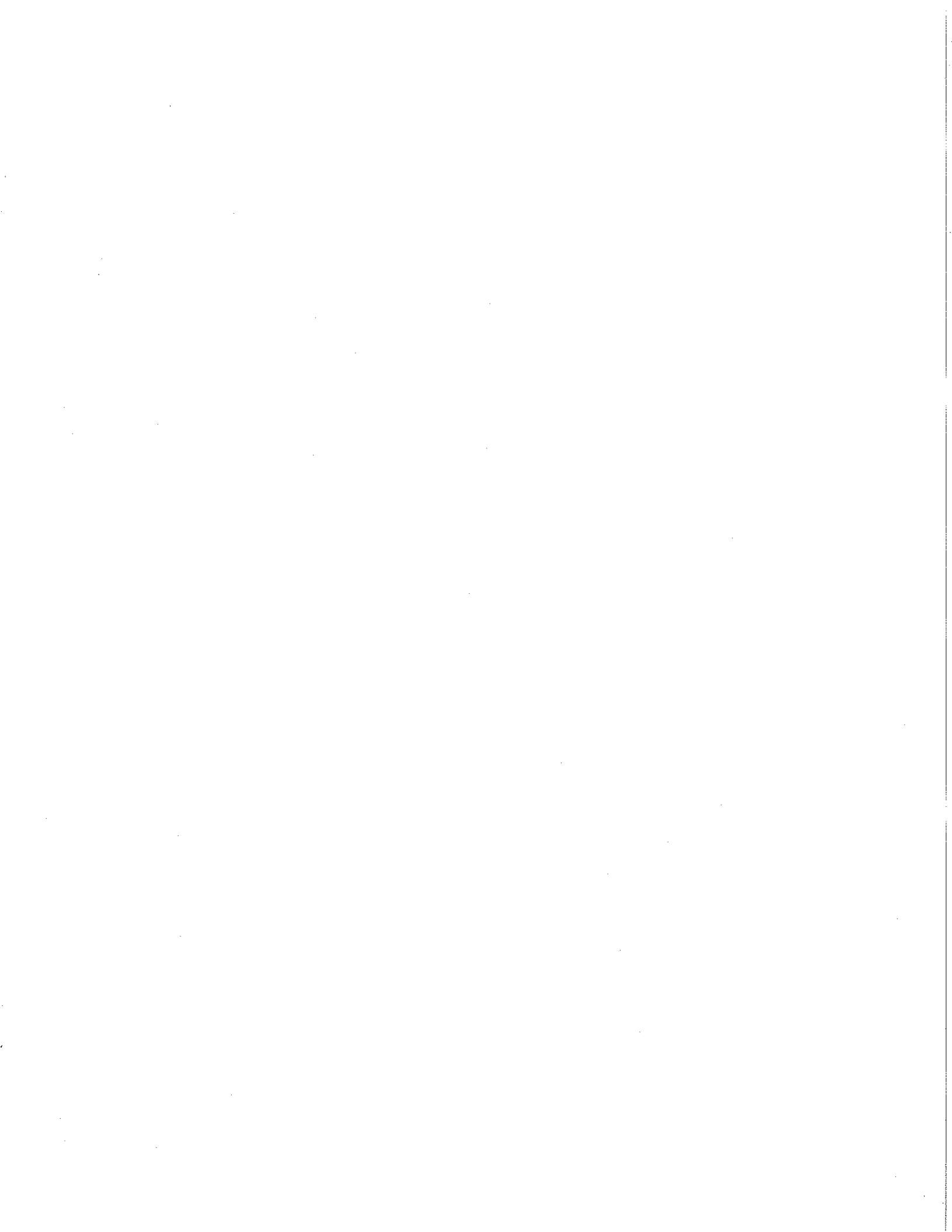
Collector and Arterial Roads

The design criteria for collector and or arterial roads will be reviewed at the time of the Draft Plan submission. The design speed, right-of-way width, asphalt width, road base design and sidewalk requirements will be based on the road function, projected traffic volume and use.

Generally the right-of-way width will be 26 m with a 9.0 m or 9.5 m asphalt surface and 1.5 m sidewalks on both sides of the street. The asphalt thickness and granular base will be determined based on the traffic volumes and use.

- Construction and material standards for the construction of streets and roads shall be in accordance with O.P.S. or as specified by the Town of Erin.
- Concrete for curb and sidewalk construction shall conform to the following specifications:
 - 1) Type 10 normal Portland cement shall be used in the mix. Compressive strength of the concrete shall be a minimum of 30 Mpa at 28 days.

Supplementary cementing materials, such as blast furnace slag or fly ash, are not permitted.
 - 2) The aggregate stockpile to be used by the Ready-Mix supplier is to be tested by an approved geotechnical engineer to verify that the aggregate meets materials specification OPSS 1350, 1001 and 1002.
- Urban Residential Entrance Design to Ontario Provincial Standards, OPSD- 351.010
- Urban Industrial Commercial and Apartment Entrance to Ontario Provincial Standards, OPSD 350.010 B.7



B7 LOT GRADING AND DRAINAGE

Lot grading and drainage shall be in accordance with C.M.H.C. Recommended Standards. The Drainage Plan shall indicate the proposed grading of all the lands to be developed and how all the lands adjacent to the subdivision which drain through the property are to be provided for. Existing ground elevations shall be shown with 1 m contours and spot elevations along lots adjacent to the development. The Developer will be required to grade the lots to within 0.3 m of the final grade within the building envelope, primary tile bed area, and driveway as specified on the approved grading plan as part of the servicing requirements. The balance of the lands shall be graded to final grade, topsoiled and seeded/sodded as part of the servicing requirements. All drainage swales and lot drainage outside of the above noted areas shall be established prior to the Town granting Preliminary Acceptance. The topsoil shall be stripped from all cut and fill areas and stockpiled for re-use during final grading operations. Should there be a deficiency in suitable on-site fill material to grade the lands, the Developer shall import suitable fill to grade the lands in accordance with the above requirements. The topsoil shall be left on site until such times as the building and grading operations are completed at which time any excess topsoil can be removed by the Developer. Proposed finished grades shall be shown as follows:

All lot corners

All changes in grade

Along centreline of roads @ 15 m minimum intervals

All building sites - elevations adjacent to foundations, walkouts as well as terraces or retaining walls adjacent to the foundation.

All top of foundation elevations and garage floor elevations

All tile bed elevations

Ditch bottoms and drainage swales @ 15 m minimum intervals

All intersecting lot lines

All terraces and top and bottom elevation of retaining walls.

The proposed direction of overland flow shall be indicated on the plans by arrows.

The location and proposed grading of all storm water management facilities shall be shown on the plans together with the location of all catchbasins.

Bench marks related to geodetic datum shall be listed on all grading and drainage plans.

Details of all terracing and slope treatment shall be submitted with lot grading plans and detailed cross-sections provided if required by the Town Engineer.

All regional flood and fill lines must be indicated on lot grading plans where developments are adjacent to existing water courses.

The Lot Grading Plan, prepared and submitted for the development, will include the recreational or park areas.

The fencing and landscaping requirements for all storm water management facilities, parks, recreational areas, walkways and easements will be reviewed with the Developer at the time of Draft Plan submission. All fencing and landscaping details shall be shown on the plans.

Grading Standards

Lot Grades	-	2% Minimum 6% Maximum
Driveways	-	Minimum 2% Maximum 6%
Swales	- - -	2% Minimum Slope 0.3 m Minimum Depth 4:1 Maximum Side Slopes
Building Grade	-	0.15 m Minimum below top of foundation or walkout sill.
Terraces	- -	3:1 Maximum Slope 3 m Maximum Horizontal Distance before a 6% slope is provided.
Cut-Off Swales	- - -	Required at the rear of all units with back to front drainage at a minimum of 3 m from rear foundation wall. 0.30 m minimum depth. 0.15 m minimum depth directing flow around sewage disposal system tile bed.
Retaining Walls	-	All retaining walls are to be designed by a Professional Engineer in accordance with O.B.C.. Specific details are to be provided on the Grading Plans showing construction materials, backfill and drainage requirements, slope, embankment and foundation requirements, barriers, etc. The design Engineer will certify on completion of the wall, it has been constructed in accordance with the design. Railings will be installed in accordance with the requirements of the O.B.C.
Embankments and Terraces	-	Embankments and terraces with slopes steeper than 3:1 will require comments from a qualified Geotechnical Engineer regarding stability, erosion protection, surface treatment, and maximum slope.

B.8 STORM WATER MANAGEMENT

Quality Control: In accordance with "Stormwater Management Practices, Planning and Design Manual", March 2003 by the Ministry of Environment.

Quantity Control: Control of post-development runoff flows to pre-development levels for rainfall events with return periods between 5 and 100 years. Over-control may be required to satisfy downstream constraints.

All hazard lands, wetlands, Environmentally Sensitive Areas (ESAs), Areas of Natural or Scientific Interests (ASNIs) and floodlines are to be identified on drawings.

DESIGN, LANDSCAPING AND FENCING

Storm water management areas will be landscaped with native species and, where appropriate, a trail system will be constructed to connect with a roadway, park system or open space area."

Residential storm water management areas will be designed to have slopes no steeper than a 1:5 and therefore will not require fencing except where they abut private lands.

Storm water management areas that are not within a residential development and exceed slopes of 1:5 will be fenced entirely.

Grand River Watershed

Facility configuration and landscaping to incorporate design recommendations outlined in the document entitled "Design Principles of Stormwater Management Facilities", August 1996. A copy of the document can be obtained from the Grand River Conservation Authority.

Credit River Watershed

Facility configuration and landscaping to incorporate design recommendations outlined in the document entitled "CVC Stormwater Management Guidelines, May 1996" under the SWM requirements section and "CVC Stormwater Management Facility Planting Guidelines, February 16, 2000".

Sediment/Erosion Control: Detailed plan to be submitted for approval.

All Stormwater Management Facilities shall be subject to Class Environmental Assessment requirements.

Note: Other approving or regulatory agencies may have additional requirements that should be incorporated into the design.

B.9 UTILITIES AND STREET LIGHTING

All Hydro, Telephone and other utilities shall be underground and placed in accordance with current local utility company regulations and standards.

All utility designs and layouts shall be submitted to the Town of Erin for their review and approval prior to installation of any utilities.

Satisfactory evidence that the Developer has entered into an agreement providing for the installation of underground hydro and street lighting must be submitted to the Town of Erin prior to the execution of a Subdivision Agreement.

All developments shall be provided with adequate street lighting in accordance with the current requirements of the local utility companies and the Town of Erin.

All materials and installation shall meet or exceed current O.P.S.S. standards and the requirements of the local utility supplier. The materials and supplier shall be reviewed with the Town prior to approval and samples shall be supplied if requested.

Poles: Poles shall be 1 piece Concrete Aluminum or Steel. Concrete poles shall be direct burial. Aluminum and steel poles shall be installed with an adjustable frangible base (direct burial shall not be permitted). All poles shall be supplied so that the minimum distance between the shoulder of the road and the bottom of the luminaire is 8 m.

Brackets: All brackets shall be tapered Elliptical Aluminum with a minimum length of 2.4 metres.

Luminaires and Lamps: Luminaires shall be a Cobra Head style and supplied with an individual photo cell and 150w clear high pressure sodium lamp.

The luminaire shall be supplied with a clear lens.

Spacing: Residential Local Classification (30ft or less road width)

- Maintained Average Horizontal Illumination = 4 lux
- Average to Minimum Uniformity Ratio = 6 to 1

Residential Collector Classification (30ft. or greater road width)

- Maintained Average Horizontal Illumination = 6 lux
- Average to Minimum Uniformity Ratio = 4 to 1

Arterial in Urban Residential Area

- Maintained Average Horizontal Illumination = 10 lux
- Average to Minimum Uniformity Ratio = 4 to 1

A street light will be required at all intersections, turning circles, the crest of vertical curves and outside radius of horizontal curves.

Utility Crossings: All ducts for utility crossings and gas mains are to be installed prior to placing Granular "B" subbase.

Gas Mains: Gas mains are to be installed on both sides of the right of way to avoid boring gas service crossings under the roadway, other utilities, and the watermain.

B.10 LANDSCAPING

TREES

Trees are to be provided by the Developer and placed as follows:

- a) Lots with less than 25 m frontage: Minimum of one tree per lot.
- b) Lots with 25 m - 45 m frontage: Two trees per lot.
- c) Lots with over 45 m frontage: Will be reviewed by the Town prior to executing the Development Agreement but no less than 2 trees per lot will be required for lands with little to no tree coverage.

Trees shall be planted along all the lots with flankage so that the spacing along the flankage is no more than the spacing requirements outlined in a), b) and c) above.

- d) Developments with existing significant tree coverage will be reviewed on an individual basis to determine areas where the above policy does not apply.
- e) Trees are to be planted in the boulevard at the location noted on the Urban and Suburban Road Standard Drawing.
- f) All trees shall be guaranteed until the end of the maintenance period or a minimum of 2 years from the date of planting, whichever is the greater.

The following hardwood varieties are acceptable;
 Black maple/acer nigrum,
 Sugar Maple/acer/saccharum,
 Common Horse Chestnut/aesculus Hippocastanum
 White Ash/Fraxinus Americana
 Green Ash/Fraxinus Pennsylvania
 Glenleven Linden (Tilla Cordata).

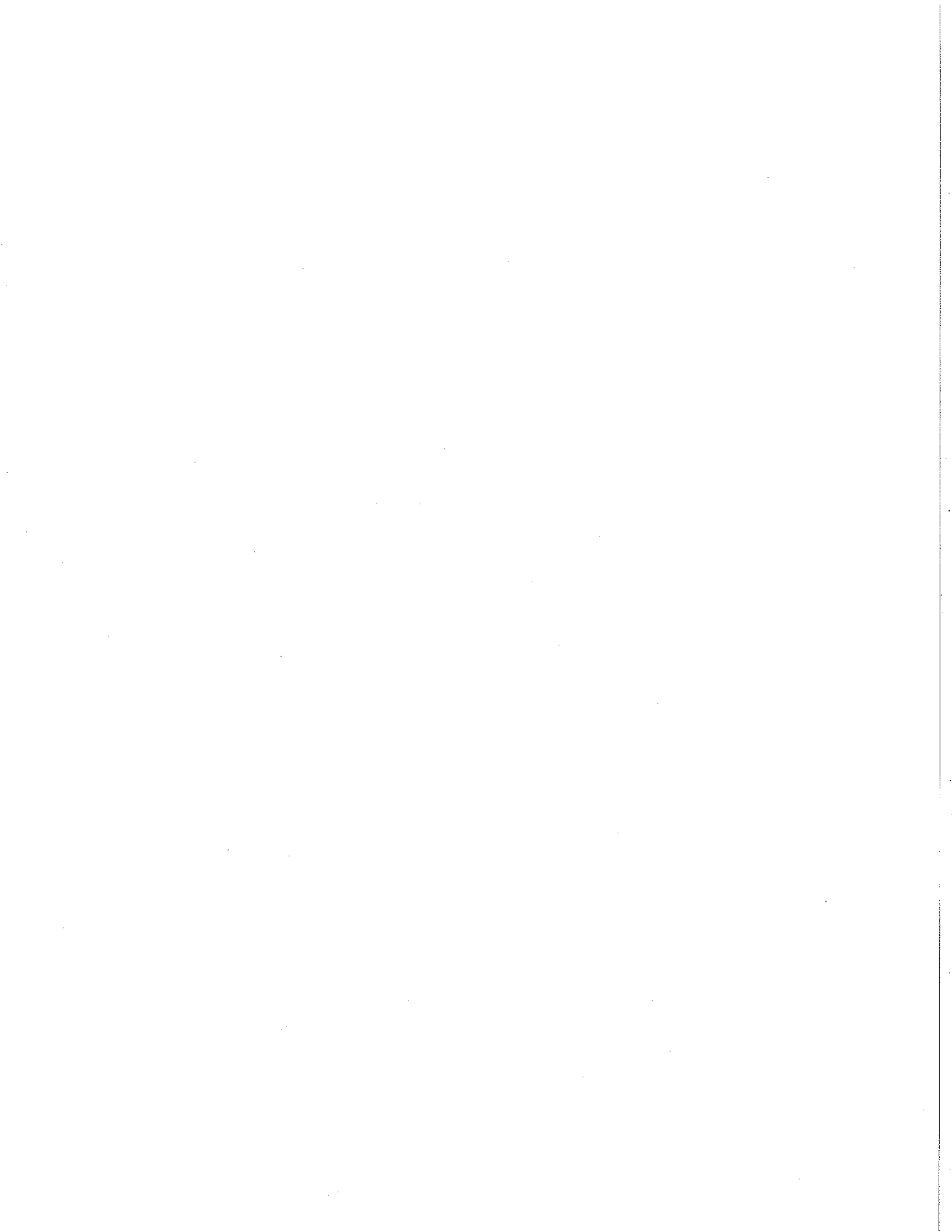
All trees shall be a minimum of 3.0 m in height, a minimum caliper of 60 mm.

PARK AND RECREATIONAL AREAS

The Park or Recreational Areas dedicated for the development shall be graded and seeded so that they are suitable for recreational use.

The area to be dedicated for park use shall be reviewed with the Town on submission of the Preliminary Draft Plan. The Town may request that a different area than that proposed by the Developer be set aside for a park due to the physical constraints of the site.

The requirements for fencing and landscaping of Recreational Areas will be reviewed with the Developer at the time of the Draft Plan submission. All fencing and landscaping details will be shown on the plans submitted for Town approval.





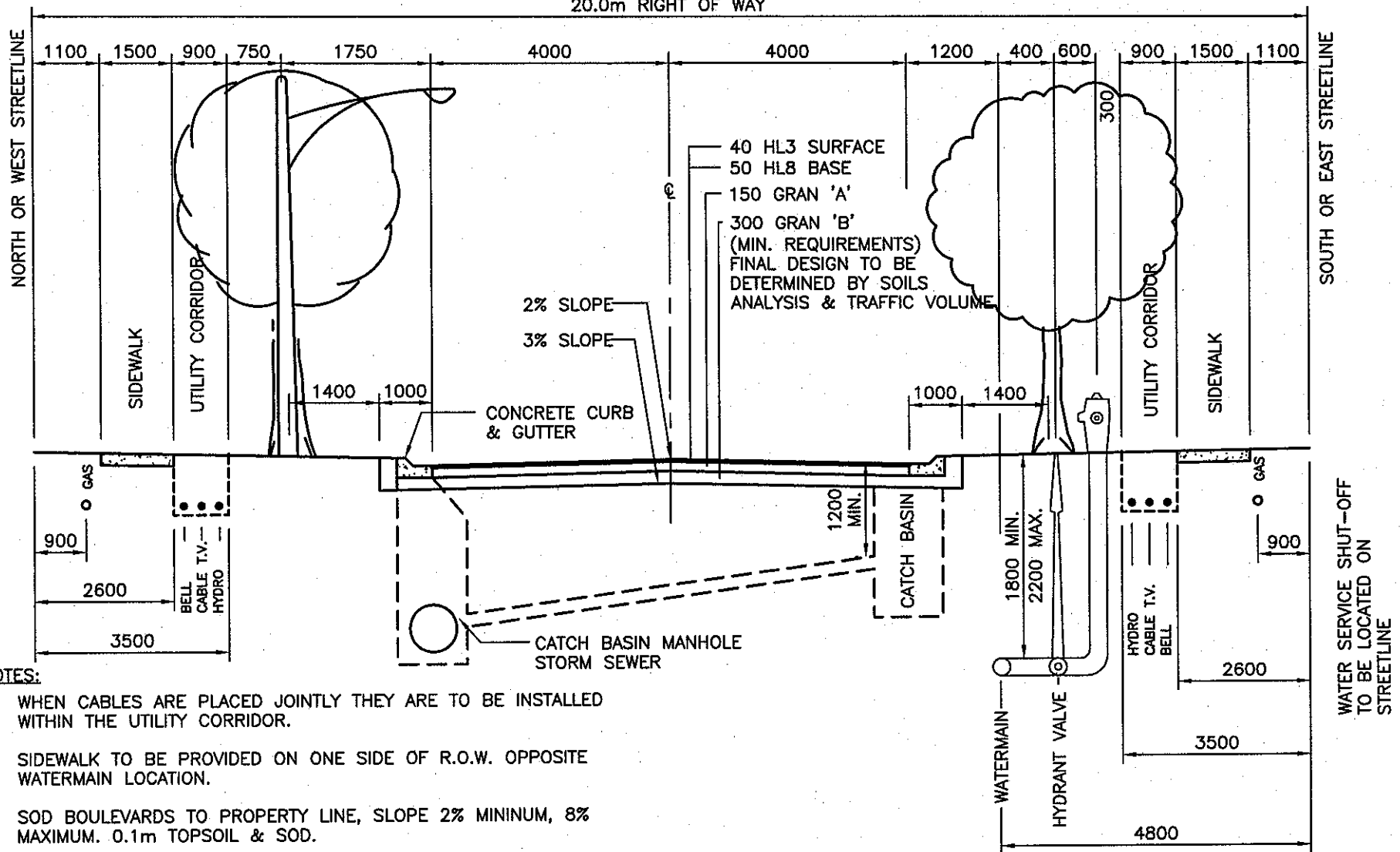
TOWN OF ERIN

STANDARD DRAWINGS

SECTION "D"

- C.1 Urban/Suburban Road Section
- C.2 Cui-de-sac Standard
- C.3 Tree Planting Detail
- C.4 Subdrain Detail
- C.5 Entrance Detail

20.0m RIGHT OF WAY



NOTES:

1. WHEN CABLES ARE PLACED JOINTLY THEY ARE TO BE INSTALLED WITHIN THE UTILITY CORRIDOR.
2. SIDEWALK TO BE PROVIDED ON ONE SIDE OF R.O.W. OPPOSITE WATERMAIN LOCATION.
3. SOD BOULEVARDS TO PROPERTY LINE, SLOPE 2% MINIMUM, 8% MAXIMUM. 0.1m TOPSOIL & SOD.
4. ROAD GRADE TO BE 0.5% MIN. 8.0% MAX.
5. TREES & STREETLIGHTS TO BE PLACED AS PER TOWN STANDARD DETAIL.
6. TRANSFORMERS TO BE PLACED IN FRONT OF SIDEWALK WITH BACK OF VAULT 500mm MIN. AWAY FROM SIDEWALK.
7. CATCH BASINS NOT TO BE LOCATED AT DRIVEWAYS.

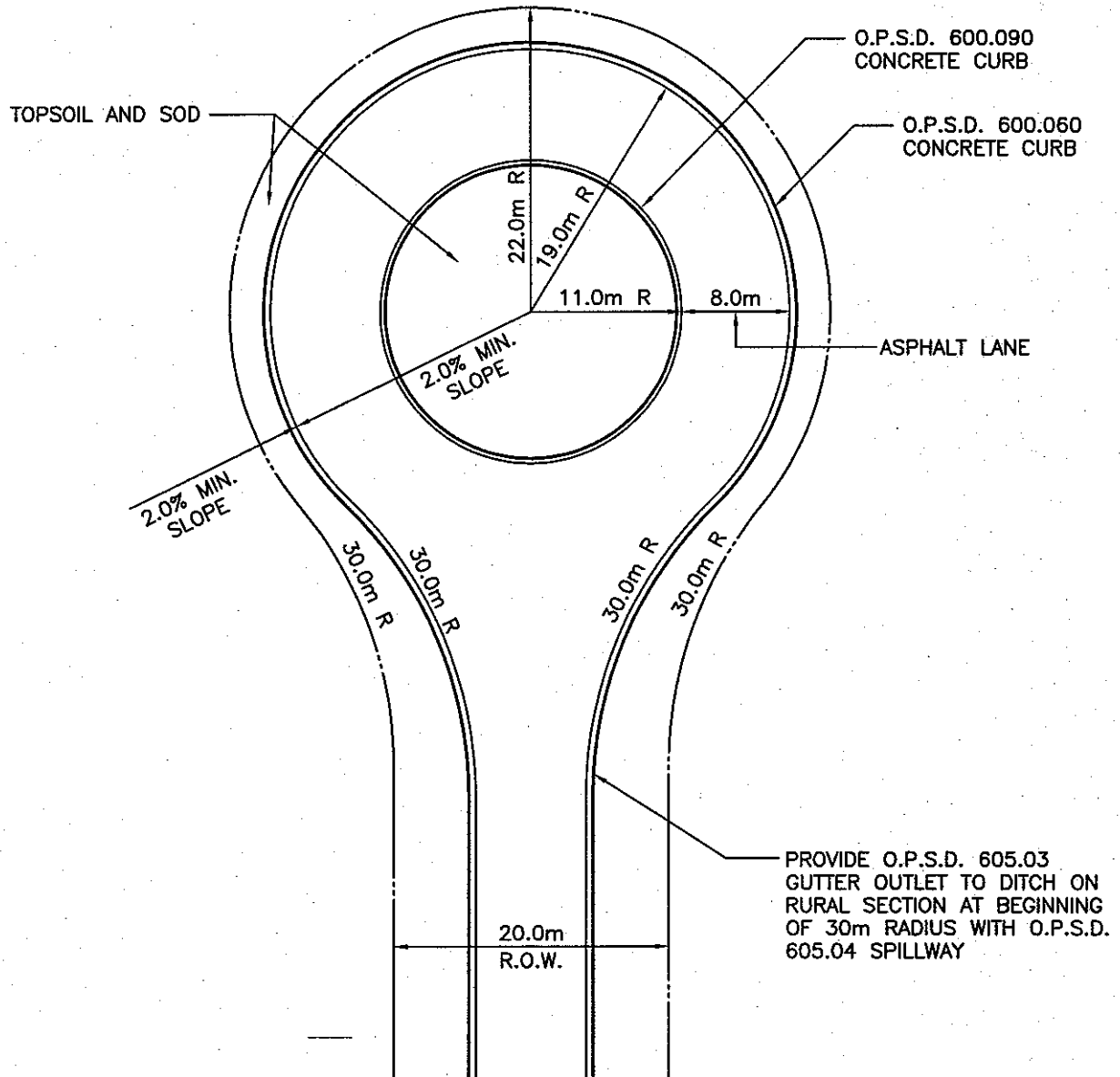
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TOWN OF ERIN

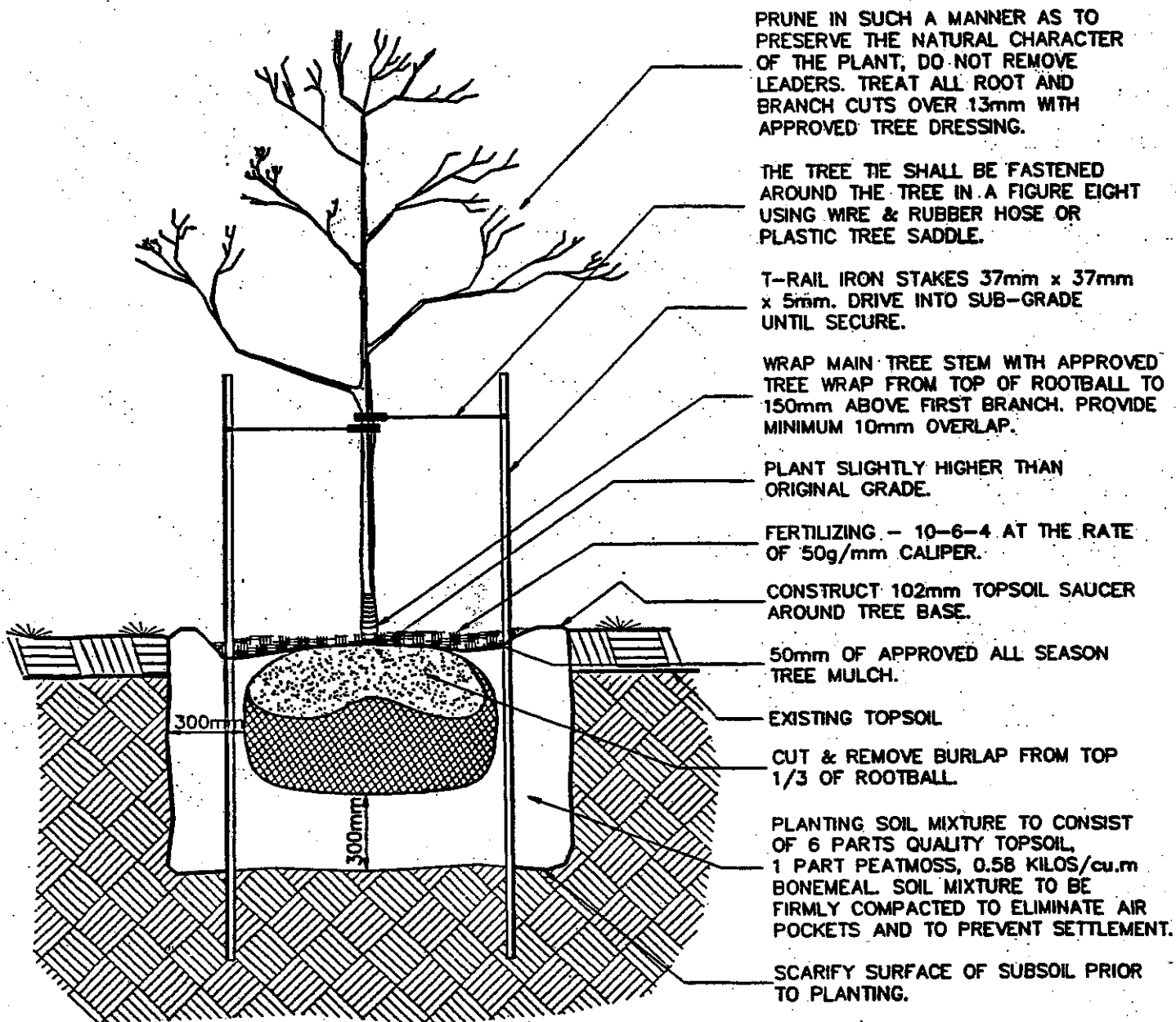
URBAN/ SUBURBAN ROAD SECTION

D.1

REVISED: NOV/05



TOWN OF ERIN
 CUL-DE-SAC STANDARD



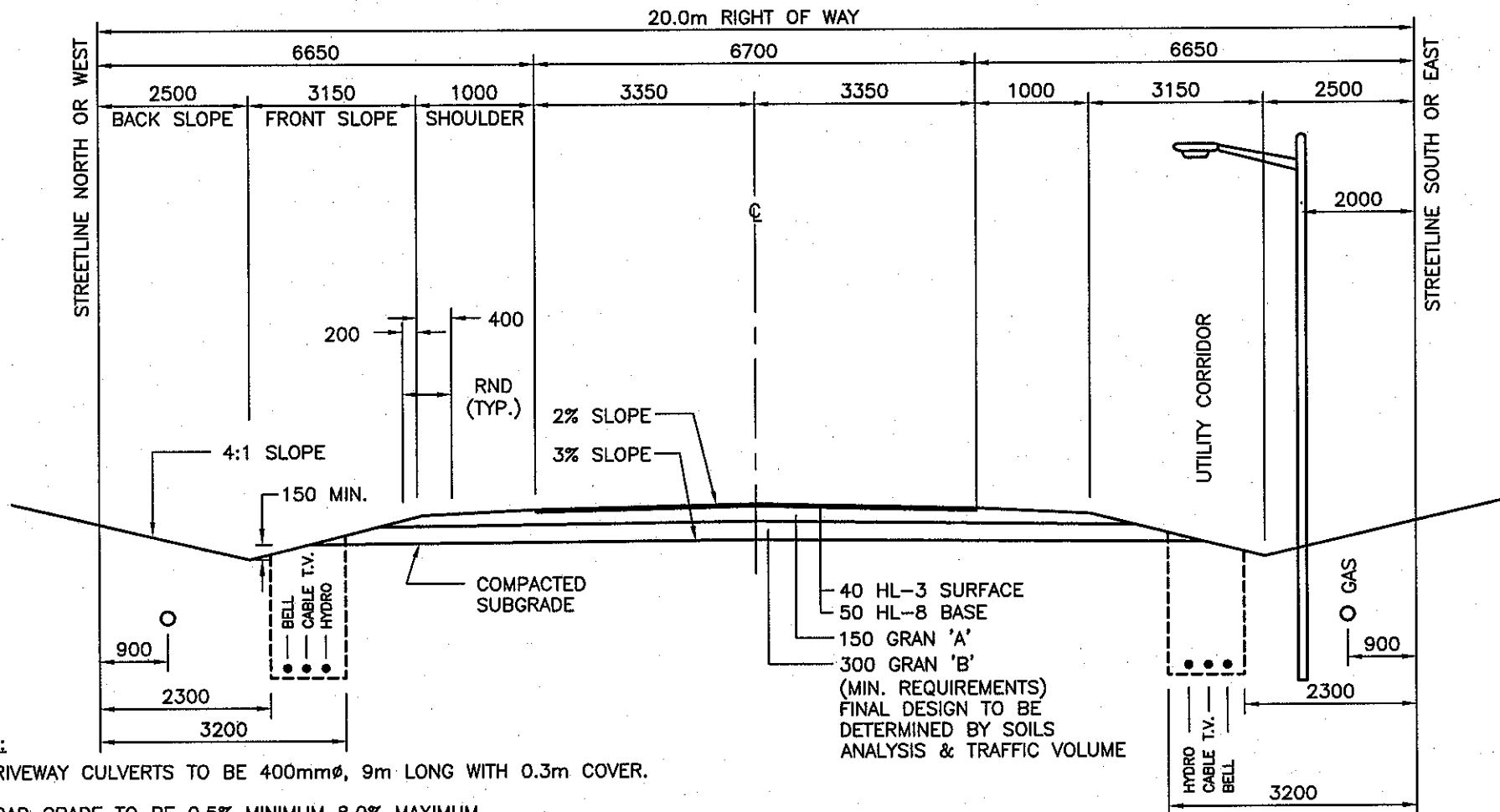
NOTES:

1. TREES UNDER 70mm CALIPER REQUIRE 2 STAKES, TREES 70mm CALIPER & OVER REQUIRE 3 STAKES.
2. SET TREE 50mm HIGHER THAN SURROUNDING GRADE TO ALLOW FOR SETTLEMENT.
3. THE ABOVE DETAIL DOES NOT REPRESENT ANY PARTICULAR SPECIES.
4. WHEN PLANT MATERIAL IS SUPPLIED IN WIRE BASKETS THE TOP 1/3 OF THE BASKET SHALL BE CUT & REMOVED FROM THE PIT.

TREE PLANTING DETAIL

N.T.S.

D.3



NOTES:

1. DRIVEWAY CULVERTS TO BE 400mm ϕ , 9m LONG WITH 0.3m COVER.
2. ROAD GRADE TO BE 0.5% MINIMUM 8.0% MAXIMUM.
3. TREES TO BE PLANTED AS PER TOWN STANDARD.
4. STREETLIGHTS TO BE PLACED AS PER TOWN STANDARD DETAIL.
5. DITCH TO BE TOPSOILED AND SODDED FROM EDGE OF ROUNDING TO LIMIT OF RIGHT OF WAY.
6. DITCH TO BE 0.9m MINIMUM DEPTH 1.2m MAXIMUM DEPTH WITH 1.0% MINIMUM INVERT SLOPE.
7. TRANSFORMERS TO BE LOCATED ON DITCH BACKSLOPE WITH FRONT OF VAULT A MINIMUM OF 500mm FROM DITCH INVERT.

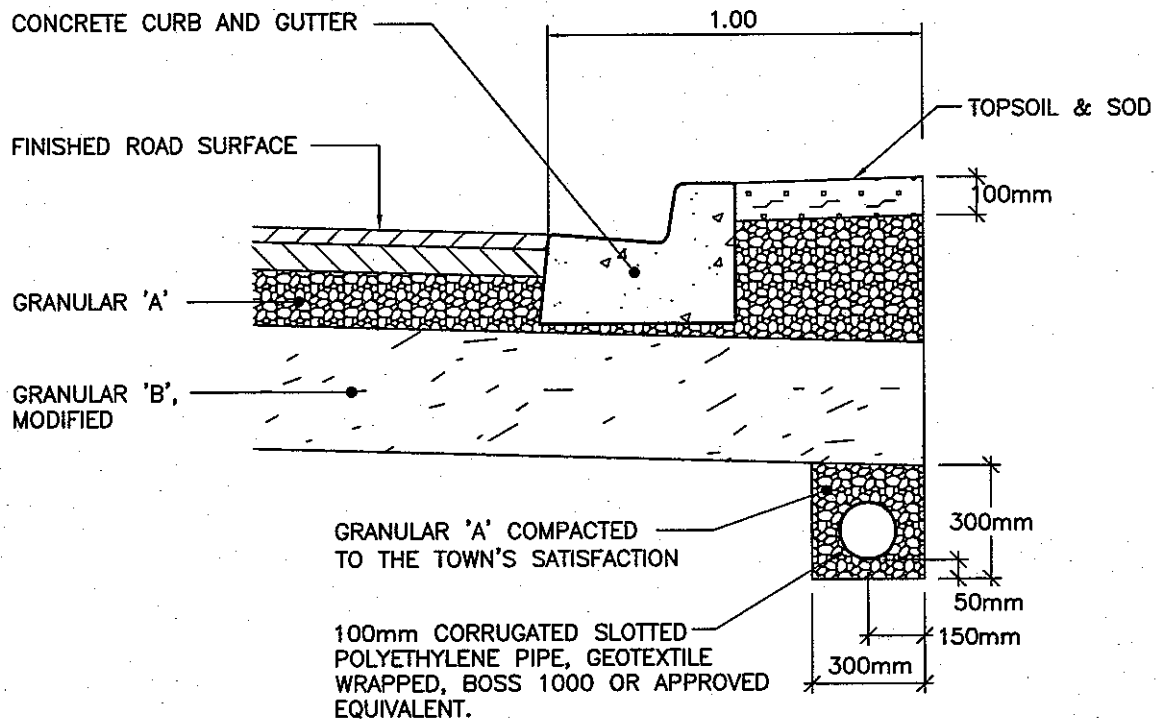
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TOWN OF ERIN

RURAL ROAD CROSS SECTION

REVISED: NOV/05

D.4



NOTES:

1. ALL CONNECTIONS TO CATCHBASINS TO BE MORTARED AT THE INSIDE AND OUTSIDE OF THE CATCHBASIN WALLS.
2. GEOTEXTILE WRAPPED SUBDRAIN PIPES SHALL NOT BE EXPOSED TO SUNLIGHT OVER A PERIOD OF 10 HOURS.
3. THE SUBDRAIN SHALL BE INSTALLED IN A RECTANGULAR TRENCH.
4. THE LOCATION OF THE SUBDRAINS HORIZONTALLY PLUS OR MINUS (\pm) 50mm.
5. ALL SUBDRAINS SHALL BE CHECKED WITH A VIDEO CAMERA INSPECTION AT THE OWNER'S EXPENSE. THE TOWN MAY REQUIRE ADDITIONAL INSPECTIONS IF THERE ARE ANY UTILITY CROSSINGS SUBSEQUENT TO THE INSPECTIONS. ADDITIONAL INSPECTIONS MAY BE REQUIRED UP UNTIL FINAL ACCEPTANCE AS DETERMINED BY THE TOWN.
6. THE SUBDRAIN SHALL MAINTAIN ITS ROUND SHAPE TO THE SATISFACTION OF THE TOWN.
7. THE SUBDRAINS SHALL BE FREE DRAINING. ANY PIPE WITH STANDING WATER SHALL BE RELAID.
8. ALL SUBDRAINS SHALL BE CONNECTED TO STORM SEWER STRUCTURES AT THE UPSTREAM AND DOWNSTREAM ENDS.
9. SUBDRAINS TO BE CONTINUOUS AND CONNECTED TO CATCHBASINS WHERE POSSIBLE.
10. SUBDRAINS EXITING STRUCTURES SHALL HAVE A REMOVABLE PLUG TO PREVENT SILTATION OF THE SUBDRAIN.

TOWN OF ERIN
SUBDRAIN DETAIL