# TOWNSHIP OF MAPLETON

**(Located in the County of Wellington)**

# DESIGN GUIDELINES
# AND
# STANDARD DRAWINGS

**March 2023**

## Record of Revisions

| Revision | Date | Description |
|---|---|---|
| 1 | July 21,2023 | - Revised the date of the MECP Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under ECA from January 23, 2023, to May 31, 2023 to reflect the current version.<br>- A2.03 d): Added paragraph to include traffic calming review.<br>- E3.06: Modified hydrant colour to chrome yellow.<br>- Appendix F: Added an Erosion and Sediment Control Inspection Report |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

# Table of Contents

## Tables

## Appendices

# SECTION A

# General Information

# Section A General Information

## A1.00 Introduction

The design of all municipal services in the Township of Mapleton are to be based on the specifications and standards in effect at the time of approval and in full accordance with all By-Laws that exists within the Township. It is incumbent upon the Developers and the Developer's Consultants to be aware of all By-laws and other regulations which may otherwise affect the works as described within this document. All plans are to be approved before they are to be used for the construction of services. Such approval shall in no way relieve the Consulting Engineer from providing an adequate and safe design.

The material presented herein is intended as a guideline in the production of designs for roads and services for development projects within the Township. While specific design guidelines are provided herein, the Ontario Provincial Standard Drawings and Specifications form the basis for the construction requirements and shall be adhered to at all times unless directed otherwise by these guidelines.

The design information contained in this manual is intended to provide guidance beyond legislative and standard design practices for use in the Township of Mapleton. There may be specific situations where the design may deviate from these Design Guidelines & Standards due to site specific constraints or through additional consultation with Township staff. Deviations from the design guidelines require approval from the Township Engineer. The Township maintains the right to accept or refuse the deviation being requested.

When the Township references other guidance documents or standards with these Design Guidelines & Standards issued by other agencies, the most up-to-date version of those documents are to be utilized which may be amended from time to time. New documents may also be issued by these agencies that are applicable to the design that will need to be referred to by the Consultant Engineer.

### A1.01 Glossary

The following abbreviations and terms are used in this document:

AODA – Accessibility for Ontarians with Disabilities Act

Consultant – Developer's representative

County – County of Wellington

CLI–ECA – Consolidated Linear Infrastructure Environmental Compliance Approval

Developer or Owner – Property owner making an application to develop land

ECA – Environmental Compliance Approval, as issued by the MECP

FSR – Functional Servicing Report

GRCA – Grand River Conservation Authority

LID – Low Impact Development

MECP – Ministry of the Environment, Conservation and Parks

NDMNRF – Ministry of Northern Development, Mines, Natural Resources and Forestry Services

MTO – Ministry of Transportation

NASSCO – National Association of Sewer Service Companies

OBC – Ontario Building Code

OLS – Ontario Land Surveyor

PTTW – Permit to Take Water

P.Eng. – Professional Engineer licensed to practice in Ontario

Township – Township of Mapleton

Township Engineer – An identified Township of Mapleton staff member or another person as assigned by the Township (typically an outside consulting firm)

## A1.02 Familiarization

Prior to the commencement of the Engineering Design, the Consultant shall obtain current copies of the Township's "Design Guidelines and Standards" to become familiarized with the requirements of design in the Township. The subject design guidelines and standards will apply to all developments in the Township regardless of type (i.e., subdivisions, plan of condominium, site plans, severances, consents, etc.).

Pre-Consultation Meetings shall be arranged through the Township's Planning and Development Manager and shall include the Township Engineer and Director of Public Works to discuss areas of preliminary concern and other data prior to commencement of both preliminary and detailed engineering designs.

## A1.03 County of Wellington

The County is responsible for all County roads. The County does not own or maintain any of the municipal water or wastewater infrastructure. Any works located within the County right of way require their approval. The Consulting Engineer shall contact the Director of Planning and Development to obtain copies of any Design Standards if/when applicable.

## A1.04 Grand River Conservation Authority

The Township falls within the jurisdiction of the Grand River Conservation Authority. The Conservation Authority is responsible for the regulation of development, interference with wetlands and alterations to shorelines and watercourses. The Consulting Engineer shall contact the designated Planner at the GRCA at the beginning of Draft Plan preparation and prior to detailed design to obtain information on all design and submission requirements.

### A1.05 Ministry of the Environment, Conservation and Parks

The MECP is responsible for the approval of works associated with development and land use changes through the Ontario Water Resources Act. Approvals are issued in the form of Environmental Compliance Approvals for various activities such as stormwater management facilities, storm sewers, wastewater services and noise and vibration.

The Township has received its first Consolidated Linear Infrastructure Environmental Compliance Approval for the Municipal Sewage Collection System (ECA Number: 105-W601) and the Municipal Stormwater Management System (ECA Number 105-S701). This allows some pre-authorized work to occur related to municipal sanitary sewers, sewage pumping stations, storm sewers and stormwater management facilities. All designs shall conform to the MECP Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval as amended from time to time (currently V.2.0 May 31, 2023).

### A1.06 Ministry of Northern Development, Mines, Natural Resources and Forestry Services

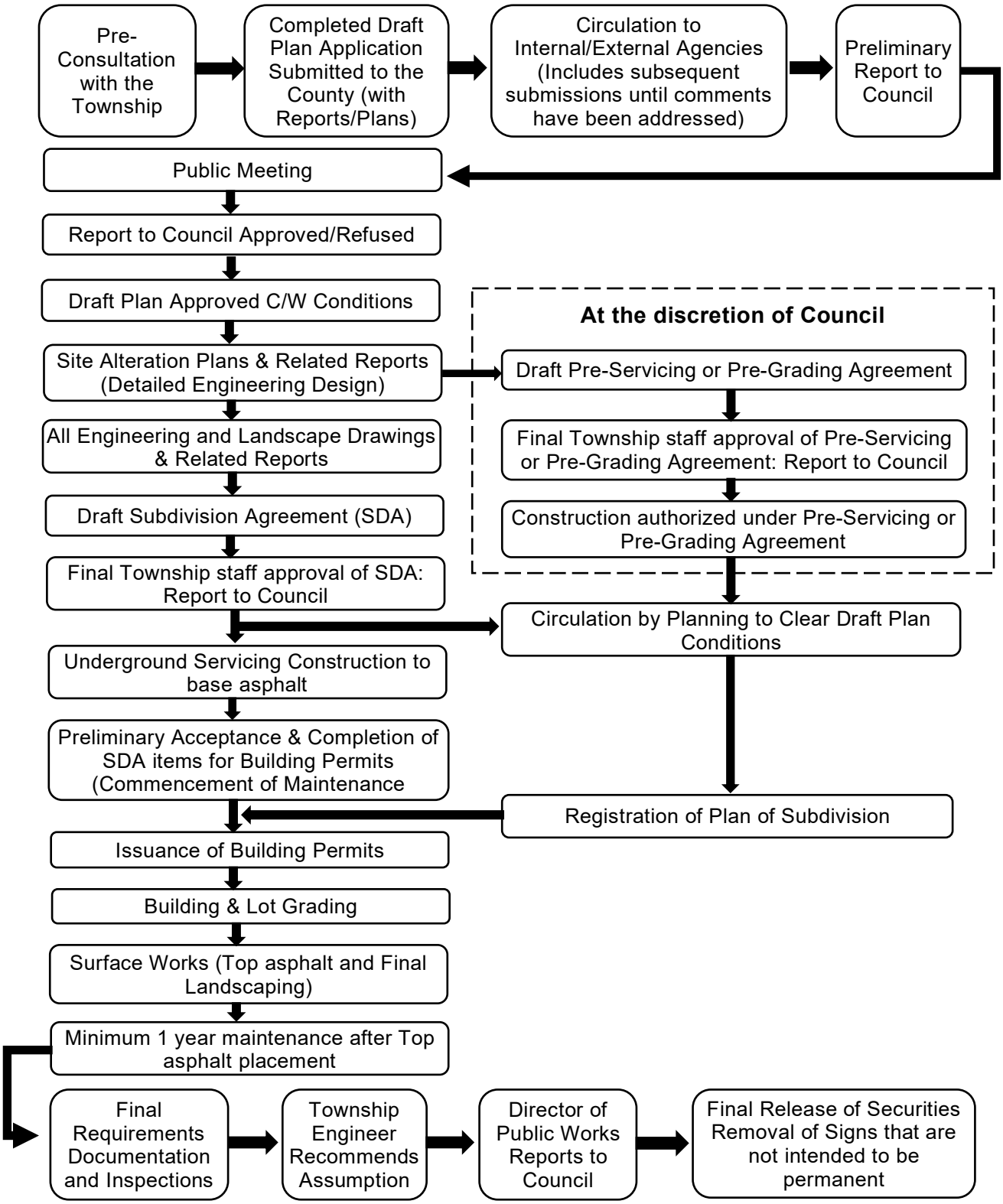
The NDMNRF is responsible for enforcing Ontario's Endangered Species Act which protects specific threatened and endangered plants and animal species in the province. The Act requires that applications for development, land use changes and servicing-related activities which may have an impact on these species, be made to and approvals obtained from the NDMNRF. Applicants are to involve the NDMNRF early in the Draft Plan review process and copies of all correspondence with the Ministry are to be provided to the Township as part of the development review process.

## A2.00 Development Process

### A2.01 Introduction

The usual development process for plan of subdivision is outlined on a general flow chart on the next page. The issuance of a Pre-servicing and/or Pre-servicing Agreement will be at the discretion of Council. Any specific requirements included in the agreements are in addition to or override specific requirements of this section.

## Plan of Subdivision – Development Process



## A2.02 Pre-Consultation

A Pre-Consultation meeting is to be arranged by the Developer through the Township's Planning and Development Manager at the beginning of the development process. The Developer is to provide to the Township prior to the meeting an overview of the characteristics of the proposed project including but not limited to the intended land use, density, concept plan, and servicing concepts to assist with understanding the project and scoping submission requirements. The submission requirements, in the form of studies, reports and drawings will be identified by the Township and confirmed through correspondence to the Developer based on the pre-consultation discussions. The Developer is to ensure copies of separate pre-consultation technical submissions and correspondence exchanged with other review agencies are provided to the Township.

## A2.03 Preliminary Functional Servicing Report and Supporting Studies

When filing a Draft Plan application, the Developer is required to prepare and submit documentation and drawings noted in the pre-consultation meeting with the Township. This will include a Preliminary Functional Servicing Report prepared in accordance with the current design guidelines. The report must be signed and sealed by a Professional Engineer. The Preliminary FSR shall contain or be submitted with the following in hard copy and digital formats:

### a) The Draft Plan

The Draft Plan must be in a form acceptable to the Township's Planner. The creation of lots that include environmental protection features and their buffers is not supported where these features and butters can be conveyed to public ownership. The Draft Plan shall consider the location of infrastructure and the requirement for easements that impact the lots width or length. The lot depths for lots that have rear property lines that abut right of ways shall have deeper depths to accommodate landscape screening. Corner lots are required to be wider to accommodate the increased exterior side yard setback and to ensure that the driveway remains outside of the day lighting triangle. The Draft Plan layout shall be supported through the various reports and studies required during the draft plan application stage. Generally, parks shall be centrally located and have significant visibility by having significant street frontage. The Draft Plan is to accommodate linkages through the plan that supports active transportation.

### b) Preliminary Geotechnical Report

A preliminary soils investigation and report from a soils consultant will be required by the Township with particular attention to sub-surface ground and groundwater conditions and the ability of the soils to structurally support underground services, roads, stormwater management facilities and foundations for residential, commercial, or industrial type structures. Design guidance and recommendations are to be provided for any potential soil retaining structures, roadway pavement structures, measures to promote post-development

infiltration of storm runoff etc. The soils report is also to address all normal and customary matters related to the construction of roads and services, including measures, if necessary, to control groundwater temporarily or permanently, corrosion protection of services, etc.

### c) Hydrogeological Study and Water Budget Report

A hydrogeological study, and water budget report will be required to be completed. The hydrogeological study should be completed using an adequate number of monitoring wells and boreholes to fully characterize groundwater conditions across the proposed development and identify depth to groundwater table, groundwater quantity, quality and flow direction within and surrounding the proposed development. Sufficient groundwater table readings should be obtained in order to determine the seasonal (4 season) variations in the groundwater table. The report shall also:

- Document the Source Water Protection concerns and potential mitigation measures for the proposed development. There shall be a specific heading related to the sewage collection system and stormwater management system confirming whether any of the proposed works would pose a significant threat in order to plan and implement risk management measures as well as comply with any requirements for drinking water source protection.
- Document implications for servicing and building construction and ascertain if a PTTW or EASR is necessary under temporary or permanent conditions.
- Address groundwater implications related to the development, including recommendations for minimum underside of footing elevations. In circumstances that groundwater will not be avoided construction recommendations are to be provided and may require coordination with the geotechnical consultant for minimum construction requirements and house building requirements to minimize nuisances with groundwater. The report is to indicate minimum sump pump sizes (½ HP or larger).
- A water budget shall be prepared to the satisfaction of the GRCA and Township. GRCA staff are to be consulted when determining pre-development water budget values.
- The recommendations of the report are to be reflected in the subdivision and servicing design. Any use of low impact development measures on private property will not be enforced/maintained by the Township. Measures that a homeowner is less likely to change (increased topsoil depth or amended topsoil) for example are preferred and if other measures are required, they are to be incorporated into the municipal stormwater management block.
- Additional testing may be required to support recommendations for low impact development measures. Infiltration rates should be determined using infiltrometers or permeameters in locations where low impact development measures are proposed. Infiltration testing should be conducted at the elevation of the proposed measures. Infiltration testing may also be required to support the design of private on-site sewage systems.

Privately Serviced Developments

- For sites serviced by individual private wells, the report shall demonstrate the proposal complies with MECP Procedure D-5-5 and that there is an adequate supply of water and the

quality is acceptable . Test wells and pumping tests are to be completed prior to draft plan approval. The Consultant should provide a terms of reference to the Township's retained hydrogeologist to review prior to commencing the field program. The Consultant shall recommend the minimum well construction requirements that should be met for each well in the development. The report is to demonstrate that any off site impacts are acceptable.

- For sites serviced by individual private on-site sewage systems, the report shall demonstrate that the proposal complies with MECP Procedure D-5-4. The use of treatment to comply with the procedure will be evaluated on a case by case basis, based on the aquifer characteristics and location of neighbouring wells. In the circumstance where treatment is permitted in the sole discretion of the Township, the maximum reliance on the equipment shall be 50%. For example, if there is a 20 lot subdivision, the calculation can only consider 10 lots with treatment and the other 10 lots shall be based on conventional even though all 20 lots in the subdivision would be installed with treatment. The development area would be subject to site specific zoning that would indicate the type and level of nitrate reduction required in the subdivision.
- Fire protection for rural developments may be required outside the village of Drayton. The minimum on site water supply shall be 37,500 US gallons and greater volume may be required determined by the type of building and construction as well as hazards included. The pumper apparatus shall have the ability to park within 24 feet of the outlet pipe and the top of the outlet pipe shall be 2 ½ feet from ground level. The underground reservoir is to be provided within its own block or incorporated into another block that is not within the municipal right of way. A well may be requested in order for a local source of water to re-fill the tank. The reservoir should be located in order that the fire truck can easily access the tank without the requirement to reverse.

### d) Traffic & Parking Studies

A Transportation Impact Study (TIS) in support of the proposed Draft Plan is to be submitted for review. The report should assess boundary road conditions and internal intersection operations and recommend improvements if necessary and to demonstrate and confirm the proposed internal lot and road fabric meet the Township's transportation planning and design requirements. The report shall also focus on maximizing on-street parking and in particular coordinate the location of sidewalk based on lot frontage widths to maximize parking capacity. The report should also make recommendations to support active transportation within the Draft Plan.

The TIS should identify safe routes to schools, parks and other locations attracting pedestrian and cyclist traffic, using the roadways, sidewalks or paths. Traffic calming features should be recommended, where required, to meet the design best practices for establishing Complete Streets, balancing the needs of all users, regardless of age, ability or mode of transportation in an equitable manner. Traffic calming measures should be context-sensitive, taking into consideration the vision for the street including the planned ROW width, land use, densities and functional classification. Neighbourhood traffic calming projects should encourage and enhance pedestrian, bicycle and transit access (if available) to neighbourhood destinations and be designed in accordance with the Canadian Guide to

Traffic Calming Second Edition (2018) (Transportation Association of Canada). Traffic calming devices must be in accordance with and satisfy engineering and safety criteria outlined in standard manuals of practice such as the Manual of Uniform Traffic Control Devices for Canada (MUTCDC) and the Ontario Traffic Manual (OTM). The TIS should recommend monitoring and evaluation of traffic calming/management measures, where required, to determine the effectiveness of such measures, once implemented.

### e) Stormwater Management Report

A Stormwater Management Report is to be prepared in support of the Draft Plan. The report is to address the major and minor storm drainage systems. Drainage area plans showing pre-development and post development areas are to be provided.

In general, creek diversions will not be permitted, unless they are approved by the GRCA.

At the preliminary design stage, the design engineer is to confirm the level of quantity and quality control. All preliminary pipe and facility sizes, designs and details are to be provided in sufficient detail to confirm functionality and present the operational and maintenance aspects of the new works.

The designs are to confirm block, easement and/or lot sizes for the proposed measures are adequate and will not change through the detailed design process. The Developer if requested by the Township Engineer shall provide any design sheets in excel format including digital versions of the SWM modelling data. The lot sizes should consider easement requirements which will necessitate the requirement for larger lots.

### f) Water and Wastewater Servicing

Where watermains and sanitary sewers are proposed, comprehensive servicing reports with supporting plans, models, design sheets and calculations shall be prepared and submitted to the Township. These services are to be in conformance with the Township's Water and Wastewater Master Plan if available. The digital versions of any design sheets should be provided in excel format.

Water and wastewater servicing of rural areas shall be in conformance with the most current versions of Provincial regulations. Wells and potable water systems shall meet O. Reg. 903. On-Site Sewage Systems which service properties with wastewater flows 10,000 L/day or less are governed by the Ontario Building Code. For rural or private wastewater treatment systems over 10,000 L/day, they are governed by the Ontario Water Resources Act and the Environmental Protection Act and are subject to review and approval by the MECP. They will require an Environmental Compliance Approval. Other Provincial policies and requirements may apply which are the responsibility of the design consultant to investigate and address.

### g) Preliminary Drawings

All drawings submitted shall refer to the appropriate Geodetic Datum and based off a topographic survey and the proposed draft plan.

### General Plan of Services

- Prepared at a maximum scale of 1:1000
- Contour lines at sufficient intervals, but not greater than 1.0 m to permit assessment of existing surface drainage patterns
- Locations of sewers and their direction of flow (storm and sanitary), watermains, catch basins, maintenance holes, etc.
- Label of sewer and watermain sizes, slopes, and inverts at MHs, all consistent with the design spreadsheets noted in the previous sections
- Location of sidewalks, walkways or other features

### Road Plan and Profiles

- Scale of 1:500 H and (1:100 V or 1:50 V)
- Shows all the services in the plan view with MH/CB labels and 20 m C/L stations.
- Preliminary sewer obverts/inverts, maintenance hole top elevations, slopes, lengths (these are to be consistent with the design spreadsheets noted in previous sections)
- Soil profile and groundwater elevations of borehole and test pit logs are to be shown on the plan and profile.
- The original ground at centreline and the proposed centreline road grade shall be plotted on the profile. The proposed centreline road grade shall be fully described (length, grade, P.I. elevations, vertical curve data, high point chainages, low point chainages, etc.).

### Grading Plan

- Scale of 1:500
- Label slopes of roadways and direction of overland flow
- C/L of road elevations every 20 m
- House types compatible with the grading design
- Grading terraces or required retaining walls
- House envelope
- Borehole locations with a label of highest groundwater level measured
- T/G elevations of all RYCBs
- Sufficient elevations to demonstrate the preliminary grading of the subdivision. Existing elevations surrounding the boundaries of the development shall be included.
- If serviced by private wells and on-site sewage systems, the location of the wells (and required separation from the sewage system and other features), sewage system, and house envelope shall be provided. The layout shall represent a realistic house footprint including space behind the house for typical amenities such as a deck/patio/pool.

### Stormwater Drainage Area Plan

- Catchment areas boundaries
- Each catchment area identified by number, area, and runoff coefficient

- Storm sewer infrastructure (size and slope, MH and label)
- Outer boundary identifying catchment area contributing to the stormwater management facility with a label noting the total area

**Sanitary Sewer Area Drainage Plan**

- Catchment areas boundaries
- Each catchment area identified by number, area, and population (if residential)
- Legend is to identify density used per unit.
- Sanitary sewer infrastructure (size and slope, MH and label)

**Preliminary Stormwater Management Drawings**

- Scale of 1:500 H, 1:400 H, or 1:300 H, scales of sections can be variable)
- General grading and sections showing storm levels, permanent pool, etc.

**Cut/Fill Plan**

- Scale of 1:500 H
- Summary table of cut/fill volumes

**h) Additional Reports**

In addition to the Preliminary Functional Servicing Report and other supporting reports noted above, the Township will require other reports to be submitted, these may include, but not limited to the following:

- Planning Justification Report (required for all draft plan approval applications)
- Environmental Site Assessment (required for all draft plan approval applications)
- Archaeological Report
- Environmental Impact Study
- Noise Report
- Minimum Distance Separation
- Tree preservation report
- Slope Stability Report
- Floodplain Analysis
- Snow Management Report

The County of Wellington Official Plan should also be referred to for any required studies.

## A3.00 Submission Requirements for Detailed Engineering Design

Engineering Drawings shall be submitted simultaneously to the Township Engineer and to the Township Director of Public Works. The Consulting Engineer is required to review the design criteria to determine the requirements for submission of Engineering Drawings. The Consultant Engineer is responsible to circulate to other agencies such as the GRCA or the

County when required. Copies of any correspondence from other agencies related to review of the design shall be provided to the Township. All report recommendations are to be reflected within the drawing set.

## A3.01 First Submission

The initial submission of engineering drawings to the Township shall contain the following information. Copies of all documents submitted shall also be provided in digital format. Two hardcopies of all documents are to be provided to the Township.

- A declaration from the Consulting Engineer showing that he/she has been retained to design and provide full time supervision for the construction of the works of the proposed subdivision;
- Approved Draft Plan;
- General Plan of Services;
- Grading Plan;
- Erosion and Sediment Control Plans (Sequencing of Earthworks)
- Cut/Fill Plan
- Stormwater Drainage Area Plan;
- Sanitary Sewer Area Plan;
- Storm and sanitary sewer design sheets, computer printouts, and calculations for pipe strength and bedding;
- Plan and profile drawings;
- Stormwater Management Facility Drawings/Sections;
- Generals Notes/Details Page;
- Any other drawings pertinent to the design;
- Stormwater Management report;
- Design brief/Functional Servicing report;
- Geotechnical report (where the Geotechnical Consultant has reviewed the detail design and has provided a report with subsequent information related to construction requirements. Any pertinent information related to construction must be included on the detail design drawing set.); and
- Hydrogeological Study (where there is high groundwater, the hydrogeologist has reviewed the detail design and has provided a report with subsequent information related to construction requirements. Any pertinent information related to construction must be included on the detail design drawing set).

The Consulting Engineer shall fill in the Asset ID# Request Form located in Appendix D and submit to the Director of Public Works to obtain asset IDs for all the proposed infrastructure. All infrastructure naming shall be based on Township Asset IDs.

## A3.02 Subsequent Submissions

Subsequent submissions of items shall be made until the Engineering Drawings and design is acceptable to the Township Engineer.

Drawings submitted during a subsequent submission include:

- Street Lighting Drawings;
- Composite Utility Plans;
- Signage and Pavement Marking Plans;
- Fence Plans;
- Landscape Plans;
- Park Plans;
- Homeowner Information Manual;
- Proposed M-plan for registration showing all block and lot numbers;
- Proposed R-plan for registration showing all easements;
- Fill Importation Report; and
- Any other reports specified in the draft plan conditions.

## A3.03 Engineering Drawing Requirements

a) All drawings to be prepared using AutoCAD 2018, or latest version.

b) All plans shall be prepared on standard A1 sheets.

c) All elevations shown on the drawings are to be of geodetic origin.

d) When streets are of a length that requires more than one drawing, match lines are to be used with no overlapping of information.

e) The reference drawing numbers for all intersecting streets and match lines shall be shown on all plan and profile drawings.

f) A north arrow shall be referenced on all drawings.

g) A key plan drawn to 1:10000 scale shall be shown on all plan and profile drawings as well as the General Plan of Services. The area covered by the drawing shall be clearly identified.

h) A standard Title Block shall be used for all drawings. A cover sheet is required for the drawings.

i) All engineering drawings shall be stamped by a Professional Engineer. The Engineer's stamp must be signed and dated, prior to the issuance of drawings for tendering.

j) Drawings should use Township Asset IDs for numbering infrastructure (MHs, CBs, street light poles, etc.) and they should obtain IDs early in the process, so all documentation and design documents use Township Asset IDs.

## A3.04 General Notes

The general notes page shall include all notes related to construction requirements and materials to be utilized. The Township's Design Guidelines & Standards includes a standard general notes detail (DWG. NO. A-02) that outlines minimum requirements that can be augmented by the Consultant as it relates to specific design requirements related to the project.

## A3.05 General Plan of Services

a) Prepared at a maximum scale of 1:1000.

b) Where more than one plan is prepared, a supplementary "General Plan of Services" at a smaller scale shall be prepared to show the entire plan of subdivision on one drawing.

c) The reference Geodetic Benchmark and the Site Benchmarks to be used for construction shall be identified on the General Plan of Services.

d) A drawing index shall be shown on all "General Plans of Services" to identify the Plan and Profile Drawing number for each street or easement shown.

e) All road allowances, lots, blocks, easements and reserves are to be shown and are to be identified in the same manner as shown on the Registered Plan.

f) All storm and sanitary sewer sizing and direction of flow

g) All maintenance holes numbered in accordance with the design drawings.

h) All catch basins are to be shown.

i) All watermains, valves and hydrants are to be shown. Watermains are to be identified by size.

j) All curbs and sidewalks are to be shown.

k) All fencing is to be indicated by height and type.

l) All street lighting location and hydro transformers and above ground pedestals are to be shown.

m) All sites for parks, schools, churches, commercial and industrial development must be shown.

n) Any limits of hazards such as floodplains, environmental protection areas, etc.

o) Proposed locations of Community Mail Boxes shall be shown on the "General Plan of Services".

p) The location of all traffic control and information signs is to be clearly shown.

## A3.06 Plan and Profile Drawings

a) Prepared at a scale of 1:500 horizontally and 1:100 or 1:50 vertically. A complete legend shall be provided on each drawing.

b) Plan and profile drawings are required for all roads, blocks and easements where services are proposed, for all outfalls and for all boundary roadways abutting the development.

c) All existing or future services, utilities and abutting properties shall be shown.

d) All road allowances, lots, blocks, easements and reserves are to be identified. Lot and block frontages are to be shown.

e) All curb and gutter and sidewalks are to be shown and dimensioned on the plan portion of the drawings.

f) All storm sewers shall be shown and dimensioned on the plan and shall also be plotted on the profile of the drawings to true scale size. Sewers shall be described only be size, type and direction of flow on the plan portion. The length, grade, material, class of pipe, usage and type of bedding shall be described in detail on the profile portion.

g) All maintenance holes shall be shown on the plan portion and the profile portion of the drawings. The maintenance holes shall be identified by number and chainage on the plan portion and by number, chainage, offset, size, invert elevations and applicable Township of Mapleton Standard Drawing or Ontario Provincial Standard Drawing (OPSD) on the profile portion of the drawing. Maintenance holes that have safety platforms or drop connections shall be noted and referred to an OPSD.

h) The profile shall show the hydraulic grade line for the 100 year storm.

i) All catch basins and catch basin connections shall be shown. Any catch basins with inlet control devices are to be labelled.

j) All rim and invert elevations for rear lot catch basins are to be shown.

k) Left and right ditch profiles and grades shall also be shown where applicable.

l) All watermains, hydrants, valves, etc., shall be described and dimensioned on the plan portion of the drawings. The watermain is to be plotted to true scale size on the profile portion of the drawing and shall be described.

m) The location of all storm, water and sanitary service connections shall be shown on the plan portion of the drawing.

n) The centreline of construction with 20 m stations shall be noted on the plan portion of the drawings.

o) The original ground at centreline and the proposed centreline road grade shall be plotted on the profile. The proposed profile shall be fully described (length, grade, V.P.I. elevations, vertical curve data, etc.).

p) Details of the gutter grades for cul-de-sacs and crescents shall be provided on the plan portion as a separate detail

q) Chainage for the centreline of construction as well as the chainages for V.P.I., B.V.C., E.V.C. shall be noted on the profile portion of the drawing.

r) All existing utilities and services shall be shown on the plan portion. It may be necessary to dig test holes to determine the actual elevations of these services to avoid conflicts with new construction. These elevations shall be shown on the profile portion.

s) Profiles of roadways shall be produced sufficiently beyond the limits of the proposed roads to confirm the feasibility of future extensions.

t) Boreholes locations on the plan view, and the logs in the profile view.

u) In addition to the above, the following detail shall be shown on the plan portion of the drawings:

- The curb radii at all intersections;
- The location of all luminaire poles and transformers;
- The location and type of all street name and traffic control signs;
- The 100 year ponding levels when there is 50% inlet capacity restriction at all depressions and roadway sags;
- Identification of lots that require sump pumps, and
- Any special notes necessary to construction procedures or requirements.

## A3.07 Storm Drainage Area Plans

All drainage plans for the storm sewer design shall be prepared in accordance with the criteria in Section C of this document.

## A3.08 Sanitary Drainage Area Plans

All drainage plans for the storm sewer design shall be prepared in accordance with the criteria in Section F of this document.

## A3.09 Lot Grading Plans

All lot grading plans shall be prepared in accordance with the criteria in Section G of this document.

## A3.10 Erosion and Sedimentation Control Plans

a) Prepared at a scale maximum scale of 1:1000 scale (or per the General Plan).

b) Instructions providing the staging of erosion and sediment control plan.

c) Minimum inspection and documentation requirements. The inspection frequency shall address dry weather periods (active and inactive construction phases), after significant storm events which shall be defined and significant snowmelt events, and after any extreme weather events. Documentation requirements shall include the name of the inspector, date of inspection, visual observations, and the remedial measures, if any, undertaken to maintain the temporary erosion and sediment control measures.

d) Location of all components to be implemented.

e) Details of all proposed components.

f) Sediment basin design confirming adequate volumes and length to width ratios.

g) Stabilization requirements.

## A3.11 Street Lighting Drawings

All street lighting drawings shall be prepared in accordance with the criteria in Section K of this document. These are generally prepared at 1:1000 scale (or per the General Plan scale).

## A3.12 Detail Drawings

The Township of Mapleton Standard Drawings shall be used whenever applicable. In the absence of a Mapleton Standard Detail the latest revision of the Ontario Provincial Standard Drawings shall be used. Individual details shall be provided by the Consulting Engineer for all special features not covered by any of the above. All details shall be reproduced or drawn on standard size sheets and shall be included as part of the Engineering Drawings.

## A3.13 Utility Coordination Drawings

Individual submissions from the various utilities are required before installation can commence. The Composite Utility Plan is to include the following:

a) Show municipal addresses (house numbers), as well as lot numbers.

b) Specify pole, conduit and fixture being used.

c) Specify locations of transformers, switch gear, telephone and cable television pedestals or vaults and the means of disconnects, power and control centers.

d) The dimensions of switch gear (including surrounding grounding systems) and utility vaults in order to ascertain the clearances to other services or aboveground structures. Switch gear, transformers and utility vaults are to be drawn to scale.

e) Lighting pole installation is to clearly show locations with respect to property line and offset.

f) The typical road cross-section shall be shown or referenced on the Utility Drawing. When utilities are in a common trench, the arrangement of the utilities shall be acceptable to the respective utility company.

g) Where utilities cross roads, they shall be installed in concrete encased ducts. The concrete encasement shall be installed below the subdrain.

h) For ditched roads, the utilities shall be located so that there are no utilities within 1 m of the bottom of the ditch in order that ditch cleanouts can be completed with normal equipment.

i) The standard location of the services to the lots shall be shown.

j) Utilities are to be located as shown on the approved standard road cross sections and the Composite Utility Plan.

k) Minimum 1 m separation is to be maintained between edge of driveway and all street furniture (vaults, pedestals, street light poles etc.

l) Minimum 3 m separation is to be maintained between edge of driveway and all transformers

m) Underground electrical to have minimum 1 m horizontal clearance at hydrant locations.

n) Hydro primary and cables to be concrete encased over split duct at watermain and hydrant connection crossings.

o) Underground electrical shall clear maintenance holes and catch basins by minimum of 1.0 m; otherwise, concrete encasement is required.

p) Gas mains shall clear underground structures by 300 mm minimum.

## A3.14 Signage and Pavement Marking Plan

Pavement marking and signage drawings shall be prepared at a scale of 1:500 horizontally and shall depict all required pavement markings and signage based on the recommendations of the TIS and the Townships Parking By-Law.

## A3.15 Landscape Plans

Landscape plans may incorporate fencing requirements, park plans, and tree preservation/compensation requirements. The drawings shall be prepared at a scale of 1:500 however a different scale may be needed if there is significant detail.

## A3.16 Homeowner Information Manual (For Residential Subdivisions);

A Homeowner Information Manual shall be provided in a non-technical manner and shall include the following:

a) Developer Representative Contact Information

b) For lots on private servicing, the following shall be included:

- On-Site Sewage System: The type of system utilized in the subdivision shall be described in a simplified manner. Reference to the Septic Smart booklet should be provided. Operation and Maintenance requirements should be provided with common DO's and DON'T's.
- Well: A general description and operational and maintenance requirements should be provided. Reference to the Wellington-Dufferin-Guelph Public Health Unit well water testing web-page should be provided. Any treatment requirements shall be included.
- Impacts of power outages on the services.

c) For lots on municipal servicing, the following shall be provided:

- The manual shall indicate that the property owner will be serviced by municipal water and wastewater and will be subject to rates and fees as imposed through the Township of Mapleton Fees and Charges By-Law.
- Municipal wastewater: The manual should list common household items that should not be flushed down the toilet or put down the drains.
- Municipal water: The location of the main shut off for the house should be described with recommendations for its operation on a regular basis. The manual shall also describe the curb stop and that it should not be buried or covered and requires operation by Township representatives only. Reference to limitations on lawn watering should also be provided. Backflow prevention requirements should also be covered, specifically the requirement for backflow prevention for any lawn irrigation systems installed.

d) The purposes of any stormwater management facility and the connection between what goes into the square grates on the road and the environment. The manual shall re-iterate that stormwater management facilities are considered infrastructure and are not intended for recreational uses listing the common DO's and DON'T's, including never putting paint, oil, etc. down a catch basin (square grate in the road), and never swimming, skating, etc. at any stormwater management facilities in the subdivision. There should also be a section educating the homeowner that they should never release unwanted household fish, game fish or aquarium pets into the stormwater management facility.

e) Information related to common projects that new homeowners complete such as decks, sheds, pools, hot tubs, fences, finishing a basement as they relate to the requirement for a Building Permit or Township By-Laws.

f) Information related to easements, what they are for, and restrictions. A map may be required for this purpose.

g) For lots with sump pumps, the minimum size of pump shall be provided with typical operation and maintenance requirements.

h) Information regarding the municipal property and DO's and DON'Ts. This includes indicating that no landscaping by the property owner is permitted and that if the road is ditched, the homeowner is not permitted to extend private piping beyond the property line limits or add headwalls, etc.

i) Any other design feature that should be shared with the homeowner.

# A4.00 Approvals

## A4.01 Township of Mapleton

Submissions of items shall be made until the Engineering Drawings and design is acceptable to the Township Engineer.

## A4.02 Grand River Conservation Authority

The Consulting Engineer is responsible to make all submissions to the GRCA. Prior to commencement of pre-grading, the Township must receive correspondence that they are satisfied including a copy of the GRCA Permit if applicable to the site and any draft plan conditions that are required to be completed prior to any on-site disturbance shall be addressed to the satisfaction of the GRCA.

## A4.03 Ministry of the Environment, Conservation and Parks

**Stormwater Management Systems and Sanitary Sewage Collection Systems**

For designs that conform to the MECP Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under the Township of Mapleton's Sanitary Sewer Collection System and Stormwater Management System, once detail design has adequately addressed the requirements, the following forms as applicable will require signing which is to be coordinated through the Township Engineer.

- Form SW1 – Record of Future Alteration Authorized for Storm from Sewers/Ditches/Culverts
- Form SW2 – Record of Future Alteration Authorized for Stormwater Management Facilities
- Form DN – Director Notification Alterations to a Municipal Stormwater Management System
- Form SS1 – Record of Separate Sewers/Nominally Separate Sewers/Forcemains Authorized as a Future Alteration
- Form SS2 – Record of Components of the Municipal Sewage Collection System Authorized as a Future Alteration
- Completion of the Consolidated Linear Infrastructure Environmental Compliance Approval Form located in Appendix F

The Township's CLI-ECAs are listed below:

| | |
|---|---|
| Township of Mapleton Stormwater Management System | ECA Number: 105-S701 |
| Township of Mapleton Sewage Collection System | ECA Number: 105-W601 |

If the project is not authorized through the CLI-ECA process, the Consulting Engineer shall apply for an individual ECA from the MECP. The Township will sign the application at the stage where the Township Engineer is generally satisfied with the design concept. A complete digital package of the application shall be provided to the Township Engineer for review. The Township Engineer will recommend the Township's Chief Administrative Officer or the Director of Public Works who has signing authority to sign the application. The Consultant Engineer will then make the application to the MECP.

**Watermains**

Consultants are required to confirm to the MECP Watermain Design Criteria for future alterations authorized. As part of the requirements, the following form must be completed prior to the installation of the watermain:

- Form 1 – Record of Watermains Authorized as a Future Alteration

Appendix E should be referred to for further information. A commissioning plan prior to commissioning, and the Water Testing Form is required to be submitted.

### A4.04 Other Agencies

The Consulting Engineer is required to make all submissions and representations necessary to obtain approvals from all affected authorities or agencies (i.e., County of Wellington, Ministry of Northern Development, Mines, Natural Resources and Forestry Services, Canada Post Corporation, etc.). The Township of Mapleton shall be kept informed of the progress of these submissions by copies of all correspondence.

## A5.00 Approved Drawings

After all approvals have been received from all parties affected, the drawings shall be submitted to the Township Engineer. These drawings shall be signed and dated by the Township Engineer and returned to the Consulting Engineer. A hard copy of the approved drawings as well as in electronic format (AutoCAD latest version required by the Township) shall be provided to the Township. Any subsequent changes must be formally submitted to the Township Engineer for approval.

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

# A6.00 Agreements

## A6.01 Pre-Grading or Pre-Servicing Agreements

Township Council at their sole discretion may allow the Developer to conduct grading and servicing installation under a pre-grading and/or pre-servicing agreement. Any work that is done under a Pre-Grading or Pre-servicing Agreement and prior to a Subdivision Agreement will be solely at the cost of and risk to the Developer. In any event, work relating to other agencies shall not commence without proper approvals.

The Pre-servicing Agreement requires the following to be completed.

- The Township requires the Clearance letter from the Ministry of Tourism, Culture and Sport for the archaeological report;
- An Erosion and Sediment Control plan approved by the Township (and GRCA where applicable);
- Grading Plans or Servicing Plans depending on the works to be included in the pre-grading or pre-servicing agreement approved by the Township (and GRCA as applicable);
- Fill Importation Plan including cut/fill plan (if applicable to the site);
- Tree Preservation Plan (if appliable to the site);
- Adherence to any recommendations or mitigation measures from Environmental Impact Study if applicable;
- All applicable draft plan conditions that are to be addressed prior to any grading on the site; and
- GRCA permit (if applicable to the site).

The Developer or his Consultant shall also submit the following prior to the commencement of site work:

a) A letter from the Consultant Engineer indicating that they have been retained and will be providing inspection including full time inspection of all underground services and ensuring all geotechnical testing is being carried out and conducting all erosion and sediment control inspections.

b) Cost Estimate for the works to determine the securities required for the pre-grading and/or pre-servicing agreement. The Developer will be required to deposit an initial cash payment as outline in the agreement (that is to be re-plenished from time to time) to pay for outside consultants retained on behalf of the Township as well as a letter of credit for the works.

c) Liability insurance provided by the Developer to the Township in the amount of no less $5,000,000.00 in accordance with Township requirements.

Prior to any work on-site, a pre-construction meeting shall be held to ensure that requirements have been met. The Consultant Engineer shall provide the Township Engineer with the following from the Contractor:

- WSIB Clearance letter;
- Insurance policies or certificates of insurance naming Township, Township Engineer and other effected authorities as coinsured;
- Notice of Project to Ministry of Labour, copy to the Township Engineer; and
- List of materials suppliers.

The Township Engineer shall be notified when all initial erosion and sediment control measures have been installed prior to commencement of topsoil stripping.

## A6.02 Subdivision Agreement

The draft of the Subdivision Agreement (based on the Township of Mapleton's Standard Subdivision Agreement) will be prepared by Township staff with input from the Township's Engineer and Township Solicitor. The Developer's Engineer shall prepare the schedules for the agreement.

The following information must be provided by the Developer's Consulting Engineer to the Township Engineer prior to the preparation of the Subdivision Agreement.

a) Copies of approvals (Environmental Compliance Approvals, GRCA Permits, etc.)

b) The name of the person and/or company and Mortgagees with whom the Subdivision Agreement will be executed.

c) The name, address and telephone number of the developer's lawyer.

d) The Reference Plan.

e) Legal Description based on the Reference Plan.

f) Proposed final plan for registration (61M-Plan) complete with all the pertinent information as required by the registry office.

g) Reference (61R-) Plans for any easements to be granted to the Township.

h) Copy of the approved engineering drawings (including street lighting, landscaping, composite utility drawings, etc.).

i) A detailed cost estimate in digital format of all services to be constructed. This estimate shall include:

   - Detailed cost of earthworks and services;
   - Cost of street lighting;
   - Landscaping costs;
   - All miscellaneous expenditures;
   - 15% allowances for contingencies and engineering; and

- This estimate will be used as a basis for calculation of the security to be posted for the development.

j) Proposed timetable for construction of services.

Prior to the commencement of construction, the Developer's Consulting Engineer shall submit the following information to the Township Engineer for approval:

- Letter from the Consultant Engineer indicating that they have been retained to supervise the construction of the work in the subdivision as well as all other engineering related matters according to the terms of the subdivision agreement;
- Liability insurance provided by the Developer to the Township in the amount of no less $5,000,000.00 in accordance with Township requirements;
- Execution and registration of subdivision agreement;
- The required Letter of Credit must be posted with the Township;
- All cash payments required have been made;
- Two sets of construction specifications;
- A copy of the signed contract tender complete with prices; and
- Any other information as required by the Township Engineer or as specified in the Subdivision Agreement.

A pre-construction meeting (if not previously held through a pre-grading/pre-servicing agreement) shall be held to ensure that requirements have been met.

The Consultant Engineer shall provide the Township Engineer with the following from the Contractor:

- WSIB Clearance letter;
- Insurance policies or certificates of insurance naming Township, Township Engineer, and other effected authorities as coinsured;
- Notice of Project to Ministry of Labour, copy to the Township Engineer;
- List of materials suppliers; and
- List of any subcontractors being used.

## A7.00 General

The record drawings constitute the original engineering drawings which have been amended to incorporate the construction changes and variances in order to provide accurate information on the works as installed in the development. The revisions shall be based on a survey of all the subdivision services and the Consulting Engineer's construction records. There is an interim and final submission of record drawings that are to be provided.

## A7.01 Interim Record Engineering Submission (Underground Infrastructure)

The interim record submission is to be provided prior to Preliminary Acceptance of the Subdivision and within 6 months of its installation and is to be provided via PDF and AutoCAD format. The interim submission includes:

**Interim Record Drawing Set (Underground Servicing)**

a) Location and invert elevations of all sewer maintenance holes.

b) Distances between all sewer maintenance holes.

c) Culvert inverts.

d) Location of all roadway catch basins and invert elevations.

e) Location of all rear yard catch basins and invert elevations.

f) Location of all valve boxes, chambers, hydrants and other watermain appurtenance.

g) Site benchmarks.

h) Location and elevation of all service connections to all lots and blocks. The elevation should be taken where the service terminates 1.5 m into the property.

i) All street names, lot numbering and block identification shall be checked against the Registered Plan and corrected if necessary.

j) All municipal civic addresses shall be added to the plans (if not already on the drawings).

k) All sewers are to be recalculated to two decimal places.

l) The interim record revision note shall be placed on all drawings in the revision block.

**Updated Designs Spreadsheets**

a) Updated sanitary design spreadsheets with as-constructed inverts and updated lengths if applicable

b) Updated storm design spreadsheet with as-constructed inverts and updated lengths if applicable

**Asset Information**

a) Material List

b) Copy of Shop Drawings

c) Cost of Asset (provide copy of contract costs)

The Consultant shall be required to explain in writing any major difference between the design and the "interim record" data and to provide verification that the alteration does not adversely affect the function of the subdivision services.

## A7.02 Final Record Drawings

The record revisions shall be based on a final survey of all the subdivision services and the Consulting Engineer's construction records. The information below supplements the information provided in the interim as-constructed drawings and shall be revised to incorporate all changes and variances and to provide ties and additional information to readily locate all underground services. Final approved drawings shall be prepared on Mylar, as well as in digital format AutoCAD and PDF.

a) All top of grates.

b) Identification of materials used (pipe materials for example).

c) Indication of geotechnical issues (the addition of geotextile, additional granular, etc.).

d) Location of all roadway catch basins.

e) Location and ties to all valve boxes, chambers, hydrants and other watermain appurtenance.

f) Road centreline elevations.

g) All structure locations (stations) and inverts (carried over from the interim record submission).

h) Constructed boundary elevations (if they adjoin to a next stage in the subdivision).

i) All road grades are to be recalculated to two decimal places.

j) All above ground structures including utility pedestals.

k) Swing ties to each corner of house for the curb stops.

l) Topographic survey of any blocks (stormwater management facility, park block)

The Consultant shall be required to explain in writing any major difference between the design and the final record data and to provide verification that the alteration does not adversely affect the function of the subdivision services. The submission of the final record drawings must be completed before "Final Acceptance" of the subdivision will be given.

## A8.00 Preliminary and Final Acceptance

The term "Preliminary Acceptance" shall be used to describe the date when the services are substantially complete and acceptable to the Township of Mapleton subject to the maintenance requirements pursuant to the terms and conditions of the Subdivision Agreement. "Final Acceptance" shall be the terminology used to describe the date when the Developer's maintenance requirements have been fulfilled and the services are acceptable to the Township of Mapleton. "Formal Acceptance" of the subdivision shall be the date on which the Township of Mapleton agrees by By-law that all conditions of the Subdivision Agreement have been fulfilled and all maintenance requirements have been completed.

The Certificate of Completion and Final Acceptance must be requested by the Developer in writing. The dates for all certificates shall be established by the Township of Mapleton.

When the services are completed and cleaned to the satisfaction of the Consulting Engineer, he/she shall advise the Township and the Township Engineer, in writing, that the work is completed and shall request an inspection by the Township of Mapleton. In no event will the Township's Consulting Engineer be required to conduct inspections or recommend preliminary acceptance of any part of the works or services during the months of December, January, February and March in any year. The Township of Mapleton shall carry out their inspections and shall advise the Consulting Engineer of any items that require further recertifications. When all deficiencies have been corrected to the satisfaction of the Township Engineer, a report shall be forwarded to Council recommending a date for the commencement of the maintenance period as defined in the Subdivision Agreement.

Near the end of the required maintenance period the services shall be re-inspected by the Consulting Engineer and all deficiencies found shall be corrected. All the sewers shall be cleaned and a survey of the stormwater management facility and complete a cleanout if required. When the Consulting Engineer is satisfied that the work is complete and acceptable, he/she shall advise the Township, in writing, and request a final inspection by the Township Engineer. When all work is completed to the satisfaction of the Township Engineer, a report shall be forwarded to the Council recommending "Final Acceptance" of the works.

The appendices include checklists for "Preliminary Acceptance" and "Final Acceptance" to help guide the Consultant Engineer on the requirements needed to meet these milestones in order for the Township Engineer to provide a report to Council.

# SECTION B

# Roads

# Section B Roads

## B1.00 Design Guidelines and References

The design of roadways within the Township is to be in accordance with the guidelines provided in this manual. In the absence of specific guidelines in this manual, the following sources of documentation can provide further information and may be adopted as a guideline by the Township at its sole discretion:

- County of Wellington (Road Master Action Plan);
- Ontario Traffic Manuals;
- Transportation Association of Canada; and
- Ontario Ministry of Transportation.

## B2.00 Classifications

All roadways in new developments shall be classified according to the traffic volume expected and to the intended use of the roadway. For predominantly residential areas, four classifications shall be noted as follows:

- Local - Estate Residential (lot widths over 60.0 m);
- Local - Urban and Hamlets; and
- Collector.

For industrial and commercial areas, the roads shall be classified Local or Collector dependent upon the length of street, traffic volume expected, and amount of truck traffic.

The proposed classification of all streets shall be confirmed with the Township of Mapleton prior to the commencement of the design.

## B3.00 Geometric Design Elements

**Table B.1: Geometric Design Elements**

| Geometric Detail | Local Estate | Local Urban | Collector Minor | Collector Major |
|---|---|---|---|---|
| Min. R.O.W. (metres) | 20 | 20 | 20 | 26 |
| Design Speed (km/hr) | 50 | 50 | 50 | 60 |
| Min. Safe Stopping Distance (metres) | 65 | 65 | 65 | 85 |
| Min. Visibility Curves in Sag (K Values) | 12 | 12 | 12 | 18 |
| Min. Visibility Curves on Crests (K Values) | 8 | 8 | 8 | 15 |
| Min. Horizontal Radius | 80 | 80 | 110 | 160 |

| Geometric Detail | Local Estate | Local Urban | Collector Minor | Collector Major |
|---|---|---|---|---|
| Pavement Width (meters) (face to face of curbs) | 8.5 | 8.5 | 10 | 15 |
| Pavement Crossfall (%) | 2 | 2 | 2 | 2 |
| Minimum Grade (%)* | 0.5 | 0.5 | 0.5 | 0.5 |
| Maximum Grade (%) | 6 | 6 | 5 | 5 |
| Max. Grade for Through Roads at Intersections | 3.5 | 3.5 | 3.0 | 3.0 |
| Max. Grade at Stop Roads at Intersections | 2.0 | 2.0 | 1.5 | 1.5 |
| Intersection Angle (degrees) | 70-90 | 70-90 | 80-90 | 85-90 |
| Minimum Tangent Length Between Reverse Curves (metres) | 30 | 30 | 50 | 60 |

Notes:

- Deviations from the above criteria may be permitted if supported by calculations prepared by an Engineer specializing in Transportation.
- *Rural standard road designs (i.e., ditched) are to provide minimum 1% ditch profile grades. Urban standard road designs (i.e., curb and gutter) are to provide a minimum 0.5% gutter grades on all curb radii.
- For industrial ditch road cross sections, the typical pavement width is 7.4 m and shoulder width of 2 m with a 26 m ROW required. Refer to TAC for industrial road geometric requirements. The ROW width for industrial roads with curb and gutter shall be confirmed with the Township.

# B4.00 Design Elements

## B4.01 Horizontal Curves

Horizontal alignment is to conform to the requirements as outlined in Section B3.00. In general, “right angle bends” will not be permitted on local streets except in the case of “Courts” or “Crescents” servicing no more than 50 residential lots. Where permitted, these bends must not have a deflection angle greater than 110 degrees.

## B4.02 Vertical Curves

All points of grade change in excess of 1% shall be designed with vertical curves as outlined in the current Ministry of Transportation of Ontario publications. The minimum visibility curves to be used are outlined in the geometric details for each roadway classification. The minimum tangent length of any road grade shall be 9 m.

## B4.03 Backfall at Intersecting Streets

At all street intersections the normal crossfall of the major street shall not be interrupted by the crown line of the minor street. A 1% or 2% backfall shall be provided on the minor street at all street intersections. This backfall shall continue to the end of the curb return radii to facilitate proper drainage of the intersection. Overland flow routing of storm drainage through the intersection must be maintained.

## B4.04 Curb Return Radii at Intersections

The curb return radii at street intersections shall conform to the following dimensions:

**Table B.2: Intersecting Road and Right-of-Way Characteristics**

| Pavement Width Street A | Pavement Width Street B | Curb Return Radii |
|---|---|---|
| 8.5 m | 8.5 m | 10.0 m |
| 8.5 m | 10.0 m | 10.0 m |
| 8.5 m | 12.8 m | 10.0 m |
| 8.5 m | 14.0 m | 10.0 m |
| 10.0 m | 10.0 m | 12.0 m |
| 10.0 m | 12.8 m | 12.0 m |
| 10.0 m | 14.0 m | 15.0 m |

## B4.05 Daylighting Requirements at Intersections

Daylighting at all intersection quadrants shall be included in the road allowances to provide for uniform boulevard widths. Such daylighting shall be included on the proposed plan for Registration (M Plan) and on all engineering drawings.

## B4.06 Cul-De-Sac and Bulbs

Permanent cul-de-sacs are discouraged, but where approved by the Township shall be constructed in accordance with the details provided on DWG NO. B-07 and B-08. Minimum gutter grades of 1% shall be maintained along the flow line of the gutters around the cul-de-sac. The design of the road grade shall be such that the drainage is directed away from the end of the cul-de-sac and towards the beginning of the bulb area where catch basins are to be located.

## B4.07 Temporary Turning Circles

Temporary turning circles will be considered whenever a road is to be continued in the future in a phased Plan of Subdivision. The minimum radius for temporary turning circles shall be as indicated on DWG NO. B-07 and B-08. When temporary turning circles are required within the subdivision limits, the land within the temporary right-of-way limit must be conveyed to the Township or easements must be provided in favour of the Township. The temporary turning circle is to have complete services to the street line. Signage is to be erected at the terminus of the cul-de-sac indicating that the road may be extended in the future and a “dead end” barricade and sign shall be erected in accordance with OPSD 973.130 with the Checkerboard Sign. Temporary turning circles require street lighting.

For lots with driveways that exist off dead end road stubs that will eventually be extended in the future, a temporary turning circle will be required to allow those lots to be developed.

This is to allow snow removal equipment and waste collection trucks to use the road without the requirement to reverse.

## B4.08 Location of Utilities

The location of utilities within the road allowance shall be as detailed on the Township of Mapleton Standard Drawings. Utility drawings shall be submitted to the Township Engineer or Representative for approval of the proposed utility locations.

All utility wiring is to be housed underground or direct buried. Hydro transformers are to be housed in suitable enclosures and mounted on transformer pads installed at the final elevation of the adjacent ground. The location of transformer pads shall be as detailed on the Township of Mapleton Standard Drawings. Bell Telephone and Cable T.V. junction boxes may be mounted at the surface in approved standard enclosures.

The Developer is required to complete all required Hydro One coordination.

## B4.09 Community Mailbox Requirements

In general, community mailbox centres shall be placed in locations approved by Canada Post. The Township may request the Developer re-consult with Canada Post if another location for a community mailbox is preferred. The design of the community mail centre must incorporate such criteria as pedestrian safety, traffic flow and aesthetics. The Township of Mapleton requires that all community mailboxes are on a poured concrete pad. The Township may also require the developer to furnish the following amenities within the community mail centre:

a) Park benches.

b) Fencing.

c) Litter containers.

d) Landscaping.

e) Pedestrian lighting.

f) Architectural controlled kiosks.

g) Adjacent car bays parallel to the traveled portion of the roadway.

All details associated with the community mail centres shall be identified on the Engineering Drawings and will be subject to the approval of the Township Engineer. The Developer shall be responsible for constructing community mail centres within residential subdivisions, prior to the issuance of the first occupancy.

## B5.00 Pavement Design

The pavement design for all roads shall be as recommended by a qualified Geotechnical Consultant. The design is to consider analysis of the subgrade material, frost susceptibility, drainage characteristics, (future predicted) traffic volumes and impacts on pavement structure during the building program prior to placement of top course asphalt. The Geotechnical report shall be submitted as part of the Engineering Drawing Submission Package. The minimum pavement design for all streets in new subdivisions shall be as follows:

**Table B.3: Minimum Pavement Design**

| Local Road | Collector Road and Industrial Road |
|---|---|
| 40 mm HL3 | 40mm HL3 |
| 50 mm HL8 | 80 mm HL8 (2 lifts) |
| 150 mm Granular “A” | 150 mm Granular “A” |
| 450 mm Granular “B” | 450 mm Granular “B” |

Compaction requirements shall be reviewed and confirmed by a qualified Geotechnical Consultant. The following minimum standards are to be met.

**Table B.4: Minimum Compaction Requirements**

| Item | Compaction Required (% of Standard Proctor Density) |
|---|---|
| HL3 Asphalt | 92% to 96.5% |
| HL8 Asphalt | 92% to 96.5% |
| Granular “A” | Minimum 100% |
| Granular “B” | Minimum 100% |
| Subgrade | Minimum 98% |
| Trench backfill | Minimum 95% |

Note: Granular and stone materials are to be spread and compacted in layers with a maximum depth of 150 mm.

A qualified Geotechnical Consultant shall be engaged by the Developer to provide sampling and testing services during construction and to provide confirmation that all roads have been constructed in accordance with the design standards. Copies of all test results shall be provided to the Township Engineer.

Testing and approval of all granular materials at the designated pits prior to placement and subsequent in situ verification tests shall be performed by the Developer’s Geotechnical Consultant.

Prior to the placement of asphalt pavement, the Consulting Engineer must submit the asphalt pavement mix designs to the Township for approval.

# B6.00 Construction Requirements

## B6.01 Clearing and Grubbing and Area Rough Grading

The road allowance shall be cleared of all trees and shrubs, which are not included in final landscaping, and of all other obstructions for such widths as are required for the proper installation of roads, services and other works. Rough grading shall be done to bring the traveled portion of the road to the necessary grade and in conformity with the cross-section shown on the drawings. Rough grading of all lots and easements must be properly shaped and compacted to 95% Standard Proctor Density, prior to any application of granular base course materials. In all cases, topsoil shall be stripped for the complete width of the road allowance and stockpiled at locations approved by the Township Engineer.

If fill importation or exportation is required, the Developer shall comply with O.Reg. 406/19. When requested, the Township shall be provided with copies of all related documentation with an overall final letter from a Qualified Person indicating that any soils imported or exported complied with all required regulations.

The location, maximum sides slopes, and maximum height of topsoil stockpiles shall be shown on the drawings. Generally, stockpiles shall be a maximum of 4 m high, have maximum 2 (H): 1(V) side slopes. Unless approved by the Township they shall not be located on blocks to be dedicated to the Township or other public agencies or in close proximity to existing developed properties

## B6.02 Road Sub-Drains

In general, 150 mm diameter perforated, filter cloth-wrapped plastic corrugated sub-drains, will be required to run continuous along both sides of all roads with curb and gutter. The sub-drains shall be trenched and have Granular “A” surround. The Township reserves the right to require video inspection of sub-drains.

## B6.03 Snow Clearing

Snow clearing operations prior to “Final Acceptance” is carried out by the Township and the annual costs are charged back to the Developer until “Final Acceptance”.

## B6.04 Placing of Final Surface Course Asphalt

The placement of surface course asphalt shall not commence in any area until all of the following conditions are met or at the discretion of the Township Engineer or Director of Public Works:

a) A minimum period of one year has expired from the completion date for the placement of the base course asphalt.

b) All undeveloped lots are rough graded in accordance with the approved lot grading plans.

c) All service connections for multiple family commercial, institutional or other blocks are installed.

d) The approval of the Township Engineer is obtained in writing.

e) All deficiencies and settlements have been repaired.

f) Favourable weather conditions are present.

g) A maximum of 4 years has passed since the placement of base course asphalt.

### B6.05 Tack Coat

A tack coat of SS-1 emulsified asphalt diluted with an equal volume of water shall be applied before surface asphalt is placed. OPSS.MUNI 310 and OPSS.MUNI 1150 shall govern. The diluted emulsion shall be applied at the rate of 0.35 kg/$m^2$.

### B6.06 Other Requirements

Whenever it is necessary to cut through an existing Township road, the Developer's Contractor will be responsible for obtaining a permit from the Director of Public Works. The placement and compaction of the backfill material and the restoration of the surface pavement shall be done in accordance with the standard and specifications in effect at that time.

Before making detours, permission is required from the Township Public Works Department. Where the road is not part of the Township road system, approval from the appropriate road authority will also be necessary. In all cases, the Fire, Police, School Bus Companies and Ambulance Service must be notified by the Developer or his Contractor.

All work will be done in accordance with ordinances and By-laws of the Township of Mapleton.

## B7.00 Concrete Curb and Gutter

Generally, all new roads are to have concrete curb and gutter and the installation of storm sewers unless otherwise approved by the Township. The type of concrete curb and gutter shall be confirmed by the Township, but will typically be as follows:

- Drayton, Moorefield and Alma: Concrete Barrier Curb with Standard Gutter (OPSD 600.040)
- Glen Allan, Estate Subdivisions: Concrete Mountable Curb with Narrow Gutter (OPSD 600.100)

Driveway depressions shall be formed in the curb according to the detail and location as per DWG. No. B-09. If driveway locations cannot be determined at the time of pouring, a full section of curb and gutter shall be poured continuously. When the driveway location is

determined, a driveway depression can be formed by cutting the back of the curb with a curb cutting machine providing the section to be cut is free from cracks and other defects. Curb-cuts are subject to inspection by the engineer and if found to be unsatisfactory shall be replaced.

All curb and gutter is to be protected from damage from heavy equipment and vehicles.

Two stage curb is not permitted.

The Concrete design mix shall be according to OPSS.MUNI 1350 and the following requirements:

| | |
|---|---|
| Class of Concrete | 32 MPa C-2 |
| Course aggregate | 19.0 mm nominal max size |
| Maximum Slump | 60 mm |
| Air Content | 6.0% +/- 1.5% |

## B8.00 Sidewalks

The location requirements of sidewalks in new subdivisions shall be confirmed with the Township Engineer prior to commencing the detailed design. In general, sidewalks are required on both sides of all arterial and collector roadway and at least one side of all local streets. For local roadways, the locations of schools and parks, commercial establishments, etc., the length of street, traffic volume expected, and the number of dwelling units serviced will be used as criteria in determining whether sidewalks are required on one or two sides of the street. Also, in order to maximize parking capacity on lots, where possible the sidewalk should be located on the side of the street where double car garages and driveways will be provided as opposed to the lots where single car garages and driveways are located. Where it is confirmed that only one sidewalk is required, it is generally required on the side of the street where the street lights are located.

The sidewalk shall conform in details and dimensions as shown on DWG. NO. B-11 and shall be installed at locations as shown on the typical road cross sections. The width of sidewalks for streets is 1.5 m. OPSS.MUNI 351 shall govern the materials and placement of concrete for sidewalks.

The sidewalks shall be increased in thickness from 150 mm to 200 mm at all commercial and industrial driveway locations.

The concrete design mix shall be according to OPSS.MUNI 1350 and the following requirements:

| | |
|---|---|
| Minimum 28 day compressive strength | 32 Mpa |
| Class of Exposure | C-2 |
| Course aggregate | 19 mm nominal max size |

| | |
|---|---|
| Air content | 6.0% +/- 1.5% |
| Water/Cementing Materials Ratio | max 0.45 |
| Maximum Slump | 60 mm |
| Air Content | 6.0% +/- 1.5% |

The sidewalk shall be ramped to a curb depression to provide an accessible ramp at all intersections and park areas, as detailed on the standard drawing. The ramped section of sidewalk is to have the appropriate tactile plates per DWG. No. B-12.

# B9.00 Driveway Approaches

The developer is responsible for the grading, graveling and asphalt paving of all driveways from the curb to the dwelling or garage. Paving with alternative hard-surface materials is subject to approval of the Director of Public Works.

For semi-detached and townhouse dwellings where driveways are adjacent to one another, interlocking stone shall be placed in such a manner as to define the limits of each property and to facilitate easier individual driveway replacement in the future.

## B9.01 Minimum Driveway Design

The minimum consolidated depth requirements for the granular base and asphalt in driveway shall be as follows:

**Table B.5: Minimum Pavement Design**

| Residential Driveways | Condominium Roads (Residential) | Commercial, Light Industrial and Apartments | Heavy Industrial |
|---|---|---|---|
| 50 mm of HL3 asphalt<br>200 mm of Granular A | 40 mm of HL3 asphalt<br>50 mm of HL8 asphalt<br>150 mm of Granular A<br>450 mm of Granular B | 40 mm of HL3 asphalt<br>50 mm of HL8 asphalt<br>150 mm of Granular A<br>225 mm of Granular B | 40 mm of HL3 asphalt<br>75 mm of HL8 asphalt<br>150 mm of Granular A<br>300 mm of Granular B |

Notes

- Subgrade compacted to 95% proctor density.
- The following is applicable to residential driveways:
  - The driveway shall be paved with asphalt or an approved alternate acceptable to the Township from the edge of the roadway to the building or garage.
  - For townhouse units or semi-detached units, where driveways are adjacent to one another, interlocking or an alternative separator shall be provided to define the limits of each property and to allow for easier replacement of each asphalt driveway separately.

## B9.02 Driveway Grades

The maximum permissible design grade for any driveway on private lands shall be 8%. The minimum grade for all residential driveways shall be 2%. A minimum slope of 1% is permitted on Industrial/Commercial/Institutional properties. The use of negative grade

driveways is not permitted in urban areas. Negative sloping driveways will only be considered in estate residential developments under special circumstances. Where negative sloping driveways are used, a positive slope of at least 2% must be maintained from the garage over a minimum distance of 10.0 m. Any variations from these limits must be approved.

## B9.03 Driveway Dimensions and Curb Depressions

### Single Family Dwelling

The width and location of driveway depressions in the curb for single family dwellings shall be as detailed on DWG NO. B-09. The maximum width shall be 6.0 m at the property line, regardless of the width at the dwelling or garage.

### Industrial/Commercial/Institutional/Apartments

The width and location of driveway depressions for industrial, commercial, institutional or apartment driveways shall be detailed on the engineering drawings, however, the maximum width shall be 12 m unless further justification is provided. In circumstances where greater than 12 m widths are required, a transportation specialist shall provide a memo and shall confirm on-site traffic volumes, turning movements and entrance driveway requirements. The geometry of non-residential driveway entrances in the road allowance shall be in accordance with or based on OPSD 350.010 and modified as required based on the approved Site Plan Traffic Study.

## B9.04 Driveway Locations and Clearances

Driveway and driveway apron locations and clearances to property lines and aboveground services shall be in accordance with the following:

**Table B.6: Driveway and Driveway Apron Clearance and Location Requirements**

| Driveway and Driveway Apron Clearance and Location Requirements | Minimum Clearance Distance |
|---|---|
| From driveway edge to road street line | Outside of 7.5 m x 7.5 m day lighting triangle |
| From driveway edge to side lot line | No closer than the main building setback per the zoning by-law and not less than 0.6 m |
| From driveway to water curb stop | 0.5 m |
| From driveway edge to outside edge of other services (adjacent driveways, street light poles, catch basins, fire hydrants, vaults, maintenance holes, chambers, CATV or telephone or fiber optic junction boxes) | 1.0 m |
| From driveway edge to edge of boulevard trees – residential driveway | 1.5 m |

| Driveway and Driveway Apron Clearance and Location Requirements | Minimum Clearance Distance |
|---|---|
| From driveway edge to edge of boulevard trees – commercial and industrial driveway | 5.0 m |
| From driveway edge to edge of community mailboxes and the hydro transformers | 3.0 m |
| Length of full height curb required between adjacent driveway curb cuts | 1.0 m |

Driveways for lots located adjacent to roundabouts are subject to a review of house siting and driveway layouts in coordination with the roundabout geometric design review prior to Draft Plan approval. The approved plans will be the basis for Zoning By-law amendments if necessary for these lots. The preliminary and detailed design will require the submission of vehicle turning templates to demonstrate full moves access to the driveways has been provided.

## B10.00 Boulevards

All boulevard areas are to be graded according to the details shown on the Township of Mapleton Standard Drawing and to the satisfaction of the Township Engineer. The grade of the boulevard is to be constant from the back of the curb to the property line and in no case will terracing be permitted. The final grade of the sod shall match and not exceed the finished grade of the top of the concrete curb and sidewalk.

All debris and construction materials shall be removed from the boulevard area upon completion of the base course asphalt and shall be maintained in a clean state until the roadway section is completed.

Clean weed free topsoil shall be placed on all boulevard areas that are to be sodded. The minimum depth of topsoil shall be 150 mm. No. 1 Nursery Sod shall be used for all boulevard areas.

### B10.01 Open Ditches

Where permitted, open ditches shall be graded to the lines and grades as shown on the plan and profile drawings.

Ditch slopes shall not exceed 4(H):1(V) with a maximum depth of 1.2 m unless otherwise approved by the Township Engineer. The minimum depth of ditches shall be 150 mm below the subgrade of the road.

Ditches are to be topsoiled with clean weed free topsoil to a minimum depth of 150 mm and seeded and mulched. The minimum ditch grade shall be 1.0%.

Entrance culverts shall be a minimum size of 400 mm in diameter with a minimum cover of 450 mm. In some circumstances a minimum of 300 mm cover is permitted. Road crossing culverts shall be a minimum size of 600 mm diameter with a minimum of 600 mm cover material. Culvert sizing is to be based on Table C-2.

Minimum wall thickness of CSP culverts shall be as follows:

- Road Crossing Culverts 2.0 mm
- Driveway Entrance Culverts 1.6 mm

Ditches shall contain the 100 year storm event. The Design Consultant shall confirm the ditch within the road allowance contains the 100 year storm event. Should the 100 year storm event surpass the right of way limits, an easement or a widened right of way may be required subject to review by the Township.

For driveways that require culverts, the culvert is not permitted to extend beyond the frontage of the property where a minimum 1 m setback is required unless otherwise approved by the Township.

## B11.00 Block and Easement Requirements

Where underground services are placed outside road allowances, blocks of land under the ownership of the Township or permanent easements are required. Blocks are generally preferred for all infrastructure; however, easements will be considered on a case by case basis in the sole discretion of the Township.

With the exception of easements for rear lot catch basins and their leads, easements should be located on one side of the common lot line between adjacent lots. Pipes shall be centered on the easement. The easements will not be permitted to straddle common lot lines. Buildings or building extensions, structures such as decks, sheds, or pools will not be permitted to encroach over the limits of the Township easements.

Easements shall be sized to permit open excavation to accommodate future maintenance of the services and shall consider the use of trench boxes, soils angle of repose, space required for casting of excavated material and construction staging. Site specific conditions are to be considered. Minimum easement widths are noted below.

**Table B.7: Minimum Easement Width Requirements**

| Purpose | Minimum Width of Block or Easement |
|---|---|
| Overland flow with no underground infrastructure | Minimum 4 m with containment of the 100 year storm event |
| Open Channels | Width of the top of the channel plus 6.0 m for maintenance requirements |

| Purpose | Minimum Width of Block or Easement |
|---|---|
| **Underground infrastructure** | |
| • 1 pipe up to a maximum dia. of 675 mm and maximum depth from ground surface to invert of 3.5 m | Minimum 5 m |
| • All other scenarios including locations where more than 1 pipe is required | Greater than 5 m, to be determined in consultation with the Township Engineer and Director of Public Works |

# SECTION C

# Storm Drainage and Stormwater Management

# Section C Storm Drainage and Stormwater Management

## C1.00 Drainage Objectives

The Township of Mapleton has set the following objectives for drainage management within its boundaries.

a) Reduce to acceptable levels, the potential risk of health hazards, loss of life and property damage from flooding.

b) Reduce to acceptable levels, the incidence of inconvenience caused by surface ponding and flooding.

c) Ensure that any development or redevelopment minimizes the impact of change to the groundwater regime, increased pollution, increased erosion or increased transport, especially during construction.

## C2.00 Attainment of Drainage Objectives

### C2.01 General

In meeting the drainage objectives, the Township has prepared a set of design criteria and applicable parameters for the design of minor and major storm drainage systems including stormwater management facilities. The most current version of the following documents applies to the planning and design of stormwater management related facilities in the Township in addition to the Township's Design Guidelines and Standards.

**Overall Design**

- MECP, Stormwater Management Planning and Design Manual (March 2003)
- MECP, Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval (May 31, 2023)
- MECP, Design Guidelines for Sewage Works (2008)
- Guidelines established by the Ministry of Transportation, Ontario, Drainage Manual.
- MECP Draft for Consultation Low Impact Development Stormwater Management Guidance Manual (January 2022)
- TRCA/CVC Low Impact Development Stormwater Management Planning and Design Guide (2010)
- CVC Planning and Design Wiki https://wiki.sustainabletechnologies.ca/index.php?title=Main_Page

**Erosion and Sediment Control**

- TRCA Erosion and Sediment Control Guidelines for Urban Construction (2019)
- CSA W208:20 Erosion and Sediment Control Installation and Maintenance
- CSA W202-18 Erosion and Sediment Control Inspection and Monitoring Standard

The following SWM planning, and design principles are to be followed:

a) Consultation with the Township and GRCA should take place early in the planning process.

b) The number of SWM facilities should be minimized.

c) Low Impact Development (LID) measures are not to replace stormwater quantity and quality control measures that are required. Redundancy to protect against blockage or plugging of LIDs and sequential runoff events is to be provided. Credit for LIDs facilities toward reducing downstream municipal SWM facilities will not be given.

d) The use of LID measures within the ROW is generally discouraged by the Township and shall not be in place to eliminate land requirements for stormwater management facilities. When LID measures are considered within the ROW, a widened ROW to compensate for their installation will be requested.

e) In the case of infill or redevelopment proposals, on-site LIDs and SWM concepts may be considered by the Township in conjunction with potential off-site storm drainage improvements.

## C2.02 Levels of Service

In general, the Township of Mapleton supports the concept of drainage having two separate and distinct components - the minor and major drainage systems. The minor system comprises swales, street gutters, ditches, catch basins and storm sewers. The major system comprises the natural streams and valleys and the manmade channels, roads, and ponds.

**Table C.1 Design Levels of Service for Major and Minor Systems**

| Item | Design Level of Service | Comments |
|---|---|---|
| Rainwater Leaders | Clean and Clear By-Law 2021-013 | • Downspouts are to discharge to grassed or vegetated areas or to rain barrels where specified, with outlets directing drainage away from building foundations.<br>• Downspouts are not to be directed toward or across paved or concrete surfaces.<br>• Downspouts are to discharge at least 1 m from the building provided it does not adversely affect the adjacent property.<br>• Downspouts at the front of the house must drain towards the street. |
| Sump pump outlet (when storm service is not provided) | Clean and Clear By-Law 2021-013 | • Sump pump outlets are to discharge at least 1 m from the building provided it |

| Item | Design Level of Service | Comments |
|---|---|---|
| | | does not adversely affect the adjacent property.<br>• Sump pump outlets are to discharge to the rear yard (and when not possible) to the side yard.<br>• The discharge pipe from the sump pump is not to be extended in close proximity to a municipal sidewalk that contributes to icing issues. |
| Foundation Drainage – service connections | Gravity service, sump pumps used in exceptional cases | • Gravity is preferred to provide continuous service during a power outage. For any areas serviced by sump pumps, the professional engineer shall describe the constraints leading to their use. |
| Storm Sewers | 1:5 year design storm (typical)<br><br>1:10 year design storm required for collector roads. 1:10 year design may be requested by the Township in specific circumstances. | • Use catch basin inlet controls – plug style (as required) to meet HGL elevation criteria. The inlet controls should be streamed line so as to utilize the same model numbers as much as possible in the development.<br>• RYCBs are not permitted to have inlet control devices.<br>• At RYCBs, ponding to be maximum 0.30m. The design shall include emergency overland flow routes that will not cause flooding to homes/buildings. |
| Hydraulic Grade Line | 1:100 year design storm | • Subject to pre-design confirmation with Township staff, no less than 0.5 m between 1:100 year storm hydraulic grade line and finished basement floor elevations. |
| Major System | 1:100 year design storm | • Overland flow cannot exceed the flow capacity of a block or right of way. |
| Culverts | Per MTO Directive B-100 | • See following Table C.2 |
| Stormwater Management Facilities | Based on the Townships CLI ECA for the Township's Stormwater Management System | • See following Table C.3 |

**Table CC.2: Level of Service for Bridges and Culverts (per MTO Directive B-100)**

| Road Classification | Up to 6 m Span | Over 6 m span | Minimum Size |
|---|---|---|---|
| Collector Road | 1:25 year | 1:50 year | 600 mm |
| Local Road | 1:10 year | 1:25 year | 600 mm |
| Driveways | 1:5 year | 1:10 year | 400 mm |

General Stormwater Management Criteria is provided below. Criteria provided by GRCA will supersede the requirements in Table C-3. Discharges to a municipal drain will require written approval and a Municipal Drainage Engineer's Report in accordance with the Drainage Act.

**Table CC.3: Stormwater Management Criteria**

| Discharge Location | Quantity Control | Quality Control | Water Balance | Erosion Control |
|---|---|---|---|---|
| Conestogo River | Post development flows controlled to the pre-development flows up to the 100 yr storm event | Level 2 (Normal) | Control the recharge to meet Pre-development conditions on property; **OR**<br><br>Control the runoff from the 29 mm storm (i.e., 90$^{th}$ percentile storm event) | Detain at minimum, the runoff volume generated from a 25 mm storm event over 24 to 48 hours<br><br>Further erosion assessments may be required depending on the location of the site |
| Any other location | Post development flows controlled to the pre-development flows up to the 100 yr storm event | Level 1 (Enhanced) | | |

## C3.00 Stormwater Management Submission Requirements

The Township requires comprehensive reports and drawings related to the planning, design, maintenance and operation of storm drainage, any low impact development proposed and stormwater management facilities as outlined below with all documentation being dated, signed, and stamped by a Professional Engineer.

While hardcopy and digital formats are required, separate digital copies such as excel design spreadsheets and the requisite SWM modelling files will be required.

### C3.01 Stormwater Management Report

As noted in Section A, a Preliminary FSR, requires submission of a Stormwater Management Report in support of a Draft Plan application. Once draft plan approved, a final FSR (including final stormwater management report) is required as part of the detailed design reports and drawings. The SWM report and design is to incorporate any

recommendations as applicable from the final geotechnical report, environmental report, or hydrogeological report.

The report shall include the following:

a) Existing and proposed catchment area plan which delineates internal/external drainage areas and labels areas and catchment reference numbers. The plan should provide a label that shows the catchment area contributing to each stormwater management facility.

b) Table summarizing pre-development and post-development catchment parameters (i.e., catchment number, area, percent impervious, CN value, etc.).

c) Table summarizing stage, storage, and discharge characteristics of the facility.

d) Table summarizing:

- Post-development peak flows and storage volumes compared to allowable unit watershed release rates as determined by the Conservation Authority, or
- Pre-development and post development peak flows and storage volumes based on output from hydrologic modeling.

e) A table summarizing on-site detention and on-site water quality control measures for development of lots or blocks in the subdivision (i.e., will be under Site Plan control) if these measures are part of the SWM design.

f) Table to summarize and compare required permanent pool and extended detention storage requirements to volumes provided in the facility.

g) Table to compare calculated 100 year hydraulic grade line elevations within storm sewer system to estimated underside of basement floor slab elevations.

h) Sample or supporting calculations for the following:

- Extended detention drain-down time (hours);
- Major system overland flow and velocity to confirm conveyance within R.O.W. and/or defined flow routes;
- 100 year hydraulic grade line to confirm basements will be protected;
- Erosion control sizing and flow velocity at inlet/outlet structures and spillways;
- Sediment forebay length and width in conformance with MECP manual; and
- Major system inlet grating sizing (assuming 50% blockage).

i) Pre-development and post-development hydrologic modeling schematic to illustrate all components of each model.

j) Identify erosion and sediment control methods to be implemented.

k) Any other detailed design components or information.

l) Table in the following format for each SWM Facility.

***Asset ID* *Type of Facility* (e.g., 201 – SWM Wet Pond)**

| | |
|---|---|
| Location | Latitude and longitude or physical address (UTM coordinates can be provided in addition) |
| Watershed/Subwatershed | e.g., Grand River/Conestogo River |
| Receiver of Discharge | e.g., Surface discharge to "Conestogo River" |
| Outlet Location | e.g., Latitude and longitude. (UTM coordinates can be provided in addition) |
| Catchment Area | e.g., 10 ha |
| Level of Treatment for Suspended Solids | e.g., Level 1 or 2 (80 or 70%) Long-term suspended solids removal or specify if other treatment level. |
| Treatment for other Contaminants, as Required | e.g., phosphorus, water temperature |
| Level of Volume Control | e.g., Local 90$^{th}$ percentile rainfall event or local water balance (X mm) |
| Design Storm | e.g., Quantity: X-yr storm; Quality: X-yr storm |
| Brief Description | Include model number if equipment is used (e.g., OGS/filters) |
| Receive Emergency Sanitary Overflows | Y/N; briefly describe |
| Notes / Additional Information | Provide any additional information relevant to this facility not captured above |

m) Section on Source Water Protection, identifying the site's vulnerability, identification any well head protection areas, indication of whether any of the stormwater management system proposed (facilities or sewers) would be identified a significant threat, and identification of any applicable policies related to the stormwater management system in the Grand River Source Protection Plan. For any significant threat, a summary of design conditions and other measures that have been put in place for mitigation resulting from the construction or operation of the stormwater system shall be included in the report.

n) All Hazard Lands should be clearly defined on all drawings and no development other than necessary access or services be located therein. Floodplains that would result from the 1:100 and regional storms should be defined for pre-development and post development conditions.

o) Hard and digital copies of input/output files from hydrologic modeling (digital files may be provided on a disk).

p) Engineering drawings for each stormwater facility. Ensure to include borehole location and existing groundwater information, and permanent, extended detention, highest water levels on plan view and include all ponding levels for various return periods on a table.

## C3.02 Monitoring Plan (for future Performance Report)

A preliminary monitoring plan shall be provided during the detailed design stage with a performance report provided prior to final assumption. It is required to outline procedures to verify that the facility is operating as intended and to assess the environmental impact of the stormwater management system. The plan shall include:

- Identification of all items to be monitored and how/when to monitor them (Inspections, measurements, sampling, analysis and/or other monitoring activities);
- Where/when water level measurements can be taken to verify a functioning facility. A range of opportunities shall be given as it should not be expected that the SWM facility will be monitored after every single rain event;
- Location of rain gauge to be used to verify precipitation;
- Where samples should be taken and what they should be analyzed for;
- The outcomes of the monitoring that verify operation; and
- Procedures for any corrective action that may be required to address any performance deficiencies or environmental impacts.

The Monitoring Plan shall be implemented after the pond is constructed. Prior to final assumption, a performance report with data with findings and recommendations is to be completed. Corrective Actions for any issues should be addressed prior to final assumption.

## C3.03 Operation and Maintenance (O&M) Manual

A preliminary O&M Manual shall be provided during detailed design which is to be finalized as soon as possible upon completion of construction. The Consultant shall confirm if the Township has prepared templates or a consolidated O&M in order that similar information can be provided.

- The manual should include a brief description of the stormwater management system and provide operation and maintenance procedures related to the works;
- Frequency and method of maintenance that is required and recommendations on how the work should be undertaken;
- It shall address any requirements for grass cutting, weed control, plantings, trash removal;
- Shall include a detailed procedure regarding pond cleanouts, including dewatering the pond, sediment testing, removal, and disposal;
- If applicable, operation and maintenance procedures to protect sources of drinking water as per the Grand River Source Protection Plan;
- Procedures for the inspection and calibration of monitoring equipment or components in accordance with the monitoring plan. Should the Township not have the appropriate tools, the Developer may be requested to purchase any required equipment;
- Emergency Response, Spill Reporting and Contingency Plans and Procedures for dealing with equipment breakdowns, potential Spills and any other abnormal situations, including

notification to the Spills Action Centre (SAC), the Medical Officer of Health, and the District Manager;
- Procedures for receiving, responding, and recording public complaints, including recording any follow-up actions taken. The Township will have their own procedure, however this procedure will be during the time prior to final assumption of the subdivision;
- Key indicators that the facility may not be functioning and when/how to check for those; and
- Cost estimates shall be provided (including labour, equipment, and materials) to perform the operation and maintenance activities described in the report.

The final O&M shall be updated as soon as possible after construction. A PDF and digital copy of the O&M shall be provided (including any digital files), in order for the document to be modified in the future if the Township modifies any operation and maintenance procedure based on experience with the facility. The updated version shall include:

- As-built drawings of the Municipal Stormwater Management System; and
- Shop drawings of any of the stormwater management system components.

Until final acceptance, the Consultant Engineer shall be required to conduct all O&M inspections. The records for inspection shall include the following:

a) Asset ID and name of facility;
b) Date and results of each inspection, maintenance, or cleaning;
c) Name of person who conducted the inspection and maintenance; and
d) As applicable to the type of works, observations resulting from the inspection including, at a minimum:
   - Hydraulic operation of the works (e.g., length of occurrence since the last rainfall event, evidence or occurrence of overflows)
   - Condition of vegetation in and around the works.
   - Occurrence of obstructions at the inlet and outlet of the works.
   - Evidence of spills and/or oil/grease contamination
   - Presence of trash build-up, and
   - Measurements of other parameters as required in the preliminary monitoring plan.

## C3.04 On-Site Workshop

Prior to final assumption, the Consultant Engineer shall coordinate an on-site meeting with the Township Engineer and Township Public Works Staff where each stormwater management facility is visited. The Consultant Engineer shall explain how the facility works and open up any control structures to explain how they function. They shall describe key O&M requirements and highlight key indicators that could show there is an issue with the facility. They shall show the structures that are used to dewater the pond and any other information that could be useful to staff to understand about the facility.

## C4.00 Erosion and Sediment Control (ESC)

The design of erosion and sedimentation controls shall be in accordance with the TRCA Erosion and Sediment Control Guidelines for Urban Construction (2019) or later amendments.

ESCs are to be designed using a “treatment train” approach and the sole use of siltation control fence is typically not acceptable unless disturbance is very minimal.

Staging of the works shall be provided to maximize the effectiveness of the ESC. Generally, the end of pipe stormwater management facility should be constructed prior to site stripping and commencing the earthworks program to the extent possible. The facility can be modified as a temporary sediment basin. The staging plan shall outline the steps the contractor should take from commencement, to topsoil stripping, post earthworks construction and post servicing construction.

Stream crossings or diversions are also to be designed to reflect various stages of construction. Consultants are to meet with the GRCA and NDMNRF requirements with respect to construction phasing, construction timing and erosion and sedimentation controls with respect to water course crossings.

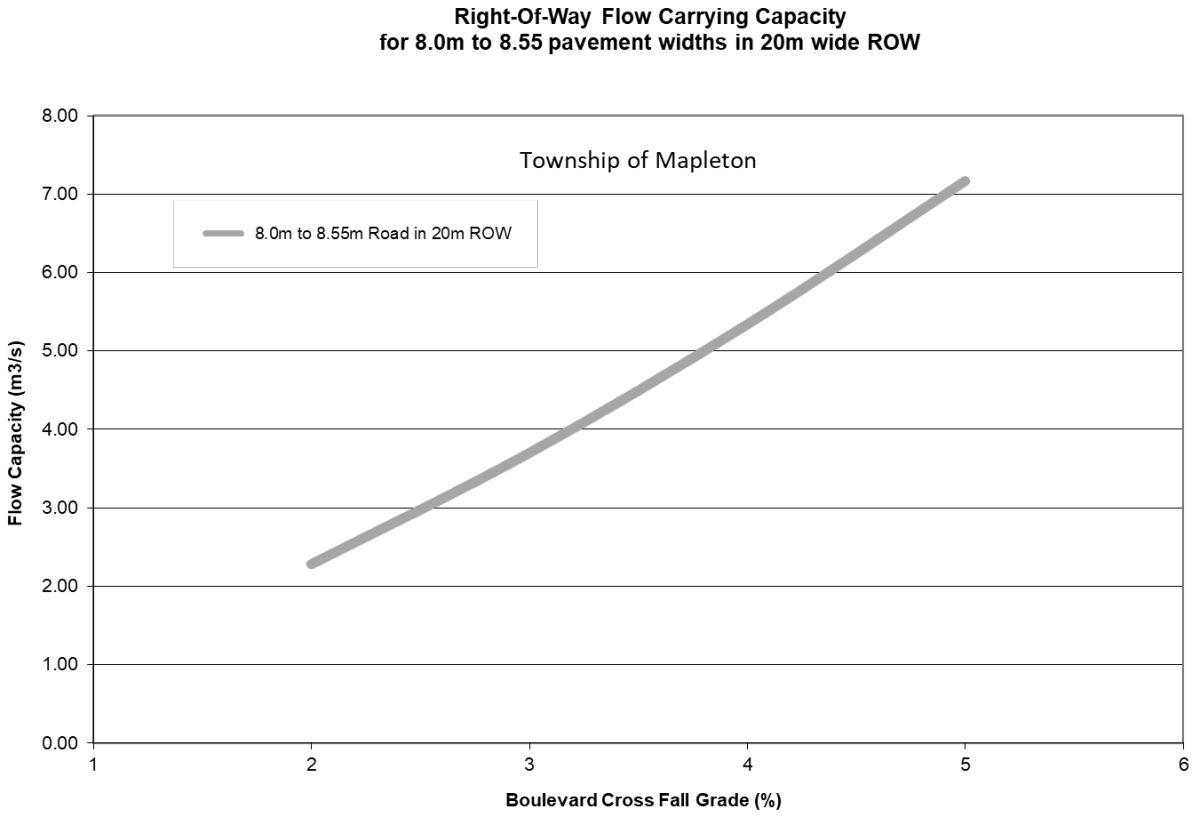
The Owner shall ensure that temporary ESC measures are installed in advance and maintained during construction activity. Inspections are to be conducted at a frequency specified on the ESC plan, for dry weather periods (active and inactive construction phases), after significant storm events and significant snowmelt events, and after any extreme weather events. The Consultant Engineer will be required to provide records of the inspections including name of the inspector, date of inspection, visual observations, and the remedial measures, if any, undertaken to maintain the temporary ESC measures. This information is required as part of the Township’s ability to pre-authorize some stormwater management works under the Township’s CLI ECA.

## C5.00 Major System

The major drainage system conveys runoff from storms greater than the 5 year return period up to the 1:100 year storm. The design of the major system shall be such that runoff is conveyed within the boundaries of municipal road allowances, blocks or easements. A continuous overland flow route is to be identified on the engineering drainage plans.

The extent of any overland ponding at low points is also to be shown on the grading plans. The maximum allowable depth of flow where vehicle or pedestrian traffic takes place or may be expected is 0.30m. Any inlet grating associated with the major drainage system is to include a 50% blockage factor in its design.

The figure below provides the maximum road allowance carrying capacity for overland flow for 8.0 m to 8.55 m pavements widths in a 20 m urban ROW. This table shall be used to confirm the capacity of the overland conveyance system relative to the expected design flows.




## C5.01 Stormwater Management Facilities

a) Facilities shall be designed as per the Level of Services outlined in C2.02 and meet all requirements of the GRCA and the Township.

b) The size, shape, and orientation of the facility shall meet the requirements set out in the MECP Stormwater Management Planning and Design Manual.

c) An Oil Grit Separator shall be provided prior to all forebays. The forebay shall remain sized as per MECP Guidelines without consideration of the Oil Grit Separator installation.

d) The maximum slopes within the pond, including below and above the permanent pool is 5(H):1(V).

e) For maintenance access, a 5.0 m wide working platform (with max 4% cross fall) shall be provided around the top of the entire pond embankment, for the berms between or in the ponds, and to any drainage structures that service the ponds.

f) The minimum slope of the bottom of the pond shall not be less than 1.0%.

g) The following are the minimum requirements for the maintenance access road:

- The minimum structure of the maintenance access road is as follows:
  100 mm limestone screening surface
  150 mm granular A
  300 mm granular B
- The crossfall shall be min 2% and maximum 4%
- The minimum width shall be 3 m centered within the 5.0 m working platform.
- Should the maintenance access route be subject to frequent erosion prior to Final Acceptance by the Township, the Consultant Engineer shall review and rectify the issue to avoid the on-going maintenance issues.
- Adequate erosion protection for the major overland flow route across the maintenance access road shall be provided. The measures implemented shall maintain pedestrian passage across the area. Erosion protection measures that reduce overall accessibility or may be potential tripping hazards should be avoided.

h) The design shall ensure that water can be drained from components of the stormwater management system.

i) Screens and orifices used on any inlet or outlet structure shall be structurally adequate to resist forces generated by the anticipated flow, secured as to prevent unauthorized access, and constructed so accumulated debris can easily be removed.

j) The outlet structures must be designed as much for ease of operation as for hydraulic efficiency. The area at the downstream end must be protected against erosion by channel lining and/or energy dissipater.

k) The use of retaining walls to reduce the size of land needed for the SWM facility will not be permitted.

l) The design shall accommodate sediment removal and drying. The method shall be approved by the Township, but generally, could include:

- Provision of a sediment drying space for each forebay, suitable to contain the volume of sediment and water remaining in the forebay (after completing pond drain-down procedures) located adjacent to each sediment forebay, OR
- Provision of a pond by-pass sewer (sized based on the minor system design criteria) between the inlet and the outlet in order to divert incoming flows around the pond for the duration of clean-out operations (allows for sediment drying in-situ).

m) Auto-turn movements may be requested by the Township to show that the access route can function.

n) A gate valve to enable the normal pond outlet to be closed in case of chemical spills.

o) Flow control devices should be located in maintenance hole structures located in the maintenance access route for easy access as opposed to a vertical pipe structure located in the pond.

p) Information & Warning Signs are required for the SWM Facility as outlined in Section H.

q) Landscaping for the SWM Facility is outlined in Section I5.00 and shall be completed by a qualified landscape design professional. All landscaping shall be low maintenance.

r) Fencing is required for all property boundaries abutting private land. In some circumstances, the Township may require the entire facility to be fenced. Section L includes minimum fencing requirements.

### C5.02 Underground Tanks for Municipal Stormwater Management

Buried tanks are not acceptable for stormwater management purposes for facilities that will be owned and maintained by the Township. This is due to the increased cost and complexity to inspect, maintain, and increased replacement costs expected with these structures. The use of super-pipes will also not be accepted.

## C6.00 Minor System (Storm Sewer System)

The system of street gutters, catch basins, and storm sewers shall be designed for the 1:5 year storm for all local roads. In some circumstances a 1:10 year storm may be requested. The design shall include capacity for connection of foundation drains or weeping tiles and the storm sewers shall be at an appropriate depth to provide connection to foundation drains. A hydraulic gradeline analysis shall be completed and submitted to the Township for review. Sufficient inlet control devices at appropriate locations shall be determined by the design engineer to ensure a sufficient level of protection is provided against potential basement flooding due to surcharge of the minor system during the 100-year storm event.

Level of services for culverts are included in C2.02.

### C6.01 Storm Drainage Plans

Storm Drainage Plans shall be prepared to a scale of 1:1000 and shall include all streets, blocks, lots and easements. The proposed storm sewer system shall be shown on this plan with all maintenance holes numbered. Each catchment area boundary shall be shown. Within each catchment area, the area (in hectares), the runoff coefficient, and the catchment ID shall be labeled.

In determining the contributing area to each maintenance hole, the proposed lot grading must be considered to define the catchment boundary.

The length, size and grade of each section shall also be shown on the storm drainage plan. Large arrows should depict the overland flow route.

The plan shall include the overall catchment boundary to each stormwater management facility with a label depicting the total area, and the overall weighted runoff coefficient.

## C6.02 Design

In general, the Rational Method shall be used for the sizing of the minor sewer system in the final design stage. For areas larger than 130 ha it may be necessary to adjust for any discrepancies in peak flows that the Rational Method fails to take into account. Calculations based on a hydrologic simulation model are required for systems serving large areas or involving treatment and/or storage systems.

## C6.03 Rainfall Intensity Data

Rainfall Intensity Data for the Township shall be based on Table C-4 for the Township's storm drainage facilities. Rainfall data was obtained from Environment Canada, Mount Forest. The period of record for the available data set from this station is from 1962 - 2017. The following are the A, B, C values for the 3-parameter Chicago distribution design storms to be used in the equation: Intensity = A / (t+B) ^C, as indicated in the following table. The 24 hour rainfall amounts are also provided:

**Table CC.4: Chicago Distribution Design Storm Parameters and Rainfall Amounts**

| Return Period | 2 Year | 5 Year | 10 Year | 25 Year | 50 Year | 100 Year |
|---|---|---|---|---|---|---|
| A | 758.485 | 876.909 | 997.497 | 1145.741 | 1273.113 | 1357.12 |
| B | 7.538 | 7.781 | 8.438 | 9.035 | 9.492 | 9.595 |
| C | 0.806 | 0.78 | 0.775 | 0.769 | 0.77 | 0.763 |
| 24 hour rainfall (mm) | 50.4 | 69.6 | 81.6 | 96.0 | 105.6 | 117.6 |

## C6.04 Run-Off or Imperviousness Coefficients

Run-off coefficients to be used in storm sewer design with the Rational Method shall be based upon soil types, slope, and initial moisture conditions.

Developments consist of various densities of impervious materials or land uses. The determination of a suitable run-off coefficient is to be justified by the Consultant Engineer by submitting weighted coefficient calculations. They must account for full build out with consideration of future improvements that are made to the lot such as the addition of patios, walkways and sheds. The following describes typical runoff coefficient values for the 5-year return period storm sewer design:

**Table CC.5: Run-off Coefficients for 5 Year Return Period Rational Method Design**

| | |
|---|---|
| Asphalt, concrete, roof areas | 0.95 |
| Gravel | 0.85 |
| Parkland | 0.35 |
| Commercial | 0.75-0.85 |
| Industrial | 0.65-0.85 |
| Single Family Dwelling (Urban – municipal water/wastewater) | 0.65 |
| Single Family Dwelling (Estate) | 0.40-0.50 |
| Semi-Detached | 0.75 |
| Townhouses | 0.80 |
| Apartments | 0.85 |
| Institutional | 0.50-0.75 |

An appropriate run-off coefficient may be determined from the following:

$C = 0.2 (1-I) + 0.9 (I)$
Where "I" is the site imperviousness ratio.

Run-off coefficients for higher return period storms shall be modified by the Antecedent Precipitation Factor "Ca" to account for saturated ground conditions, reduced depression storage and infiltration capacity during these events. The following modification factors shall be applied to the extent that the product of C x Ca does not exceed 1.00:

**Table CC.6: Run-off Coefficient Modification Factors for Rational Method and Modified Rational Method Design**

| Design Storm Return Period | Run-off Coefficient Modification Factor (Ca) |
|---|---|
| 5 Year | 1.00 |
| 25 Year | 1.10 |
| 50 Year | 1.20 |
| 100 Year | 1.25 |

## C6.05 Time of Concentration

A ten minute entry time at the head of the system must be utilized unless large external drainage areas exist.

## C6.06 Pipe Capacities

Manning's Formula shall be used in determining the capacity of all storm sewers. The capacity of the sewer shall be determined on the basis of the pipe flowing 85% full.

The value of the roughness coefficient 'n' used in the Manning's Formula shall be as follows:

- Smooth-walled pipe materials (HDPE, PVC, Concrete): 0.013
- Corrugated metal pipe: 0.024

- Concrete box culverts: 0.015

## C6.07 Flow Velocities

Minimum flow velocity = 0.75 m/sec Maximum flow velocity = 4.5 m/sec

## C6.08 Minimum Sizes

The minimum size for a storm sewer main shall be 300 mm.

The minimum size for entrance culverts shall be 400 mm and the minimum size for road crossing culverts shall be 600 mm unless otherwise approved by the Township Engineer.

## C6.09 Minimum Grades

Regardless of flow velocities obtained, the minimum design grades for pipe storm sewer shall be as follows:

| Sewer Size | Slope |
|---|---|
| up to 375 mm | 0.40% |
| 450 mm to 525 mm | 0.30% |
| 600 mm to 1200 mm | 0.20% |
| 1200 mm and over | 0.15% |

## C6.10 Minimum Cover

Typically, a minimum cover of 2.7 m (from future road grade) is required to the top outside edge of the pipe barrel for the storm sewer. There may be circumstances due to constraints that may require a shallower storm connection. These circumstances will need to be reviewed on a case by case basis and approved by the Township Engineer.

## C6.11 Location

The storm sewers shall be located as shown on the standard Township of Mapleton road cross section drawings. The standard location shall be generally adjacent to the curb line, on the opposite side of the watermain. All storm sewers are to have a minimum clear horizontal separation of 2.5 m from watermains and a minimum clear vertical clearance of 0.5 m when the storm sewer crosses above the watermain in accordance with MECP Regulations.

## C6.12 Limits

All sewers shall be terminated at the subdivision limits when external drainage areas are considered in the design with suitable provision in the design of the terminal maintenance holes and stubs to allow for the future extension of the sewer.

## C6.13 Sewer Alignment

All storm sewers shall be laid in a straight line between maintenance holes unless radial pipe has been designed and accepted for use by the Township Engineer.

## C6.14 Pipe Crossings

Generally, a minimum clearance of 0.2 m shall be provided between the outside of the pipe barrel at the point of crossing for storm and sanitary sewers. It is preferred wherever possible for the watermain to cross above all sewers with a minimum of 0.3 m clearance (0.5 m preferred). A minimum clearance of 0.5 m shall be provided between sewers and watermain crossings, where the watermain passes under the sanitary sewer.

In the event the minimum clearance cannot be obtained of 0.5 m where the watermain passes under the sanitary sewer, either the watermain or the sewer line shall be encased in a watertight carrier pipe which extends 3 m on both sides of the crossing, measured perpendicular to the watermain.

In cases where the storm sewer crosses an existing utility trench at an elevation higher than the elevation of the utility, a support system shall be designed to prevent settlements of the storm sewer, or alternatively the utility trench is to be excavated and backfilled with compacted crushed stone or concrete to adequately support the storm sewer. When the storm sewer passes under an existing utility, adequate support shall be constructed to prevent damage to that utility.

## C6.15 Changes in Pipe Size

No decrease of pipe size from a larger upstream pipe to a smaller downstream size will be allowed regardless of the increase in grade.

## C6.16 Sewer Pipe Materials

The type and classification of all storm sewer pipe and the sewer bedding type shall be clearly indicated on all profile drawings for each sewer length. Concrete or plastic pipe will be permitted for storm sewers 375 mm in diameter and smaller. All storm sewer mains 450 mm diameter and over shall be constructed with reinforced concrete pipe.

Concrete pipe shall conform to the requirements of CSA Specification A257-M 1982 for the particular classes as shown below:

- Pipes up to 375 mm – Non-Reinforced Concrete Pipe, CSA Standard A257.1 M1982, Classes 1, 2 and 3.
- Pipes 450 mm or greater – Reinforced Concrete Pipe, CSA Standard A257.2M1982, Strength Classification 50D, 65D, 100D and 140D.

Polyvinyl Chloride (PVC) pipe is permitted for sewers up to 375 mm diameter. PVC products shall conform to the requirements of CSA B182.1, CSA B182.2, ASTM D3034, ASTM F1760 and ASTM F1336. The pipe must be manufactured with factory assembled spigot gasket and integral bell joints. Externally ribbed pipe will not be permitted. PVC pipe for storm sewers shall be any colour except green.

High density polyethylene (HDPE) pipe shall conform to the requirements of CSA Specification B182.6 and shall have a smooth inside wall and corrugated outside wall (such as HDPE BOSS Poly-Tite or equivalent) with minimum stiffness of 300 kPa.

Storm sewer leads from catch basins shall be constructed with PVC DR35 or BOSS Poly-tite HDPE pipe.

Watertight bell and spigot connections will be required for all pipe joints.

### C6.17 Pipe Bedding and Backfill

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. Details of the types of bedding are illustrated in OPSD 802.010 and 802.030. Bedding and trench compaction shall be carried out in conformance with OPSS.MUNI 501. The width of trench at the top of the pipe must be carefully controlled to ensure that the maximum trench width is not exceeded unless additional bedding or higher strength pipe is used. The recommendations of a Geotechnical Engineer will be required in determining strength of pipe required and construction methods to be used.

## C7.00 Maintenance Holes

### C7.01 Location

Maintenance holes shall be located at each change in alignment, grade or pipe material, at all pipe junctions, including at RYCB connections, and at intervals along the pipe to permit entry for maintenance of the sewer.

If a blind connection is made and approved, an upstream maintenance hole at a distance of 30 m or less is required to facilitate maintenance.

### C7.02 Maximum Spacing of Maintenance Holes

| Pipe Size | Maximum M.H. Spacing |
|---|---|
| 300 mm | 95 m |
| 375 mm to 750 mm | 100 m |
| 825 mm to 1200 mm | 125 m |
| 1200 mm and over | 150 m |

## C7.03 Maintenance Hole Types

Maintenance holes may be constructed of precast or poured concrete. The standard maintenance hole details as shown on the OPS Drawings shall be used for maintenance holes. In cases where the standard drawings are not applicable, the maintenance holes shall be individually designed and detailed.

Precast maintenance holes shall conform to ASTM Specifications C-478 M latest revision.

A reference shall be made on all profile drawings to the type and size of all storm maintenance holes.

## C7.04 Maintenance Hole Design

a) All maintenance hole chamber openings shall be located on the side of the maintenance hole parallel to the flow for straight run maintenance holes, or on the upstream side of the maintenance holes at all junctions.

b) The maintenance hole shall be centered on the sewer main.

c) All storm sewer maintenance holes shall be benched per OPSD 701.021.

d) Safety gratings shall be provided in all maintenance holes when the depth of the maintenance hole exceeds 5.0 m.

e) Maintenance holes that require a safety platform shall be minimum 1500 mm diameter.

f) When the difference in elevation between the obvert of the inlet and outlet pipes exceeds 0.9 m, a drop structure shall be placed on the inlet pipe.

g) The direction of flow in any maintenance hole shall not be permitted at acute interior angles.

h) The obverts on the upstream side of maintenance holes shall not be lower than the obvert of the outlet pipe.

i) The maximum change in direction of flow in maintenance holes, for sewer sizes 900 mm diameter and over, shall be 45°.

## C7.05 Grades for Maintenance Hole Frames and Covers

All maintenance holes located within the traveled portion of a roadway shall have the rim elevation set flush to the base course of asphalt. Prior to the placement of the surface course asphalt the maintenance hole frame shall be adjusted to the finished grade of asphalt. Steel adjusting rings will not be permitted. The setting of the frame and cover shall be in accordance with the details on the OPS Drawings. A maximum of 300 mm of modular rings shall be permitted on maintenance holes in new subdivisions.

### C7.06 Head Losses Through Maintenance Holes

Suitable drops shall be provided across all maintenance holes to compensate for the loss of energy due to the change in flow velocity and for the difference in the depth of flow in the sewers.

The minimum drops across maintenance holes shall be as follows:

| Change of Direction | Minimum Drop |
|---|---|
| 0 | 30 mm |
| up to 45 degrees | 50 mm |
| 46 to 90 degrees | 80 mm |

## C8.00 Catch Basins

### C8.01 Location and Spacing

a) Catch basins shall be generally located upstream of sidewalk crossings at intersections. Catch basins shall be located at the standard gutter location. Offset curb and gutter is not permitted.

b) Double catch basins shall normally be required when the catch basin intercepts flow from more than one direction (at all road sags). Single catch basins may be used in the case where the total length of drainage to the catch basin does not exceed 95 m, subject to the analysis of the major minor system.

c) The typical maximum spacing of catch basins is 75 m. Minor adjustments can be made to avoid driveways or walkway connections, or to minimize an additional maintenance hole for segments well under the maximum storm sewer length, provided that the spacing in Table CC.7 is not exceeded.

**Table CC.7: Maximum catch basin spacing**

| Road Gradient (%) | Typical Minimum Spacing | Maximum Spacing (m) |
|---|---|---|
| 0.5 to 3 | 75 | 110 |
| 3.1 to 4.5 | 75 | 90 |
| Over 4.5 | 75 | 75 |

d) At intersections, catch basins shall be installed:

- At the start and end of the curb radius on each street at an intersection, except where the slope of the road grade is away from the intersection;
- To ensure that surface water does not drain across any road surface at the intersection or sidewalks; and

- All catch basins at street intersections shall be located on the tangent of the curb at a minimum of 0.6 m distance from the beginning or the end of the radial portion of the curb.

e) Rear lot catch basins and connections shall be located as outlined in DWG NO. C-05.

### C8.02 Catch Basin Types

Catch basins must be of the precast concrete type as shown on the OPS Drawing 705.010 (single) or OPSD 705.020 (double).

Street catch basins shall have 600 mm deep sumps.

Special catch basins and inlet structures shall be fully designed and detailed by the Consulting Engineer. In situations where inlet control catch basins are required, detailed calculations of the flow and the hydraulic grade line may be required.

### C8.03 Catch Basin Connections

| Type | Minimum Size of Connection | Minimum Grade of Connection |
|---|---|---|
| Single catch basin | 250 mm | 1.0% |
| Double catch basin | 300 mm | 1.0% |
| Rear lot catch basin | 300 mm | 1.0% |

### C8.04 Catch Basin Frame and Covers

Street Catch basins OPSD 400.010
Frames shall be set to base course grade and adjusted immediately prior to placement of top course asphalt. Curb at these locations can be formed from asphalt during this temporary period placed in accordance with OPSD 601.010 between the two adjacent expansion joints.

Rear Yard Catch basin OPSD 400.010

## C9.00 Inlets, Outfalls and Special Structures

### C9.01 Inlets

Inlet structures must be fully designed and detailed on the Engineering Drawings. Inlet grates shall generally consist of inclined parallel bars or rods set in a plane at approximately 18 degrees with the top away from the flow.

Gabions, rip rap or concrete shall be provided at all inlets to protect against erosion and to channel flow to the inlet structure.

Precaution must be taken in the design of grating for structures to minimize the risk of entanglement or entrapment of a person.

Hydraulic design calculations for inlet structures must be performed in accordance with guidelines established by the Ministry of Transportation, Ontario, Drainage Manual.

## C9.02 Outlets

a) OPSD 804.030 standard headwall shall be used for all storm sewers less than 900 mm in diameter.

b) For sewers 900 mm in diameter and larger the headwall shall be in accordance with OPSD 804.040 or individually designed.

c) All headwalls shall be equipped with a grating over the outlet as per OPSD 804.050.

d) Safety railings or chain link fence with 38 mm by 38 mm diamond “non-climbable” mesh shall be provided along the top of all headwalls 0.6 m in height or greater. Railings may also be required along shorter headwalls where a risk to pedestrian safety has been identified. The site-specific conditions must be reviewed in determining the requirement for safety railings or fencing and must have due regard to public health and safety.

e) All outlets shall blend in the direction of flow of the watercourse with the directional change being taken up in the sewer rather than the channel.

f) Rip-rap, concrete, river stone, vegetative mats, or other erosion protection acceptable to the Township and/or GRCA shall be provided.

## C9.03 Open Channels

The proposed criteria for an open channel shall be submitted to the Township Engineer for approval. The Consulting Engineer shall be responsible for obtaining the approval from the GRCA, MECP, and NDMNRF as required, if the open channel concept is favorably considered.

The designer shall provide for dry weather flow in the design of open channels. The maximum velocity for sod-lined channels shall be 1.2 m/s. Where flows are in excess of this amount, the use of open channels may not be permitted by the Township.

# C10.00 Testing

Testing shall be carried out to ensure minimum requirements included in Appendix A of the Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval are completed.

All testing shall be done in the presence of the Developer's Engineer and the Township Engineer.

Flushing shall be completed prior to any testing or visual inspection. A visual inspection in each maintenance hole, catch basin and structure is required prior to preliminary acceptance and prior to final acceptance. The Township may request additional inspections or testing prior to placement of top course asphalt.

All tests noted in the subsequent sections shall be completed prior to preliminary acceptance.

## C10.01 Deflection Test

A deflection test shall be performed on all sewers constructed using PVC material.

A suitably designed device described below shall be pulled manually through the pipe not sooner than 24 hours after completion and backfilling.

The device shall be cylindrical in shape and constructed to the following dimensions:

Diameter = Pipe O.D. x (100-0.15 DR) % - 1 mm

| Nominal Pipe Size (mm) | Length (mm) |
|---|---|
| 150 | 100 |
| 200 | 150 |
| 250 | 200 |
| 300 | 250 |
| 350 | 300 |
| 400 | 300 |

## C10.02 Video Record

All newly constructed storm sewer systems shall be CCTV inspected upon satisfactory completion of all other testing, prior to the municipality's issuance of Preliminary Acceptance.

A copy of the video is to be provided along with the CCTV report identifying any unusual or substandard conditions shall be submitted. The CCTV shall be prepared and completed by a company experienced in this field.

Prior to Final Assumption or after subsequent repairs, additional CCTV and related reports are required to be submitted to the Township Engineer.

All digital CCTV files and reports provided from inspections are to become the property of the Township of Mapleton.

The Design Consultant shall review the CCTV and report and shall submit recommendations for repair prior to the Township receiving the information. A list of deficiencies and minimum expectations are noted below.

**Table CC.8: Deficiencies and Repair Requirements**

| Deficiency | Repair/Action Required |
|---|---|
| Gasket exposed | Remove exposed portion of gasket by cutting and sealing the pipe joint. |
| Debris | Flush and re-inspect with CCTV. If debris cannot be removed, reaming and/or excavate to remove and repair is required. |
| Ponding | May require excavation and repair. |
| Cracking – minor and isolated | The Township may retain a third-party consultant to review and provide a recommendation. Pressure crack sealing may be required as directed by the Township. An extended monitoring period may be required. |
| Cracking – significant | Excavate and repair required. |
| Structural Defect (based on assessment per NASSCO methods) | Repair required. Consulting Engineer's recommendation required. The Township may retain a third-party consultant to review recommendation. |
| Flexible pipe out of round (greater than 5%) | Re-rounding process is not acceptable. Excavate and repair required. |
| CCTV results not clear | If the video becomes unclear, a new CCTV will be requested. |

# SECTION D

# Asset Management

# Section D Asset Management

## D1.00 General

Asset Management provides a long term operating and capital forecast for assets in the Township. It is important that new infrastructure is added to the Township's GIS database. The Township will require that the Consultant Engineer provide information to ensure the database is complete. The information is also required to update key infrastructure maps related to the Township's consolidated linear infrastructure application which requires the Township to update any drawings to reflect additions to the stormwater management system or sewage collection system.

### D1.01 Procedures and Documents to be submitted

a) During the detailed design stage, the Consultant Engineer shall request asset IDs by completing the excel file included in Appendix D. The consultant should use these IDs for the drawings and to identify structures in design sheets.

b) Within 6 months of underground services being installed and before Preliminary Acceptance, the Consultant Engineer shall provide the following:

- Interim record drawings (as noted in Section A);
- Copy of Tender document that will identify the cost for each asset;
- Installation date;
- Any model numbers/manufacture for assets such as oil grit separators;
- Pipe material;
- Shop drawings;
- AutoCAD of the interim as-constructed drawings for input into the Township's GIS system; and
- Updated design spreadsheets with as-constructed invert information included.

c) Prior to final assumption, the Final record drawings in AutoCAD format are to be provided to provide the remaining information required for the asset IDs (T/G for example).

# SECTION E

# Water Distribution Design and Construction Specifications

# Section E Water Distribution Design and Construction Specifications

## E1.00 General

All water distribution systems for subdivisions shall be designed by the Developer's Consultant Engineer. Current MECP criteria shall be used for the design of water distribution systems. The drawings and specifications for materials and construction shall be prepared and submitted to the Township of Mapleton for approval prior to the commencement of construction.

The Developer is required to provide designs in AutoCAD format in order to add the proposed watermains to any Township water models that may exist as part of the review of the application. The Consultant Engineer shall also review any Master Water Servicing Plans that may be available in the Township.

## E2.00 Design

a) Watermains in subdivisions shall typically have a minimum of two connections to the existing municipal water network to provide redundancy of supply.

b) The minimum size of pipe shall be 150 mm diameter. Subdivisions that contain uses other than single residential detached shall be increased to a minimum 200 mm diameter.

c) Watermain installations are to be looped to avoid dead-ends. Where dead ends cannot be avoided, a fire hydrant for flushing purposes shall be installed. Temporary dead-ends on watermains that are to be extended in the future shall be equipped with a 50 mm blow-off at the end of the watermain. The Township may request easements or blocks in order to loop watermains. The Township may also request the installation of an auto-flusher if at the Township's sole discretion accepts the installation of a permanent dead end watermain. Where dead end watermains exist in proximity to the new development (regardless of the requirement to have two minimum connections), the Township may require the Developer to connect to the nearby dead-end watermains.

d) Fire flows are to be determined based on the most recent publication of the Fire Underwriters Survey. Generally, new watermains shall be designed to accommodate a minimum available fire flow of 133 L/s (8,000 L/min). There may be circumstances where fire flow may be limited by the capabilities of the Municipal Water System such as pumping or nearby watermain sizes.

e) Hydrant spacing shall be no greater than 120 m in residential areas and 90 m in industrial/commercial areas measured along the centre of the watermain.

f) The Township of Mapleton shall determine on which side of the street the watermain will be installed. However, in any case it will be on the opposite side as the proposed storm sewer. The installed distance from the lot line shall be according to the Township of Mapleton standard road cross section.

g) House service connections shall be seamless copper water pipe, Type 'K' or approved Municipex (PEXa). The minimum size of pipe installed from the watermain to the lot line shall be 25 mm for each single-family, semi-detached, or townhouse unit. All service materials shall have compression fittings. Solder joints are not allowed.

h) Every residence, whether it is a single family unit or part of a multi-unit shall be equipped with a water meter and a double check backflow prevention valve. The Township of Mapleton supplies the water meter kit at the time of building permit application paid for by the applicant. For apartment buildings, the Township will supply one meter for the entire building. The Township will not provide individual meters for each apartment unit.

i) All watermains shall have a minimum cover of 1.8 m below the road C/L elevation.

j) Grade and line changes will be made by bends and noted on the drawings. Any pipe deflection shall be a maximum of 50% of manufacturers specifications

k) New watermain installations shall remain isolated from the existing water distribution system by means of a physical separation, including the use of an approved backflow prevention device. This isolation shall remain in place until such time as all tests have been completed, and bacteriological samples have been returned as 'acceptable'. Refer to Appendix E for the minimum process and forms to complete.

# E3.00 Material

## E3.01 Watermains and Fittings

The Contractor shall use PVC – poly vinyl chloride AWWA spec. C900 – Class 150 for all sizes of watermains up to and including 300 mm. Pipe material for all sizes greater than 300 mm shall be subject to Township of Mapleton approval. Bends and tees may be mechanical iron, or an approved PVC type, conforming to CSA B127-3.

For special circumstances, the Consultant Engineer shall consult with the Township Engineer.

## E3.02 Bedding

Granular A or approved select material is to be used for bedding under the watermain. Backfill in accordance with recommendations in Geotechnical report.

## E3.03 Blocking and Thrust Restraints

All plugs, caps, tees, bends, hydrants, ends of mains, valves and reducers shall be protected as follows.

a) By means of concrete blocking with mechanical restraints for 300 mm in diameter or smaller. Anything larger than 300 mm will have to be reviewed by the Township Engineer.

b) All steel rods shall be stainless steel.

c) Poured concrete thrust blocks are typically not permitted and would be subject to approval by the Township for their use if required. If approved, the Township Engineer shall observe the construction of all poured concrete thrust blocks.

d) Watermains constructed in areas of engineered fill require mechanical restraints.

e) Mechanical joint restraints are required through all road crossings.

f) All mechanical restraint systems shall be installed with cathodic protection and treated with denso paste, mastic, and tape as directed by the Township.

## E3.04 Tracer Wire

a) A tracer wire shall be provided along the top of all watermains to permit field tracing of the watermain.

b) Tracer wire is to be secured (taped) to the top of the watermain before and after every fitting and at intervals not to exceed 2 m.

c) All tracing wires shall be #8 copper PVC covered tracer wire.

d) Tracing wire shall be brought up the outside of each valve box so the wire does not interfere with the valve wheel, through the sleeve hole and back to the watermain, taped at minimum 2 m intervals.

e) Where valves are in roadways, the tracer wire shall be on the outside of the box to within 300 mm of surface, with hole drilled into the box to extend wire inside the valve box.

f) For hydrants, the tracer wire is to be installed along the lead, taped at a minimum of 2 m intervals. The tracer wire shall be brought up the outside of the hydrant valve box, so the wire does not interfere with the valve wheel, through the sleeve hole and back down to the hydrant lead. The tracer wire shall continue to the hydrant, up to the surface to attach to the flange, looping back down to provide a continuous loop.

g) For municipex services or other PVC services, tracer wire shall be installed along the service between the service saddle and the curb stop, taped to the service pipe at a minimum of 2 m intervals or more to ensure the tracer wire does not deviate from the

alignment of the service pipe. The tracer wire shall then be connected to the tail nut on the curb stop.

h) Tracer wire is to be continuous for the full length of the installation. Waterproof, corrosion proof connectors are to be provided where joints are required (Dryconn VisiLock).

i) Confirmation of the continuity of the tracer wire installation is to be provided in writing by the Owner's Consulting Engineer as part of the commissioning of the watermain system and prior to Final Acceptance.

## E3.05 Watermain Corrosion Protection

The minimum corrosion protection requirements are to be confirmed in the Geotechnical Report based on the site specific soil conditions. These are intended to be minimum requirements.

a) Anodes

Packaged anodes shall be zinc anodes confirming to ASTM B-418 Type II attached by the CADWELD method.

- Fittings Z-12–24 (12 lbs)
- Hydrants Z-24– 48 (24 lbs)
- Type K Copper Water Service Z-12-24 (12 lbs)

b) Petroleum Coating System

- Material requirements shall be as per AWWA C217, CSA Z245.30-14,and be ISO 9001 and ISO 14001 compliant. The installation of the petrolatum coating system shall be in strict conformity with the following exceptions/amendments.
- All surfaces of fittings, flanged connections, nuts, bolts, tie rods, clamps, valves, sleeves, victaulic couplings, joint restraints, etc., shall be protected using petrolatum materials. Prior to application all surfaces shall be free of dirt, grease, oil, paint, or foreign material. The minimum acceptable application of a petrolatum coating system is a two-step process consisting of a primer and petrolatum tape. Where voids or other surface irregularities are encountered, filler material is required where the tape will not come into full contact with surfaces. Placement of petrolatum tape only is not acceptable.
- All surfaces of pipes, valves, fittings, and appurtenances in valve chambers shall be coated using petrolatum materials. Valves or appurtenances that are epoxy coated do not require this procedure.
- Petrolatum coatings shall be denso or approved equivalent.

## E3.06 Hydrants

All hydrants are to comply with AWWA spec. C502. Only Canada Valve "Century" hydrants are accepted. All hydrants shall be fitted with 2-65 mm hose nozzles and 1-100 mm 'Storz'

type pumper nozzle. All hydrants are to open counter-clockwise and be coated with high quality chrome yellow paint (colour described as HEX #FFA700, RGB (225,167,0). See OPSD 1105.010.

The hydrant shall be plum with nozzles parallel to the curb or edge of pavement and the pumper connection facing the roadway. Each hydrant shall be supported with concrete blocking between the hydrant and the undisturbed ground.

Each hydrant shall be provided with a 4 ft (1.2 m) yellow marker.

## E3.07 Gate Valves

All valves shall be resilient seat valves, complying with the latest AWWA C509 standard and open counter-clockwise with end connections to suit type of pipe involved. Valve boxes shall be 5 1/4" (130 mm) "Mueller" composite valve box complete with guide plate and adjustable valve box top. Extension stems are to be installed from top of valve within 300 mm of ground level. Service Saddles are required.

- All valves 300 mm in diameter and larger shall be installed inside valve chambers.
- The size of the line valves shall be the same size as the watermain diameter.
- At least two valves shall be provided at a ‘T’ intersection and at least three valves shall be provided at a ‘Cross’ Intersection
- A sufficient number of valves should be provided on watermains to minimize inconvenience and contamination during repairs. Additional valves may be requested at the discretion of the Township Engineer beyond minimum MECP requirements with the maximum spacing permitted 240 m.
- Valves should be located within the boulevard (grassed area) and not within the roadway. The location of intersection valves shall be located at the beginning or end of the curb radii.

## E3.08 Water Meters

All residential water meters shall be 5/8” x 3/4” with double check valve, with the remote pad read-out installed outside near the electric meter. The meters and check valves will be supplied by the Township of Mapleton and billed to the developer, contractor, or owner. The Township retains ownership of the meter and check valve. If a larger meter size is required, contact the Township. See OPSD 1107.01 (no by-pass).

For commercial or industrial developments all metering requirements shall be reviewed by the Township of Mapleton. Where the Township feels that an application is rated as high hazard, a reduced pressure principle backflow preventer will be required and tested on an annual basis. Refer to the appendix for this form. All costs related to meter and check valve purchase and installation shall be borne by the developer. Ownership will be retained by the Township. Refer to OPSD 1107.010, 1107.020, 1107.030, and 1108.010.

### E3.09 Service Materials

Service materials such as main stops, curb stops and service boxes all require Township of Mapleton approval before use. See OPSD - 1104.010, 1104.020, 1104.030.

## E4.00 Construction (Testing & Commissioning)

a) Refer to Appendix E for testing and notification requirements including identification of Township representatives who have to observe the testing.

b) Planned disruption of water service shall be authorized only by the Township. One week advance notice to impacted customers (weather pending) is preferable for any planned water disruptions, however a minimum 48 hour notice may be acceptable in certain circumstances.

c) All new watermain installations shall be swabbed including service connections 100 mm and greater.

d) All watermain shall be subject to a hydro-static testing in accordance with OPSS.MUNI 441.07.24

e) All watermain shall be chlorinated in accordance with 2020 MECP Watermain Disinfection Procedure or latest amendment.

f) All new watermains shall have bacteriological samples drawn after a 24 and 48 hour period has elapsed from the time of chlorination, in accordance with 2020 MECP Watermain Disinfection Procedure. New watermains may only be permanently connected to the existing distribution system after acceptable bacteriological results have been received by the Township. Sampling may only be done by the Township's Water Operator.

## E5.00 Drawings

The referenced OPSD drawings form part of these specifications.

| | | | |
|---|---|---|---|
| OPSD | 1100.010 | OPSD | 1104.030 |
| | 1101.011 | | 1105.010 |
| | 1103.010 | | 1107.010 |
| | 1103.020 | | 1107.020 |
| | 1104.010 | | 1107.030 |
| | 1104.020 | | 1108.010 |

# SECTION F

# Sanitary Sewers and Appurtenances

# Section F Sanitary Sewers and Appurtenances

## F1.00 Hydraulic Design

### F1.01 Confirmation of Capacity

Prior to commencement of any design for sanitary sewage works within the Township, the applicant shall confirm with the Township that adequate infrastructure capacity available for the proposed development (wastewater treatment plant capacity and sanitary sewage pumping station capacity). Within the Township, municipal sewage collection systems exist in Moorefield and Drayton.

### F1.02 Sanitary Drainage Plan

The sanitary drainage plan shall be drawn to a scale suitable to show all the tributary areas that are being used to determine the design flows.

The design flow in each maintenance hole and length of sewer shall be computed on standard sanitary design sheets. For each area entered on the design sheet, the street, maintenance hole numbers, the size and grade of the sewers shall be indicated. A column with actual velocities based on the design flows should be provided in addition to the full flow velocity.

### F1.03 Residential Sewage Flows

Peak domestic sewage flows are to be calculated using the following formula:

$$Q(d) = \frac{PqM}{86.4} + IA$$

Where

- $Q(d)$ = Peak domestic sewage flows including extraneous flows, in L/s
- $P$ = Design population, in thousands
- $q$ = Average daily per capita domestic flow in L/cap/day
- $M$ = Peaking factor
- $I$ = Unit of peak extraneous flows in L/ha/s
- $A$ = Gross tributary area in hectares

An average daily per capita flow of 450 L/cap/day shall be used.

The unit of peak extraneous flow shall be 0.28 L/ha-sec.

The peaking factor shall be calculated based on the Harmon formula:

$$M = 1 + \frac{14}{P^{0.5} + 4}$$

Where

- $P$ = Population, in thousands
- $M$ = 3.8 Maximum
- $M$ = 2 Minimum

The design population shall be derived from the drainage area and expected population over a minimum design period of 20 years. For more detailed information regarding the projected residential growth and densities, the designer is advised to review Wellington County Official Plan.

When the number and type of housing units within a proposed development are known, the calculation of population for the proposed development shall be based on the following densities:

**Table F.1: Population Density per Residential Unit**

| Type of Housing | Persons/Unit |
|---|---|
| Single Family Detached and Semi-Detached | 3.555 |
| Townhouse and Apartments (three bedrooms and greater) | 2.314 |
| Apartments (two bedroom or less) | 1.542 |

Source: 2020 Development Charges Background Study

## F2.00 Commercial Sewage Flows

A design flow of 28 $m^3$/ha/d including allowances for infiltration and peaking effect shall be used for the design of all local sewers. Actual flow monitoring data (covering at least 2 years) at the subject site or a similar site observed locally can be used.

### F2.01 Industrial Sewage Flows

A design of 35 $m^3$/ha/d for light industry and 55 $m^3$/ha/d for heavy industry shall be used, including allowances for infiltration and peaking effect shall be used for the design of all local sewers. The area shall be calculated using the gross area of the industrial lot or block. Where available, actual sanitary flow monitoring data at the subject site or a similar site (covering at least 2 years) shall be used for accurate prediction of industry specific wastewater flows.

### F2.02 Institutional and School Sewage Flows

A design of 28 $m^3$/ha/d including allowances for infiltration and peaking effect shall be used for the design of all local sewers unless historical water use data at the subject site or similar site (covering at least 2 years) of the facility or other similar facilities can be used to calculate average institutional flows. The area shall be based on the gross area.

For school sites, an estimate of the ultimate site's student capacity shall be provided and a comparison to the 28 $m^3$/ha/d shall be compared to the 70-140 L/d per student rate included in Table 1 in the MECP Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains

for Alterations Authorized under ECA (May 31, 2023). The flows utilized in the spreadsheet shall be the greater of the two comparisons.

# F3.00 Sanitary Sewer Design

## F3.01 Location

All sanitary sewers shall be located as shown on the standard road cross-section on the centreline of the road. All sanitary sewers are to have a minimum clear horizontal separation of 2.5 m from watermains and a minimum clear vertical clearance of 0.5 m when the sanitary sewer crosses above the watermain in accordance with MECP Requirements.

## F3.02 Pipe Capacities

Manning's formula shall be used in determining the capacity of all sanitary sewers. The capacity shall be determined on the basis of the pipe flowing 80% full in the sub-critical slope range.

## F3.03 Flow Velocities

Minimum acceptable velocity = 0.6 m/s. Maximum acceptable velocity = 3.0 m/s.

Every effort through the design process is to be made to meet minimum flow velocities based on actual flow rates.

## F3.04 Minimum Size

The minimum allowable size for a sanitary sewer shall be 200 mm in diameter.

## F3.05 Minimum Grade

The minimum desirable grade for sanitary sewers is 0.5%. The minimum grade for the first upstream leg shall not be less than 1.0%.

## F3.06 Minimum Depths

For residential, commercial and institutional areas, the minimum depth of a sewer shall be 2.8 m. For industrial areas, the minimum depth shall be 2.15 m.

The depth of the sewer shall be measured from the final centreline finished road elevation to the top of the sanitary sewer.

## F3.07 Curved Sewers

The use of radius pipe or deflected pipe will not be permitted.

## F3.08 Limits

All sewers shall be terminated at the subdivision limits when external drainage areas are being considered in the design with suitable provision in the design of the terminal maintenance holes to allow for future extension of the sewer.

## F3.09 Sewer and Watermain Crossings

Generally, a minimum clearance of 0.2 m shall be provided between the outside of the pipe barrel at the point of crossing for storm and sanitary sewers. It is preferred wherever possible for the watermain to cross above all sewers with a minimum of 0.3 m clearance (0.5 m preferred). A minimum clearance of 0.5 m shall be provided between sewers and watermain crossings, where the watermain passes under the sanitary sewer.

In the event the minimum clearance cannot be obtained of 0.5 m where the watermain passes under the sanitary sewer, either the watermain or the sewer line shall be encased in a watertight carrier pipe which extends 3 m on both sides of the crossing, measured perpendicular to the watermain.

In cases where the sanitary sewer crosses an existing utility trench at an elevation higher than the elevation of the utility, a support system shall be designed to prevent settlements of the storm sewer, or alternatively the utility trench is to be excavated and backfilled with compacted crushed stone or concrete to adequately support the storm sewer. When the sanitary sewer passes under an existing utility, adequate support shall be constructed to prevent damage to that utility.

## F3.10 Service Connections to Deep Sewers

No service connections will be permitted to sanitary sewers exceeding 7.60 m in depth, measured from the finished centreline road elevation.

## F3.11 Changes In Pipe Size

No decrease of pipe size from a larger upstream to a smaller downstream will be allowed regardless of the increase in grade.

## F3.12 Head Losses

The following minimum allowances shall be made for hydraulic losses incurred at sewer maintenance holes:

| Change of Direction | Minimum Drop |
|---|---|
| 0 | 30 mm |
| up to 45 degrees | 50 mm |
| 46 to 90 degrees | 80 mm |

In order to reduce the amount of drop required, the designer shall, wherever possible, restrict the change in velocity between the inlet and outlet to 0.6 m/sec.

Regardless of the invert drop across a maintenance hole, as required by calculations, the obvert of the outlet pipe shall not be higher than the obvert of the inlet pipes at any maintenance hole location.

### F3.13 Pipe Bedding

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. Details of the types of bedding are illustrated in the Ontario Provincial Standard Drawings. The width of the trench at the top of the pipe must be carefully controlled to ensure that the maximum trench width is not exceeded unless additional bedding or higher pipe strength pipe is used.

## F4.00 Maintenance Holes

### F4.01 Location

Maintenance holes shall be located at each change in alignment, grade or pipe material, at all pipe junctions and at intervals along the pipe to permit entry for maintenance to the sewer.

### F4.02 Maximum Spacing

The maximum spacing between maintenance holes shall be as follows:

| Pipe Size | Maximum Spacing |
|---|---|
| 200 mm to 750 mm | 110 m |
| 825 mm to 1200 mm | 125 m |
| 1200 mm and over | 155 m |

### F4.03 Maintenance Hole Types

Maintenance holes may be constructed of precast or poured concrete. The Ontario Provincial Standard maintenance hole details shall be used for maintenance hole design where applicable. In all cases where the standard drawings are not applicable, the maintenance holes shall be individually designed and detailed.

A reference shall be made on all profile drawings to indicate the type and size of all sanitary maintenance holes.

Precast maintenance holes shall conform to ASTM Specification C-478 latest revision.

## F4.04 Maintenance Hole Design

- All maintenance hole chamber openings shall be located on the side of the maintenance hole parallel to the flow for straight run maintenance holes, or on the upstream side of the maintenance hole at all junctions.
- The maintenance hole shall be centered on the sanitary sewer main.
- The maximum change in the direction of flow in any sanitary sewer maintenance hole shall be 90 degrees. A change of flow direction at acute interior angles will not be permitted.
- External drop structures shall be used when invert levels of inlet and outlet sewers differ by 0.61 m or more. Wherever feasible, sewer systems should be designed to avoid the use of drop structures.
- All maintenance holes shall be benched as detailed in the Ontario Provincial Standard Drawings.
- Safety gratings shall be required in all maintenance holes greater than 5.0 m in depth. Safety gratings shall not be more than 5.0 m apart and shall be constructed in accordance with the OPSD details. When a Maintenance hole requires a safety platform, the maintenance hole minimum diameter shall be 1500 mm.
- Where practical, a safety grating shall be located 0.5 m below the drop structure inlet pipe.
- A rubber-gasketed fitting (Kor-n-Seal or equivalent) is to be used to connect the sewer to the maintenance hole.
- Maintenance holes shall be located away from any overland flow route or ponding area particularly maintenance holes submerged in road sags or depressions. The 100 year ponding areas with 50% inlet restriction shown on the drawings are to be reviewed by the Consultant Engineer. Maintenance holes are to be re-located outside of these areas. If they cannot be re-located, watertight design including water-tight covers shall be specified for submerged sanitary maintenance holes and where more than one consecutive sanitary maintenance hole requires sealing due to exposure to overland flow, appropriate ventilation shall be provided.
- Frost straps (internal or external) shall be provided to hold maintenance hole sections together (at least three between each section). External straps to extend vertically from top to bottom and for deep maintenance holes extended at least 1 m below frost depth.
- Joints between maintenance hole sections, and inlet and outlet pipes shall be sealed with gasketed flexible watertight connections. Where works are cast-in-place, sealing is required only at the point of connection between individual components of the maintenance hole structures.

## F4.05 Grades for Maintenance Hole Frame and Covers

All maintenance hole covers shall be watertight lids with external lifting apertures, per OPSD 401.030 or equivalent.

All maintenance hole adjustment rings shall be sealed to become waterproof between all rings and from the outside of the structure prior backfilling with a polyethene or asphalt composite membrane or approved equivalent.

All maintenance holes located within the travelled portion of the roadway shall have the rim elevation initially set flush with the base course asphalt. A maximum of 300 mm height of modular rings shall be permitted on all maintenance holes in new subdivisions. No concrete shall extend over the edge of the maintenance hole.

Prior to the placement of the final course asphalt, the maintenance hole frame shall be adjusted to suit the final surface asphalt elevation.

# F5.00 Sanitary Service Connection

## F5.01 General

All sanitary sewer service connections for single, semi-detached, and townhouse dwellings shall be individual services.

## F5.02 Location

The proposed location of the sanitary sewer service shall be shown on the plan and profile drawings and consistent with the typical layouts shown on the standard DWG NO.s C-01 to C-04.

## F5.03 Connection to Main

The connection to the main sewer shall be made with an approved manufactured tee. Approved saddles shall be used for connecting to existing sewer mains.

No service connection of a size greater than half the diameter of the main shall be cut into the main sewer. A maintenance hole shall be installed on the main sewer at the intersection of a service connection which has a size greater than half the diameter of the main sewer except as provided below.

A 150 mm service connection will be permitted to connect to a 200 mm and 250 mm main sewer providing an approved manufactured tee is installed and providing the invert of the service connection is above the springline of the main sewer.

## F5.04 Size

Service connections for single family, semi-detached, and townhouse units shall be 125 mm in diameter.

Service connections for multiple family and other blocks, Commercial, Institutional, and Industrial areas shall be sized according to the intended use.

### F5.05 Depth

The depth of the service connections for single family units and semi-detached units at the property line measured from the finished centreline road elevation shall be:

Minimum 2.50 m
Maximum 3.00 m

Risers shall be used when the obvert depth of the sewer main exceeds 4.50 m. The riser section shall not exceed 3.0 m in depth. Vertical risers shall not be permitted.

### F5.06 Grade

| Size of Connection (mm) | Minimum Grade |
|---|---|
| 125 | 2% |
| 150 | 2% |

### F5.07 Connection to Multiple Family, Commercial/Industrial/Institutional

An inspection maintenance hole shall be required on private property located approximately 1.50 m from the property line to the centre of the rim.

## F6.00 Pipe Materials

### F6.01 Sanitary Sewers

Sanitary sewers shall be constructed of reinforced concrete pipe or polyvinyl chloride (PVC) pipe.

The type and classification shall be clearly indicated on all profile drawings or each sewer length.

All sanitary sewers up to and including 375 mm in diameter shall be PVC pipe. Pipe material for all sanitary sewers exceeding 375 mm in diameter shall be subject to the approval of the Township of Mapleton.

Polyvinyl Chloride Pipe (PVC) shall conform to C.S.A. Specification B137.0 and B137.3, or latest revisions thereof.

Dimension ratio (DR) of PVC sewer pipe shall not exceed 35.

The maximum deflection measured not earlier than 24 hours after backfilling shall not exceed 5.5% of I.D.

### F6.02 Sanitary Service Connections

All 125 mm sanitary service connections for residential uses shall be constructed of the following pipe materials and specifications:

- Polyvinyl Chloride (PVC) CSA 8182.1
- DR 28 minimum
- Material:
  - PV compound 12454-B, 12454-C or 12364-C,
  - All confirming to ASTM D 1784
- Joints: Bell and spigot with rubber gaskets
- Colour: Green

Sanitary service connections to multiple residential blocks, or non-residential land uses which require service sizes greater than 150 mm diameter shall be PVC (DR35) bell and spigot pipe conforming to CSA Specification B182.2.

## F7.00 Testing

### F7.01 General

Testing shall be carried out to ensure minimum testing requirements included in the Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval are completed.

All testing shall be done in the presence of the Developer's Engineer and the Township Engineer.

A visual inspection in each maintenance hole or chamber is required prior to preliminary acceptance and prior to final acceptance. The Township may request additional inspections or testing prior to placement of top course asphalt.

All tests noted in the subsequent sections shall be completed prior to preliminary acceptance.

### F7.02 Infiltration Test

An infiltration test shall be carried out where the groundwater at the time of testing is 600 mm or more above the crown of the pipe throughout the section of sewer being tested.

The allowable infiltration shall not exceed an amount based on the following calculation:

- 0.075 L/mm of pipe diameter/100 m of sewer/hour.

The testing shall conform to OPSS.MUNI 410.

## F7.03 Exfiltration Test

An exfiltration test shall be carried out where the groundwater table is lower than 600 mm or more above the crown of the pipe of the highest point of the highest service connection included in the test section.

The allowable leakage for the test section shall not exceed the following:

- 0.075 L/mm of pipe diameter/100 m of sewer/hour.

The testing shall conform to OPSS.MUNI 410.

## F7.04 Deflection Test

A deflection test shall be performed on all sewers constructed using PVC material.

A suitably designed device described below shall be pulled manually through the pipe not sooner than 24 hours after completion and backfilling. The device shall be cylindrical in shape and constructed to a diameter equal to the allowable deflection, as given by:

Allow. Diameter = (0.15 DR) % x Nominal Internal Dia.

| Nominal Pipe Size (mm) | Mandrel Device Length (mm) |
|---|---|
| 150 | 100 |
| 200 | 150 |
| 250 | 200 |
| 300 | 250 |
| 350 | 300 |
| 375 | 300 |

Mandrel testing shall conform to OPSS.MUNI 438.

## F7.05 Closed-Circuit Television (CCTV)

All newly constructed sanitary sewers shall be CCTV inspected upon satisfactory completion of all other testing, prior to the municipality's issuance of Preliminary Acceptance.

A copy of the video is to be provided along with the CCTV report identifying any unusual or substandard conditions shall also be submitted. The CCTV shall be prepared and completed by a company experienced in this field.

Prior to Final Assumption or after subsequent repairs, additional CCTV and related reports are required to be submitted to the Township Engineer.

All digital CCTV files and reports provided from inspections are to become the property of the Township of Mapleton.

The Design Consultant shall review the CCTV and report and shall submit recommendations for repair prior to the Township receiving the information. A list of deficiencies and minimum expectations are noted below.

**Table F.2: Deficiencies and Repair Requirements**

| Deficiency | Repair/Action Required |
|---|---|
| Gasket exposed | Remove exposed portion of gasket by cutting and sealing the pipe joint. |
| Debris | Flush and re-inspect with CCTV. If debris cannot be removed, reaming and/or excavate to remove and repair is required. |
| Ponding | Excavation and repair |
| Cracking – Minor and Isolated | The Township may retain a third-party consultant to review and provide a recommendation. Pressure crack sealing may be required as directed by the Township. An extended monitoring period may be required. |
| Cracking – Significant | Excavate and repair |
| Structural Defect (based on assessment per NASSCO methods) | Repair required. Consulting Engineer's recommendation required. The Township may retain a third party consultant to review the recommendation. |
| Flexible pipe out of round (greater than 5%) | Re-rounding process is not acceptable. Excavate and repair required. |
| CCTV results not clear | If the video becomes unclear, a new CCTV will be requested. |

# SECTION G

# Lot Grading

# Section G Lot Grading

## G1.00 General

The lot grading of all lots and blocks in new subdivisions must be carefully monitored by the Consulting Engineer in order to provide sites that are suitable for the erection of buildings and to provide satisfactory drainage from all lands within the development.

It is imperative that the overall initial Draft Plan of Subdivision be laid out with regard to the lot grading criteria outlined in this section. In particular lots requiring rear yard drainage swales or rear yard catch basins may require extra depth or width to accommodate swales and related easements.

### G1.01 Objectives

- All areas shall be graded in such a way as to provide positive drainage, maximum use of land and ease of maintenance.
- The subdivision area grading, and detailed lot grading shall be designed to avoid retaining walls.
- Grading shall be performed in such a way to preserve existing trees wherever possible.
- Drainage flows must be directed away from houses. The front yards of all residential urban lots shall be graded to drain towards the street.
- Driveways shall not be utilized as drainage outlets and shall not receive drainage from roof downspouts.
- Storm drainage is to be directed to approved outlets on public lands and shall not adversely affect adjacent lands.
- The use of rear lot catch basins and retaining walls should be minimized. Overland flow outlets must be provided for all rear lot catch basins with no impact on building envelopes.

### G1.02 General Grading Plans

All grading plans for new development in the Township of Mapleton shall be prepared in accordance with the criteria contained in this section and shall contain the following information and detail: (See DWG NO. G-01)

a) Scale 1:500

b) All proposed lot numbers and blocks (municipal numbers are to be added as soon as they are available)

c) Existing elevations are to be shown, extending to adjacent lands to enable assessment of the grading between the subdivision and the adjacent areas. The lot grading plan must accommodate drainage patterns on adjacent property.

d) Proposed elevations are to be shown for all lot corners and intermediate points of grade change. Proposed elevations along the frontage, sides, and rears of blocks shall be provided at reasonable intervals to illustrate the grading of the block in relation to the surrounding lands.

e) All proposed rear lot catch basins, leads, top elevations and inverts.

f) Location of service connections.

g) Septic bed layout and dimensions (where applicable).

h) Proposed well locations (where applicable).

i) Location and dimensions of driveways.

j) Existing contours at maximum 0.5 m intervals.

k) Existing and proposed elevations at lot corners.

l) Specified house grades - including Top of Foundation Wall, Underside of footing and finished floor elevations.

m) The specified minimum basement floor elevation for each lot shall also be shown where it may be impacted by hydraulic grade line issues. Lots that require sump pumps are to be identified.

n) Proposed elevations along the boundary of all blocks abutting single family and semi-detached lots in the subdivision.

o) Direction of the surface run-off by means of arrows.

p) All proposed easements required for registration.

q) Proposed centreline road elevations are to be shown at 20 m stations along all roads within and abutting the subdivision. (Elevations are to be shown for the 20 m stations in accordance with the profile drawings.)

r) Lots proposed to be brought to grade with compacted or “engineered” fill to support structure foundations are to be indicated.

s) Rear yard catch basin top of grate elevations

t) Plans are to include the grading details at each intersection (maximum scale of 1:250).

## G2.00 General Grading Design

a) Generally, the front yards of all lots shall be graded to drain towards the street.

b) All boulevards are to be graded with a constant slope from the curb to the street limit. (Minimum slope to be 2% and the maximum slope to be 5%.)

c) All rear yard drainage is to be directed away from the houses in defined swales which outlet at the curb or a catch basin.

d) Drainage over abutting lands outside the subdivision limits will only be allowed in exceptional cases approved by the Township Engineer. The Township Engineer may require an easement or written permission from the adjacent property owner to permit drainage over abutting lands.

e) The lot grading design shall provide for drainage problems on adjacent property that can be best resolved by permitting drainage through the subdivision.

f) The grading design shall accommodate grading improvements for abutting roads, such as ditch modifications for ditch sloping or adequate subgrade drainage or modified to coordinate with future planned road works as requested by the Township Engineer.

g) All lot surfaces shall be constructed to a minimum grade of 2%. Where soils are classified as Group D, the minimum lot surfaces shall be increased to 3%.

h) The maximum slope on all embankments and terraces shall be 4(H):1(V) preferred.

i) The maximum flow allowable to any side yard swale shall be that from two lots plus that from two adjacent lots not exceeding a maximum of 2 ha.

j) The maximum number of rear lots contributing to a rear yard swale shall be that of four rear yards.

k) The maximum length of a rear yard swale between outlets shall be 90 m. Where rear yard swales provide drainage for more than two lots, the swale must be located within a 4.0 m drainage easement over the total length. Rear yard swales shall have a minimum slope of 2% (increased to 3% where soils are classified as Group D). Where a drainage easement also contains underground infrastructure refer to Section B for easement requirements.

l) Swales providing internal drainage from each lot shall have a minimum slope of 2% and increase to 3% where soils are classified as Group D.

m) Minimum depth of any swale to be 150 mm.

n) Maximum depth of rear yard swales to be 750 mm.

o) Maximum depth of side yard swales to be 450 mm.

p) Maximum side slope on swales to be 4(H):1(V). A maximum slope of 3(H):1(V) is permitted on side yard swales between houses that have less than a 1.5 m setback or is zoned Industrial, Commercial, or Institutional.

q) All drainage swales shall be located on the common lot line between adjacent lots.

r) Rear yard catch basins and outlet pipes are to be located entirely on the same lot and shall be located per the DWG NO. C-05.

s) The minimum driveway grade shall be 2.0% and the maximum grade permissible shall be 8.0%. The minimum driveway grade on industrial, commercial, and institutional properties shall be 1.0%.

t) The grade immediately adjacent to houses shall be a minimum of 150 mm above the invert of adjacent swales.

u) The entire lot shall be sodded with No. 1 Nursery sod for all lots 0.2 ha or less. For lots larger than 0.2 ha outside seeding is also acceptable, however final certification of the lot cannot be provided until the vegetation is fully established. The Ontario Land Surveyor or the Professional Engineer shall not certify or take as-constructed elevations until all the entire lot is sodded or if seeded is well established.

v) For residential lots where side yard doors are provided to the garage, the grading plan shall include the following details:

- A 1 m walkway sloped at 2-4% towards the sideyard swale from the driveway to the side door where the house is setback a minimum of 1.5 m. The edge of the outer walkway shall be a minimum of 0.15 m higher than adjacent property line elevation maintaining a minimum swale depth of 0.15 m with a side slope less 3:1 or less.
- A 0.75 m walkway sloped at 2-4% towards the sideyard swale from the driveway to the side door where the house is setback between 1.2 m, but less than 1.5 m. The edge of the outer walkway shall be a minimum of 0.15 m higher than adjacent property line elevation maintaining a minimum swale depth of 0.15 m.
- Where a garage side door is proposed where the distance between the house and property line is less than 1.2 m, a note shall be included on the drawing that indicates that a walkway is not permitted.

## G3.00 Individual Lot Grading Plan and Certification Requirements

All lots that have been issued building permits and are occupied require Final Lot Grading Approval prior to Final Acceptance of the Subdivision.

There is no release of the lot grading security until all lots in the subdivision have Final Lot Grading Approval. Individual lot grading securities are not taken from the applicants of the building permits rather the Developer is required to provide a general lot grading security deposit for the subdivision.

## G3.01 Step 1 – Proposed Individual Lot Grading Plan

Prior to application for a building permit, individual lot grading plans for each lot shall be prepared by the Developer's Engineer and submitted to the Township for review and approval by the Township's Consulting Engineer. The Township's Consulting Engineer will provide a copy of the reviewed plan stamped either "Reviewed as noted in red", "Reviewed without changes", or they will require a revised plan when it is determined that the grading is not in general conformance with the Master Grading Plan and Township Design Guidelines & Standards. These individual lot grading plans shall include the following:

- Lot description including Registered Plan Number;
- Municipal number and Street Name;
- Dimensioned property limits and house location;
- House type; normal, side split, back split, etc.;
- Finished floor elevation;
- Finished garage floor elevation;
- Finished basement floor elevation;
- Top of foundation wall elevations (all locations);
- Underside of footing elevation;
- Existing and proposed lot corner elevations;
- Existing trees to be maintained;
- Driveway location, width and proposed grades;
- Arrows indicating the direction of all surface drainage and swales;
- Location and elevation of swales;
- Location of walkway and grading details leading to side garage doors if applicable;
- Location of decks, pools, patios, or other walkways if known;
- Location of terraces and retaining walls;
- Sump pump outlet location (to the rear yard) if discharged to surface where no storm service is being installed;
- Bottom and top of wall of any proposed retaining walls including outlets of any required subdrains;
- Location and type of any private sewage disposal system, and private wells location if applicable;
- Coordination of sewage system design if applicable (including finished and original grades over septic tile beds) with diversion swales shown;
- Above ground utilities fronting the lot in the municipal boulevard;
- Sidewalk in the municipal boulevard fronting the property if applicable;
- Notes that direct builders to specific requirements;
    - Rainwater leader downspouts to discharge 1 m from all walls.
    - Sump pump outlet location shall be on the rear wall (discharge 1 m from house rear wall).
- Any other specific grading requirements if applicable to the subdivision; and
- An 'approved' stamp from the Developer's representative.

The Developer is responsible to provide Builders in the subdivisions with copies of the subdivision drawings, copy of the Township's Design Guidelines & Standards, and shall be responsible to identify any subdivision agreement requirements that may impact the builder. Relaying this information is the ultimate responsibility of the Developer.

## G3.02 Step 2 –Top of Foundation Certificate

For every house being constructed, before the builder proceeds past the foundation stage, they shall retain an OLS to complete a Top of Foundation Certificate. The OLS shall provide a certificate that verifies the following:

- The top of foundation elevation complies with the levels shown on the individual grading plan; and
- The location of the foundation as illustrated on the building survey complies with the applicable zoning by-law.

An example is included in Appendix G.

## G3.03 Step 3 – Final Lot Grading Approval

When the entire lot is sodded (or if seeded is fully established), the Developer's Engineer shall complete an as-constructed survey and perform a visual assessment of the property to confirm general conformance with the approved grading plan and to assess any other requirements noted on the Final Lot Grading Approval Form included in Appendix G. Any deficiencies found by the Developer's Engineer shall be rectified by the Builder so the Final Lot Grading Form can be completed.

The as-constructed survey plan shall include:

- Spot elevations are required (preferably where proposed elevations were shown on the approved individual grading plan) including top and bottom of any retaining walls to show that the lot has been graded in general conformance with the approved individual grading plan and that proper positive drainage has been provided;
- Top of foundation elevations;
- Basement floor elevation; and
- Final location of wells, on-site sewage system, and culvert inverts.

When all deficiencies have been rectified, the completed Final Lot Grading Form included in Appendix G shall be provided to the Building Department with a copy of the as-constructed drawing.

The Building Department provides the completed Form and as-constructed drawing to the Township's Consulting Engineer for review. The Township's Consulting Engineer will perform a visual assessment and recommend Final Lot Grading Approval or provide a list of items to be rectified or reviewed. The Developer's Engineer is encouraged to attend the site visit with the

Township Engineer. Site visits will not be completed when there is snow cover. When Final Lot Grading Approval Forms and As-Constructed Surveys are submitted between November to March, final site visits typically occur the following spring.

## G4.00 Retaining Walls

The lot grading design is to avoid the use of retaining walls. All reasonable alternatives must be investigated prior to the use of retaining walls.

Where retaining walls are necessary and agreed to by the Township, the structures shall be free-standing gravity walls constructed of large size heavy pre-cast concrete blocks (no smooth wall permitted) or armour stone. No wood or gabion basket retaining walls will be permitted. Tie-back systems are to be avoided in all applications. If in the sole opinion of the Township tie-backs cannot be avoided, the tie-backs are to be located entirely on the same property as the retaining wall.

All retaining walls exceeding 1.0 m in exposed height even if not a designated structure as defined in the OBC, must include an engineering drawing or shop drawing stamped by a registered professional engineer for any structure not covered under Ontario Provincial Standard Drawings.

Building permits for the construction of retaining walls that fall into the category of designated structures within the scope of the OBC are required.

Final post-construction certification from a Professional Engineer will be required for each wall constructed exceeding 1.0 m in exposed height clearly stating that the wall has been designed to suit the site conditions, that construction of the wall has been inspected by the Engineer and that it has been constructed in accordance with the design.

The outlets of all drainage pipes shall be shown on the drawings.

Retaining walls shall be constructed entirely on one lot so that the ultimate maintenance of the wall is the responsibility of the owner of the lot on which the wall is built. For any walls that cross property boundaries, a legal opinion shall be provided on how to address the future replacement or repair.

Retaining walls will not be permitted on property that will be transferred to Township ownership.

## G5.00 Subdivision Area Rough Grading

Area rough grading must be performed prior to road construction unless alternate arrangements have been approved by the Township Engineer.

Erosion and sediment control measures and any tree preservation measures shall be in place prior to commencing area rough grading (including topsoil stripping). As rough grading proceeds, the Developer must maintain all erosion and sediment control measures. Additional measures are required during construction if it is determined additional measures are required.

The Consultant Engineer shall control the placement of imported fill material on lots with private sewage disposal systems or when “engineered fill” is required. Imported fill must meet or exceed the original ground’s capability to support a private sewage disposal system, or recommendations in reports provided to support the design of the subdivision. The Consultant Engineer shall coordinate the Geotechnical Consultant for any on-site testing and observations.

## G6.00 Importation or Exportation of Soils

The Developer shall engage a Qualified Person to ensure compliance with all regulations related to importation and exportation of soils and comply with O.Reg. 406/19.

Should fill importation be required, the Owner shall provide an Imported Fill Management Plan, consistent with O. Reg. 406/19 and the Management of Excess Soil - A Guide for Best Management Practices, to the Township. The Imported Fill Management Plan shall be prepared by a Qualified Person (QP), as defined in O. Reg. 153/04 and O. Reg. 406/19, (QP), and in compliance with O. Reg. 406/19, to the satisfaction of the Township, including:

a) Identification of the locations, volumes and appropriate soil quality Standards as per the Rules For Soil Management And Excess Soil Quality Standards, as referenced in O. Reg. 406/19 for any proposed imported Excess Soil

b) Identification of the locations, volumes, and appropriate certifications, as determined by the QP and approved by the Township, for the proposed importation of any fill materials that does not meet the O. Reg. 406/19 definition of Excess Soil excluding materials sourced from a licenced aggregate pit.

c) The receipt, review and approval by the QP of the following reports as outlined in the Rules For Soil Management And Excess Soil Quality Standards for all Excess Soil to be imported to the site:
   (i) Assessment of Past Uses (APU)
   (ii) Sampling and Analysis Plan
   (iii) Soil Characterization Report
   (iv) Excess Soil Destination Assessment Report

d) Approval of the Tracking System for the importation as per the Rules For Soil Management And Excess Soil Quality Standards

e) Registration with the Resource Productivity and Recovery Authority (RPRA) if required, with the Owner being defined as the Project Leader in accordance with O. Reg. 406/19

f) Identification of Haul Routes. A general roads damage deposit will form part of the subdivision agreement for any significant fill importation operations.

# SECTION H

# Signs and Pavement Markings

# Section H Signs and Pavement Markings

## H1.00 General

The Developer shall be required to supply and install all signage in the development. The Developer shall maintain all signage until final assumption and shall be responsible to remove and dispose of any temporary signs.

Consistent use of colour is a major factor in recognition of the Township of Mapleton Logo. DWG NO. H-01 includes a breakdown of colours used in the logo that should be incorporated in any custom signage being prepared for the development.

## H2.00 Traffic Control and Advisory Signs & Street Name Signs

The proposed location and type of all street name signs, traffic control signs, signalization, parking and pavement markings shall be shown on the Pavement Marking and Signage Plan. All traffic control devices, including warning and regulatory signs, street signs, parking restrictions, etc., shall conform to the Ontario Traffic Manual (OTM). The plan shall be prepared by a Professional Engineer skilled in municipal traffic design.

The Developer shall install all signs in the development. Permanent street name signs and all regulatory signs, excluding parking restriction signs, must be installed upon completion of the base course asphalt and prior to the issuance of the first building permit for the subdivision. Signs indicating parking restrictions are to be installed prior to the occupancy of any initial dwelling or building being issued in a development.

### H2.01 Street Name Signs

a) Street names shall be approved by Township Council. Street naming shall be coordinated by the Planning and Development Manager.

b) Street name signs shall be placed at each intersection and shall identify each street intersection. DWG NO. H-02.

c) The street name sign blades shall be extruded aluminum having a minimum thickness of 2.3 mm, a height of 150 mm (urban), and height of 200 mm (rural) and a length of 610 to 915 mm. The rural sign heights are larger to accommodate the 911 numbering along the bottom.

d) Lettering for the street name shall be uppercase 100 mm in height. The lettering for street (ST), drive (DR) avenue (AVE), crescent (CRES), etc., shall be abbreviated as noted, uppercase 50 mm in height.

e) All sign messages shall be white lettering on green background. Lettering and background material is to be Scotchlite Reflective sheathing, engineering grade as manufactured by 3M Canada Ltd. Signs to be made by a 3M certified fabricator.

f) All signs shall be mounted with a 150 mm x 150 mm (6" x 6") SPF No. 2 pressure treated post embedded 1.5 m into the ground.

g) The Township uses Cedar Signs Inc. for their street name signs however the developer can choose to use an alternate vendor.

## H2.02 Traffic Control and Advisory Signs

a) Traffic control and advisory signs shall be located in accordance with the Manual of Uniform Traffic Control devices for Ontario as published by the Ministry of Transportation Ontario.

b) Traffic control and advisory signs shall conform to the current revised standards of the Manual of Uniform Traffic Control Devices for Ontario.

c) All regulatory/warning signs shall be mounted with a 150 mm x 150 mm (6" x 6") SPF No. 2 pressure treated post embedded 1.5 m into the ground.

d) All "No Parking" and "No Stopping" zones should be clearly identified with signs in accordance with the OTM. The Township will allow the placement of No Parking and No Stopping signs on streetlight poles to reduce clutter. The placement of signs on streetlight poles is only permitted when the appropriate spacing is achieved. 5 ft U channel, installed 3 ft underground, with an 8 ft U channel bolted above ground shall be utilized if standalone signs are required.

e) For local roads parking is generally only permitted on one side of the street. No parking zones are typically established on the side of road opposite where the sidewalk is located. No parking signs shall be spaced at 50 m or less.

f) Dead-end barricades shall be constructed in accordance with OPSD 973.130 with the Checkerboard Sign.

## H3.00 Development Sign

In addition to the signage requirements outlined in the subdivision agreement, a Development Sign shall be posted at the entry to the subdivision that provides contact information for the Owner and Owner's Engineering Consultant as shown on DWG NO. H-03.

## H4.00 Stormwater Management Signage

All stormwater management signage shall also be installed prior to preliminary acceptance. All signs shall be maintained by the Developer and adjusted as necessary prior to the granting of "Final Acceptance" by the Township.

### H4.01 Stormwater Management Information Sign

The Developer shall establish an Information Sign for all Stormwater Management Facilities that is a wet pond, dry pond, hybrid facility, or engineered wetland. The sign shall be posted at the main access route to the SWM Facility.

The Information Sign is to include the following minimum information:

a) Identification that a Stormwater Management Facility is present.

b) Identification of potential hazards and limitations of water use, as applicable.

c) Identification of the purpose of the Facility.

d) Township Asset ID.

e) Township contact information.

The fabricator of the sign and contact details shall be provided to the Township. Refer to DWG. NO. H-04.

### H4.02 Stormwater Management Warning Sign

In addition to the Information Sign, at any other access points to the SWM Facility, additional signs shall be posted per DWG. NO. H-05. The Township may also request posting of this sign at other locations.

## H5.00 Trail Signs

Trail signs are required at each trailhead or entry into the trail as part of AODA requirements. Please refer to DWG. NO. H-06 for the minimum information to be included on the sign. Other trail signage examples are included in DWG. NO. H-07.

# H6.00 Park Signage

## H6.01 Park Entrance Sign

Each entrance to a park shall have a main entrance sign. The sign shall include the park name, the civic address, and the Township logo. Park Entrance sign details are included in DWG. NO. H-08.

## H6.02 Park Rule Sign

Each playground shall have a park rule sign posted as shown on DWG. NO. H-09.

## H6.03 No Smoking or Vaping Sign

No smoking or vaping signs are to be mounted on the same post as the Park Rule Sign

# SECTION I

# Landscaping

# Section I Landscaping and Street Tree Planting Plans

## I1.00 Responsibility

The Developer will be required to provide tree preservation and landscaping in accordance with the conditions and specifications established in the Subdivision Agreement. The Developer is responsible for the maintenance of all plantings for a period of two years or until issuance of a certificate of final acceptance, whichever is longer. A minimum of two years maintenance is to be provided on all subsequent replacement plantings unless alternate arrangements have been made with the Township in writing.

## I2.00 Tree Preservation and Compensation

The Township considers the principle of 'no net loss of trees or forest cover' when reviewing development projects. It is recognized that this approach will not be feasible in all cases. Where vegetation removal cannot be avoided, efforts should be made to provide compensation in the form of new plantings.

These new plantings shall be incorporated into the design to offset what was lost, and where possible enhance the streetscape and/or natural environment. Plans are to be prepared by landscape/forestry professionals such as foresters, arborists, or landscape architects in consultation with engineering designers. The professional shall refer to any environmental impact studies prepared to ensure any requirements and/or mitigation measures are incorporated.

It is necessary that the tree preservation report is completed at the draft plan stage in order for the draft plan to be modified to provide for recommended tree preservation and to accommodate grading changes necessary to preserve trees. General information regarding compensation can be provided at the draft plan stage to show where compensatory tree planting will be provided. The final details of plantings (species, planting details, etc.) can be prepared at the detailed design stage.

### I2.01 Tree Inventory

The landscape/forestry professional should prepare a term of reference for the Township to review for tree inventories to be completed. In general, the following is required:

- Identify natural vegetation communities, including species composition, diameter at breast height (DBH), crown diameter, location, and spatial extent; and
- Individual trees 10 cm DBH and greater shall be inventoried including location, species, size and condition.

### I2.02 Tree Preservation and Compensation Plans

Using the information collected from the street tree inventory, a street tree preservation plan shall be developed. The plan shall provide information regarding minimum protection zones, mitigation measures, and any transplanting requirements. The engineering designer shall incorporate design measures to minimize impact to vegetation or trees such as adjusting the grading design. This review may require adjustments of lots/layout. Where removal cannot be avoided, compensation plans shall be provided to offset what was lost.

## I3.00 Vegetation Planting Details

Vegetation planting details for coniferous trees, deciduous trees, and shrubs, are provided in the Township standard drawings. DWG. NO. I-01 to DWG. NO. I-09. Consultants and contractors are to follow these standards in the design and installation of plantings required as part of development applications.

Any plantings on municipal blocks shall be low maintenance. Unless confirmed to be acceptable by the Township, continuous planting beds shall be avoided.

## I4.00 Street Tree Planting

### I4.01 Street Tree Planting Plans

Street Tree Planting Plans are to be produced based upon complete and current Composite Utility and Servicing Drawings. The design of aboveground services and utilities shall be carried out in coordination with the siting of street trees to achieve a complete streetscape design with minimal blank frontages.

### I4.02 Street Tree Quantities

Street trees shall be provided as follows:

- Single detached lot: 1 tree;
- Semi-detached lot: 1 tree;
- Townhouse block: 0.5 tree/unit (i.e., a tree is not expected to be planted for every unit) due to utility constraints;
- All other blocks (parks, industrial, commercial, etc.): at a minimum of 10 m intervals; and
- Lot flankage: at a minimum of 10 m intervals, but not within 7.5 m x 7.5 m daylight triangle.

Notwithstanding the minimum number of trees above, where street trees cannot be planted due to minimum setback requirements and utility constraints, the Developer shall provide the Township with cash in lieu for any street trees that cannot be planted or determine an alternative location for them. The details of this arrangement are to be included in the subdivision agreement.

## I4.03 Street Tree Locations

Street tree sitting is to be in accordance with the following:

**Table I.1: Street Tree Siting**

| Location / Description | Street Tree Siting Requirements |
|---|---|
| Distance from Street Line | • Minimum 1.2 m (located on Private Property) |
| Distance from driveway | • Minimum 1.5 m clear to edge of tree from residential driveway; and<br>• Minimum 5.0 m clear to edge of tree from commercial/institutional/industrial driveway. |
| Distance from streetlights | • Minimum 5.0 m offset for large shade canopy trees;<br>• Minimum 3.0 m offset for small ornamental flowering trees. |
| Distance from hydrants | • Minimum 3.0 m clearance. |
| Distance from transformer | • Minimum 3.0 m clearance. |
| Distance from utility pedestals or vaults | • Minimum 1.5 m clearance. |
| Space between trees | • Large canopy shade trees:<br>– Not less than 8 m nor greater than 10 m<br>• Ornamental flowering trees:<br>– Not less than 5 m nor greater than 9 m |
| Daylight Triangle | • Not within the 7.5 m x 7.5 m triangular space formed from the intersecting street lines; and<br>• Landscaping within a daylight triangle shall be maintained to a height of not more than 0.7 m. |

## I4.04 Types

The species of tree to be planted shall be selected from trees native to the Township of Mapleton area and commonly used in municipal tree planting programs. The species and percentage of types to be used are to be approved by the Township Engineer prior to commencement of the plating program.

The following list of trees, includes, but does not limit those that are acceptable for this purpose:

**Table I.2: Acceptable Tree Species**

| Common Name | Botanical Name |
|---|---|
| **Medium Species** | |
| Yellow-wood | *Cladrastis lutea* |
| Turkish Hazel | *Corylus colurna* |

| Common Name | Botanical Name |
|---|---|
| Littleleaf Linden | *Tilia cordata* |
| Eurpoean Mountain Ash | *Sorbus aucuparia* |
| Ivory Silk Lilac | *Syringa reticulata 'Ivory Silk'* |
| **Large Species** | |
| Red Maple | *Acer rubrum* |
| Sugar Maple | *Acer saccharum* |
| European Hop Hornbeam | *Carpinus betulus* |
| Common Hackberry | *Celtis occidentalis* |
| Basswood | *Tilia americana* |
| Bur Oak | *Quercus macrocarpa* |
| Red Oak | *Quercus rubra* |

Trees are to be planted in tree pits, large enough to accommodate the root system. Trees shall be planted and backfilled to eliminate air pockets. All trees are to be placed during the Spring or Fall dormant season in unfrozen soil. Refer to Standard DWG. NO.s I-01 to DWG. NO. I-07 for tree planting details

Trees shall be protected by steel tee posts or timber stakes placed on both sides of the tree, parallel to the street line. Tree straps will be used for securing the trees to the posts.

### I4.05 Quality and Source

All trees shall be No. 1 Nursery Stock, 2.4 m to 4.0 m in height with a minimum caliper of 60 mm measured 15 cm above ground level. All plant material (trees, shrubs, perennials, ground covers) shall be in accordance with the Canadian Nursery Stock Standards.

All trees that die or are deemed to be unsatisfactory prior to “Final Acceptance” shall be replaced by the Developer. Trees shall be guaranteed for a period of two years including a minimum of two years on all subsequent plantings.

## I5.00 Stormwater Management Pond Landscaping

Landscaping shall be used to enhance the safety, aesthetics, and functional aspects of stormwater ponds. Native, non-invasive trees, shrubs, and ground cover shall be low maintenance.

A landscaping plan prepared by a registered landscape architect is to be submitted to the Township for review and approval. The design is to ensure a minimum 3 m separation from the edge of trails or walkways to trees or shrubs and adequate separation from infrastructure to ensure trees can be preserved during potential repair and/or replacement. The plan is to address the following objectives:

- Provide shade to areas of the permanent pool (minimize thermal impacts);

- Proposes vegetation which has high nutrient up-take capability and is planted in shallow ponding areas in the extended detention zones;
- Provide outlooks or viewing features with space suitable for installation of benches and use of gravel paths to link viewing areas with local walkway or trail systems; and
- Provide a low maintenance ground cover that minimizes the area to be mowed on a regular basis.
- Only provide low maintenance shrubs and trees.
- Shrubs are not to be provided on the upstream side of the maintenance access route, where it is more likely that the area will be mowed.

The Township requires the following minimum standards for trees and shrubs:

- Deciduous trees – minimum 60 mm diameter caliper;
- Coniferous trees – minimum 1.8 m in height; and
- Deciduous or coniferous shrubs – minimum 0.6 m in height.

When GRCA has landscaping guidelines for stormwater management facilities they should be referred to. The landscape architect can refer to other guidelines available such as the:

- NVCA Stormwater Management Pond Planting Guidelines (April 2006, as amended); and
- CVC Stormwater Management Pond Planting Guidelines (Appendix D1, draft July 2014, as amended).

## I6.00 Park Block Landscaping

The park landscape plan shall incorporate all components including fencing, tree plantings, walkways, any specification for playground areas, etc. Refer to Section J for more information.

Unless confirmed to be acceptable by the Township, continuous planting beds shall be avoided and only trees shall be planted.

For park blocks that abut residential properties, sufficient landscape screening shall be installed to provide some privacy with mixes of Deciduous and Coniferous trees. The use of shrubs should be confirmed with the Township.

All plans to be prepared by a registered landscape architect.

# SECTION J

# Parklands

# Section J Parklands

## J1.00 Plan

The Developer is responsible for preparing a detailed grading plan for all lands to be dedicated for Park purposes. This plan is to be reviewed and approved by the Township. The plan shall show all existing trees and features that conform to the end use of the park and are to remain. All dead trees and other features that do not conform to the end use of the park are to be removed by the Developer.

### J1.01 Grading

The park shall be fine graded in accordance with the approved grading plan with particular care being taken to avoid damage to those trees that are to remain. All graded areas shall be covered with a minimum of 150 mm of approved topsoil and shall be seeded and fertilized in accordance with the specifications of the Township Engineer.

The Township will require the Developer to provide fencing along park boundaries.

### J1.02 Timing of Construction

All park blocks are to be graded and seeded within one year of the completion of the base course asphalt road construction in the area adjacent to the park. Seeding must be carried out during the desirable months for seeding, being May, August or September.

Developed parks (equipped with playground) are required to be in place prior to the subdivision reaching 50% occupancy unless other arrangements are included in the subdivision agreement.

### J1.03 Maintenance

The Developer shall be responsible for the maintenance, fertilizing and mowing of the parkland until “Final Acceptance”.

### J1.04 Services

The Developer is required to provide services to the park if requested by the Township. This could be a water service, sanitary service, storm service, hydro service, or lighting.

### J1.05 Accessibility

The Township will be expecting facilities and park designs to be designed in such a manner to provide accessible options so all residents can enjoy public spaces including compliance with the Accessibility for Ontarians with Disabilities Act.

**Trails and Walkways** - Parkland and park facilities will be designed to provide barrier free access to wheelchair users and other mobility aids or devices. Trails and walkways shall adhere to the following standards below unless deviations are approved by the Township Engineer or Director of Public Works.

- Minimum width: 1.5 m
- Surface type: Firm and stable with preference for asphalt or concrete
- Maximum running slope: 5%
- Minimum cross slope: 2%
- Maximum cross slope: 4%
- Curb ramps:
  - Clear width of 1.2 m;
  - Maximum running slope of 12.5% where elevation is less than 75 mm;
  - Maximum running slope of 10% where elevation is between 75 mm to 200 mm;
  - Maximum cross slope is 2%; and
  - Curb ramp has tactile plates (minimum 610 mm depth, extend full width of the curb, setback between 150 mm to 200 mm from curb edge).

There will be instances where a recreational trail may not be able to meet the maximum running slope of 5% (through natural areas due to existing terrain, forested areas). Trail signage must clearly indicate information about the trail as noted in DWG. No. H-06. The designer should refer to O.Reg. 191/11 for recreational trail requirements.

**Playground Equipment and Park Furniture** - The design of play areas is to include accessible paths to the playground area, providing ramps or level surfacing to facilitate accessible access. Specific play components and park furniture (picnic tables, benches) should provide for a wide range of capabilities and age groups.

## J1.06 Outdoor Play Spaces including Playground Equipment

When the Developer provides playground equipment or other outdoor play spaces, there are mandatory consultation requirements that are to take place. For Developer's who are providing a developed park, the following steps are generally followed:

Step 1: Playground Options are submitted to the Township

The Developer is responsible for providing a minimum of three options for input/consideration by the Township. The information provided shall be in an accessible format. The outdoor play space should incorporate accessibility features, such as sensory and active play components. The Developer shall also review the latest amendment to the 2005 Facility Accessibility Design Manual – Wellington Accessibility Partnership for additional guidance and O.Reg. 191/11.

Step 2: Submission to Accessibility Advisory Committee and Public Consultation

The Township will provide the options to the Accessibility Advisory Committee. The Developer and the Developer's Playground Consultant (typically the Landscape Consultant) will be requested to attend the meeting to present the options and to answer any questions. The Developer may be requested to augment the options based on the feedback received from the committee.

The Township will also arrange for public consultation with respect to the options provided.

Step 3: Council Meeting

Feedback from the consultation will be prepared in a Township staff report. Final selection will be determined by Council. Council may include amendments to the plans based on the feedback received.

The following are minimum requirements with respect to play area design:

- Playground areas are to have perimeter concrete curbing. The final grade adjacent to the outside of the curb is to be flush with the curb. Play bases are to have adequate drainage including subdrains where requested.
- The play area is to be fenced off with orange plastic snow fence and is to stay in place until a CSA inspection report is provided from a third party confirming that there are no deficiencies with the installation and that the equipment meets current CSA guidelines. A sign may be required to indicate "DO NOT USE". This inspection report shall be provided to the Township Engineer and Director of Public Works.
- The surfacing within the playground area will need to be approved by the Township. Any surfacing product will require a certificate or letter from the manufacturer/installer that the play surfacing product and installation meets most current CSA guidelines.
- The plans shall include drawings that show the play area has adequate drainage, including the installation of subdrains under the surfacing where required.
- Viewing benches should be placed on concrete pads. The concrete pads shall be wide enough to accommodate a mobility aid such as a wheelchair beside the bench.
- Walkways in close proximity to the playground area, or those considered higher traffic (such as a walkway from the road to the playground area) should be a minimum of 2 m wide.
- Park Entrance Sign and Park Rule Sign (DWG. NO. H-08 and H-09) shall be in place prior to playground equipment use.
- If the permanent Park Entrance Sign is not in place at the time the playground has been certified for use, the Developer will be required to install a temporary sign that includes the Park's civic address and the name of the park.

# SECTION K

# Street Lighting

# Section K Street Lighting

## K1.00 General Requirements and Technical References

Lighting systems designs shall be prepared, signed, and sealed by a Professional Engineer with expertise in the discipline of street and roadway lighting. The Township's Design Guidelines provide general direction to the consulting engineer who shall prepare competent designs based on good engineering practice and having regard to the following industry references:

- IES Handbook 10th Edition: Illuminating Engineering Society – The Lighting Handbook/Reference and Application.
- ANSI standard C78.377-2008 "Specifications for the Chromaticity of Solid-State Lighting".
- ANSI C136.31-2010 "Roadway and Area Lighting Equipment – Luminaire Vibration".
- ANSI/IEEE C.62.41.2: Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- ANSI/IEEE C62.45: Recommended Practice on Surge Testing for Equipment Connected to Low Voltage (1000 V and less) AC Power Circuits.
- ANSI/IES RP-8-21, Recommended Practice: Lighting Roadway and Parking Facilities.
- ANSI/IES RP-22-11: Recommended Practice for Tunnel Lighting.
- ANSI/IES RP-33-14: Recommended Practice for Lighting for Exterior Environments.
- ASTM B117 – American Society for Testing Materials: Standard Practice for Operating Salt Spray (Fog) Apparatus.
- IEC spec 529 – International Electrotechnical Commission: International Protection Marking.
- Guide for the design of Roadway Lighting – 2006 Edition – Transportation Association of Canada (TAC).
- IESNA TM-15-11: Luminaire Classification System for Outdoor Luminaires.
- IES LM-79-08: Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products.
- IES LM-80-08: Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- IESNA LM-67-94: Calculation Procedures and Specifications of Criteria for Lighting Calculations.
- IES LM-82-12: Approved Method for the Characterization of LED Light Engines and LED Lamps for Electrical and Photometric Properties as a Function of Temperature.
- IESNA TM-10-00: Addressing Obtrusive Light (Urban Sky Glow and Light Trespass) in Conjunction with Roadway Lighting.
- IESNA TM-11-00: Light Trespass; Research, Results and Recommendations.
- IES TM-21-11: Projecting Long Term Lumen Maintenance of LED Light Sources.
- IES/IDA MLO: Model Lighting Ordinance with user's guide.
- CSA C653-13: Photometric Performance of Roadway and Street Lighting Luminaires.
- CSA C22.2 NO. 250.0-08 (R2013) – Luminaires.

## K1.01 Design Criteria

The street lighting system shall be designed by a qualified Professional Engineer in accordance with ANSI/IESNA RP-8-21 – Illuminating Engineering Society of North America's American National Standard Practice for Design of Roadway Facility Lighting. All street lighting systems for roadways, walkways and public areas shall meet the requirements of the Township and Hydro One.

The consultant shall state in the submission that the lighting design has been completed based on ANSI/IESNA RP-8-21, or any revised edition. The consultant is to evaluate the conditions and land uses surrounding the site and take these into account in preparation of the lighting design. The consultant is to employ only the Luminance design method. However, where ANSI/IESNA RP-8-21 allows for use of Illuminance methodology in specific cases as acknowledged in Section K2.04 of the Township's Design Guidelines, the consultant shall state these instances in the lighting design submission.

The distance between grid lines in the longitudinal direction of the photometric analysis should be one-tenth (1/10) of the spacing between luminaires, or 5.0 m, whichever is smaller. At intersections the grid spacing is 2.0 m throughout the calculation area.

The design engineer is to provide the luminaire manufacturer's recommendation for selection of the Light Loss Factor (LLF) value for design. For LED technology the LLF is expected to be between 0.8 and 0.9.

When establishing the spacing of street lighting within a residential subdivision, consideration must be given for the placement of a streetlight adjacent to the location of community mailboxes. In determining the position of a light standard, the designer shall take into consideration the location of driveways, living room windows and other aspects of the site. The objective is to provide a sense of security and to minimize light spill and other disturbances within the development plan and to adjacent properties. Pole spacing shall be supported by detailed photometric calculations. Maximum spacing shall not exceed 50 m. Each streetlight power pedestal is to be energized at 240 volts split neutral. The main breaker is to be 60-amp, full size neutral, with up to four individual circuits, 120 volt, 40 amp single pole breakers. Each 120-volt, 40 amp breaker is to feed a circuit in each direction to a maximum of six street lights.

Road crossings are to be sited such that they do not terminate under driveways and shall be installed at right angles with respect to the boulevard. A minimum clearance of 1 m shall be maintained from the edge of the driveway to the road crossing. The location of road crossings is to be referenced to a fixed point such as transformers or property lines and shown on the street lighting drawings.

## K1.02 Classifications and Definitions

The ANSI/IESNA RP-8-21 standard is based on evaluation of Roadway Classifications and Pedestrian Conflict Area Classifications. Minimum required light levels are based on IESNA and TAC recommendations accounting for the combination of various classes of roadways, sidewalks, walkways, and pedestrian activities. The objective is to address both potential vehicle/vehicle conflicts and vehicle/pedestrian conflicts based on these classifications.

### Roadway Classifications and Definitions (per ANSI/IESNA RP-8-21)

The consultant shall document the classification of roadways (i.e., arterial or major, collector, local or lanes) and pedestrian facilities (i.e., sidewalk, walkway/bikeway and pedestrian underpass) assigned in the lighting system design to the development plan. The determination of roadway pedestrian facility classifications shall have regard for the Official Plan roadway designation and ANSI/IESNA descriptions. Each area shall be illustrated and/or described to demonstrate the basis of the design.

### Pedestrian Conflict Classifications (per ANSI/IESNA RP-8-21)

The consultant shall document the assignment of pedestrian conflict area in the lighting system design to the development plan. The areas shall be based on the classification definitions of “low, medium or high” potential conflicts with vehicular traffic. The choice of an appropriate level of pedestrian activity will be based on pedestrian forecasts which are subject to the Township’s approval. The assignments are to be illustrated and/or described in the design submission to the Township.

## K1.03 K1.03 Design Methodology

### Straight Roadways, Streets and Sidewalks

The recommended Luminance levels for straight roadways and the recommended Illuminance levels for sidewalks are noted below:

**Table K.1: Straight Roadways Luminance Levels and Sidewalks Illuminance Levels**

| Roadway Classification | Pedestrian Conflict | Avg. Luminance $L_{avg}$ (cd/m$^2$) | Avg. Uniformity Ratio ($L_{avg}$ / $L_{min}$) | Max. Uniformity Ratio ($L_{max}$ / $L_{min}$) | Max. Veiling Luminance Ratio ($LV_{max}$ / $L_{avg}$) | Sidewalk Average Illuminance $E_{avg}$ (lux) |
|---|---|---|---|---|---|---|
| Local | Low | 0.3 | 6.0 | 10.0 | 0.4 | 3.0 |
| | Medium | 0.5 | 6.0 | 10.0 | 0.4 | 5.0 |
| | High | 0.6 | 6.0 | 10.0 | 0.4 | 10.0 |
| Collector | Low | 0.4 | 4.0 | 8.0 | 0.4 | 3.0 |
| | Medium | 0.6 | 3.5 | 6.0 | 0.4 | 5.0 |
| | High | 0.8 | 3.0 | 5.0 | 0.4 | 10.0 |

| Roadway Classification | Pedestrian Conflict | Avg. Luminance $L_{avg}$ (cd/m$^2$) | Avg. Uniformity Ratio ($L_{avg}$ / $L_{min}$) | Max. Uniformity Ratio ($L_{max}$ / $L_{min}$) | Max. Veiling Luminance Ratio ($LV_{max}$ / $L_{avg}$) | Sidewalk Average Illuminance $E_{avg}$ (lux) |
|---|---|---|---|---|---|---|
| Major (Arterial) | Low | 0.6 | 3.5 | 6.0 | 0.3 | 3.0 |
| | Medium | 0.9 | 3.0 | 5.0 | 0.3 | 5.0 |
| | High | 1.2 | 3.0 | 5.0 | 0.3 | 10.0 |

Source: IESNA RP-08-21

Where: Lavg is the minimum maintained average pavement luminance
Lmin is the minimum pavement luminance
LVmax is the maximum veiling luminance (a measure of the glare produced by the lighting system
Sidewalk average illuminance is the minimum maintained average horizontal illuminance (lux)

Where directed by the Township, the consultant shall provide dedicated sidewalk lighting as directed in IESNA RP-08-21 based on use of horizontal and vertical illuminance criteria.

**Intersections**

Intersections shall be designed based on Illuminance criteria, road classifications and pedestrian area classifications noted as follows:

**Table K.2: Intersection Illuminance Levels**

| Street Functional Classification | Average Maintained Illumination at Pavement by Pedestrian Area Classification in [Lux/FC] | | | Uniformity Ratio ($E_{avg}$ /$E_{min}$) |
|---|---|---|---|---|
| | High | Medium | Low | |
| Major/Major | 34/3.4 | 26/2.6 | 18/1.8 | 3.0 |
| Major/Collector | 29/2.9 | 22/2.2 | 15/1.5 | 3.0 |
| Major/Local | 26/2.6 | 20/2.0 | 13/1.3 | 3.0 |
| Collector/Collector | 24/2.4 | 18/1.8 | 12/1.2 | 4.0 |
| Collector/Local | 21/2.1 | 16/1.6 | 10/1.0 | 4.0 |
| Local/Local | 18/1.8 | 14/1.4 | 8.0/0.8 | 6.0 |

Source: IESNA RP-08-21

**Roadway Curves and Cul-de-Sac**

The Illuminance design method shall be used for lighting design of the cul-de-sac portion of dead-end roadways. This analysis is based on the area which begins at the point of curvature of the pavement curb return and targets the illuminance lighting values of the roadway approaching the cul-de-sac. For this purpose, the equivalent illuminance can be calculated using the ratio of 1 cd/m$^2$ = 15 lux for an R3 pavement or 1 cd/m$^2$ = 10 lux for an R1 pavement.

For roadways with gradual curves consisting of a centerline radius greater than or equal to 600 m, lighting systems shall be designed using the luminance method. Luminaires shall be perpendicular to the tangent of the centerline roadway curve. The road classification and pedestrian conflict level criteria shall determine the lighting requirements.

Where the centerline radius of the roadway is less than 600 m, the illuminance lighting design methodology shall be used. The equivalent ratio of 1 cd/$m^2$ = 15 lux for an R3 pavement and 1 cd/$m^2$ = 10 lux for an R1 pavement can be used.

**Pedestrian Walkways and Bikeways**

The illuminance calculation is the primary method used to establish lighting levels for pedestrian walkways and bikeways. The Township's Public Works Department is to be contacted specifically regarding lighting requirements for walkways and bikeways within municipal parks or other locations.

In cases where the security of pedestrians and cyclists is of concern, a minimum illumination level of 10.0 Lux (1.0 FC) with an average-to-minimum uniformity ratio no greater than 4 to 1 will apply. The application of this criteria will be determined by the Township. Alternatively, the following illumination lighting shall apply:

**Table K.3: Pedestrian Walkways and Bikeways Illuminance Levels**

| Pedestrian Area Classification | Sub-Category | $E_{avg}$ [Lux/FC] | $EV_{min}$ [Lux/FC] | $E_{avg}/E_{min}$* |
|---|---|---|---|---|
| High | N/A | 10.0/1.0 | 5.0/0.5 | 4.0 |
| Medium | N/A | 5.0/0.5 | 2.0/0.2 | 4.0 |
| Low | Rural/Semi-Rural Areas | 2.0/0.2 | 0.6/0.06 | 10.0 |
| | Low Density Residential (2 or fewer dwelling units per acre) | 3.0/0.3 | 0.8/0.08 | 6.0 |
| | Medium Density Residential (2.1 to 6.0 dwelling units per acre) | 4.0/0.4 | 1.0/0.1 | 4.0 |

Source: IESNA RP-08-21

Where: Rural/Semi-rural are areas:
With very low residential density away from urban areas;
cities or large Townships or areas that are partly rural;
between rural and urban.
$E_{avg}$ is the minimum maintained average horizontal illuminance at pavement
$E_{min}$ is the minimum horizontal illuminance at pavement
$EV_{min}$ is the minimum vertical illuminance at 1.5 m above pavement
*Horizontal illuminance only

# K2.00 Submissions

## K2.01 Street Lighting Submissions

Street lighting design, layout and detail drawings are to be submitted to the Township by an Electrical Consultant, signed and stamped by a Professional Engineer, and are to be included with the submission of engineering drawings at the detailed design stage (typically

2nd or 3rd submissions). One hard copy and one electronic digital copy of the following are to be provided:

a) A Design Engineer Certification Letter confirming that the design has been completed in conformance with ANSI/IESNA Recommended Practice RP-8-21, TAC: Guide for he the Design of Roadway Lighting – 2006, and the Electrical Safety Authority (ESA) requirements.

b) Details of proposed luminaires, poles and arms including the Manufacturer's technical data sheets, photometric file and TM-21 data.

c) For each Luminaire type, product cut-sheets shall be submitted that include the Luminaire input current, LED drive current, nominal Correlated Color Temperature (CCT) and the Light Loss Factor (LLF) and associated calculations.

d) Calculations and distribution diagrams as per the Township's Design Guidelines including photometric analysis (AGi32 software or approved equivalent) in electronic format for all streets and intersections. A photometric drawing is to be prepared showing the results of the photometric analysis on the development plan. A table summarizing the lighting analysis results and statistics relative to the applicable design parameters is to be included on the photometric drawing.

e) Photometric files in electronic IES format from the luminaire manufacturer.

f) Street lights must be numbered on the drawings, in accordance with the Township's asset identification numbers. A request is to be made to the Township to provide the necessary quantity of asset identification numbers.

g) Street lighting layout and electrical drawings in AUTOCAD and PDF format showing the following:

    1. The location and identification of switch gear, transformers, pedestals, power and control centers, street lights, luminaires and poles.

    2. A Street Light Pedestal Chart on each drawing listing the street light pole numbers that area associated by circuit number to the numbered street light pedestal on the drawing.

    3. The wiring layout throughout the plan including road crossings.

h) Include manufacturer's shop drawings for all materials to be supplied. The Developer's Consultant shall be responsible for the review/approval of any required shop drawings submitted by the Contractor/supplier for verification or compliance to the lighting design and Township specifications.

i) A summary of the electrical street lighting loads.

j) A copy of the tender providing costs of the street lighting shall be provided to the Township in order that each asset can be assigned a cost within the Township's GIS database.

### K2.02 Hydro One Design Drawing Circulation

The civil design Consultant and the Developer are to review and approve the Hydro One electrical design drawing prior to circulation to the Township for its endorsement. In addition, the Consultant is required to coordinate the Hydro One design with other utilities and consultants to ensure the necessary physical clearances and sittings meet the Township's requirements.

## K3.00 Specifications

### K3.01 Light Poles

Street light poles shall be in accordance with the Township material specifications and OPSD standard or OPSD modified drawings. All concrete poles to have a minimum of two coats of transparent, protective sealer (i.e., "cap seal") applied from the base of the pole to approximately 3 m above the top of the hand hole box.

**Residential Areas**

Poles in residential areas are to be 6.1 m (20 ft) Round (overall pole length 7.62 m (25 ft), Class B direct buried concrete pole, complete with cast zinc hand hole and cover (per Stresscrete E-250-BPR-G (Grey), or approved equivalent). An arm may be requested pending style of neighboring poles.

**Industrial Areas**

Standard poles for industrial areas are to be 9 m (29.5 ft) Round (overall pole length 10.67 m (35 ft), Class B direct buried, complete with cast zinc hand hole and cover (per 29'6" StressCrete E-350-BPR-G, or approved equivalent). Poles are to be supplied with 2.4 m polished aluminum elliptical arm bracket (per Powerlite RE8MA).

Where the hydro poles exist and can be used as the street light pole, cobra head luminaire with arm should be installed on Hydro poles with local hydro company coordination.

**Downtown Pedestrian Lighting (Drayton and Moorefield)**

Street light poles fronting commercial properties are subject to approval by the Township. Typically, the light poles will be requested to closely match the adjacent streets in close proximity to the development. In the downtown areas, the Township has installed decorative pedestrian lighting which may be required to be incorporated into the design. These lights are installed in the downtown areas of Drayton and Moorefield.

Pole & Arm: Rosemount 2 Pole with Ornate Arm & GFI Receptacle (01), Product Code IDG-SC-200-AR20-NSE-DTG-P-01-HFH2110-P4A

Luminaire: Laurentian Series Luminaire with Button Photocell & Custom Arm adapter, product code IDG-LRT501-0VS3S-GGC-PBT-70HPS-MOG-120-BKTX-QSP914

**Walkways**

If walkway lighting is requested, poles for walkways shall be a 6.1 m long, direct buried, Octagonal Class A concrete pole (per StressCrete No. E-250-APO-G or approved equivalent). A matching colour 0.15 m long arm bracket shall be specified. The pole finish shall be Polished Pearl Gray (S40).

## K3.02 Lighting Luminaries

Prior to undertaking detailed design, consultants shall confirm with the Township the luminaires acceptable to each project. All standard street lighting luminaires are to be consist of Light Emitting Diode (LED) technology. All LED luminaires shall be tested in accordance with LM80 methods. The following criteria applies to the selection of luminaires:

- low glare from luminaires;
- readily available product for ease of replacement;
- products which maintain a consistent aesthetic look and feel throughout the Township;
- Luminaires shall be Fully Cut-Off and classified as “Dark Sky Friendly” as determined by the International Dark Sky Association, with no up-light characteristics; and
- Luminaire detail sheets are to be included in the engineering drawing set.

**Residential Areas**

Subject to the Township’s approval for compatibility with nearby streets, the following luminaires may be considered:

**Post Top**

- King Luminaire “K601D Coach Lantern (Post Top)” LED Luminaire;
- Cooper Lighting Solution “UTLD Traditionaire Decorative Post Top” LED Luminaire; and
- Lumec “Square Lantern Post” Top LED Luminaire.

**Cobra Head**

- Cree XSP “cobra head style” LED Luminaire;
- GE Evolve LED Luminaire; and
- Cooper Lighting Solution ARCH “Archeon Series” LED Luminaire.

Generally, the “post top lantern” luminaire will be applied in urban residential areas.. The maximum allowable heat value for luminaires on rural, local residential and minor collector residential roadways is 3000K. Luminaires are to be equipped with an individual photo

sensor. The colour and style shall closely match existing hardware in adjacent developments. The Township may request 4000 K (rather than 3000 K) to transition from adjacent existing neighbourhoods where the heat valve is 5000 K.

**Industrial Areas**

In industrial areas, the "cobra head-style" LED luminaire from the bellow list shall be specified complete with individual NEMA photocell sensors. The maximum heat value for luminaires on local and collector industrial class roadways is 3000K. On major collector or arterial industrial roads, the maximum heat value is 4000K. The mounting height of the luminaire is to be 7.6 m above the finished grade.

**Cobra Head**

- Cree XSP "cobra head style" LED Luminaire;
- GE Evolve LED Luminaire; and
- Cooper Lighting Solution ARCH "Archeon Series" LED Luminaire.

**Commercial Areas**

Street light luminaires are subject to approval by the Township and selection may take into consideration the existing luminaries on the surrounding streets.

**Walkways**

For Walkway luminaires, the King Luminaire K700 series LED, deep dish type or approved equivalent shall be specified. The luminaire mounting height shall be 4.6 m and the luminaire shall have a maximum heat value of 3000K. The proposed luminaire shall be submitted with a specifications sheet for the Township's review and approval.

## K3.02 Street Light Pedestals

Standard street lighting pedestals are to be metal enclosures per Pedestal Solutions, No. SLS1 (240 V), or approved equivalent, being dark green in colour, short 690 mm and mounted on a precast concrete base (per Utilicon UP1420, or equivalent). A detail sheet showing the specified street light pedestal is to be included in the engineering drawing set.

## K3.03 Manufacturer's Warranty

The Developer shall provide to the Township a 10 year manufacturer's warranty certificate, in the Township's name, for LED luminaires and components confirming that the luminaire housing and all of its internal components, including but not limited to LED drivers and light engines shall be covered against defective workmanship, material and premature light source failures. The Developer is also to provide a manufacturer's certificate indicating that the service life of the LED luminaires is 100,000 hours of operation or greater.

The warranty shall commence on the date of receipt of material from the supplier. The supplier/manufacturer shall provide the Township with appropriate warranty certificates and shipping documents as proof of the date of shipment.

# K4.00 Installation

## K4.01 Street Light Pole Installation

Street light poles shall be installed as per OPSS.MUNI 615 and OPSD 2225.010 and the manufacturer's recommendations. Pole hand hole locations shall be as per OPSD 2220.010. Street light pole detail sheets are to be included in the engineering drawing set.

## K4.02 Underground Services and Wiring

All wiring must conform to the Ontario Electrical Safety Code (Latest Edition) and be acceptable to the Electrical Safety Authority.

Each street light pedestal is to be energized at 240 volts split neutral. Main breakers 60 amp, full size neutral, with up to four individual circuits, 120 volt, 40 amp single pole breakers are to be provided. Each 120 volt, 40 amp breaker feeds a circuit in each direction to a maximum of six street lights.

Street light cables shall be installed in 50 mm diameter rigid ducts per OPSS.MUNI 603, standard drawings OPSD 2101.010 and OPSD 2103.020 and meeting Hydro One's requirements. Rigid ducts shall be PVC with solvent weld fittings and conform to CSA C22.2, No. 211.2. Ducts shall be direct buried bedded in earth to a minimum depth of 900 mm and only in special cases where directed by the Township shall be bedded in concrete per OPSD 2100.060. Treatment in accordance with OPSD 2103.050 is required where ducts cross other utilities. Cables shall be installed per OPSS.MUNI 604.

For all conduit, both when it is left empty for future use or has wiring installed in it, the Contractor shall install a 400 N test nylon fish line in the conduits (1.5 m of line coiled at each end of each conduit run).

Backfill shall conform to the requirements of OPSS.MUNI Form 1010, consisting of Granular "A" to road subgrade compacted to 100% Standard Proctor Density.

For the installation of a grounding system, construction shall be as per OPSS.MUNI 609. For the removal of electrical equipment, construction shall be as per OPSS.MUNI 617.

Street light cables from the power pedestal or disconnect to the hand hole in the pole shall be 2#6 Copper RWU90 with 1-#6 stranded copper green jacketed ground wire. Note that jacket colours shall be as follows: Black (line); White (neutral) and Green (ground). Voltage Drop shall be considered as per Ontario Electrical Safety Code.

Street light cables from the hand hole to the fixture shall be 2-#12 Copper RW90 complete with 1#12 stranded copper green jacketed ground wire. Note that jacket colours shall be as follows: Black (line); White (neutral) and Green (ground), such that the entire circuit has an acceptable power drop. Compression type connectors shall be used throughout. All wiring connections shall be made in the hand holes of street light holes. A waterproof CSA fused connector kit complete with a 10 Amp ceramic midget fuse located within the pole handhole shall separate the line end from the load end all as per OPSD 2255.010.

The final installation shall be inspected by and subject to Electrical Safety Authority and the Township's approval.

## K5.00 Street Light Energization and Certification Procedure

The Township requires the following procedure regarding the commissioning of street lights:

a) The agreement between the Developer and Hydro One to energize the street lighting system is to be executed and a copy provided to the Township before the Township will issue the first Building Permit.

b) The Electrical Consultant is required to inspect all equipment and works associated with street light construction including but not limited to underground wiring, street light pole and installation, fixture and installation, fuses and connections.

c) Once the street light construction is complete, the Electrical Consultant is required to provide a Letter of Certification to the Township, signed and stamped by a Professional Engineer, stating that the consultant has reviewed and inspected the street light equipment and installation and certifies that same has been supplied and constructed in general accordance with the design and drawings.

d) The street light system is to be energized prior to issuance of the first Occupancy Certificate by the Township.

e) The ESA Certificate of Inspection and construction Record Drawings shall be attached to the above noted Certification.

f) All street lighting hydro costs are to be borne by the Developer until at least 50% of the lots have been occupied upon which the Township will take over the hydro costs for the street lighting.

# SECTION L

# Fencing Requirements

# Section L Fencing Requirements

## L1.00 Fence Specifications

**Table L.1: Minimum Fencing Requirements**

| Type | Minimum Fencing Requirements |
|---|---|
| Chain Link Fence | Galvanized black vinyl coated with 37 mm mesh openings constructed with a top rail, in accordance with OPSD 972.130. Minimum 9 gauge to be utilized and in some cases 6 gauge may be requested based on recommendations by the landscape architect or Consultant Engineer. |
| Solid Wood Privacy Fence | 1.8 m high per DWG. NO. L-01 |
| Noise Fence (if required) | In accordance with the noise report and to be provided via a berm that includes landscape screening. |

## L2.00 Minimum Fencing Requirements

The following minimum fencing requirements are included as a general reference and are subject to confirmation at the time of detailed design.

**Table L.2: Minimum Fencing Requirements**

| Description | Minimum Fencing Requirements | Location |
|---|---|---|
| Between residential and ICI properties | 1.8 m high solid wood privacy fence (OR a landscape feature that can provide sufficient screening).<br><br>There may be specific noise fencing requirements that would need to be considered in the fencing of the site. | Fence on property line<br><br>Landscaping to be provided on the ICI side<br><br>Owners of ICI properties could approach the adjacent owner to request permission to provide landscape screening or other acceptable measures to enhance privacy for the residential use on the residential property. These arrangements are solely between the Developer and residential property owner. |

| Description | Minimum Fencing Requirements | Location |
|---|---|---|
| Between residential and agricultural | 1.8 m Chain Link Fence (black vinyl coated) | On residential side |
| Between ICI and agricultural | 1.8 m Chain Link Fence (black vinyl coated) | On ICI side |
| Between residential areas | No fencing requirement (subject to review of areas involved prior to Draft Plan approval) | On property line |
| Between walkways and residential lots | Chain Link Fence (black vinyl coated). | On property line |
| Adjacent to parks, stormwater management ponds and open spaces | 1.8 m high black vinyl chain link fence<br><br>The Township will confirm if walkway gates (maximum 48 inches wide) are permitted from residential lots to Parks during the detailed design stage. | On private property side |
| Between private lots and natural areas | 1.8 m high black vinyl chain link fence. Gates are not to be constructed in fencing bordering Open Space areas which have an environmental designation without approval of the GRCA. | On private property side |
| Adjacent to School Board property | 1.8 m high black vinyl chain link fence | On property line |
| Where subdivision developments have rear yards that connect to road frontages | Landscape screening to be provided | On private property side (or located as requested by the School Board) |

*In circumstances where a fence is noted to be placed on the property line, but adjacent owner does not agree to a fence, the fence is to be placed solely on the developer's property. This is not applicable to lands within a subdivision development where the property is owned by the Developer prior to registration of the lands.

# SECTION M

# Lands Developed Under Site Plan Control

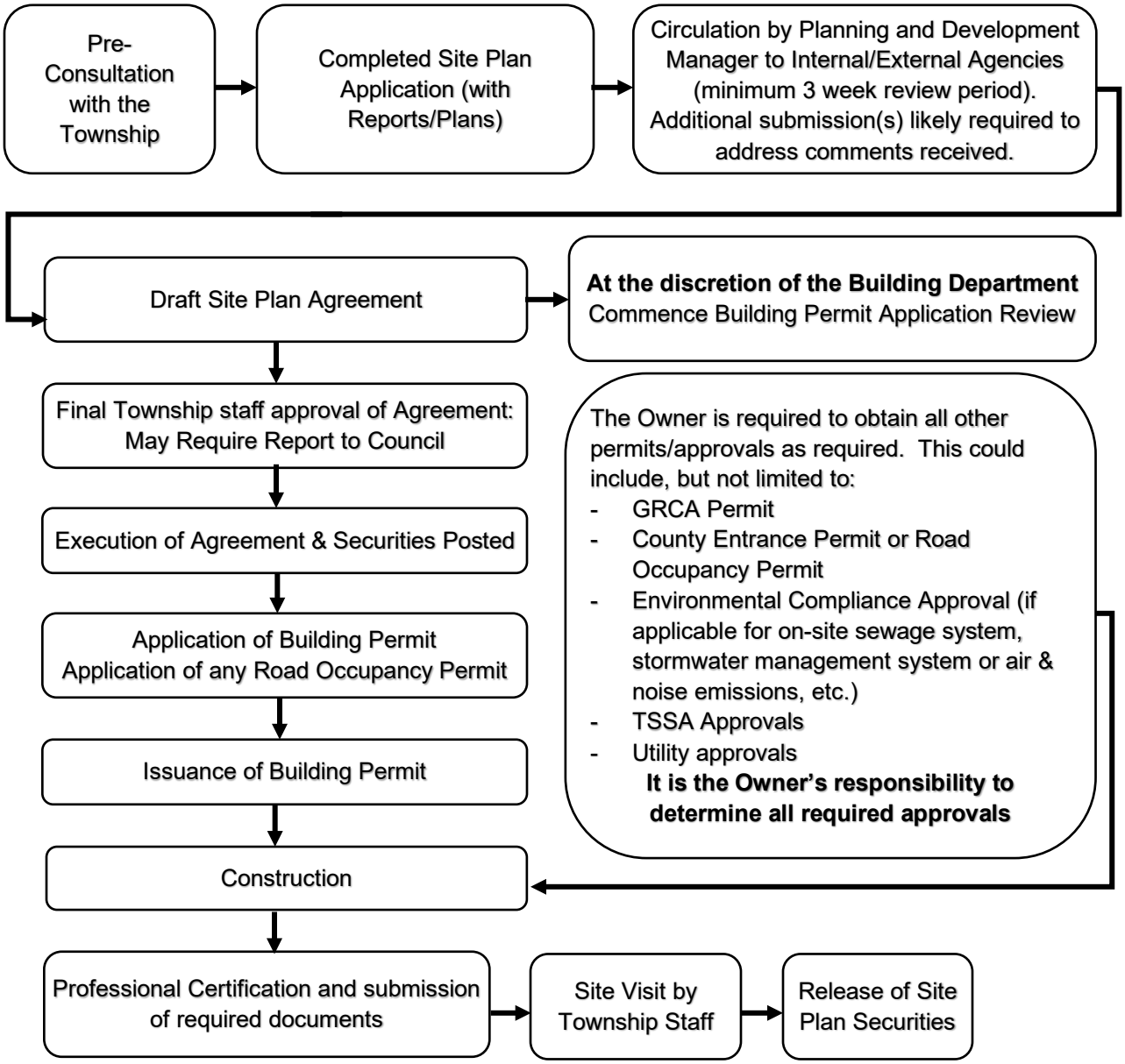
# Section M Lands Developed Under Site Plan Control

## M1.00 Site Plan Control

### M1.01 Site Plan Agreement

The Developer of lands under Site Plan Control, as specified in both the Township's Site Plan Control By-law, shall be required to enter into a "Site Plan Agreement" with the Township prior to the commencement of construction of any building or service within the parcel of land. The general development process is shown below.

**Site Plan – Development Process**



## M1.02 Township of Mapleton Requirements

The scope of the project will determine the required reports/studies to be submitted which can be determined at a pre-consultation meeting with the Township. Prior to the pre-consultation meeting, the Developer shall provide a concept and provide a general letter providing information related to the application. This may include a general description about the use, the estimated number of employees, the expected water/wastewater consumption, truck traffic or any information that will help describe what is being proposed.

All engineering drawings shall be prepared from the same base plan. The plan shall be submitted in metric. We acknowledge that some sites are smaller, and drawings can be combined so long as all the information is included and is legible.

**Table M.1: Minimum Submission Requirements**

| | |
|---|---|
| **Memo** | The submission package should include a general description about the proposal and intended use. As applicable it should include the expected number of employees, estimated hours of operation, truck usage, water demand, wastewater discharge, etc. |
| **Site Plan** | • The SPA number, when assigned by the Township;<br>• Civic address. If not available, a key map with sufficient information to locate the site;<br>• Site plan statistics, including areas and dimensions of the proposed development. The chart should include the following:<br>– Total property area;<br>– Total building area;<br>– Building coverage as a percentage of total property area;<br>– Height of building;<br>– Floor area of each storey;<br>– Total number of off-street vehicular loading & parking facilities, either covered or uncovered;<br>– For residential buildings - the number of units, unit size and the number of bedrooms;<br>– Setbacks as applicable to the zoning requirements;<br>– Column with minimum zoning requirements; and<br>– Column indicating via (YES or NO) in terms of compliance with zoning by-law.<br>• Street names, Lot and Registered Plan numbers, easements on or adjacent to the property;<br>• Existing site features including trees, utilities and watercourses;<br>• Existing and proposed roadways, driveways, laneways, loading areas, parking spaces, curbs, sidewalks, garbage enclosures and snow storage areas, sidewalks, including dimensions, radii and proposed materials; |

| | |
|---|---|
| | • The location of the proposed fire route, including indication of heavy duty road paving. The location of the proposed fire department connection (Siamese connection) shall be shown if required. The width and all center line radii shall be labelled;<br>• Existing and proposed retaining walls, screens, noise fences, berms, and privacy fences, including materials, height and reference to details (the details may be included on landscape plans);<br>• The location of proposed and existing light fixtures and poles;<br>• The location of proposed and existing aboveground infrastructure, including catch basins, maintenance holes, valves, hydrants, and electrical transformers, etc.;<br>• Pavement markings and signage, including stop, no parking, fire route signs, accessible parking signs and pedestrian crossings;<br>• Locations and dimensions of wells, septic systems. Any on-site sewage systems or wells within 35 m of the property boundaries shall locate the adjacent properties well and on-site sewage system; and<br>• The location of any existing hydrants within 100 m (328 ft) of the proposed building face.<br><br>Note: If there are questions with respect to adequate turning movements, drawings may need to be provided to show vehicle turning movements for the fire route, loading areas and garbage truck pickup areas. The municipal road cannot be used as part of the turning movement (such as reversing into the site from the roadway, etc.) |
| **Site Grading & Servicing Plan** | These drawings can be separated into individual plans if required.<br><br>**Grading**<br><br>• Centreline grades at minimum 20 m intervals along all existing streets bounding the property and existing grades. For sites with smaller frontage, additional centerline grades may be required.<br>• Contours at maximum 0.5 m intervals to indicate the existing elevations of the site. These contours are to extend to a minimum distance of 15 m beyond the property limits to indicate the grading and drainage patterns of the adjacent lands. As an alternative to contours, spot elevations may be noted on the drawings to illustrate existing conditions, provided that these elevations were obtained from field survey.<br>• Proposed elevations on paved areas, around proposed buildings, along swales, along roadways, parking areas, driveways, catch basin rim elevations, and any other elevations necessary to establish the grading and drainage patterns for the development. Arrows to be used to indicate the direction of the surface drainage. |

| | |
|---|---|
| | • All building elevations to be established and referenced to a “Finished First Floor” or a “Finished Entrance Floor” elevation, and a “Finished Basement Floor” elevation.<br>• Pavement and granular base design.<br>• The location and detail of all curbs.<br>• The location of embankments, retaining walls (top and bottom wall elevations, subdrain outlets), etc.<br><br>**Servicing**<br><br>• All existing underground services on the streets and easements adjacent to the property.<br>• The basement floor elevations of all buildings to be constructed.<br>• The location, size, length, grade, invert elevations, rim elevations, material and bedding requirements for all sanitary sewers and sanitary maintenance holes to be constructed within the development. Control maintenance holes are to be provided outside the road allowance, in close proximity to the property line (located approximately 1.5m to the centre of the rim at the property line unless otherwise approved by the Township). The length of sewer connection from the building to the first maintenance hole shall not exceed 30m.<br>• The location, size, length, grade, invert elevations, rim elevations, material and bedding requirements for all storm sewers, storm maintenance holes and all stormwater management measures including storage pipe/tanks and control devices, etc. to be constructed within the development. Control maintenance holes are to be provided outside the road allowance, at the property line. The length of sewer connection from the building to the first maintenance hole shall not exceed 30 m.<br>• The location, size and material specifications for all watermains including hydrants, valves and water meters to be constructed within the development.<br>• Refer to DWG. NO. M-04 for proposed buildings with fire lines.<br>• For areas outside of Drayton, the requirement for water storage for fire protection shall be confirmed with the Fire Department.<br>• The location and size of all sanitary, storm and water service connections to the individual units.<br>• The location of all roof water leader downspouts (must discharge at least 1 m from building unless otherwise approved by the Township Building Department).<br>• The location of sump pump outlets (must discharge towards the rear yard at least 1 m from building unless otherwise approved by the Township Building Department) |

| | |
|---|---|
| | • All construction notes are required to describe the construction detail or requirements.<br>• The locations of the on-site sewage system, including mantles where required.<br>• The locations of water supply well to be constructed within the development where required. |
| **Erosion & Sedimentation Control Plan** | The sedimentation and erosion control plan shall show all the necessary measures proposed to ensure that the effects of soil erosion will not adversely affect adjacent properties or watercourses. The controls are to be planned, designed, and illustrated on the plan in accordance with the TRCA Erosion and Sediment Control Guide for Urban Construction. Notes describing the process to install, inspect and maintain the erosion and sedimentation control measures are to be included. This plan shall also indicate proposed tree removals and tree preservation measures. The required information can be combined within other drawings. |
| **Landscape Plan** | The Landscaping Plan shall be prepared by a qualified Landscape Architect. All maintenance holes, catch basins, hydrants, valves, street lights, slopes, berming, fencing and other servicing features that appear above grade shall also be shown on the Landscaping Plan.<br>Refer to detail DWG. No. M-06 for minimum landscape requirements. |
| **Photometric Plan** | • Provided for sites where lighting is being provided beyond the building exterior or is in close proximity to residential properties. If a photometric plan is determined not to be required, a general note shall be included on the site plan that indicates “External Lighting shall be arranged as to not caste glare onto adjacent properties nor onsite to nearby streets. Full cutoff lighting to be utilized”.<br>• Cannabis Plan Cultivation Facilities that require lighting shall provide a lighting plan (this includes both outdoor and indoor lighting). Outdoor lighting and indoor lighting from the cultivation of cannabis plants that can be seen outdoors shall be operated, placed, and maintained to prevent and block direct illumination to adjoining lands. While interior window coverings may be provided, additional exterior barriers shall be provided.<br>• ICI properties that have illuminated signage and are in close proximity to residential properties shall provide a photometric plan at the request of the Township |
| **Site Plans within Unassumed Subdivisions** | The applicant shall obtain written approval from the Developer’s Engineer stating that the proposed site plan services have been designed in accordance with the approved subdivision design. |

Other reports as determined at the pre-consultation stage may include:

- Stormwater Management Report;
- Traffic Impact Study (specific turning movements may also be requested);

- Construction Management Plan;
- Noise Report;
- Odour Report;
- Natural Impact Study;
- Environmental Site Assessment;
- Functional Servicing Report;
- Geotechnical Report;
- Hydrogeological Report;
- Plan & Profile Drawings (for condominium roads);
- Fill Importation Management Plan; and
- Snow Management Report.

## M2.00 Electrical Services Plan and Photometric Plan

The Electrical Services Plan shall be prepared by a qualified Electrical Consultant. The Plan shall show all details, specifications and notes of the electrical distribution system and the street and parking lot lighting systems. All hydro lines are to be located underground, unless expressly approved by the Township.

The design of all site and parking lot illumination must be in accordance with the guidelines of the Illuminating Engineering Society of Canada (IESNA) National Standard Practice for Lighting (latest version). The design engineer is to provide the luminaire manufacturer's recommendation for selection of the Light Loss Factor (LLF) value for design. For LED technology the LLF is expected to be between 0.8 and 0.9.

To confirm the design meets the required lighting levels, a photometric plan indicating the resulting lighting levels across the site, at the property line and 10 m onto adjacent properties is required to assess light trespass. The photometric analysis shall be prepared based on an adequate number of lighting zones based on the design criteria and the configuration of the site plan.

The following details are to be included in the drawing submission:

a) A summary table of the site lighting statistics based on the photometric analysis and comparison to the required standards noted below. The table is also to confirm the LLF used in the calculations.

b) A detail drawing and specification sheet of the selected luminaires proposed for the site. Note that all luminaires shall be classified as "Dark Sky Friendly" or "Full Cut-Off" as determined by the International Dark Sky Association with no up-light characteristics.

c) A detail drawing and specification sheet for the selected light poles.

d) A detailed drawing and specification for the light pole base foundations.

e) The standard for industrial/commercial site including service stations and car dealerships is noted in Table M.2:

**Table M.2: Site Plan Lighting Requirements**

| Type | Location | Illumination | | | | |
|---|---|---|---|---|---|---|
| | | Minimum (lux) | Average (lux) | Uniformity (Ave / Min) | Maximum (lux) | Uniformity (Max / Min) |
| General Commercial / Retail Plots | | 5 | | | 75 | 15:1 |
| Service Station with Light Surroundings | Approach & Driveway | | 20 | | | |
| | Pump Island | | 100 | | | |
| | Building Facades & Service Areas | | 30 | | | |
| Car Dealership (Secondary Business Areas or Small Townships) | Front Row | | | | 50-100 | 5:1 |
| | Other Rows | | | | 25-50 | 10:1 |
| | Entrances | | | | 25-50 | 5:1 |
| | Driveways | | | | 10-20 | 10:1 |
| Private Residential | Rear Lane Way | | 4 | 6:1 | | |
| Light Trespass: Property adjacent to Residential, Farm lands, Open Space and Environmental areas | | | | | 3 | |

The following criteria shall apply to condominium corporation laneway lighting:

a) The maintained average illuminance shall be 4 Lux and the Average to Minimum illumination ratio 6:1.

b) The luminaires shall be “dark sky” friendly (Fully Cut-Off), light-emitting diode (LED)-type decorative fixtures.

c) Fixtures are subject to review and acceptance by the Township.

d) There shall be an independent metered power supply and distribution to the street lights under the control of the condominium corporation.

# M3.00 Design Requirements

## M3.01 Site Grading Design

- Grading design shall meet the requirements of Section G Lot Grading unless otherwise noted.
- The drainage of the site is to be self-contained. Any external drainage is to be accommodated within the design of the site drainage system;
- The grading of the site is to be compatible with the elevation of the surrounding lands;
- All grassed embankments shall have a maximum slope of 3 (H):1 (V), maximum 4 (H):1 (V) for residential properties;
- Drainage shall be directed away from buildings and conveyed by sheet flow or in defined swales. Minimum slopes for residential is 2% (increased to 3% for Group D soils), and for ICI properties, the minimum slope is 1%;
- The minimum depth for any drainage swale shall be 150 mm; and
- The maximum side slope on any drainage swale shall be 3(H):1(V) for ICI properties (except schools) and 4(H):1(V) for residential properties and schools.

## M3.02 Roadway and Driveway Design

- All roadways shall be designed in accordance with Section B Roads, unless noted otherwise;
- The necessary pavement markings and signage for internal roadway traffic control, parking space designations and site accesses are to be shown on the plans. and shall be in accordance with Section H Signs and Pavement Markings, unless otherwise noted; and
- Pavement design suitable for heavy duty traffic and fire routes shall be provided by the consulting geotechnical engineer. The minimum pavement design is as follows. Subject to approval from the Township Engineer they may be modified based on the consulting geotechnical engineer's recommendation for pavement design.

**Table M.3: Minimum Pavement Design**

| Residential Driveways | Condominium Roads (Residential) | Commercial, Light Industrial and Apartments | Heavy Industrial |
|---|---|---|---|
| 50 mm of HL3 asphalt<br>200 mm of Granular A | 40 mm of HL3 asphalt<br>50 mm of HL8 asphalt<br>150 mm of Granular A<br>450 mm of Granular B | 40 mm of HL3 asphalt<br>50 mm of HL8 asphalt<br>150 mm of Granular A<br>225 mm of Granular B | 40 mm of HL3 asphalt<br>75 mm of HL8 asphalt<br>150 mm of Granular A<br>300 mm of Granular B |

Notes
- Subgrade compacted to 95% proctor density.

- The following is applicable to residential driveways:
  - The driveway shall be paved with asphalt or an approved alternate acceptable to the Township from the edge of the roadway to the building or garage.
  - For townhouse units or semi-detached units, where driveways are adjacent to one another, interlocking or an alternative separator shall be provided to define the limits of each property and to allow for easier replacement of each asphalt driveway separately.
- For Industrial properties, granular may be permitted in the rear/side yard if they are not parking areas. Any stormwater management report shall consider the surface asphalt regardless of the use granular;
- For ICI and apartment properties, driveway geometry is to comply with OPSD 350.010. with the following revisions:
  - Returns having a minimum 9 m radius; and
  - The centerline of pavement having at least a 12 m radius.
- The Township may require the submission of turning movements of design vehicles with the Site Plan submission. The required design vehicles will be determined by the Township;
- The Township does not support the use of proposed dead end streets within Site Plans. Where dead end streets are unavoidable, provision shall be provided for vehicle turning with the use of turning circles;
- The minimum grade for any driveway shall be 2% (residential) and 1.0% otherwise, and the maximum grade shall be 8.0%. Driveway grade beyond this range shall only be permitted with Township approval. All driveway aprons shall be sloped towards the roadway, except for rural cross sections where a low point is provided near the area of the culvert.
- Driveway entrances shall be such that the minimum sight distance shall be per the TAC design manual. The sight distance requirements are to be based on roadway design speed versus the posted speed and are to account for turning sight distances where applicable;
- Sidewalks in the street boulevard are to be continuous through the driveway entrances to properties developed under Site Plan control;
- Driveway entrances are to be paved from the paved road to the property line. The Township will require barrier curbing per OPSD 350.010 where the development is located off of roads that have curb/gutter.
- If rural entrances are to be relocated or decommissioned, existing culverts are to be removed and the ditch regraded and restored with a minimum 150 mm depth of topsoil and seed.

## M3.03 Fire Routes

The designated fire route providing access through the property shall meet the following requirements or the latest requirements stipulated under the Ontario Building Code:

- Be connected to a public road allowance;
- Have a clear width of 6 m;
- Have a centerline radius of not less than 12 m, and a curb radius of 9 m;
- Have an overhead clearance not less than 5 m;

- Have a change in gradient not more than 1 in 12.5 over a minimum distance of 15 m;
- Dead-end sections of the access routes are not permitted, and a turnaround shall be provided; and
- Shall consist of heavy duty asphalt or concrete or other material acceptable to the Fire Chief.

# M4.00 Storm Sewers and Stormwater Management under Site Plan Control

## M4.01 On Site Stormwater Management

In most cases, a stormwater management report is required. At the pre-consultation meeting, the Township will advise the applicant if a stormwater management report is required. It is to be prepared to demonstrate how stormwater quality and quantity is being controlled on site. Criteria is outlined in Section C.

The design of private stormwater management facilities is to be based on MECP guidelines.

Stormwater Management Facilities that service Industrial Land as defined by the definition in O.Reg 525/98 and/or service more than one lot or parcel of land require an Environmental Compliance Approval from the MECP. Industrial Land under the regulation is defined as follows:

*"industrial land" means land used for the production, processing, repair, maintenance or storage of goods or materials, or the processing, storage, transfer or disposal of waste, but does not include land used primarily for the purpose of buying or selling,*
*(a) goods or materials other than fuel, or*
*(b) services other than vehicle repair services;*

It is the Owner/applicant's responsibility to contact the MECP if there is uncertainty whether an ECA is required.

Each site plan development is required to include stormwater pre-treatment devices sized to remove 80% of suspended solids from the runoff from the site before entering the Township's storm sewer system. Calculations demonstrating the correct sizing of the units are to be included in the stormwater management report.

The estimation of peak design flow rates can be done using the Modified Rational Method or computer model simulation. The Modified Rational Method is typically used to design storm sewers and estimate peak flow rates from small urban areas (generally less than 5 ha). Its application should be limited where the time of concentration (Tc) is less than approximately 30 minutes.

Computer analyses are best suited to large urban areas, rural areas and designing municipal SWM facilities. It is also advisable to validate the results from one model by using different models.

The minimum theoretical design storm should be based on the 4 hour Chicago distribution unless the GRCA requests otherwise.

A copy of all stormwater management calculations, including storm sewer design sheets, signed and stamped by a Professional Engineer are to be submitted to the Township.

There may be circumstances in which existing developed portions of the site will require stormwater management. This will be determined at the pre-consultation stage.

## M4.02 Storm Sewer Design

All storm sewers within a development proceeding under Site Plan control are to be designed in accordance with Section C and minimum Ontario Building Code Standards. The level of service of the storm sewer pipe should be determined by the applicant and their Engineer.

In general, uses that are likely to have many visitors or are in the built up areas of the Township should have an underground piping system to collect runoff for minor storm events.

## M4.03 Storm Sewer Connection Size

Where a storm sewer connection is being made, it shall be sized individually according to the intended use of the lands, to any on-site stormwater management control requirements and in accordance with the requirements of Section C. The minimum connection sewer size is 300 mm diameter.

## M4.04 Depth of Storm Sewer Connection

The depth of the storm drain connection shall be governed by the grading of lands and the extent of the area to be served. The depth of the connection shall be sufficient to provide for drainage of all lands within the block and the preferred minimum depth to top of the pipe is 1.5 m. Shallower depths may be permitted at the discretion of the Township Engineer pending consideration of potential constraints.

Where storm sewers are aligned parallel to building foundations, the sewer setback from the foundation shall be sufficient to ensure that the trench excavation for the sewer is beyond the area of influence for the foundation bearing. This is the responsibility of the Design Consultant to confirm.

### M4.05 Storm Control Maintenance Hole

A storm sewer control maintenance hole is to be installed immediately inside the property line and is to be accessible for inspection of the sewer and incoming flow by the Township. The control maintenance hole is to be sized based on the OPSD to accept the outflow sewer from the private development and the municipal service connecting the main storm sewer. The Storm Control Maintenance Hole may be an oil grit separator. The Township may allow an alternate location for this control maintenance hole which is to be used for the purpose of sampling discharges or deposits.

### M4.06 Connection to Main Sewer

The connection of the storm drain to the storm sewer is to be connected to a maintenance hole. In circumstances where a maintenance hole cannot be provided, an upstream maintenance hole is required at 30 m (max) from where the maintenance hole could not be provided.

A maintenance hole is not required for a storm service that is there for foundation drainage (via gravity or sump pump) only, if the size of the connection is less than one-half of the size of the storm sewer.

### M4.07 Storm Drain Materials

Storm sewer materials are to meet the requirements of Section C. All materials used on private property shall comply with the Ontario Building Code.

### M4.08 Bedding for Storm Drain Connections

Storm sewer bedding is to meet the requirements of Section C.

## M5.00 Sanitary Sewers

### M5.01 General

Municipal wastewater systems are available in Moorefield and Drayton. Moorefield's sanitary collection system is a low pressure sewer system, and each property needs to be equipped with a grinder pump package. Remaining sites within the Township require their own private on-site sewage system.

Where a municipal wastewater system exists, all future development blocks within a plan of subdivision shall have a sanitary drain installed from the mainline sanitary sewer to the street limit of the proposed block. Where the proposed development land use zoning differs from the current approved land use zoning, a detailed design study may be required to ensure that the receiving sanitary system has sufficient capacity for the proposed development. All tributary sanitary drainage areas, including future development lands, are

to be considered in assessing the capacity of the receiving system. The Township will not consider the use of on-site sanitary flow storage to address the issue of existing system capacity. Any required upgrades to the Township's sanitary sewer system, resulting from the proposed development, will be the responsibility of the applicant.

All connections including effluent criteria shall comply with Wastewater By-Law 2009-065. The Owner shall advise the Township if their site has industrial related discharges. For sites that have industrial related discharges, the Owner shall confirm that the discharge does not exceed the limits identified in the by-law.

## M5.02 Sanitary Sewer Design

All sanitary sewers within a development proceeding under Site Plan control are to be designed in accordance with Section F Sanitary Sewers and Appurtenances.

## M5.03 Sanitary Sewer Connection Size

The sanitary drain connection for all site plans shall be sized individually according to the intended use of the lands, and in accordance with the requirements of Section F. No service connection is permitted to be less than 125 mm for the municipal portion of the service.

## M5.04 Depth of Sanitary Sewer Connection

The depth of the sanitary drain connection shall be governed by the grading of lands and the extent of the area to be served. The depth of the connection shall be sufficient to provide for drainage of all lands within the block, and shall provide a minimum depth to the top of the pipe of 1.5 m.

Shallower depths may be permitted at the discretion of the Township Engineer pending consideration of potential constraints to meeting this requirement and the advantages and disadvantages of a pumped vs. gravity system based on the constraint. The Consultant Engineer shall specify any required insulation in these special circumstances.

Where sanitary sewers are aligned parallel to building foundations, the sewer setback from the foundation shall be sufficient to ensure that the trench excavation for the sewer is beyond the area of influence for the foundation bearing. This is the responsibility of the Design Consultant to confirm.

## M5.05 Sanitary Control Maintenance Hole

A sanitary sewer control maintenance hole is to be installed immediately inside the property line and is to be accessible for inspection of the sewer and incoming flow by the Township. The control maintenance hole is to be sized based on the OPSD to accept the outflow sewer from the private development and the municipal service connecting the main storm sewer.

The Township may allow an alternate location for this control maintenance hole which is to be used for the purpose of sampling discharges or deposits.

### M5.06 Connection to Main Sewer

The connection of the sanitary drain to the sanitary sewer may be made at a maintenance hole or directly to the sanitary sewer if approved by the Township.

### M5.07 Sanitary Drain Materials

Sanitary sewer materials are to meet the requirements of Section F and minimum Ontario Building Code Requirements.

### M5.08 Bedding for Sanitary Drain Connections

Sanitary sewer bedding is to meet the requirements of Section F.

## M6.00 Municipal Domestic Water Supply and Fire Protection

### M6.01 General

Drayton and Moorefield are the only locations where there is a municipal water system. The Moorefield water distribution system does not provide fire protection capabilities.

### M6.02 Commissioning, Testing and Certification of Water Connections

For all new piping 100 mm diameter and larger, the Development Engineer is to inspect its construction, supervise the sampling, testing, and commissioning of the system and certify to the Township that the required standards have been met, adhering to the 2020 Watermain Disinfection Procedure. The completed forms and results of water sample testing from the new system are to be submitted to the Township prior to connection to the municipal water system. All final connections to the municipal water system shall be witnessed by the Township's Water Operator, which is to be arranged through the Director of Public Works.

### M6.03 Pipe Specifications

The water system design, including materials and bedding is to meet the requirements of Section E.

The provision of the pipe, the size and the need are to be established by an architect or engineer as necessary for the applicable use of the site. Design parameters will include the fixture demands of the proposed use, requirements for fire suppression, building code requirements, etc.

Generally, only one service connection pipe is permitted to any site and should be such as to provide for fire suppression systems and domestic needs. All water flowing into the site shall be metered.

The minimum clear horizontal separation for water service pipes and storm or sanitary service pipes shall be 2.5 m. When this separation cannot be achieved, the Ontario Building Code (7.3.5.7. Spatial Separation) provides alternatives that can be considered.

The Township requires a minimum of 15 m between a water service and any on-site sewage disposal system (tanks, tile bed). When this is not provided, the Ontario Building Code 7.3.5.7 Spatial Separation provides an alternative. The Consultant Engineer should consider the implications if a future repair has to take place, which could result in a compliance issue due to the pipe no longer being considered a 'single run with no joints or fittings'.

## M6.04 Metering

All flows are to be metered. A meter kit, paid for by the applicant, is provided by the Township when the building permit application has been applied for and necessary fees have been paid. For all water meters greater than 25 mm (1 inch), they are special order, and the Township requires a minimum of 6 weeks notice. The applicant should complete Schedule 'A' of By-Law 2015-120 and submit it with the Building Permit to begin this process.

## M6.05 Connections to Main

All connections to the Municipal water system are to be approved by the Township. Connection configuration will be assessed by the Township on a site specific basis. The specific requirements for each site plan connection are to be developed in conjunction with the Consultant based on the expected use and scale of the site, buildings, etc. The proponent should pre-consult with Township staff to determine the approach to be used for the specific application. The following shall apply:

- There shall be no private watermains within the public road allowance;
- Backflow prevention per the Township's Waterworks By-Law 2015-120 shall be provided. For industrial malls where the uses are unknown, a reduced pressure principal backflow prevention device will be required.
- Each condominium corporation shall have at least one independent connection to a municipal watermain. Two connections are recommended to each condominium corporation.

### M6.06 Fire Protection

- Drayton

Municipal water systems are present in Drayton and Moorefield. Moorfield's municipal water distribution system does not provide fire protection. It is up to the applicant's mechanical designer to confirm whether the municipal's system can provide adequate fire flows. During fire events, the municipal distribution system is permitted to drop to 20 psi.

For fire protection purposes, hydrants are required to be located within 90 m horizontally of any portion of a building perimeter required to face a street. The architect and engineering consultant are to review the Ontario Building Code requirements with respect to hydrant coverage for each application.

The fire department connection for an automatic sprinkler system shall be located such that the distance from the fire department connection to a hydrant is unobstructed over a distance of no more than 45 m.

All fire hydrants shall meet the requirements of Section E.

For Buildings with Fire Lines with or without hydrants, refer to DWG. NO. M-04.

- All areas outside Drayton

For areas outside of Drayton, the design consultants shall confirm requirements with the Fire Department to determine if an underground reservoir is required. Section A2.03 c) includes minimum requirements to be expected.

## M7.00 Private Servicing

### M7.01 Water Supply Systems

For plan of subdivisions and condominiums, the requirements are noted in Section A for the required hydrogeological report to be submitted.

For other sites, it will be determined at the pre-consultation stage whether a hydrogeological report is required to confirm that there is adequate water supply, and any offsite impacts are acceptable.

a) All wells shall comply with O.Reg. 903 and shall be installed and supervised by a licensed contractor/licensed well technician.

b) The final grading shall ensure that the casing extends a minimum 40 cm above the highest point on the ground within 3 m radially from the well.

c) The minimum clear horizontal separation for water service pipes and storm or sanitary service pipes shall be 2.5 m. When this separation cannot be achieved, the Ontario Building Code (7.3.5.7. Spatial Separation) provides alternatives that can be considered.

d) The Township requires a minimum of 15 m between a water service and any on-site sewage disposal system (tanks, tile bed). When this is not provided, the Ontario Building Code 7.3.5.7 Spatial Separation provides an alternative. The Consultant Engineer should consider the implications if a future repair has to take place, which could result in a compliance issue due to the pipe no longer being considered a 'single run with no joints or fittings'.

e) All recommendations including any treatment requirements noted in the hydrogeological report shall be adhered to.

### M7.02 On-Site Sewage Systems

On-site sewage works that have a design capacity in excess of 10,000 L/day will require an Environmental Compliance Approval from the MECP. The Owner will be required to provide a copy of the Environmental Compliance Approval to the Township. The Township may not issue a building permit until the Owner has received the Environmental Compliance Approval.

On-site sewage works that have a design capacity of 10,000 L/day or less are governed by the Ontario Building Code. Site Plan Applications that have an on-site sewage system shall show its location on the plans and provide a design brief related to its sizing and related geotechnical information all to the satisfaction of the Chief Building Official.

The Developer shall retain a qualified Consultant in the design of the sewage system and to supervise the installation.

## M8.00 Snow Management

The Township may request that the applicant provide a snow management report. This will typically be requested on sites where there appears to be limited snow storage available on site. The Snow Management report shall include the following:

a) Description of snow removal operations for removal of snow from all driveways, parking areas, walkways, sidewalks, internal roadways, etc.

b) The maximum height of all snow storage areas. The height should not impact the site visibility for drivers or impact visibility at the site's entrance.

c) Include minimum radius of 1.0 m around hydrants to be kept clear in all directions and a 1.0 m width from the face of the hydrant to the road (or parking area).

d) Justification for adequate temporary snow storage. Reliance on 'on the spot' removal will not be permitted. Sites that have residential occupancies shall have sufficient snow storage as to not rely on snow removal regardless of whether the development is condominium or from municipal roads.

e) For plans that have reliance on some snow removal, the plan shall provide multiple contacts for snow removal contractors.

f) Any snow storage areas that are in proximity to a municipal sidewalk must have grading that would direct runoff from the snow melt to a catch basin to mitigate potential icing issues. The catch basin shall have a sump and other features that will minimize any sediment or debris that may lead to the Township's stormwater management system.

g) The plan should identify minimum requirements for street cleaning and cleaning of the temporary snow storage areas. This could include street sweeping, catch basin sump cleanout, oil grit separator cleanout as well as manual removing sediment and garbage that may have built up in the temporary snow storage locations.

h) For residential condominium properties, outline the process for when residents have concerns with snow removal. For example, concerns should be directed to the Condominium Board and not the Township.

## M9.00 Landscaping Design

All proposed landscaping shall be shown on the plans and prepared by a landscape architect. The following outlines minimum requirements.

a) Deciduous trees shall be located at a minimum interval of 10 m along the road right-of-way. The trees shall be located 1.2 m from the property line located on the private property side.

b) Properties that have outside storage shall provide landscaping that provides sufficient screening of the outdoor storage. They may include the combination of landscaping and wood privacy fencing.

c) Minimum 1.5 m wide sidewalks shall be provided along or near the building to provide a pedestrian access point to the building (including from all accessible parking spaces), but also to separate any parking stalls that are adjacent to the building. Planting beds are encouraged.

d) The use of barbed wire fencing is strongly discouraged and will only be permitted in Industrial zones, at the sole discretion of the Township Planner. Regardless of the Industrial zone, barbed wire fencing will not be permitted on sites that abut residential properties.

e) DWG. NO. M-06 has been provided for conceptual purposes to provide a schematic of general minimum requirements.

f) Refer to Section I for other requirements.

g) Confirm with the Township's Planning and Development Manager on any available Urban Design Guidelines.

# M10.00 Process for Release of Site Plan Securities

## M10.01 General

The site plan agreement will identify any site specific requirements for the release of site plan securities. The following outlines the minimum requirements.

## M10.02 Site Plan Certification

Upon completion of construction, the Consultant shall provide written certification to the Township that all works have been constructed in accordance with the approved plans and specifications, and in accordance with good engineering practices. At the time of certification all signage, landscaping, line painting, etc. is to be complete and verified based on the approved plans.

In most cases, as-constructed drawings will be required to accompany the final certification. The drawings shall be amended to incorporate the changes and alterations made during construction. The Township may require the as-constructed drawings in AutoCAD format should any new works be placed in the Township's road right of way that would require entry into the Township's GIS database for asset management purposes.

For larger sites, interim site plan security reductions may be permitted under the site plan agreement. A certification of the works to date with an outline of when remaining works will be completed are required for all security reduction requests.

## M10.03 Final Site Visit

Upon completion of all construction, the certification/as-construction drawings are to be submitted to the Township and a final site visit requested. The Township will identify deficiencies found during this final inspection which shall be corrected by the Owner. This final inspection is carried out for the benefit of the Township and shall in no way relieve the Owner of his obligations under the Condominium Act and the Site Plan Agreement.

# Appendix A

# Standard Detail Drawings

# STANDARD DETAIL DRAWINGS

**Section A – General Information**

| Drawing | Description |
|---|---|
| A-01 | Benchmark Monument |
| A-02 | General Notes |

**Section B – Roadways**

| Drawing | Description |
|---|---|
| B-01 | Typical Road Cross Section (20.0 m Road Allowance Urban Section (Drayton, Moorefield and Alma) |
| B-02 | Typical Road Cross Section (Ditched) |
| B-03 | Intentionally Left Blank |
| B-04 | Intentionally Left Blank |
| B-05 | Intentionally Left Blank |
| B-06 | Typical 90° Bend Detail |
| B-07 | Turning Basin Residential |
| B-08 | Turning Basin Industrial |
| B-09 | Urban Residential Driveway |
| B-10 | Ditched Driveway |
| B-11 | Concrete Sidewalk |
| B-12 | Tactile Plate Installation |

**Section C – Storm Drainage and Stormwater Management**

| Drawing | Description |
|---|---|
| C-01 | Typical Detached Lot Service Arrangement |
| C-02 | Typical Semi-Detached Lot Service Arrangement Option A |
| C-03 | Typical Semi-Detached Lot Service Arrangement Option B |
| C-04 | Typical Townhouse Lot Service Arrangement |
| C-05 | Rear Yard Catch basin and Lead |
| C-06 | Sump Pump Discharge to Storm Sewer |
| C-07 | Connection of Foundation Drain to Storm Drainage Piping |

**Section D – Asset Management**

| Drawing | Description |
|---|---|
| | Intentionally left blank |

**Section E – Water Distribution Design and Construction**

| Drawing | Description |
|---|---|
| E-01 | 19 mm to 25 mm Water Meter and Remote Receptacle Installation in Building (Residential) |
| E-02 | Industrial/Commercial/Institutional Water Meter & Testable Backflow Preventer Detail |
| E-03 | Industrial/Commercial/Institutional Water Meter Installation Notes |

**Section F – Sanitary Sewers and Appurtenances**

| Drawing | Description |
|---|---|
| F-01 | Standard Sewer Service Connection in Common Trench (Single-Service Residential) |
| F-02 | Standard Sewer Service Connection Common Trench |
| F-03 | Sanitary Sewer Cleanout for Paved Areas (Residential) |
| F-04 | Service Connection Bedding Details |
| F-05 | Typical Residential Lateral Installation for Infill Connections to Moorefield Low Pressure Sanitary Sewer |

**Section G – Lot Grading**

| Drawing | Description |
|---|---|
| G-01 | Subdivision Area Grading Plan Requirements |
| G-02 | Front Lot Drainage |
| G-03 | Split Lot Drainage |
| G-04 | Split Lot Drainage for Walkout or Backsplit |

**Section H – Signs and Pavement Markings**

| Drawing | Description |
|---|---|
| H-01 | Township Of Mapleton Sign Colours |
| H-02 | Street Name Sign Height and Location |
| H-03 | Development Sign |
| H-04 | Stormwater Management Information Sign |
| H-05 | Stormwater Management Warning Sign |
| H-06 | Recreational Trail Head Sign |
| H-07 | Trail Sign Examples |
| H-08 | Park Entrance Sign |
| H-09 | Park Rule Sign |

**Section I – Landscaping and Street Tree Planting Plans**

| Drawing | Description |
|---|---|
| I-01 | Coniferous Tree Wire Basket |
| I-02 | Coniferous Tree Potted |
| I-03 | Coniferous Tree on Slope |
| I-04 | Deciduous Tree Wire Basket |
| I-05 | Deciduous Tree Potted |
| I-06 | Deciduous Tree on Slope |
| I-07 | Deciduous Tree Bare Root |
| I-08 | Shrub Potted Continuous |
| I-09 | Shrub On Slope |
| I-10 | 3 m Walkway Landscaping |

**Section J – Parklands**

| Drawing | Description |
|---|---|
| | Intentionally left blank |

**Section K – Street Lighting**

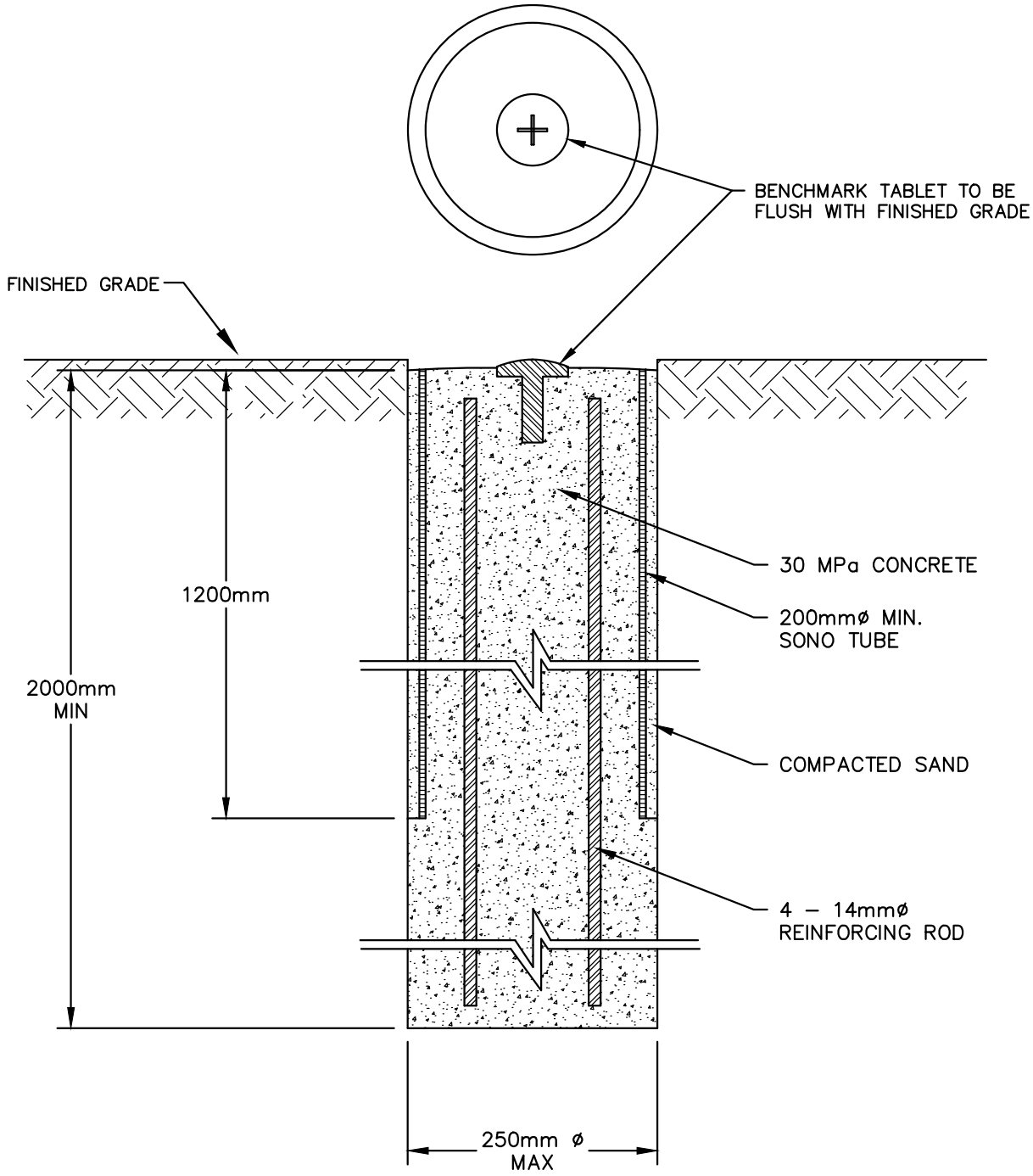
| Drawing | Description |
|---|---|
| K-01 | Residential Lighting Standard |

**Section L – Fencing Requirements**

| Drawing | Description |
|---|---|
| L-01 | 1.8m High Wood Privacy Fence |

**Section M – Lands Developed Under Site Plan Control**

| Drawing | Description |
|---|---|
| M-01 | Private Road Cross Section Condominium – Off Street Parking |
| M-02 | Private Road Cross Section Condominium – On Street Parking |
| M-03 | Schematic of Servicing to Condominium Townhouse |
| M-04 | Servicing for Buildings with Fire Lines |
| M-05 | Check Valve and Chamber Detail |
| M-06 | Minimum Landscape Requirements for Industrial/Commercial Sites |




ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.

TOWNSHIP OF MAPLETON

# BENCHMARK MONUMENT

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | A-01 |

## GENERAL NOTES

1. THE NOTES ON THIS SHEET APPLY TO ALL WORKS UNDER THIS CONTRACT UNLESS OTHERWISE NOTED ON THE PLAN AND PROFILE DRAWINGS AND/OR SPECIFIC DETAIL DRAWINGS.
2. ALL MATERIALS ARE TO COMPLY WITH THE MANUFACTURER'S SPECIFICATIONS PER APPROVED PRODUCTS AS LISTED IN APPENDIX 'C' OF THE TOWNSHIP OF MAPLETON'S DESIGN GUIDELINES & STANDARDS.
3. THE STANDARD DRAWINGS OF THE TOWNSHIP OF MAPLETON, ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS (OPSS) AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) CONSTITUTE PART OF THE PLANS OF THIS CONTRACT. ORDER OF PRECEDENCE OF STANDARD DRAWINGS IS FIRSTLY TOWNSHIP OF MAPLETON STANDARD DRAWINGS, AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL RELEVANT STANDARD DRAWINGS AND SPECIFICATIONS AS REQUIRED FOR THIS CONTRACT.
5. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS SHOWN ON THE ENGINEERING DRAWINGS ARE IN METRES OR MILLIMETERS.
6. ALL DIMENSIONS AND ELEVATIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
7. EXISTING SERVICES AND UTILITIES SHOWN ON THESE CONTRACT DRAWINGS ARE BASED ON THE BEST INFORMATION AVAILABLE AND THEIR LOCATIONS ARE NOT GUARANTEED. THE CONTRACTOR SHALL INTERPRET THIS INFORMATION WITH THE UNDERSTANDING THAT THE OWNER DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY AND/OR SUFFICIENCY.
8. THE CONTRACTOR IS RESPONSIBLE TO ARRANGE FOR AND MAINTAIN ALL UTILITY STAKE-OUTS AND LOCATES.
9. ALL PRIMARY HYDRO, STREET LIGHT CABLE, TELECOMMUNICATION CABLE, GAS LINES AND CABLE T.V. SHALL BE PLACED UNDERGROUND IN LOCATIONS SHOWN ON THE ROAD SECTIONS LISTED IN THE STANDARD DRAWINGS.
10. ALL EROSION AND SEDIMENT CONTROL DEVICES ARE TO BE IN PLACE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL CONSTRUCTION IS COMPLETE AND THE GROUND COVER HAS ESTABLISHED GROWTH.
11. NATIVE MATERIAL, SUITABLE FOR BACKFILL, SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
12. GRANULAR MATERIAL USED FOR BACKFILL, SHALL BE PLACED IN LAYERS 150mm IN DEPTH MAXIMUM AND COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY.
13. ALL DISTURBED AREAS ARE TO BE REINSTATED TO THEIR ORIGINAL CONDITION OR BETTER, AS DETERMINED BY THE ENGINEER. ALL GRASS AND VEGETATION COVERED AREAS SHALL BE RESTORED BY PLACING A MINIMUM DEPTH OF 150mm AND A MAXIMUM DEPTH OF 250mm OF APPROVED TOPSOIL AND No. 1 NURSERY SOD.
14. THE STREET LIGHTING SYSTEM SHALL BE DESIGNED BY A QUALIFIED CONSULTING ENGINEER IN ACCORDANCE WITH THE ILLUMINATION ENGINEERING SOCIETY OF NORTH AMERICA (IESNA) LATEST EDITION STANDARDS AND APPROVED BY THE TOWNSHIP. STREET LIGHTING SYSTEMS FOR ROADWAYS IN THE TOWNSHIP OF MAPLETON SHALL MEET THE REQUIREMENTS OF HYDRO ONE.
15. ALL DESIGNS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT (AODA).

## GENERAL NOTES – ROADS

1. THE ROAD PAVEMENT MINIMUM STRUCTURE SHALL CONSIST OF THE FOLLOWING AND WILL BE CONFIRMED BY A SOILS CONSULTANT AND APPROVED BY THE TOWNSHIP:

   LOCAL ROAD:
   - 40mm HL3 SURFACE COURSE ASPHALT
   - 50mm HL8 BASE COURSE ASPHALT
   - 150mm GRANULAR A
   - 450mm GRANULAR B

   COLLECTOR ROAD/OR INDUSTRIAL:
   - 40mm HL3 SURFACE COURSE ASPHALT
   - 80mm HL8 BASE COURSE ASPHALT (2 LIFTS)
   - 150mm GRANULAR A
   - 450mm GRANULAR B

2. BOULEVARDS IN URBAN AREAS AND DITCHES IN RURAL AREAS ARE TO BE STABILIZED WITH No. 1 NURSERY SOD PLACED ON A MINIMUM 150mm AND MAXIMUM 250mm DEPTH OF TOPSOIL.
3. NATIVE SUBGRADE TO BE COMPACTED TO MINIMUM 98% STANDARD PROCTOR MAXIMUM DRY DENSITY AND SHALL BE PROOF ROLLED. NATIVE SUBGRADE SHALL HAVE A CROSS-FALL OF 3% AND THE MATERIAL SHALL BE APPROVED BY A SOILS CONSULTANT AND IS SUBJECT TO APPROVAL BY THE TOWNSHIP ENGINEER.
4. 150mm DIAMETER PERFORATED, SUB-DRAINS WITH GEOTEXTILE SOCK WILL BE REQUIRED TO RUN CONTINUOUS ALONG BOTH SIDES OF ALL ROADS WITH CURB AND GUTTER.
5. CONCRETE CURB AND GUTTER CONFORMING TO OPSD 600.040 OR 600.100 AS SPECIFIED. CONCRETE STRENGTH IS TO BE A MINIMUM OF 32MPa AT 28 DAYS, CLASS C-2 WITH 6.5% ± 1.5% AIR ENTRAINMENT.
6. SIDEWALK CONSTRUCTION SHALL COMPLY WITH TOWNSHIP GUIDELINES AND STANDARD DRAWINGS AND SHALL BE CONSTRUCTED ON 150mm OF GRANULAR A COMPACTED FOUNDATION. CONCRETE STRENGTH IS TO BE A MINIMUM OF 32MPa AT 28 DAYS WITH 6% ± -1.5% AIR ENTRAINMENT. SIDEWALK TO BE 150mm THICK. AT ALL COMMERCIAL AND INDUSTRIAL DRIVEWAYS SIDEWALK THICKNESS TO BE INCREASED TO 200mm.
7. PROVIDE FROST TAPERS FOR ROAD CROSSING CULVERTS AS PER OPSD 803.030.
8. RESIDENTIAL DRIVEWAYS TO BE CONSTRUCTED WITH A MINIMUM OF 200mm GRANULAR 'A', AND BE PAVED WITH A MINIMUM OF 50mm HL3 ASPHALT FROM STREET TO GARAGE/DWELLING, OR AS APPROVED BY THE TOWNSHIP.
9. ALL ACCESS DRIVEWAYS SHALL BE LOCATED A MINIMUM OF 1m FROM LIGHT POLES, CATCHBASINS, HYDRANTS, WATERMAIN VALVES, CABLE TV JUNCTION BOXES, UTILITY VAULTS 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.
10. FOR DRIVEWAYS REQUIRING CULVERTS, THE CULVERT ENDS SHALL NOT EXTEND FURTHER THEN THE FRONTAGE OF THE PROPERTY, WITH A MINIMUM SETBACK OF 1m FROM AN EXTENDED SIDE LOT LINE AT THE DITCH BOTTOM. ALL DRIVEWAY CULVERTS SHALL BE SEPERATED BY A MINIMUM OF 2m.
11. MINIMUM SLOPES ON DRIVEWAYS SHALL BE 2.0% AND MAXIMUM SLOPES SHALL BE 8.0%
12. ROAD OCCUPANCY PERMIT IS REQUIRED FROM THE TOWNSHIP OR COUNTY AS APPLICABLE PRIOR TO THE COMMENCEMENT OF ANY WORK ON ANY ROAD THAT IS EXTERNAL TO THE PLAN. A MINIMUM 48 HOUR NOTICE IS REQUIRED.
13. AN ENTRANCE PERMIT IS REQUIRED FOR ALL DRIVEWAYS THAT ARE INSTALLED ON A DITCHED ROAD CROSS SECTION.

## GENERAL NOTES – STORM SEWERS

1. PIPE SHALL CONFORM TO THE REQUIREMENTS SHOWN BELOW:
   a. NON-REINFORCED CONCRETE PIPE, CSA STANDARD A257.1 CLASS 1,2,3.
   b. REINFORCED CONCRETE PIPE, CSA STANDARD A257,2 STRENGTH CLASS 50-D, 65-D, 100-D AND 140-D.
   c. PVC PIPE, CSA STANDARD B182.1 AND B182.2 (DR35).
2. ALL STORM SEWERS OVER 450mm DIAMETER SHALL BE CONSTRUCTED WITH REINFORCED CONCRETE PIPE.
3. THE MINIMUM COVER OVER STORM SEWERS SHALL BE 1.5m. THE MAXIMUM DEPTH TO THE OBVERT OF STORM SEWERS WITH DIRECT SERVICE CONNECTIONS SHALL BE 6.0m. WHERE DEEPER SEWERS ARE REQUIRED, LOCAL SEWERS SHALL BE CONSTRUCTED TO PROVIDE FOR DIRECT SERVICE CONNECTIONS.
4. SEWERS SHALL BE CONSTRUCTED WITH 19mm CRUSHER RUN LIMESTONE BEDDING AS PER OPSD 802.010, AND 802.030, UNLESS OTHERWISE SPECIFIED BY A GEOTECHNICAL CONSULTANT AND APPROVED BY THE TOWNSHIP.
5. TRENCH BACKFILL APPROVED BY THE GEOTECHNICAL ENGINEER SHALL BE PLACED IN 200mm LIFTS AND COMPACTED TO 95% SPMDD.
6. ALL STORM SEWER MAINTENANCE HOLE TO BE ACCORDING TO TOWNSHIP STANDARDS AND BE BENCHED TO OBVERT IN ACCORDANCE WITH OPSD 701.021.
7. DROP STRUCTURES SHALL CONFORM WITH OPSD 1003.010 AND 1003.020.
8. MAINTENANCE HOLE TOPS ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE'. GRADE AND CROSSFALL ADJUSTMENT SHALL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE. MODULAR ADJUSTMENT RINGS ARE TO BE USED TO ADJUST THE MANHOLE TO FINAL GRADE.
9. CATCHBASINS MUST BE OF THE PRECAST TYPE AS SHOWN ON THE OPSD DRAWINGS 705.010 OR 705.020. DOUBLE CATCHBASINS ARE REQUIRED IN ALL ROAD SAGS.
10. SINGLE CATCHBASIN LEADS SHALL BE PVC DR35 PIPE WITH MINIMUM SLOPE OF 1% AND MINIMUM SIZES AS FOLLOWS:
    a. SINGLE CATCHBASIN 250mm DIAMETER
    b. DOUBLE CATCHBASIN 300mm DIAMETER
    c. REAR LOT CATCHBASIN 300mm DIAMETER
11. THE FRAME AND GRATE FOR CATCHBASINS SHALL BE OPSD 400.010. CATCHBASIN GRATES SHALL INITIALLY BE SET TO BASE ASPHALT AND ADJUSTED TO FINAL GRADE BEFORE PLACEMENT OF TOP ASPHALT..
12. REAR LOT CATCHBASIN LEADS TO BE CONCRETE ENCASED FROM THE STREET LINE TO THE CATCHBASIN, PER TOWNSHIP STANDARD DRAWING. FRAME AND GRATE TO BE OPSD 400.010.
13. WHERE CATCHBASINS ARE CONNECTED DIRECTLY TO SEWERS, PRE-MANUFACTURED TEES SHALL BE USED.
14. PARTIAL BULKHEADS ARE REQUIRED AT MAINTENANCE HOLE CONNECTIONS TO EXISTING SEWERS.
15. MAINTENANCE HOLE STEPS ARE TO BE SOLID, RECTANGULAR ALUMINUM PER OPSD 405.020.
16. ROOF LEADERS SHALL DISCHARGE TO GRASSED AREAS DISCHARGING 1m FROM BUILDING PER TOWNSHIP CLEAN AND CLEAR BY-LAW 2021-013.
17. "TRENCH PLUGS" AS SPECIFIED BY THE GEOTECHNICAL ENGINEER SHALL BE USED IN THE TRENCH AND PLACED 2 TO 3 METERS UPSTREAM FROM ANY MANHOLE WHICH IS SUSPECTED OF BEING SUSCEPTIBLE TO HIGH WATER LEVELS OF INFLOW/INFILTRATION, SUBJECT TO VERIFICATION BY GEOTECHNICAL ENGINEER.
18. ALL TESTING OF THE STORM SYSTEM IS TO BE COMPLETED IN ACCORDANCE WITH MECP DESIGN CRITERIA FOR SANITARY SEWERS, STORM SEWERS AND FORCEMAINS FOR ALTERATIONS AUTHORIZED UNDER ENVIRONMENTAL COMPLIANCE APPROVAL.

## GENERAL NOTES – SANITARY SEWERS

1. SANITARY SEWERS SHALL GENERALLY BE LOCATED IN THE CENTRE OF THE RIGHT OF WAY.
2. ALL POLYVINYL CHLORIDE (PVC) MAIN LINE SANITARY SEWER PIPE SHALL HAVE WATERTIGHT JOINTS AND MEET CSA STANDARD B182.2, DR35. ALL GASKETTED FITTINGS SHALL BE PVC DR26.
3. SEWERS SHALL BE CONSTRUCTED WITH 19mm CRUSHER RUN LIMESTONE BEDDING AS PER OPSD 802.010, AND 802.030, UNLESS OTHERWISE SPECIFIED BY A GEOTECHNICAL CONSULTANT AND APPROVED BY THE TOWNSHIP.
4. TRENCH BACKFILL APPROVED BY THE GEOTECHNICAL ENGINEER SHALL BE PLACED IN 200mm LIFTS AND COMPACTED TO 95% SPMDD.
5. FRAMES AND COVERS SHALL BE WATERTIGHT IN ACCORDANCE WITH O.P.S.D. 401.010 (CLOSED COVER), EXCEPT WHERE MAINTENANCE HOLES WILL BE SUBMERGED IN THE 100 YEAR STORM EVENT REQUIRE WATERTIGHT COVERS AS PER O.P.S.D. 401.030.
6. THE MINIMUM DEPTH OF SANITARY SEWERS FROM THE CENTERLINE OF ROAD SHALL BE 2.8m. THE MAXIMUM DEPTH TO THE OBVERT OF SANITARY SEWERS WITH DIRECT SERVICE CONNECTIONS SHALL BE 6.0m. WHERE DEEPER SANITARY SEWERS ARE REQUIRED, LOCAL SEWERS SHALL BE CONSTRUCTED TO PROVIDE FOR DIRECT SERVICE CONNECTIONS.
7. INSTALL SEWER DROP CONNECTIONS TO MANHOLES AS PER OPSD 1003.010 AND 1003.020.
8. ALL MAINTENANCE HOLE ADJUSTMENT RINGS SHALL BE MADE WATERTIGHT BY PLACING SEALANT BETWEEN ADJUSTMENT RINGS AND WRAPPED ON THE OUTSIDE OF THE STRUCTURE WITH AN APPROVED COMPOSITE MEMBRANE PRIOR TO BACKFILLING.
9. MAINTENANCE HOLE JOINTS AND PIPE CONNECTIONS AT MAINTENANCE HOLES ARE TO BE MADE WATERTIGHT WITH AN APPROVED COMPOSITE MEMBRANE WRAP, OVERLAPING JOINTS AND CONNECTIONS BY 0.3m ON THE OUTSIDE OF THE STRUCTURE PRIOR TO BACKFILLING.
10. "TRENCH PLUGS" AS SPECIFIED BY THE GEOTECHNICAL ENGINEER SHALL BE USED IN THE TRENCH AND BE PLACED 2 TO 3 METERS UPSTREAM FROM ANY MAINTENANCE HOLE WHICH IS SUSPECTED OF BEING SUSCEPTIBLE TO HIGH WATER LEVELS OF INFLOW/INFILTRATION, SUBJECT TO VERIFICATION BY GEOTECHNICAL ENGINEER.
11. MAINTENANCE HOLE TOPS (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE, AND THEN ADJUSTED TO FINAL GRADE WHEN TOP LIFT OF ASPHALT IS PLACED. GRADE AND CROSSFALL ADJUSTMENT SHALL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE. MODULAR ADJUSTMENT RINGS INCLUDING ADDITIONAL EXTERNAL COMPOSITE WATERPROOF MEMBRANE WRAP ARE TO BE USED TO ADJUST THE MANHOLE TO FINAL GRADE.
12. PRECAST CONCRETE MAINTENANCE HOLES SHALL CONFORM TO OPSD 701.010 FOR 1200mm DIAMETER.
    a. REINFORCED, POURED IN PLACE CONCRETE MAINTENANCE HOLES, ARE SUBJECT TO APPROVAL OF THE TOWNSHIP.
    b. SAFETY PLATFORMS ARE TO BE PROVIDED FOR MAINTENANCE HOLES IN ACCORDANCE WITH PROVINCIAL REGULATIONS.
    c. ALL SANITARY MAINTENANCE HOLES TO HAVE BENCHING TO OBVERT PER OPSD 701.021.
13. MINIMUM CLEARANCES BETWEEN SERVICES SHALL BE PROVIDED IN ACCORDANCE WITH THE ONTARIO BUILDING CODE.
14. ALL TESTING OF THE SANITARY SYSTEM IS TO BE COMPLETED IN ACCORDANCE WITH MECP DESIGN CRITERIA FOR SANITARY SEWERS, STORM SEWERS AND FORCEMAINS FOR ALTERATIONS AUTHORIZED UNDER ENVIRONMENTAL COMPLIANCE APPROVAL.
15. MAINTENANCE HOLE STEPS ARE TO BE SOLID, RECTANGULAR ALUMINUM PER OPSD 405.020.

## GENERAL NOTES – SEWER SERVICE LATERALS

1. SINGLE SANITARY SERVICE LATERAL PIPES SHALL BE 125mm DIAMETER PVC DR28, GREEN IN COLOR. THE SERVICE SHALL BE EXTENDED FROM THE TEST FITTING 1.5m INTO THE LOT WITH A SERVICE SIZE 125mm IS TO BE SLOPED 2% MINIMUM TO 8% MAXIMUM.
2. DOUBLE STORM SERVICE LATERAL PIPES SHALL BE 150mm DIAMETER PVC DR 28, WHITE IN COLOR. SINGLE SERVICE PIPES SHALL BE EXTENDED FROM THE WYE TEST FITTING 1.5m INTO EACH LOT WITH 150mm DIAMETER PVC DR28 SERVICE PIPES.
3. ELEVATION OF SERVICE CONNECTIONS AT THE STREETLINE IS TO BE 2.5m MINIMUM BELOW FINISHED GRADE. EACH SERVICE PIPE EXTENDED 1.5m INTO EACH LOT SHALL BE TERMINATED WITH A WATERTIGHT PLUG.
4. THE LOCATION OF THE WATERTIGHT PLUG FOR EACH SERVICE PIPE SHALL BE STAKED WITH A 50mm x 100mm WOOD MARKER PAINTED GREEN FOR SANITARY AND RED FOR STORM.
5. IF REQUESTED BY THE TOWNSHIP, THE LATERALS SHALL BE INSPECTED BY CCTV FROM THE MAINLINE TO THE DWELLING.
6. SERVICE RISERS SHALL BE PROVIDED WHERE THE DEPTH TO THE SEWER OBVERT EXCEEDS 4.5m. THE RISER SHALL RAISE THE SERVICE PIPE TO A DEPTH OF 3m BELOW CENTERLINE OF ROAD. THE MAXIMUM HEIGHT OF A SERVICE RISER SHALL BE 3m, UNLESS SPECIFICALLY APPROVED BY THE TOWNSHIP..
7. SERVICE CONNECTION BEDDING SHALL BE 19mm CRUSHER RUN LIMESTONE AND INSTALLED PER OPSD 1006.010. RESIDENTIAL SERVICES TO BE SLOPED MINIMUM 2% LONG RADIUS SWEEP BENDS ARE TO BE USED.

## GENERAL NOTES – WATERMAINS

1. WATERMAIN SHALL BE LOCATED AS SHOWN ON THE STANDARD TOWNSHIP ROADWAY CROSS SECTION. WATERMAIN SHALL BE OFFSET FROM STREET LINE AS PER STANDARD ROAD CROSS SECTION.
2. ALL WATERMAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH OPSS.MUNI 441. PIPE MATERIAL SHALL BE A MINIMUM CLASS 150 PVC (DR18) IN ACCORDANCE WITH AWWA C900 STANDARDS, LATEST REVISION.
3. WATERMAIN BEDDING SHALL BE GRANULAR A OR AN APPROVED EQUIVALENT AS PER OPSD 802.010 AND AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. A MINIMUM CLEARANCE BETWEEN THE WATERMAIN AND ALL UTILITIES MUST BE KEPT, WHILE STILL MAINTAINING A MINIMUM DEPTH OF COVER AT ALL TIMES.
5. WATERMAIN SHALL BE INSTALLED WITH A MINIMUM COVER OF 1.8m BELOW THE CENTERLINE OF ROAD.
6. TEMPORARY DEAD-ENDS OF WATERMAINS SHALL BE EQUIPPED WITH A TEMPORARY FIRE HYDRANT.
7. PVC WATERMAIN SHALL INCLUDE TRACER WIRE. A TRACER WIRE SHALL BE PROVIDED ALONG THE TOP OF ALL WATERMAINS. THE WIRE IS TO BE SECURED AT EVERY FITTING AND VALVE AND AT INTERVALS NOT TO EXCEED 2m. ALL TRACING WIRES SHALL BE #8 COOPER PVC COVERED. TRACER WIRE SHALL BE CONTINUOUS FOR THE FULL LENGTH OF THE INSTALLATION. WHERE JOINTS ARE REQUIRED WATERPROOF, CORROSION PROOF CONNECTORS ARE TO BE UTILIZED.
   a. FOR HYDRANTS, THE TRACER WIRE IS TO BE INSTALLED ALONG THE LEAD, TAPED AT A MINIMUM OF 2m INTERVALS. IT SHALL BE BROUGHT TO THE HYDRANT VALVE BOX SURFACE AND LOOPED BACK DOWN TO THE HYDRANT LEAD. THE TRACER WIRE SHALL CONTINUE TO THE HYDRANT, UP TO THE SURFACE TO ATTACH TO THE FLANGE AND BACK TO THE WATERMAIN TO PROVIDE A CONTINUOUS LOOP.
   b. FOR VALVES, THE TRACER WIRE IS TO BE INSTALLED ALONG THE OUTSIDE OF THE VALVE BOX SO THE WIRE DOES NOT INTERFERE WITH THE VALVE WHEEL, GO THROUGH THE SLEEVE HOLE AND BROUGHT BACK TO THE WATERMAIN, TAPED AT MINIMUM 2m INTERVALS.
   c. FOR MUNICIPEX SERVICES OR OTHER PVC SERVICES, THEY SHALL BE INSTALLED ALONG THE SERVICE BETWEEN THE SERVICE SADDLE AND THE CURB STOP, TAPED TO THE SERVICE PIPE AT A MINIMUM OF 2m INTERVALS OR MORE TO ENSURE THE TRACER WIRE DOES NOT DEVIATE FROM THE ALIGNMENT OF THE SERVICE PIPE. THE TRACER WIRE SHALL THEN BE CONNECTED TO THE TAIL NUT ON THE CURB STOP.
8. CONCRETE THRUST BLOCKS ARE NOT PERMITTED. MECHANICAL JOINT RESTRAINTS ARE TO BE INSTALLED AT ALL TEES, HORIZONTAL AND VERTICAL BENDS, HYDRANTS, END OF MAINS AND VALVES, AND IN AREAS OF ENGINEERED FILL INCLUDING SEWER TRENCH BACKFILL. MECHANICAL JOINT RESTRAINTS ARE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ARE TO INCLUDE CATHODIC PROTECTION. HYDRANT TEES TO BE ANCHOR STYLE.
9. EACH FITTING, WATER SERVICE CONNECTION, HYDRANT AND VALVE SHALL BE INSTALLED WITH A ZINC ANODE OR AN APPROVED EQUIVALENT FOR CATHODIC PROTECTION. PROPOSED ALTERNATIVE CATHODIC PROTECTION MEASURES SHALL BE RECOMMENDED BY A GEOTECHNICAL ENGINEER AND ARE SUBJECT TO APPROVAL OF THE TOWNSHIP.
   a. FITTINGS Z-12-24 (12lbs)
   b. HYDRANTS Z-24-28 (24lbs)
   c. TYPE K COPPER WATER SERVICE Z-12-24 (12lbs)
10. A PETROLEUM COATING SYTEM SHALL BE USED.
    a. MATERIAL REQUIREMENTS SHALL BE AS PER AWWA C217, CSA Z245.30-14, AND BE ISO 9001 AND ISO 14001 COMPLIANT. THE INSTALLATION OF THE PETROLATUM COATING SYSTEM SHALL BE IN STRICT CONFORMITY WITH THE FOLLOWING EXCEPTIONS/AMENDMENTS.
    b. ALL SURFACES OF FITTINGS, FLANGED CONNECTIONS, NUTS, BOLTS, TIE RODS, CLAMPS, VALVES, SLEEVES, VICTAULIC COUPLINGS, JOINT RESTRAINTS, ETC., SHALL BE PROTECTED USING PETROLATUM MATERIALS. PRIOR TO APPLICATION ALL SURFACES SHALL BE FREE OF DIRT, GREASE, OIL, PAINT, OR FOREIGN MATERIAL. THE MINIMUM ACCEPTABLE APPLICATION OF A PETROLEUM COATING SYSTEM IS A TWO-STEP PROCESS CONSISTING OF A PRIMER AND PETROLEUM TAPE. WHERE VOIDS OR OTHER SURFACE IRREGULARITIES ARE ENCOUNTERED, FILLER MATERIAL IS REQUIRED WHERE TAPE WILL NOT COME INTO FULL CONTACT WITH SURFACES. PLACEMENT OF PETROLEUM TAPE ONLY IS NOT ACCEPTABLE
    c. ALL SURFACES OF PIPES, VALVES, FITTINGS, AND APPURTENANCES IN VALVE CHAMBERS SHALL BE COATED USING PETROLATUM MATERIALS. VALVES OR APPURTENANCES THAT ARE EPOXY COATED DO NOT REQUIRE THIS PROCEDURE.
    d. PETROLATUM COATINGS SHALL BE DENSO OR APPROVED EQUIVALENT.
11. CAST IRON MECHANICAL JOINT FITTINGS MEETING AWWA SPECIFICATIONS C-110 AND C.S.A. B137.2 SHALL BE USED ON PVC WATERMAIN 150mm TO 300mm IN DIAMETER.
12. ALL VALVES SHALL BE RESILIENT WEDGE GATE VALVES WITH VALVE BOX UNLESS OTHERWISE APPROVED BY THE TOWN. VALVES SHALL HAVE A NON-RISING STEM AND A 50mm SQUARE OPERATING NUT, OPENING COUNTER-CLOCKWISE.
13. VALVES IN EXCESS OF 1.8m IN DEPTH SHALL REQUIRE A VALVE STEM EXTENSION.
14. VALVE CHAMBERS SHALL BE PROVIDED ON WATERMAINS 300mm DIAMETER AND ABOVE.
15. HYDRANTS SHALL BE LOCATED A MINIMUM OF 1m FROM THE EDGE OF DRIVEWAYS. OTHER ABOVE GROUND UTILITIES SUCH AS LIGHT STANDARDS, TRANSFORMER OR STREET SIGNS SHALL NOT BE LOCATED ANY CLOSER THAN 3m TO A HYDRANT. HYDRANTS SHALL BE LOCATED IN CLOSE PROXIMITY TO A LOT LINE.
16. HYDRANTS SHALL BE INSTALLED IN ACCORDANCE WITH OPSD 1105.010. HYDRANTS SHALL BE CANADA VALVE "CENTURY" HYDRANTS. ALL HYDRANTS TO BE FITTED WITH 2-65mm HOSE NOZZLES AND 1-100mm STORZ TYPE PUMPER NOZZLE. ALL HYDRANTS ARE TO BE OPENCOUNTER CLOCKWISE AND TO BE COATED WITH HIGH QUALITY (TREMCLAD) YELLOW PAINT. THE PUMPER NOZZLE SHALL BE PAINTED BLACK. A 4" YELLOW HYDRANT MARKER SHALL BE PROVIDED FOR EACH HYDRANT. EACH HYDRANT SHALL HAVE A MARK-A-HYDRANT COLOR CODED TO IDENTIFY THE FLOW RATE.
17. A MINIMUM CLEAR HORIZONTAL SEPARATION OF 2.5m SHALL BE MAINTAINED BETWEEN THE WATERMAIN AND ANY SEWER. WHEN A WATERMAIN PASSES UNDER A SEWER A MINIMUM CLEAR SEPERATION OF 0.5m SHALL BE MAINTAINED BETWEEN THE WATERMAIN AND SANITARY SEWER.
18. PIPE DEFLECTION SHOULD BE USED WHEREVER POSSIBLE TO MINIMIZE THE USE OF BENDS. WHEREVER IT IS NECESSARY TO DEFLECT FROM A STRAIGHT LINE, EITHER IN THE VERTICAL OR HORIZONTAL PLANE, THE AMOUNT OF DEFLECTION SHALL NOT EXCEED 50% OF THE RECOMMENDATIONS OF THE MANUFACTURER.
19. THE MAXIMUM SIZE OF CONNECTION THAT CAN BE TAPPED INTO A 150mm DIAMETER WATERMAIN IS 50mm IN DIAMETER. WATER SERVICE CONNECTIONS 75mm IN DIAMETER AND LARGER SHALL BE MADE BY INSTALLING A TEE ON THE SUPPLY MAIN.
20. THE TOWNSHIP ENGINEER MUST BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF ANY PRESSURE AND LEAKAGE TESTING, CHLORINATION OR FLUSHING WHICH MUST BE CARRIED OUT IN ACCORDANCE WITH TOWNSHIP REQUIREMENTS, OPSS.MUNI 441, AND THE MECP 2020 WATERMAIN DISINFECTION PROCEDURE.

## GENERAL NOTES – WATER SERVICES

1. RESIDENTIAL LOTS SHALL HAVE A SINGLE 25mm DIAMETER, TYPE K COPPER OR MUNICIPEX (PEXa) WATER SERVICE. ALL MUNICIPEX WATER SERVICES SHALL INCLUDE TRACER WIRE.
2. SERVICES SHALL BE INSTALLED ACCORDING TO OPSD 1104.010 AND 1104.020.
3. WATER SERVICES SHALL BE LOCATED BASED ON THE TYPICAL STANDARD DRAWINGS AND SHALL NOT BE LOCATED UNDERNEATH DRIVEWAYS. THE CURB STOPS SHALL BE A MINIMUM OF 0.5m FROM THE EDGE OF THE DRIVEWAY. THE CURB STOP SHALL BE INSTALLED AT THE STREET LINE AND THE SERVICE SHALL BE EXTENDED 1.5m INTO THE LOT. THE LOCATION OF THE EXTENDED SERVICE INTO THE LOT IS TO BE STAKED WITH A 50mm X 100mm WOOD MARKER PAINTED BLUE.
4. THE MINIMUM DEPTH OF COVER IS 1.8m.
5. NO COUPLINGS WILL BE ALLOWED BETWEEN THE CURB STOP AND MAIN STOP.
6. STAINLESS STEEL SERVICE SADDLES SHALL BE USED WHEN TAPPING INTO THE PVC WATERMAIN.
7. THE TOWNSHIP WILL PROVIDE THE METER KIT (INCLUDING REMOTE READOUT) WHICH SHALL BE PAID FOR THE APPLICANT OF THE BUILDING PERMIT AND INSTALLED BY THE APPLICANT'S PLUMBER PER THE TOWNSHIP'S STANDARD DRAWING.

## GENERAL NOTES – LOT GRADING

1. LOTS ARE TO BE RESTORED AND STABILIZED WITH A MINIMUM DEPTH OF 150mm AND A MAXIMUM DEPTH OF 250mm OF TOPSOIL AND No. 1 NURSERY SOD.
2. ALL ROOF LEADERS AND DOWNSPOUTS ARE TO BE DIRECTED TO GRASSED AREAS AND SHALL NOT DISCHARGE TO PAVED OR CONCRETE SURFACES.
3. ALL DOWNSPOUTS ARE TO BE DISCHARGED 1m FROM THE BUILDING (BY-LAW 2021-013) UNLESS TOWNSHIP BUILDING DEPARTMENT APPROVES OTHERWISE
4. ALL SWALES SHALL BE LOCATED ON THE PROPERTY LINE UNLESS OTHERWISE SHOWN ON THE DETAIL DESIGN DRAWINGS.
5. ALL RESIDENTIAL LOTS SHALL HAVE A MINIMUM OF 2% SLOPE PROVIDING POSITIVE DRAINAGE AWAY FROM THE HOUSE. ALL GRADING SHALL ENSURE THAT A FLATTER AREA SLOPED AWAY FROM THE HOUSE AT 2-5% IS PROVIDED FOR AT LEAST A 3m WIDTH AT THE REAR OF THE HOUSE TO PROVIDE AN AMENITY SPACE FOR THE OWNER.
6. THE FINAL ELEVATION AT THE BUILDING EDGE SHALL COMPLY WITH THE ONTARIO BUILDING CODE.

GENERAL NOTES ARE TO BE MODIFIED BASED ON REPORT RECOMMENDATION AND REQUIREMENTS. THE NOTES & DRAWINGS ARE TO HAVE SUFFICIENT DETAIL THAT THERE IS NO REQUIREMENT TO REFER BACK TO REPORTS. THESE ARE INTENDED AS A BASE BUT ARE INTENDED AS A BASE BUT ARE INTENDED TO BE SUPPLEMENTED BASED ON THE ACTUAL PROJECT AND SITE CONDITIONS.

| No. | Revision | Date | By | Appr'd |
|---|---|---|---|---|
| 4. | | | | |
| 3 | | | | |
| 2 | | | | |
| 1. | | | | |

Benchmarks

| No. | Elevation | Description |
|---|---|---|
| | | |

CONSULTANT

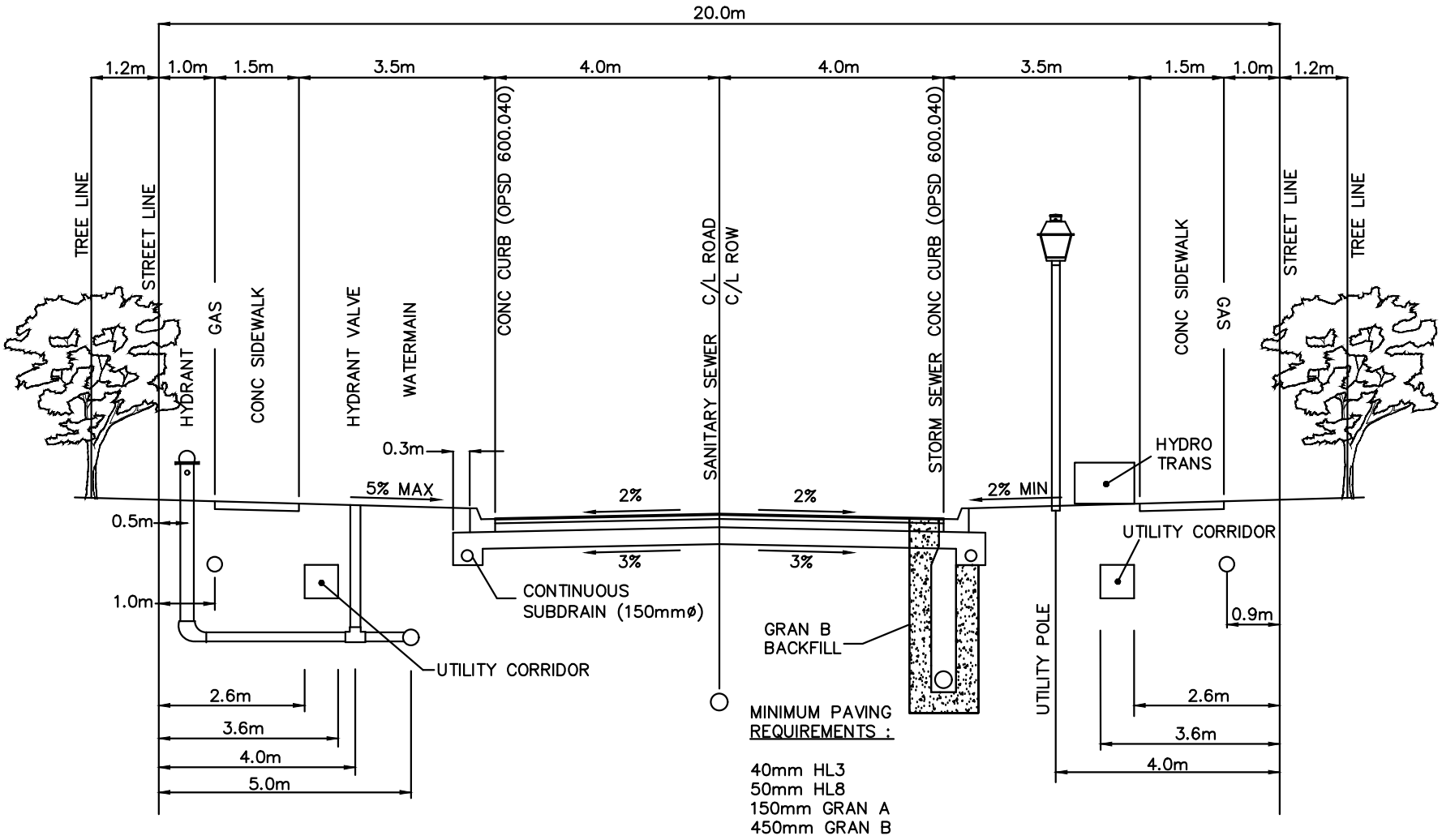
ACCEPTED
TOWNSHIP OF MAPLETON

SIGNATURE DATE

(CONSULTANTS COMPANY INFO & LOGO)

(PROJECT NAME)
GENERAL NOTES

| | | |
|---|---|---|
| Surveyed by: | Checked by: | Project No. ??-?? |
| Drawn by: | Approved by: | |
| Designed by: | Date: | Drawing No. A-02 |
| Scale Horz. 1:500 Vert. 1:50 (0m 10m 20m / 0m 1m 2m) | | Sheet No. - OF - |




NOTES:

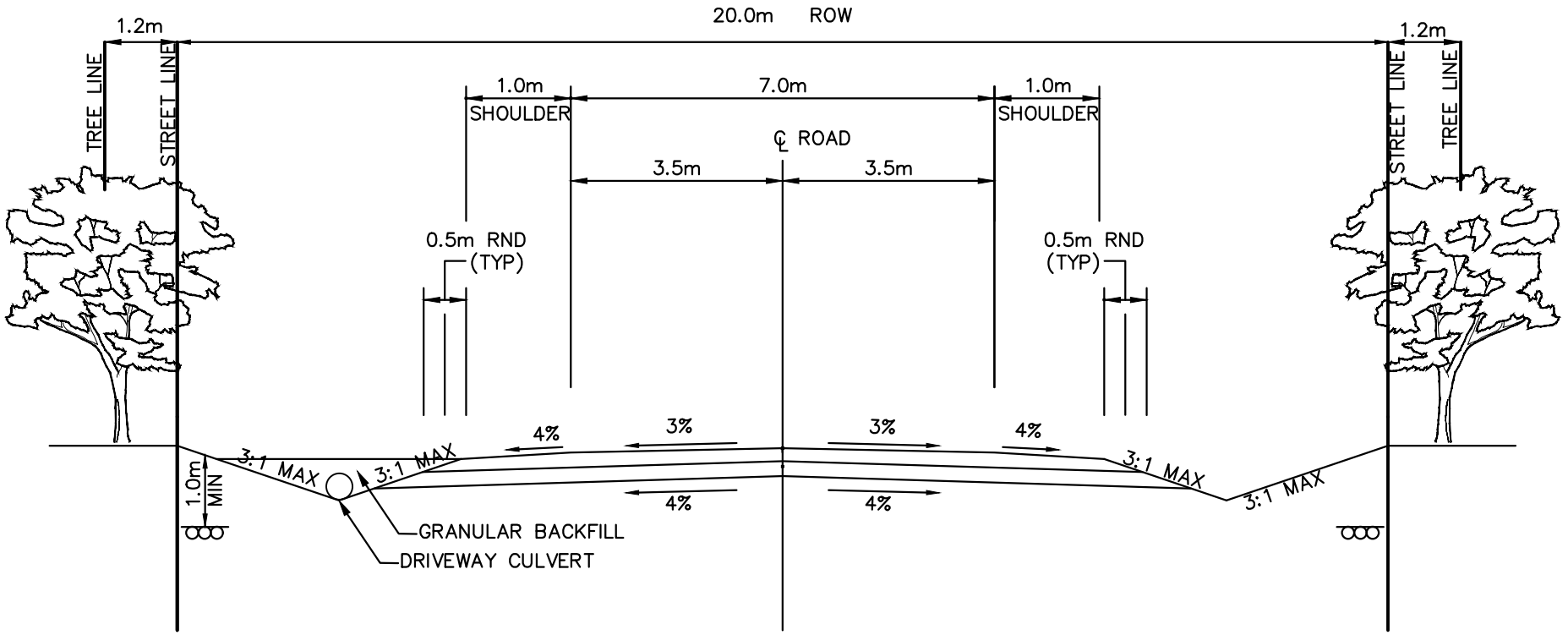
– FOR LOCAL ROADS, SIDEWALK TYPICALLY REQUIRED ON ONE SIDE OF THE STREET (STREET LIGHT SIDE).
– FOR ALMA MUNICIPAL WATER AND WASTEWATER IS NOT PRESENT.

TOWNSHIP OF MAPLETON

Mapleton

# TYPICAL ROAD CROSS SECTION 20.0m ROAD ALLOWANCE URBAN SECTION (DRAYTON, MOOREFIELD AND ALMA)

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | B–01 |




NOTES:

1. BOULEVARD SLOPES – 2% MIN., 8% MAX.
2. GRANULAR BASED TO BE CONFIRMED BY SOILS REPORT.
3. DITCHES TO BE 150mm MIN. BELOW GRANULAR ROAD BASE.
4. MINIMUM ROAD GRADE – 0.50%
5. MAXIMUM ROAD GRADE – 6%
6. ALL HYDRO, BELL AND OTHER UTILITIES TO BE APPROVED THROUGH MUNICIPAL CONSENT. ALL UTILITIES TO BE AS CLOSE AS POSSIBLE TO THE PROPERTY LINE.
7. MINIMUM DITCH PROFILE SLOPE REQUIRED IS 1.0%.
8. DRIVEWAY CULVERTS TO BE AS PER DWG. No. B–10
9. BOULEVARD AND DITCHES ARE TO BE TOPSOILED WITH A MINIMUM DEPTH OF 150mm AND SEEDED.
10. SIDE SLOPES OF DITCHES TO BE REDUCED TO 4:1 MAX IN RESIDENTIAL SUBDIVISIONS.
11. EASEMENTS AT ALL TRANSFORMER LOCATIONS WILL NEED TO BE PROVIDED IN FAVOUR OF HYDRO ONE AND ENBRIDGE.

MIN. REQUIREMENTS

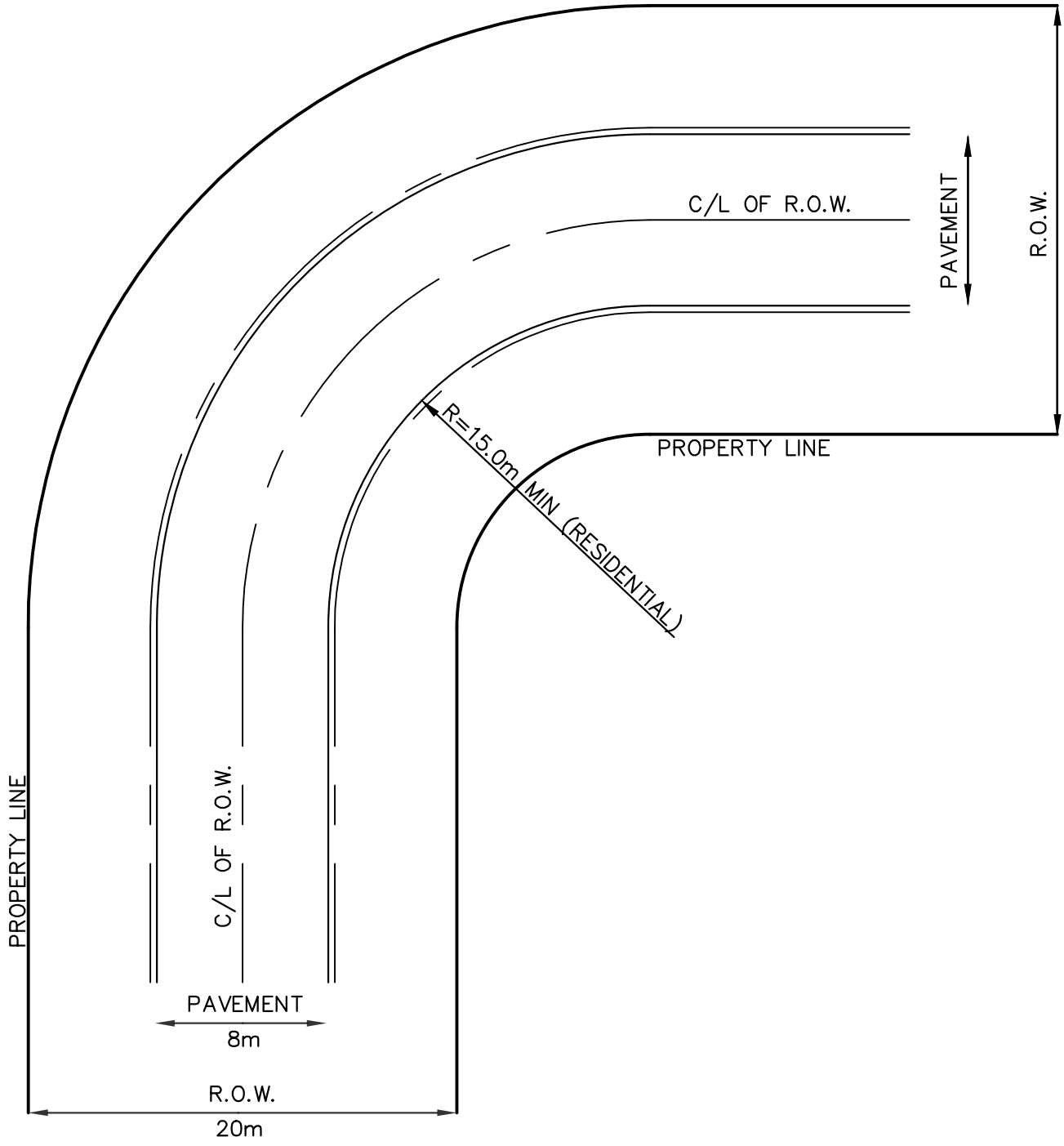
– 150mm GRANULAR 'A'
– 400mm GRANULAR 'B'

TOWNSHIP OF MAPLETON

Mapleton

# TYPICAL ROAD CROSS SECTION (20.0m ROAD ALLOWANCE DITCHED)

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | B–02 |



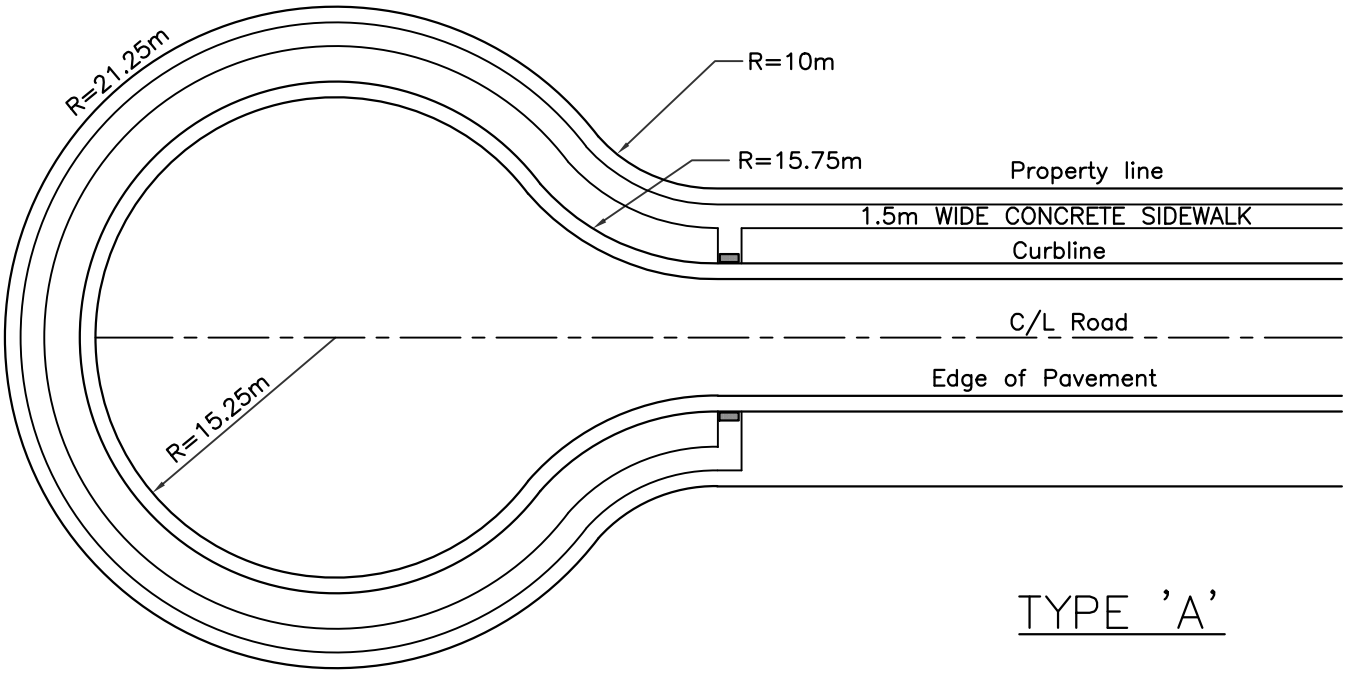

NOTES:

1. GUTTER ELEVATIONS AND GRADES TO BE SPECIFIED ON PLANS.
2. PAVEMENT AND BOULEVARD WIDTHS TO REMAIN CONSTANT THROUGHOUT.
3. FOR INDUSTRIAL ROADS, THE MINIMUM RADIUS OF R=15.0m SHALL BE INCREASED TO A MINIMUM RADIUS OF R=18.0m.

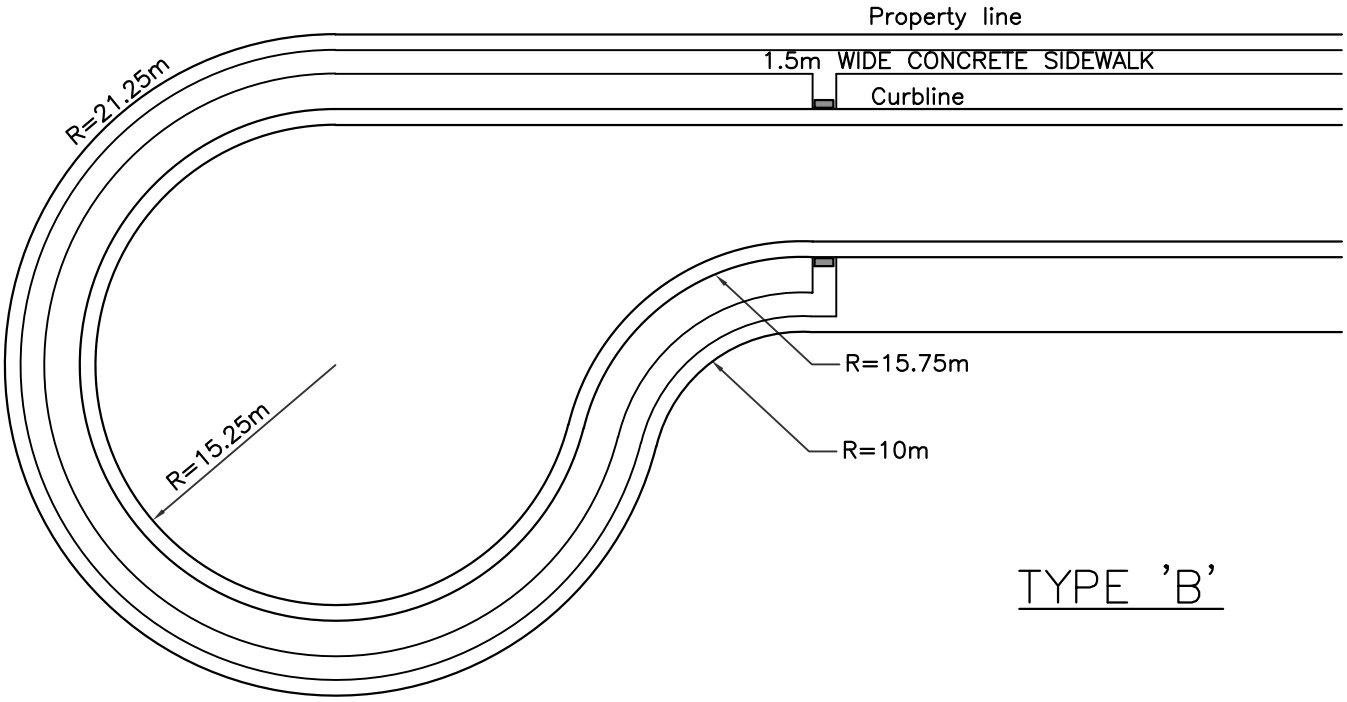
TOWNSHIP OF MAPLETON

# TYPICAL 90° BEND DETAIL

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | B-06 |




TYPE 'A'



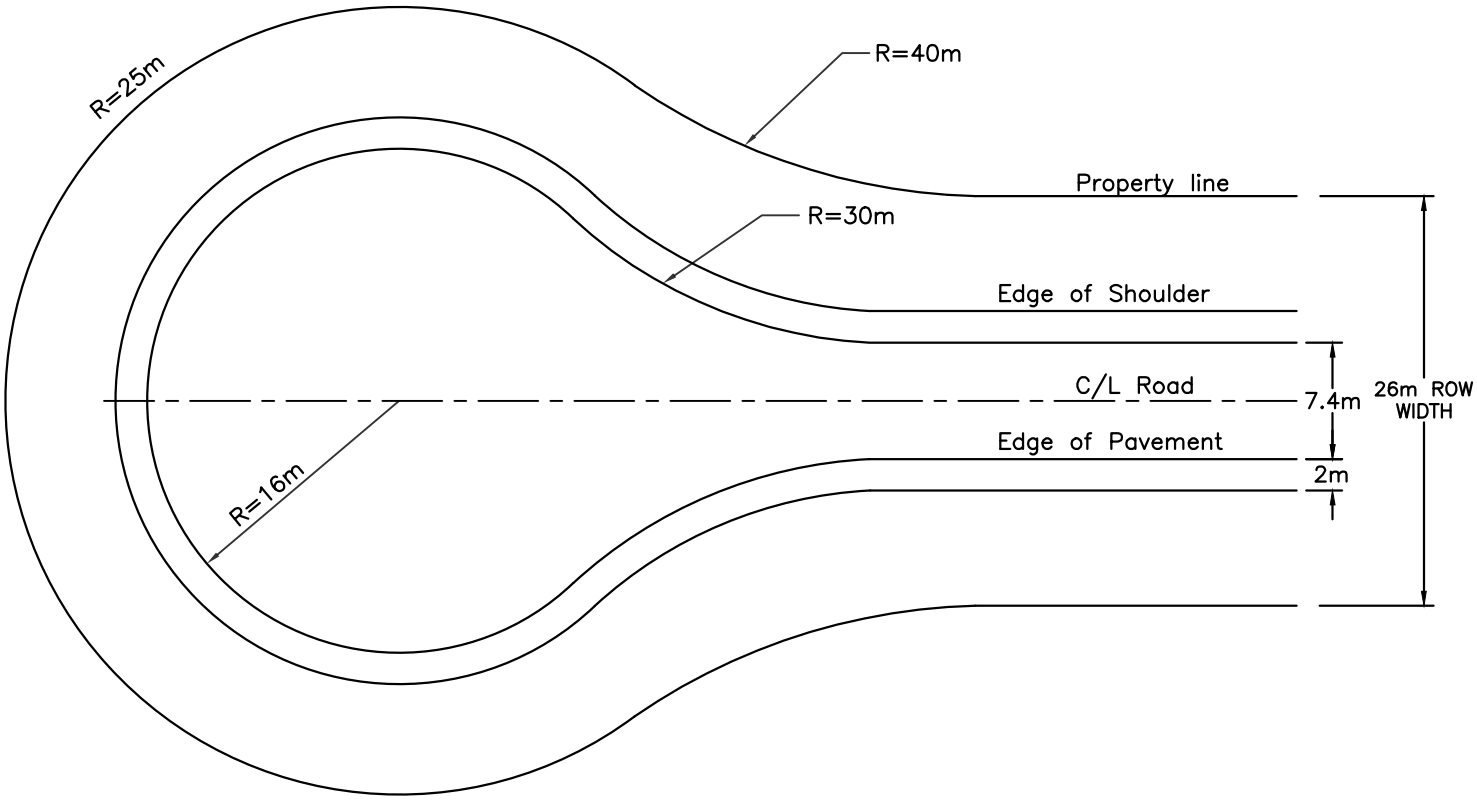

TYPE 'B'

TOWNSHIP OF MAPLETON

Mapleton

# TURNING BASIN RESIDENTIAL

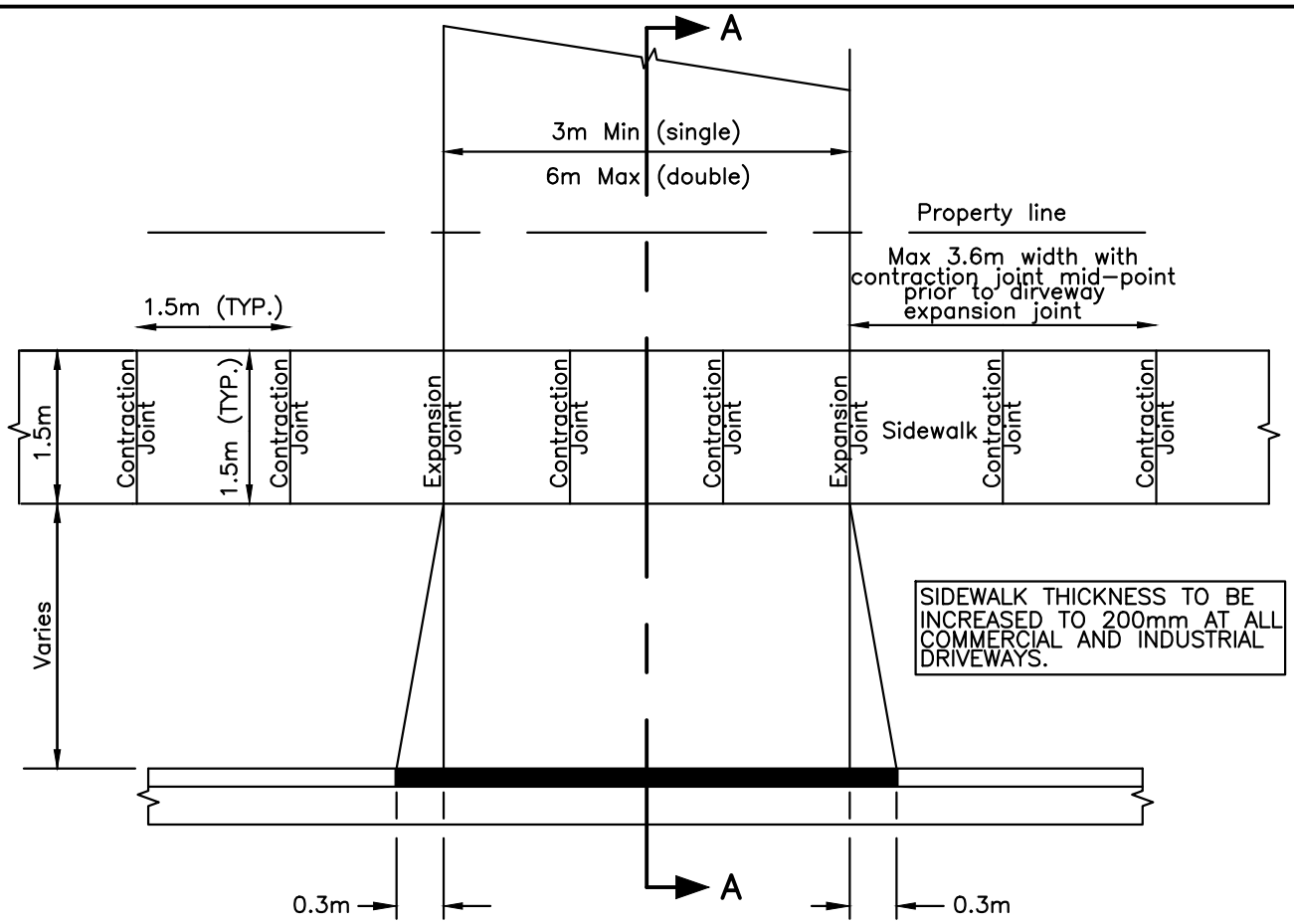
| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | B-07 |



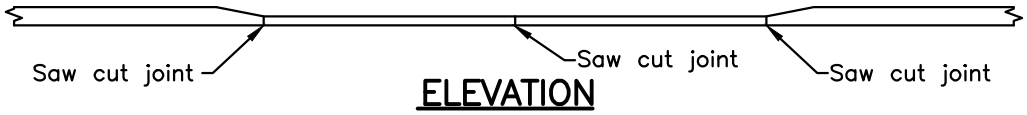

TOWNSHIP OF MAPLETON

# TURNING BASIN INDUSTRIAL

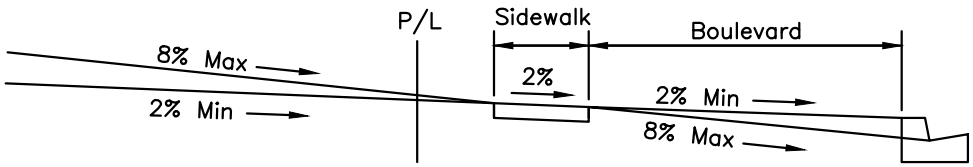
| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | B-08 |




PLAN




ELEVATION

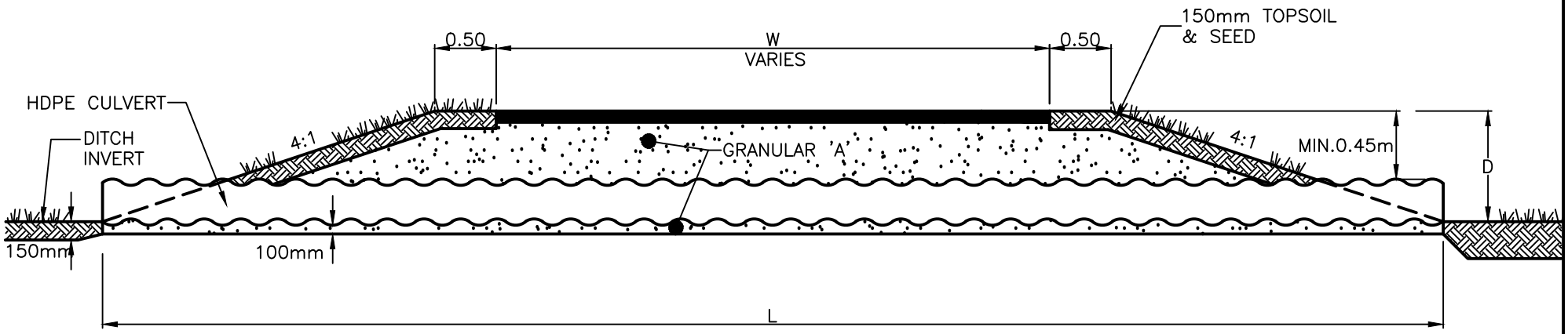



SECTION A–A

## NOTES:

1 Driveway width to match garage width (outside walls) in new developments or existing driveway in older areas. Maximum 6m at property line or sidewalk. No portion of the municipal water service should be covered by the driveway including the curb stop unless approved by the Township Engineer or Director of Public Works.
2 Driveway grades in redevelopment areas may be varied to suit existing conditions.
3 Driveway to be paved from curb to garage/dwelling. Driveway structure to include minimum 200mm Granular 'A' and 50mm HL3 asphalt.
4 Contraction joints on the sidewalk to be placed uniformly through driveways and expansion joints to be placed at either end.

| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | URBAN RESIDENTIAL DRIVEWAY DETAIL | DATE: ---<br>ISSUE NO. 0<br>SCALE: N.T.S.<br>DWG. NO. B–09 |




NOTES:

1. DRIVEWAY CULVERTS TO BE 400mmø (MINIMUM). WHERE APPROVED BY TOWNSHIP ENGINEER. CULVERT SIZES MAY BE REDUCED TO ACCOMMODATE SHALLOW DITCHES PROVIDING A 10 YEAR DESIGN STORM CAPACITY IS MAINTAINED.
2. CULVERT MATERIAL TO BE HDPE (BOSS 2000). ALTERNATIVE MATERIAL MAY BE ACCEPTED BY THE TOWNSHIP. IF CSP CULVERT IS APPROVED, THE MINIMUM WALL THICKNESS OF CSP CULVERTS SHALL BE AS FOLLOWS:
   RESIDENTIAL – 1.6mm
   INSTITUTIONAL/COMMERCIAL/INDUSTRIAL – 2.0mm
3. DRIVEWAY STRUCTURE PER TOWNSHIP STANDARDS.
4. DRIVEWAY CULVERT TO BE BACKFILLED WITH GRANULAR 'A' TO OBVERT OF PIPE AND COMPACTED TO 100% S.P.D.
5. THE NUMBER OF COUPLINGS ARE TO BE MINIMIZED AND SHALL NOT EXCEED THE FOLLOWING NUMBER NOTED BELOW BASED ON CULVERT LENGTH:
   CULVERT UP TO 6m: 1 COUPLING
   CULVERT GREATER THAN 6m UP TO 12m: 2 COUPLINGS
   CULVERT GREATER THAN 12m UP TO 18m: 3 COUPLINGS
   CULVERT GREATER THAN 18m UP TO 24m: 4 COUPLINGS
6. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.

LENGTH OF CULVERT

L = W + 8D + 1

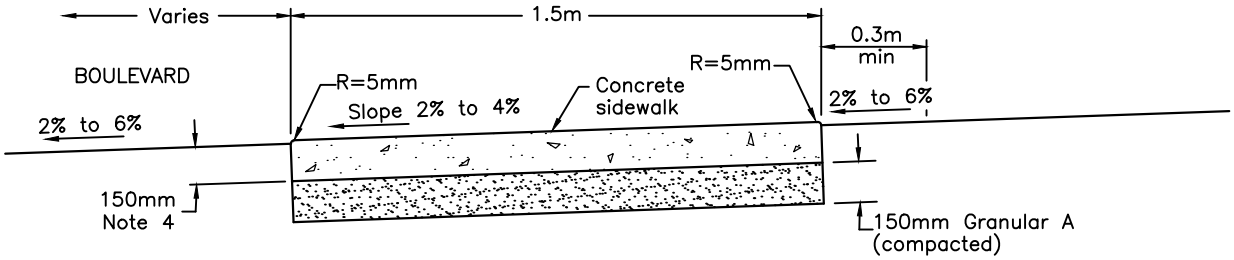
RESIDENTIAL: MAX "W" IS 6m
FARM FIELD ENTRANCE: MAX "W" IS 6m
INDUSTRIAL/COMMERCIAL/INSTITUTIONAL: MAX 'W' IS 12m
*INDUSTRIAL/COMMERCIAL/INSTITUTIONAL THAT REQUIRE GREATER THAN 12m DRIVEWAY SHALL PROVIDE AUTOTURN DRAWINGS AND WILL BE SUBJECT TO ACCEPTANCE BY THE TOWNSHIP

TOWNSHIP OF MAPLETON

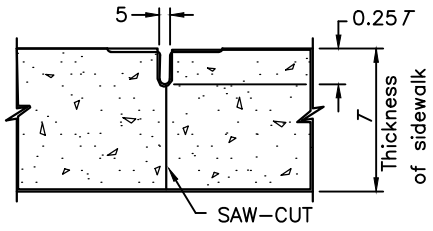
Mapleton

# DITCHED DRIVEWAY

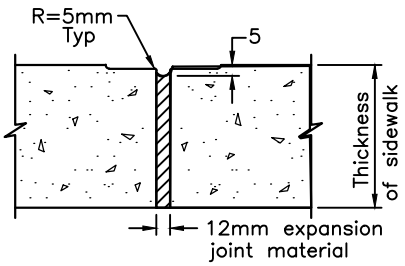
| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | B–10 |



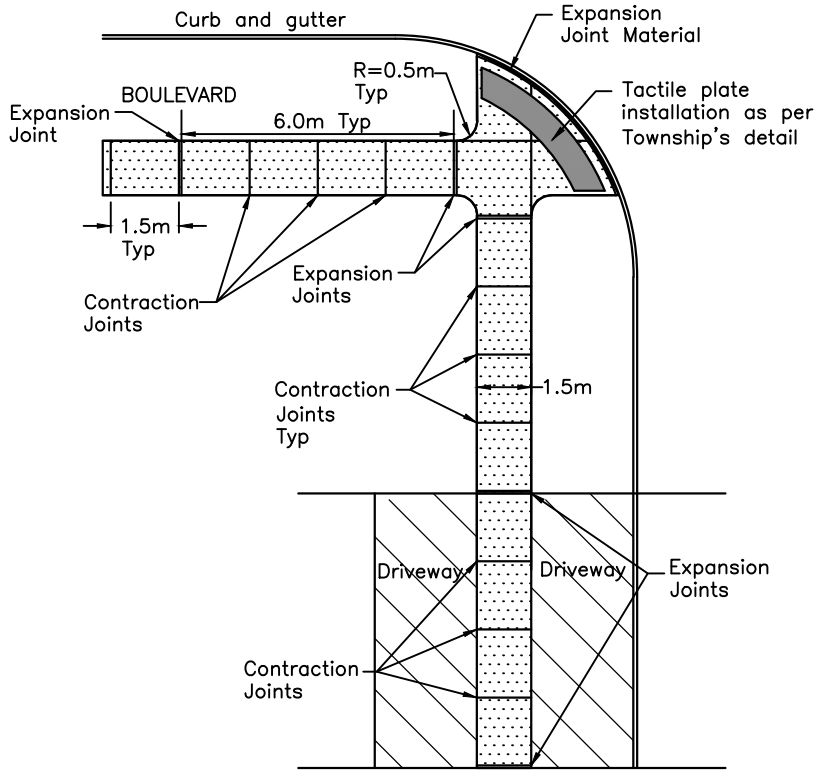

## TYPICAL SECTION




## CONTRACTION JOINT




## EXPANSION JOINT




## JOINT LAYOUT

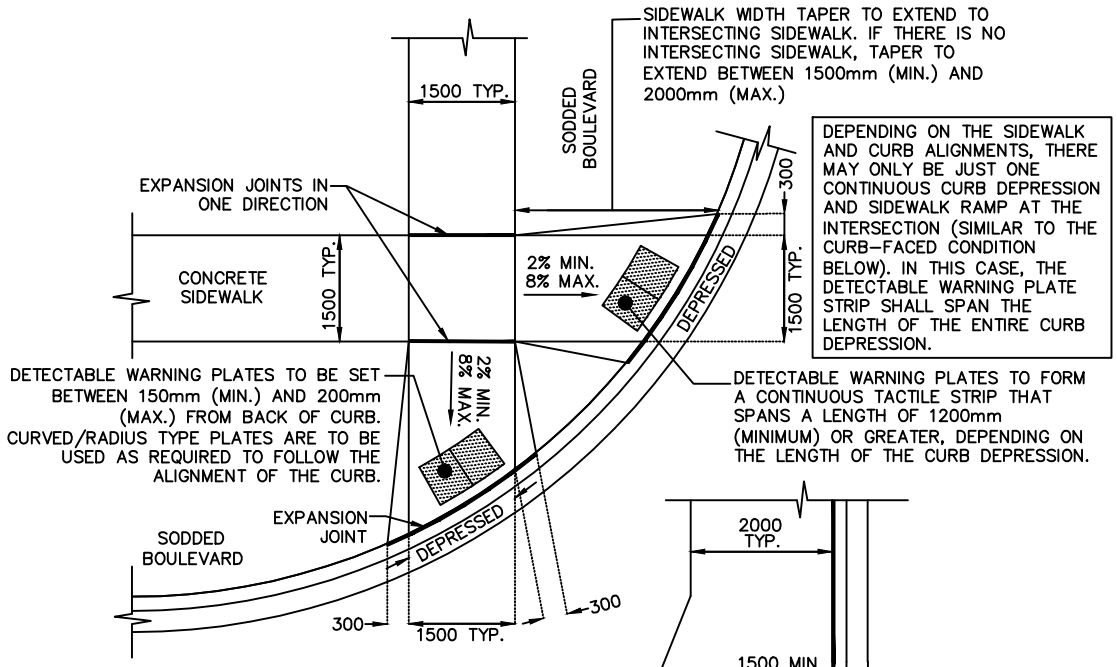
## NOTES:

1. Expansion joints to be provided every 6m and at driveway edges.
2. Contraction joints shall be saw-cut.
3. The concrete design mix shall be according to OPSS 1350 and the following requirements:
   - Class of Concrete: 32Mpa @ 28 days C-2
   - Course aggregate: 19.0mm nominal maximum size
   - Maximum Slump: 60mm
   - Air Content: 6.0% +/- 1.5%
   - Water/Cementing Material Ratio: Max 0.45
4. The sidewalk thickness shall be 150mm and increased to 200mm at commercial or industrial driveways
5. The sidewalk shall have a broom finish.
6. A 12mm Bituminous fibre expansion joint to be used against any hard surface such as an existing concrete driveway.

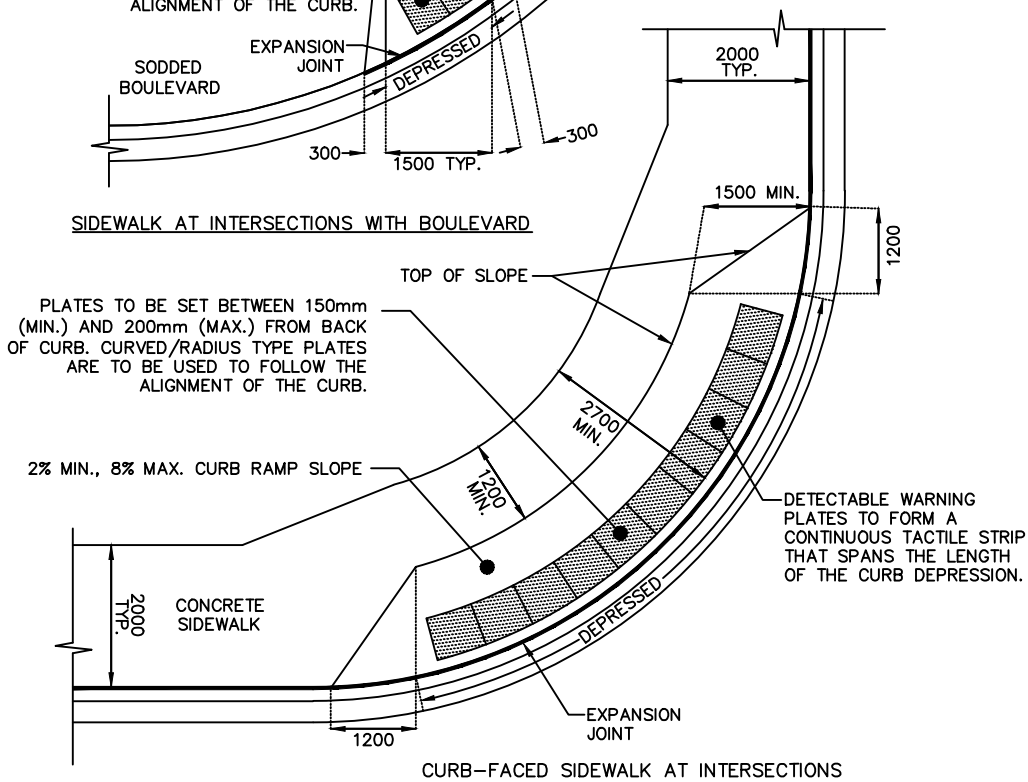
TOWNSHIP OF MAPLETON

# CONCRETE SIDEWALK

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | B-11 |




SIDEWALK AT INTERSECTIONS WITH BOULEVARD




CURB-FACED SIDEWALK AT INTERSECTIONS

NOTES

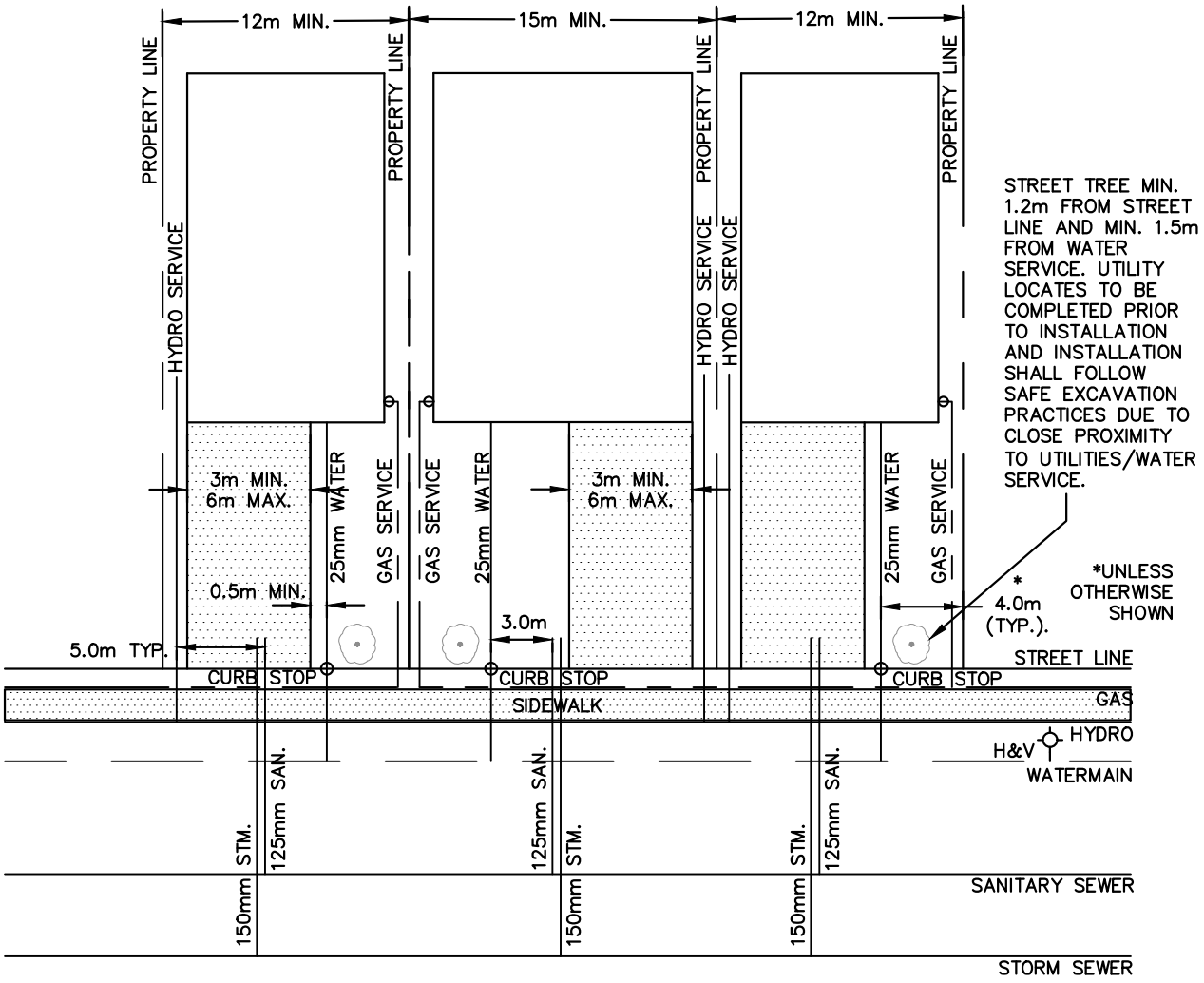
1. THIS STANDARD IS TO BE USED AS A GUIDE ONLY AND WILL REQUIRE ADJUSTMENTS TO SUIT FIELD CONDITIONS.
2. TACTILE PLATES SHALL BE THE TUFTILE CAST IRON TACTILE PLATE YELLOW (WET SET) STINSON OWL-LITE:
   - 24"X24" D1-TTC12424YEL
   - 24"X12" D1-TTC12412YEL
   - RADIUS PLATES AS REQUIRED IF ABOVE PLATES ARE NOT UTILIZED
3. A SUMMARY OF THE TACTILE PLATES USED AT EACH INTERSECTION SHALL BE PROVIDED TO THE TOWNSHIP AS PART OF THEIR ASSET MANAGEMENT.

ALL DIMENSIONS ARE EXPRESSED IN MILLIMETRES (mm) UNLESS OTHERWISE NOTED.

TOWNSHIP OF MAPLETON

# TACTILE PLATE INSTALLATION

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | B-12 |




NOTES

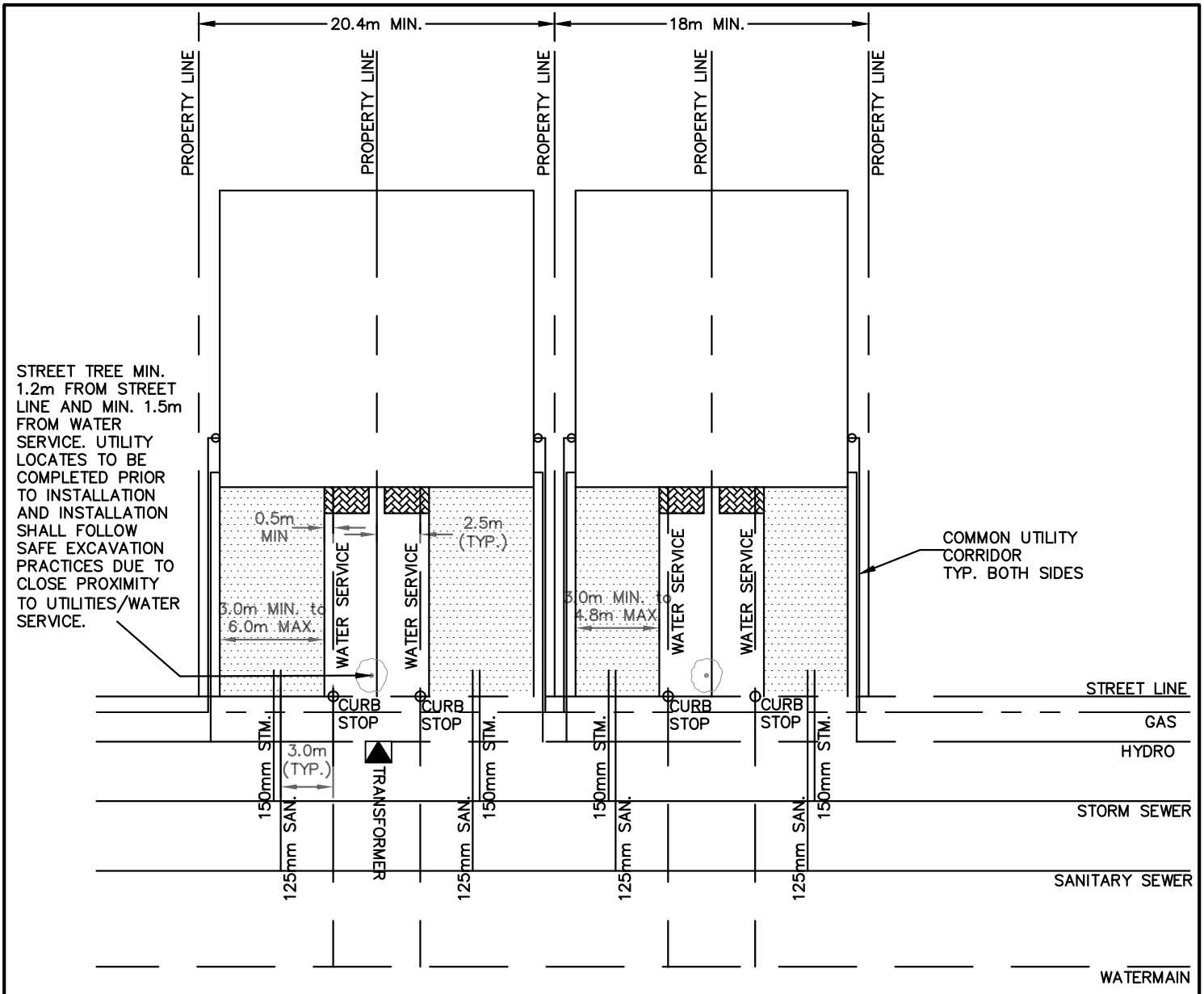
1. PROPOSED DRIVEWAY APRONS TO BE SHOWN ON DRAWINGS.
2. WATER SERVICES WILL NOT BE PERMITTED WITHIN DRIVEWAYS UNLESS OTHERWISE APPROVED BY THE TOWNSHIP.
3. HOUSE DESIGN SHALL DISCHARGE RAINWATER LEADERS TO GRASSED LOCATIONS AND NOT ON DRIVEWAYS OR AREAS WHERE WALKWAYS WOULD LIKELY BE CONSTRUCTED TO FRONT DOORS
4. BUILDERS
   (A) IF STORM SERVICES ARE NOT AVAILABLE TO THE LOT, THE SUMP PUMP SHALL DISCHARGE TO THE REAR YARD AT LEAST 1m FROM THE HOUSE (BY–LAW 2021–013).
   (B) ALL RAINWATER LEADERS SHALL DISCHARGE 1m FROM THE HOUSE (BY–LAW 2021–013) UNLESS THE TOWNSHIP BUILDING DEPARTMENT APPROVES OTHERWISE.
5. REGARDLESS OF GARAGE WIDTH, THE MAXIMUM DRIVEWAY WIDTH IN THE MUNICIPAL BOULEVARD IS 6m.

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.

TOWNSHIP OF MAPLETON

# TYPICAL DETACHED LOT SERVICE ARRANGEMENT

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | C–01 |




NOTES

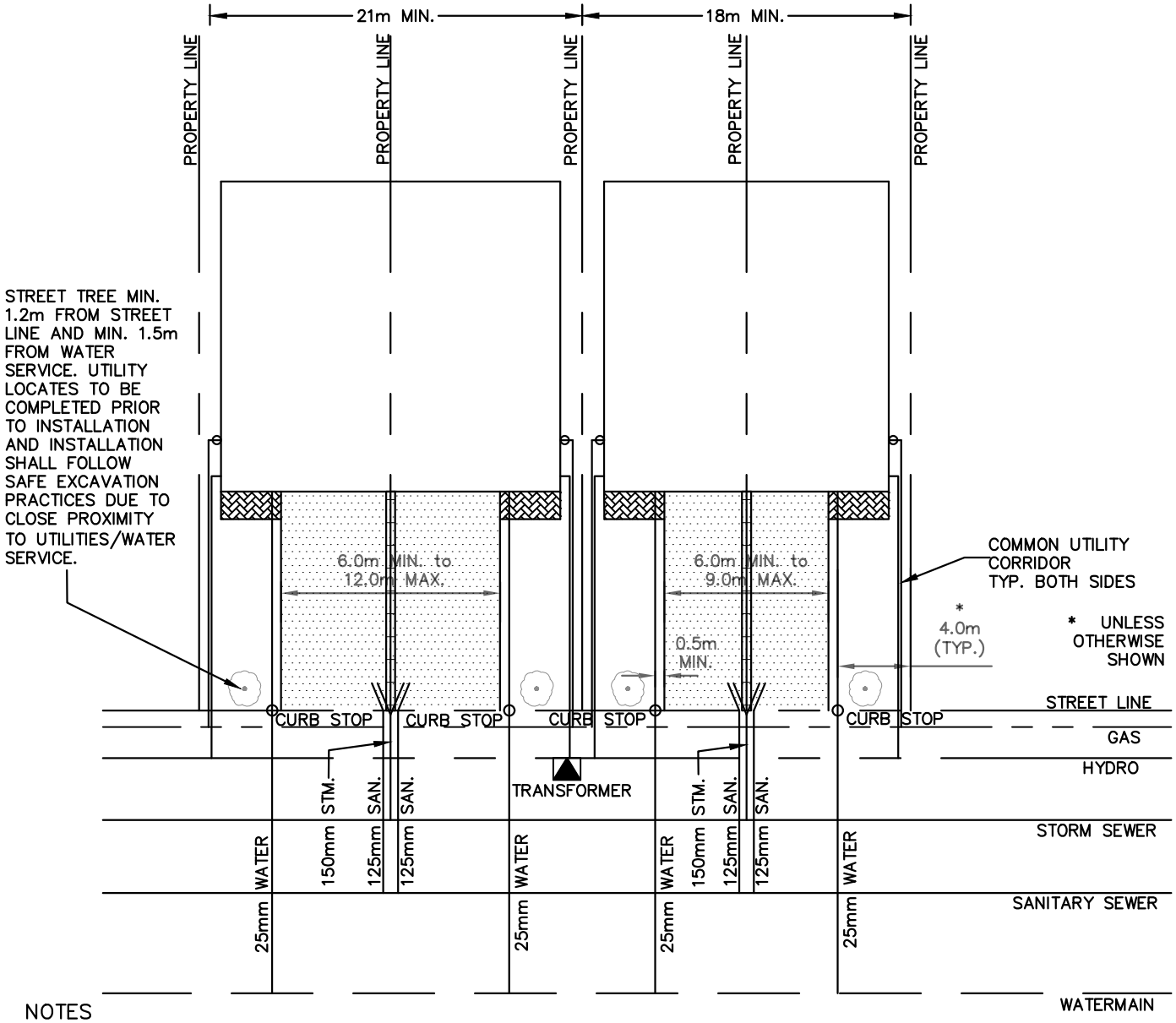
1. PROPOSED DRIVEWAY APRONS TO BE SHOWN ON DRAWINGS.
2. WATER SERVICES WILL NOT BE PERMITTED WITHIN DRIVEWAYS UNLESS OTHERWISE APPROVED BY THE TOWNSHIP.
3. RAINWATER LEADERS TO DISCHARGE TO GRASSED LOCATIONS AND NOT ON DRIVEWAYS OR AREAS WHERE WALKWAYS WOULD LIKELY BE CONSTRUCTED TO FRONT DOORS.
4. BUILDERS
   (A) IF STORM SERVICES ARE NOT AVAILABLE TO THE LOT, THE SUMP PUMP SHALL DISCHARGE TO THE REAR YARD AT LEAST 1m FROM THE HOUSE (BY-LAW 2021-013)
   (B) ALL RAINWATER LEADERS SHALL DISCHARGE 1m FROM THE HOUSE (BY-LAW 2021-013 UNLESS THE TOWNSHIP BUILDING DEPARTMENT APPROVES OTHERWISE.

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.

TOWNSHIP OF MAPLETON

# TYPICAL SEMI-DETACHED LOT SERVICE ARRANGEMENT OPTION A

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | C-02 |




NOTES

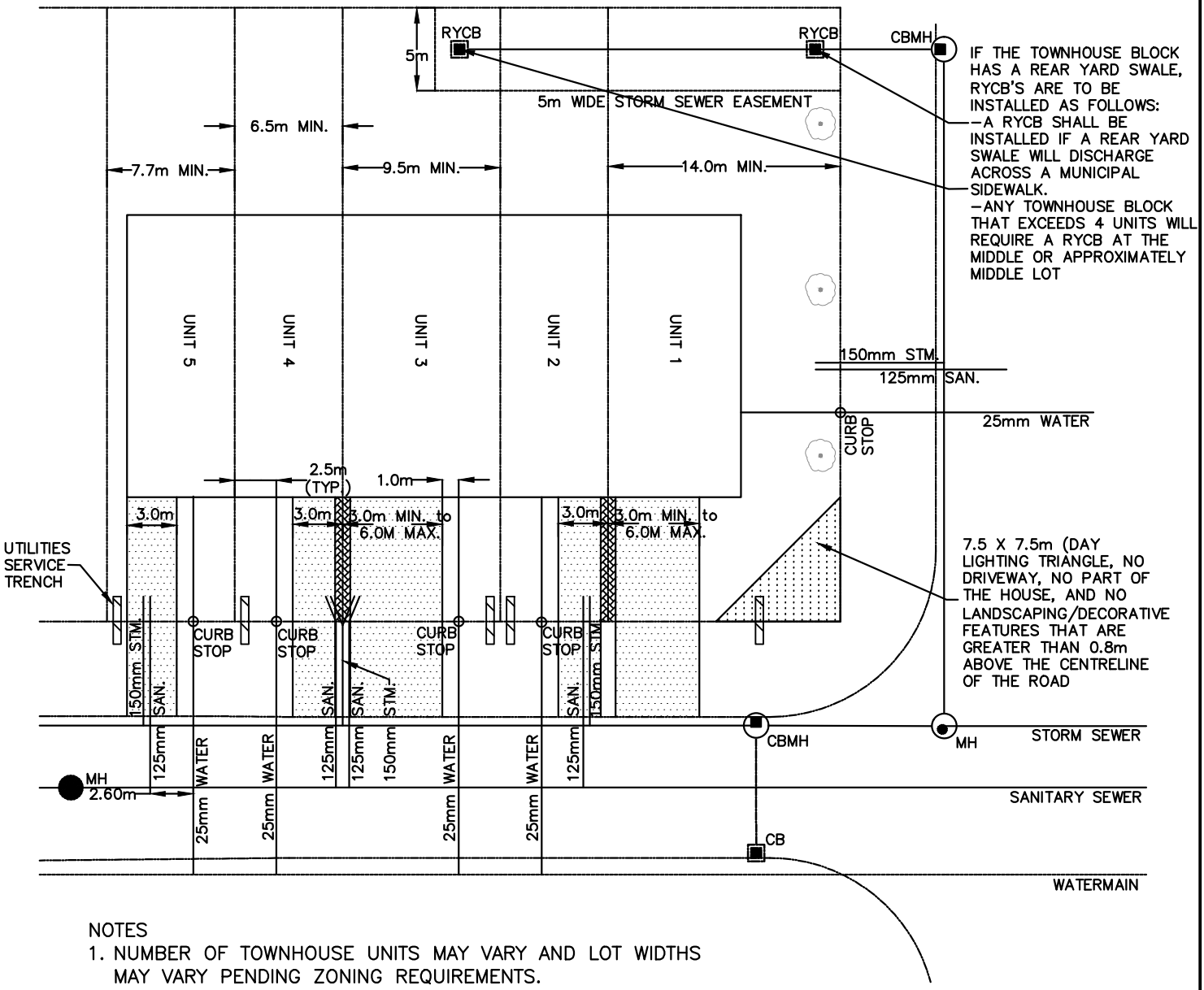
1. PROPOSED DRIVEWAY APRONS TO BE SHOWN ON DRAWINGS.
2. WATER SERVICES WILL NOT BE PERMITTED WITHIN DRIVEWAYS UNLESS OTHERWISE APPROVED BY THE TOWNSHIP.
3. RAINWATER LEADERS TO DISCHARGE TO GRASSED LOCATIONS AND NOT ON DRIVEWAYS OR AREAS WHERE WALKWAYS WOULD LIKELY BE CONSTRUCTED TO FRONT DOORS.
4. BUILDERS
   (A) IF STORM SERVICES ARE NOT AVAILABLE TO THE LOT, THE SUMP PUMP SHALL DISCHARGE TO THE REAR YARD AT LEAST 1m FROM THE HOUSE (BY–LAW 2021–013)
   (B) ALL RAINWATER LEADERS SHALL DISCHARGE 1m FROM THE HOUSE (BY–LAW 2021–013 UNLESS THE TOWNSHIP BUILDING DEPARTMENT APPROVES OTHERWISE.
   (C) THE DRIVEWAYS SHALL BE SEPERATED BY INTERLOCKING BRICK. ALTERNATIVES MAY BE CONSIDERED THAT FACILITATE INDIVIDUAL DRIVEWAY REPLACEMENT IN THE FUTURE AND DEFINES THE LIMITS OF EACH PROPERTY.

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.

TOWNSHIP OF MAPLETON

# TYPICAL SEMI–DETACHED LOT SERVICE ARRANGEMENT OPTION B

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | C–03 |




NOTES

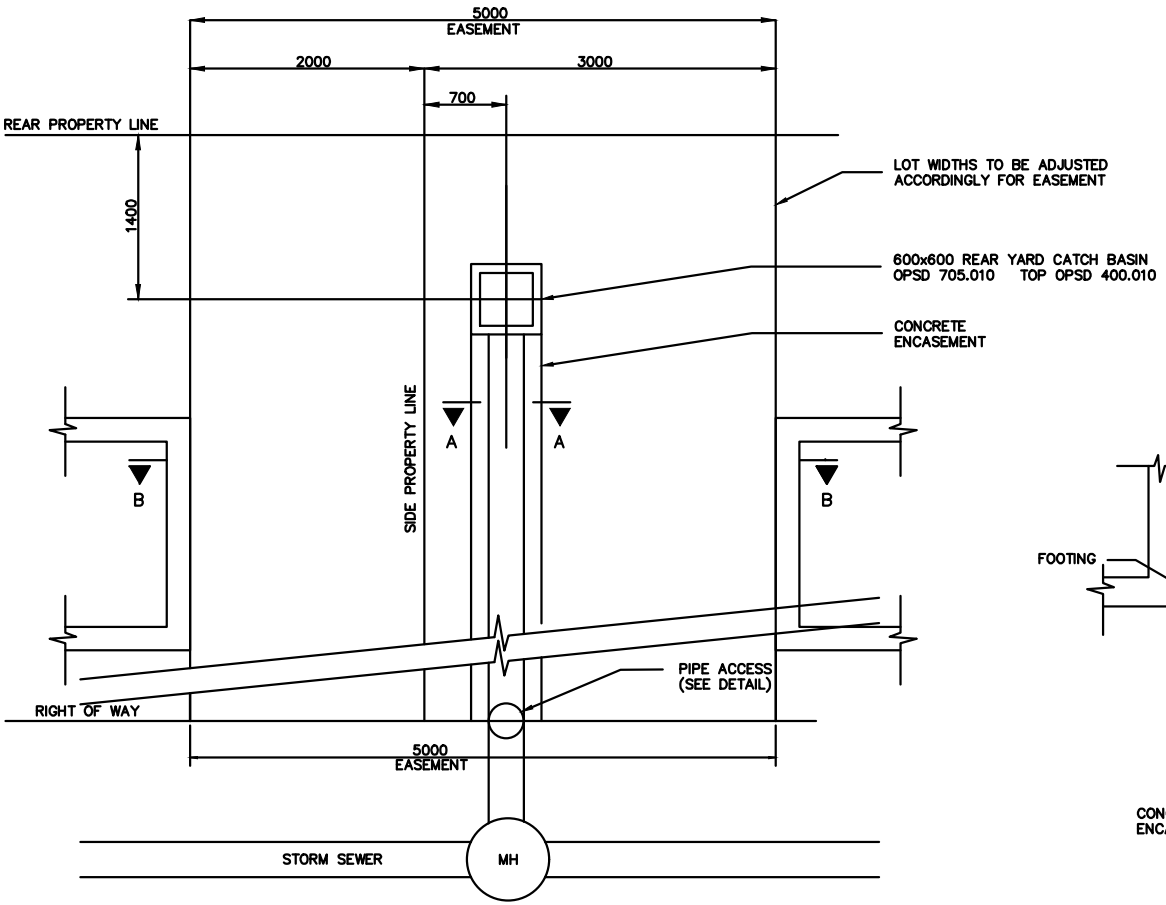
1. NUMBER OF TOWNHOUSE UNITS MAY VARY AND LOT WIDTHS MAY VARY PENDING ZONING REQUIREMENTS.
2. PROPOSED DRIVEWAY APRONS TO BE SHOWN ON DRIVEWAYS.
3. WATER SERVICES WILL NOT BE PERMITTED WITHIN DRIVEWAYS UNLESS OTHERWISE APPROVED BY THE TOWNSHIP.
4. RAINWATER LEADERS TO DISCHARGE TO GRASSED LOCATIONS AND NOT ON DRIVEWAY OR AREAS EXPECTED TO BE WALKWAYS TO THE FRONT DOOR.
4. BUILDERS
   (A) IF STORM SERVICES ARE NOT AVAILABLE TO THE LOT, THE SUMP PUMP SHALL DISCHARGE TO THE REAR YARD AT LEAST 1m FROM THE HOUSE (BY–LAW 2021–013)
   (B) ALL RAINWATER LEADERS SHALL DISCHARGE 1m FROM THE HOUSE (BY–LAW 2021–013 UNLESS THE TOWNSHIP BUILDING DEPARTMENT APPROVES OTHERWISE.
   (C) THE DRIVEWAYS SHALL BE SEPERATED BY INTERLOCKING BRICK. ALTERNATIVES MAY BE CONSIDERED THAT FACILITATE INDIVIDUAL DRIVEWAY REPLACEMENT IN THE FUTURE AND DEFINES THE LIMITS OF EACH PROPERTY.

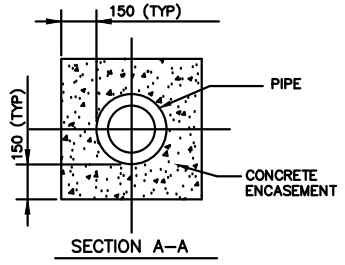
ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.

TOWNSHIP OF MAPLETON

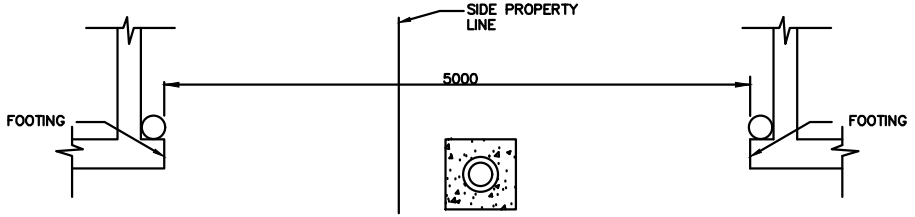
# TYPICAL TOWNHOUSE LOT SERVICE ARRANGEMENT

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | C–04 |

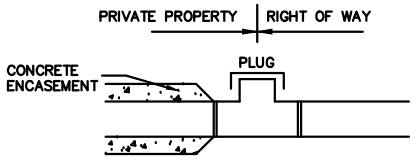



SECTION A–A




SECTION B–B




PIPE ACCESS DETAIL

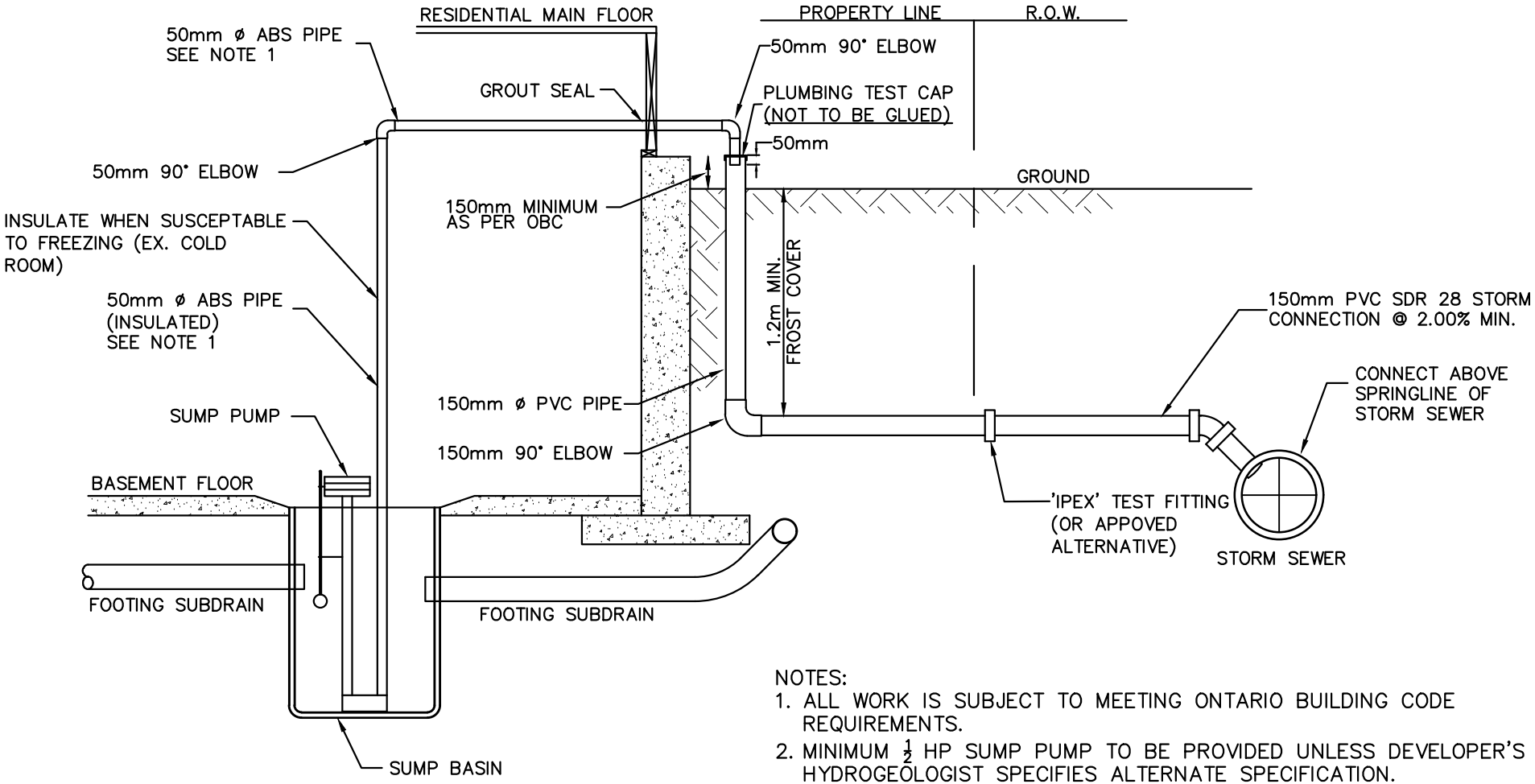
NOTES:

1. ALL DIMENSIONS IN MM UNLESS NOTED OTHERWISE.
2. CONCRETE ENCASEMENT TO FIRST PIPE JOINT NEAREST FRONT PROPERTY LINE.
3. MINIMUM 300 DIAMETER.
4. REAR YARD CATCHBASIN LEADS TO CONNECT TO A MAINLINE SEWER MAINTENANCE HOLE EXCEPT WHERE DIRECTED BY THE TOWNSHIP.
5. NO AIR CONDITIONING UNITS, METERS, STRUCTURES, POOLS, ETC. WILL BE PERMITTED WITHIN THE EASEMENT.
6. FOOTINGS TO EXTEND BELOW INVERT OF RYCB LEAD INCLUDING CONCRETE ENCASEMENT (ENGINEERING DRAWINGS SHOULD IDENTIFY THE MINIMUM UNDERSIDE OF FOOTINGS ON THE MASTER GRADING PLAN).
7. RYCB LEAD SHALL HAVE MINIMUM 1.2m OF COVER.

TOWNSHIP OF MAPLETON

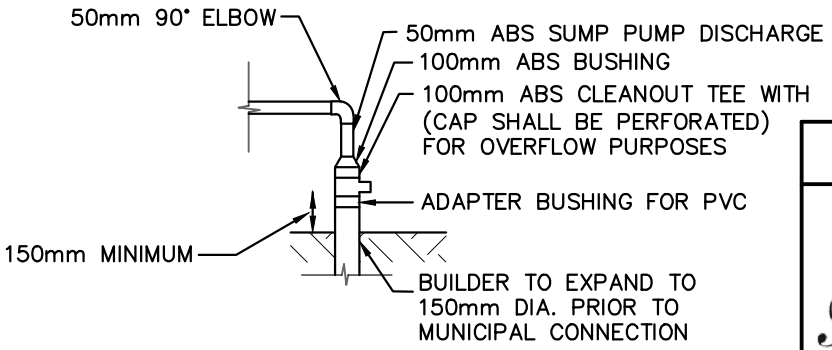
# REAR YARD CATCHBASIN AND LEAD

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | C–05 |




NOTES:

1. ALL WORK IS SUBJECT TO MEETING ONTARIO BUILDING CODE REQUIREMENTS.
2. MINIMUM $\frac{1}{2}$ HP SUMP PUMP TO BE PROVIDED UNLESS DEVELOPER'S HYDROGEOLOGIST SPECIFIES ALTERNATE SPECIFICATION.

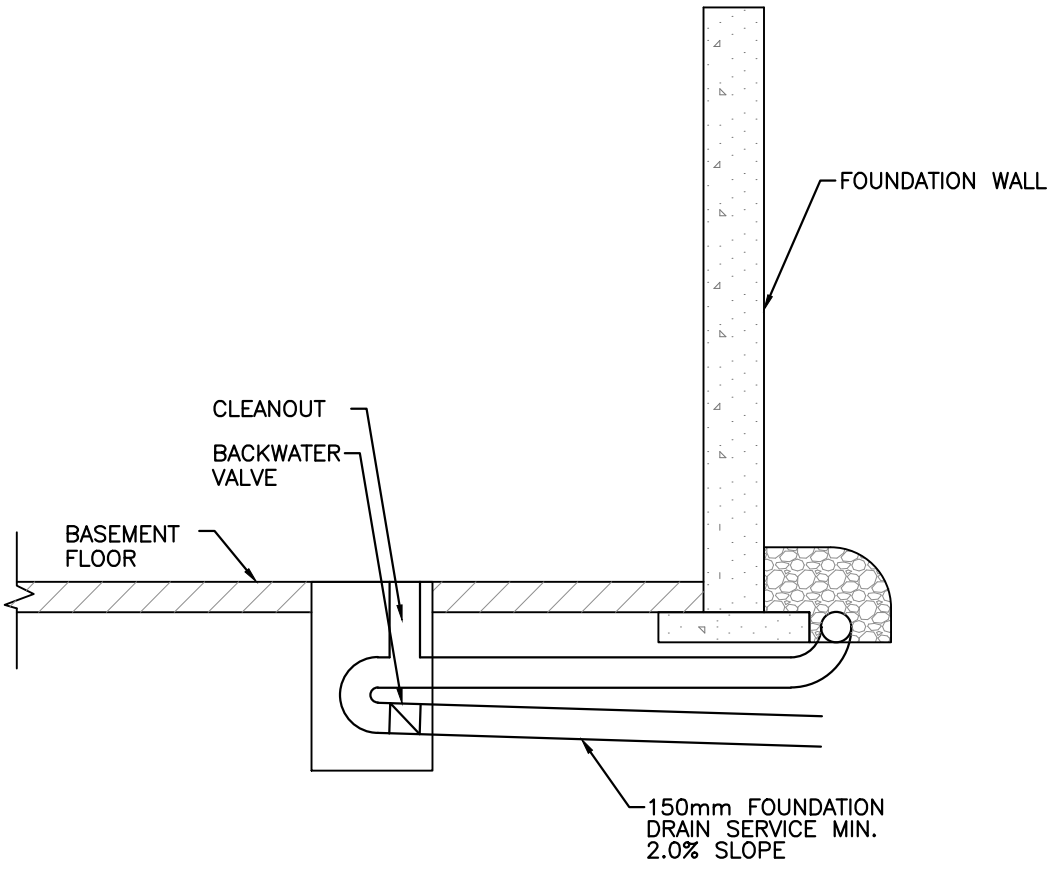



ALTERNATE DETAIL A

TOWNSHIP OF MAPLETON

# SUMP PUMP DISCHARGE TO STORM SEWER

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | C–06 |

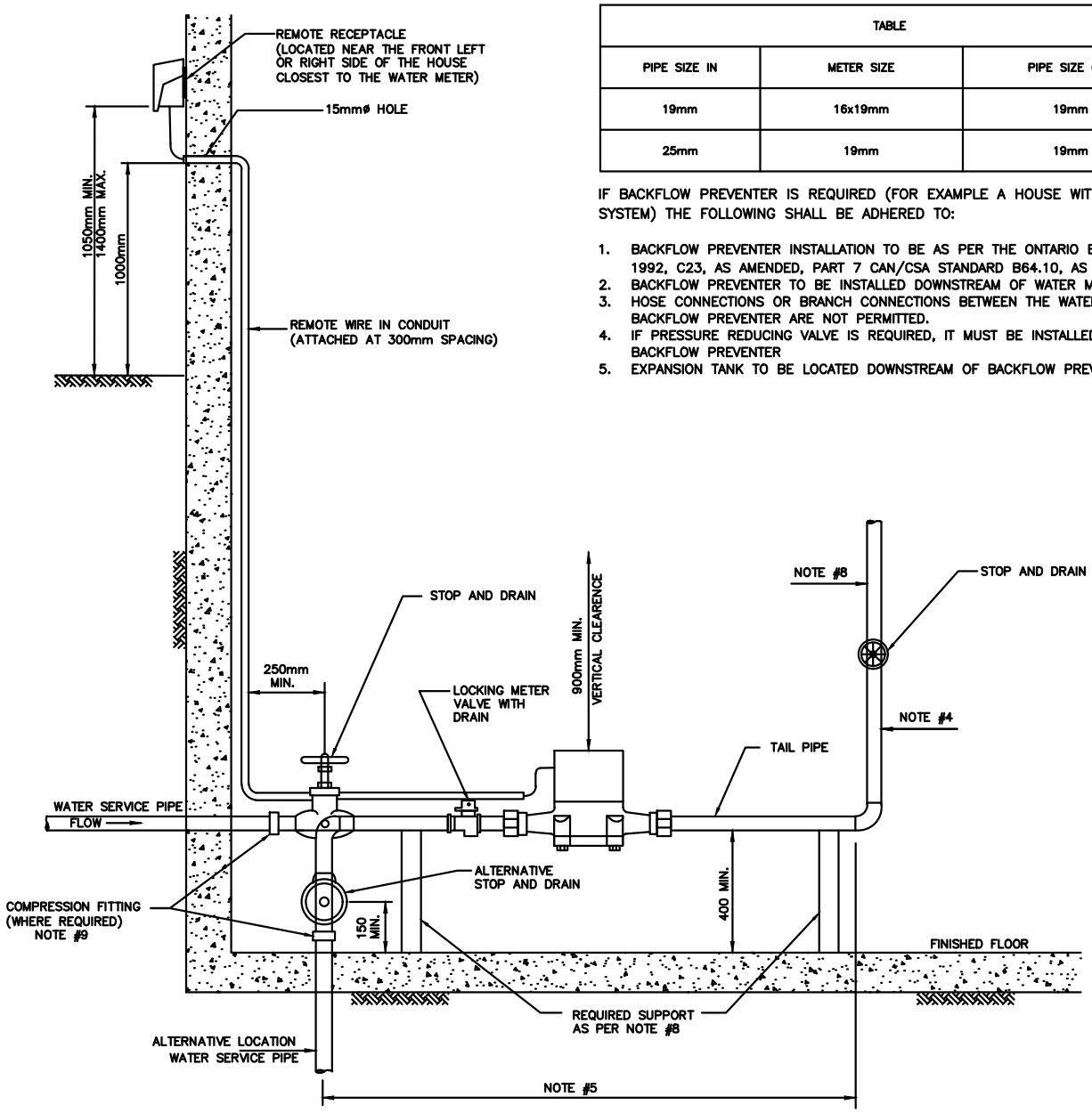



# ELEVATION

## NOTES:

1. ALL WORK IS SUBJECT TO MEETING ONTARIO BUILDING CODE REQUIREMENTS
2. GRAVITY SERVICE CONNECTION IS SUBJECT TO ENGINEERING DESIGN ENSURING THAT THE BASEMENT FLOOR ELEVATION IS AT LEAST 0.5m HIGHER THAN THE 1:100 YEAR HYDRAULIC GRADE LINE
3. ROOF LEADERS DOWNSPOUTS OR ANY OTHER STORMWATER SOURCE MUST NOT BE CONNECTED TO THE SERVICE

| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | **CONNECTION OF FOUNDATION DRAIN TO STORM DRAINAGE PIPING** | DATE: ---<br>ISSUE NO. 0<br>SCALE: N.T.S.<br>DWG. NO. **C-07** |




| TABLE | | |
|---|---|---|
| PIPE SIZE IN | METER SIZE | PIPE SIZE OUT |
| 19mm | 16x19mm | 19mm |
| 25mm | 19mm | 19mm |

IF BACKFLOW PREVENTER IS REQUIRED (FOR EXAMPLE A HOUSE WITH A LAWN IRRIGATION SYSTEM) THE FOLLOWING SHALL BE ADHERED TO:

1. BACKFLOW PREVENTER INSTALLATION TO BE AS PER THE ONTARIO BUILDING CODE ACT, S.O. 1992, C23, AS AMENDED, PART 7 CAN/CSA STANDARD B64.10, AS AMENDED.
2. BACKFLOW PREVENTER TO BE INSTALLED DOWNSTREAM OF WATER METER.
3. HOSE CONNECTIONS OR BRANCH CONNECTIONS BETWEEN THE WATER METER AND THE BACKFLOW PREVENTER ARE NOT PERMITTED.
4. IF PRESSURE REDUCING VALVE IS REQUIRED, IT MUST BE INSTALLED DOWNSTREAM OF BACKFLOW PREVENTER
5. EXPANSION TANK TO BE LOCATED DOWNSTREAM OF BACKFLOW PREVENTER

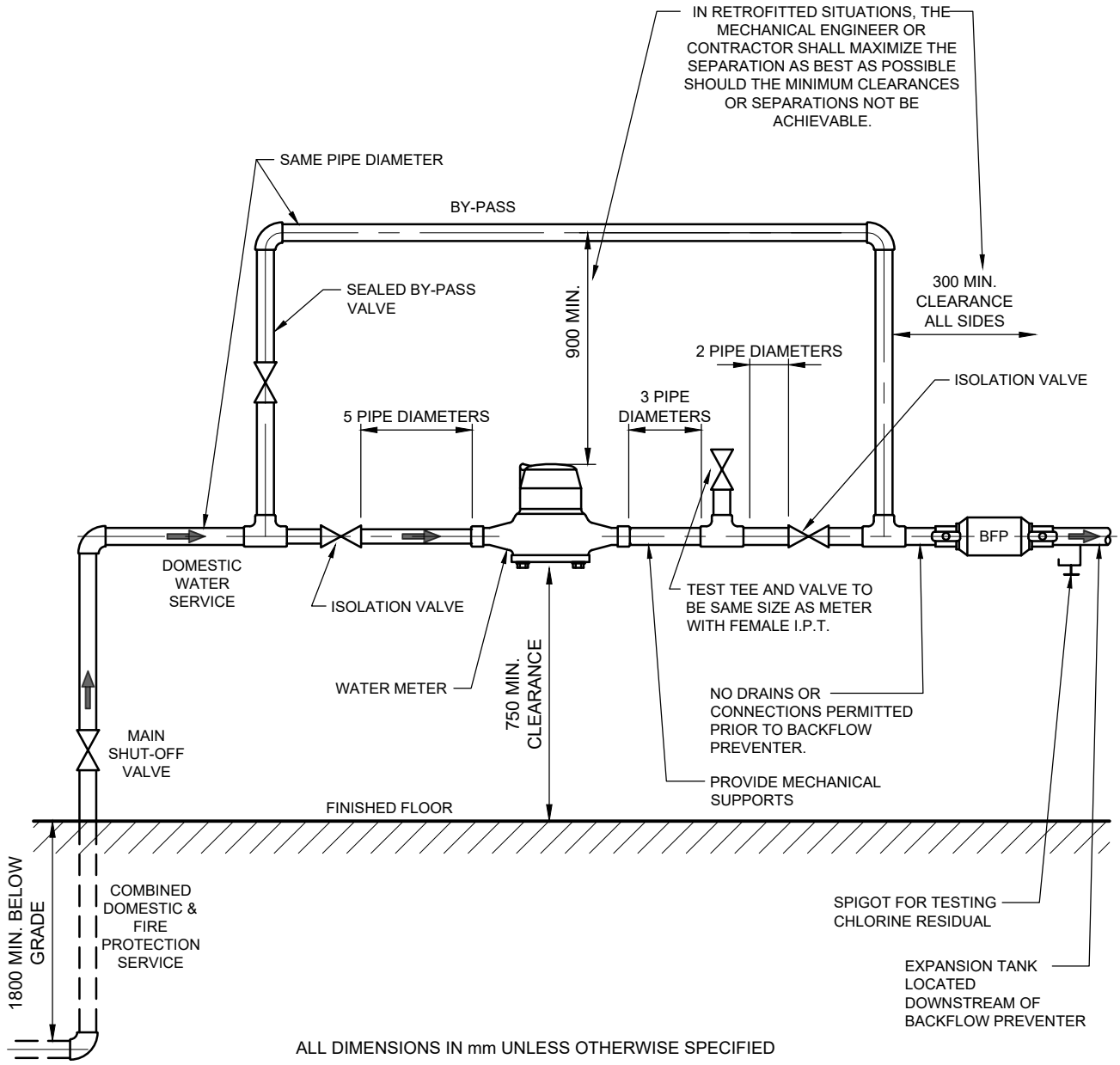
NOTES:

1. COMPLETE THE WATER SERVICE APPLICATION FORM PROVIDED IN SCHEDULE "A" OF BY-LAW 2015-120 AND SUBMIT FORM WITH THE BUILDING PERMIT APPLICATION. A METER KIT PURCHASED BY THE BUILDER WILL BE PROVIDED FROM THE TOWNSHIP FOR INSTALLATION BY THE BUILDER'S PLUMBER. THE BUILDING DEPARTMENT NOTIFIES PUBLIC WORKS WHEN THE BUILDING PASSES THE OCCUPANCY INSPECTION AND THE PUBLIC WORKS DEPARTMENT COMPLETES THE NECESSARY PROGRAMMING. THE METER KIT INCLUDES THE WATER METER, RADIO TRANSMITTER WITH 50ft WIRE, 4 FITTINGS, GROUND WIRE AND 2 CLIPS.
2. 175mm MINIMUM CLEARANCE BETWEEN WALL AND C/L OF PIPE AND 75mm HORIZONTAL CLEARANCE BETWEEN WALL AND METER.
3. STOP AND DRAIN TO BE THE SAME SIZE AS INCOMING PIPE; VALVE TO BE PER BUILDING CODE.
4. MAINTAIN SERVICE PIPE DIAMETER TO CONNECTION AT HOT WATER TANK (OBC 7.6.3.4).
5. ALL COPPER PIPING AFTER THE STOP AND DRAIN SHALL BE TYPE "L" COPPER.
   PIPING FOR METER TO BE RUN HORIZONTALLY & METER TO BE INSTALLED ON HORIZONTAL PIPING ONLY.
6. METER MUST NOT BE LOCATED BEHIND FURNACES, PARTITION WALLS, WATER TANKS, ETC.
7. WHERE REQUIRED, DUAL CHECK VALVE BACKFLOW PREVENTER IS TO BE INSTALLED DOWNSTREAM OF THE METER.
8. IF PLUMBING RISER/WATER SERVICE IS PLASTIC, SUPPORTS SHALL BE REQUIRED FOR METER ASSEMBLY AREA.
   TO AVOID INSTALLING SUPPORTS, RISER SHALL BE COPPER AND ATTACHED TO LOWER FLOOR LEVEL JOISTS.
9. COMPRESSION FITTING TO BE SUFFICIENTLY STAYED, CLAMPED, ANCHORED OR BUTTRESSED IN ACCORDANCE WITH 7.3.4.8 OF THE OBC.
10. ALL NEW WATER SERVICE ARE TO BE 25mm THUS REQUIRING A 19mm METER SIZE. OLDER SERVICES MAY BE 19mm REQUIRING THE SMALLER METER SIZE LISTED IN THE TABLE.

TOWNSHIP OF MAPLETON

# 19mm TO 25mm WATER METER AND REMOTE RECEPTACLE INSTALLATION IN BUILDING (RESIDENTIAL)

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | E-01 |




ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED

REFER TO STD. DWG No. E-03 FOR ADDITIONAL DETAILS & NOTES

TOWNSHIP OF MAPLETON

# INDUSTRIAL/COMMERCIAL/ INSTITUTIONAL WATER METER & TESTABLE BACKFLOW PREVENTER DETAIL

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | E-02 |

APPROVALS/CONNECTION PROCESS

1. COMPLETE THE WATER SERVICE APPLICATION FORM PROVIDED IN SCHEDULE "A" OF BY-LAW 2015-120 AND SUBMIT FORM WITH THE BUILDING PERMIT APPLICATION. A METER KIT PURCHASED BY THE APPLICANT WILL BE PROVIDED BY THE TOWNSHIP FOR INSTALLATION BY THE APPLICANTS PLUMBER. THE BUILDING DEPARTMENT NOTIFIES PUBLIC WORKS WHEN THE BUILDING PASSES THE OCCUPANCY INSPECTION AND THE PUBLIC WORKS DEPARTMENT COMPLETES THE NECESSARY PROGRAMMING. THE METER KIT INCLUDES THE WATER METER, RADIO TRANSMITTER WITH 50ft WIRE, 4 FITTINGS, GROUND WIRE AND 2 CLIPS.

2. SERVICE SIZING FOR BOTH THE DOMESTIC & FIRE PROTECTION TO BE DETERMINED BY THE APPLICANTS MECHANICAL ENGINEER. A REPORT SUBMITTED BY THE APPLICANTS MECHANICAL ENGINEER APPENDED TO THE FORM IS TO INCLUDE THE FOLLOWING:
   - SERVICE SIZING & MATERIAL TYPE FROM THE PROPERTY LINE DIRECTLY INTO THE BUILDING;
   - CONFIRMATION THAT THE WATER SERVICE IS DESIGNED SO THAT WATER SHALL NOT REMAIN UNUSED IN THE SERVICE FOR MORE THAN THREE (3) DAYS UNDER AVERAGE DAY DEMAND. TO DEMONSTRATE A THREE DAY TURNOVER, THE DESIGNER SHALL PROVIDE A HYDRAULIC ANALYSIS FOR REVIEW. WHERE THERE IS A CONCERN THAT THERE MAY BE DEGRADATION OF THE WATER QUALITY (WHEN A 3 DAY TURN OVER CAN NOT BE ACHIEVED) THE TOWN RESERVES THE RIGHT TO REQUIRE PREMISE ISOLATION. THIS SHALL CONSIST OF APPROPRIATE BACKFLOW PREVENTION AT THE PROPERTY LINE AT THE OWNER'S EXPENSE;
   - WATER METERS SIZED GREATER THAN 51mm (2 INCH) REQUIRES THE OWNER TO RETAIN A QUALIFIED CONTRACTOR TO OBTAIN AND INSTALL THE METER AT THEIR EXPENSE. THE WATER METER SHALL BE APPROVED BY THE TOWNSHIP; AND
   - SPECIFY THE MAKE & MODEL OF THE PROPOSED DOMESTIC & FIRE (IF APPLICABLE) BACKFLOW PREVENTER.

3. ANY TEMPORARY WATER SUPPLY REQUEST FROM THE TOWNSHIP REQUIRES THE SUPPLY AND INSTALLATION OF A TESTABLE BACKFLOW PREVENTER DEVICE BY A CERTIFIED/QUALIFIED CONTRACTOR AT THE OWNER/OCCUPANTS EXPENSE. A COPY OF THE TESTING REPORT MUST BE PROVIDED TO THE TOWNSHIP. THE TOWNSHIP'S WATER OPERATING AUTHORITY SHALL BE PRESENT DURING THE INSTALLATION AND TESTING.

4. PRIOR TO THE FINAL CONNECTION TO THE MUNICIPAL WATER SUPPLY, THE TOWNSHIP SHALL BE PROVIDED DOCUMENTATION TO THEIR SATISFACTION CONFIRMING ALL WORKS HAVE BEEN INSTALLED IN ACCORDANCE WITH THE BUILDING PERMIT & SITE PLAN CONDITIONS FROM THE APPLICANTS MECHANICAL ENGINEER AND A COPY OF MICROBIOLOGICAL TEST RESULTS SHALL BE PROVIDED AS WELL AS THE BACKFLOW PREVENTER TESTING REPORT BY A CERTIFIED TESTER ON TOWNSHIP FORM. THE BACKFLOW PREVENTER CERTIFICATION SHALL BE COMPLETED WITHIN FIVE (5) BUSINESS DAYS OF ITS INSTALLATION AND SHALL BE RECERTIFIED ANNUALLY, ALONG WITH THE CREDENTIALS OF THE CERTIFIED TESTER.

5. THE FINAL CONNECTION MUST BE BY A CERTIFIED CONTRACTOR AND OBSERVED BY THE TOWNSHIP'S WATER OPERATING AUTHORITY.

6. THE OWNER, ON AN ANNUAL BASIS, SHALL SUBMIT A REPORT PREPARED BY A QUALIFIED CONTRACTOR WITH THE FOLLOWING INFORMATION:
   - BACKFLOW PREVENTER TEST REPORT COMPLETED BY A CERTIFIED TESTER ON TOWNSHIP FORM;
   - CONFIRMATION THAT ALL BYPASS LOCKOUTS ARE SECURELY IN PLACE;
   - CONFIRMATION THAT ALL PRIVATE HYDRANTS (IF APPLICABLE) HAVE BEEN FLUSHED AND ALL ASSOCIATED APPURTENANCES (VALVING, ETC.) IS OPERATIONAL; AND
   - COMPLETE A LEAK LOSS TEST ON THE FIRE SYSTEM AND PROVIDE RESULTS.

7. OPERATION OF THE TOWNSHIP'S CURB STOP (WATER VALVE) LOCATED AT THE PROPERTY LINE SHALL ONLY BE OPERATED BY THE TOWNSHIP'S WATER OPERATING AUTHORITY. ANY COORDINATION OF OPERATION SHALL BE VIA THE TOWNSHIP OF MAPLETON PUBLIC WORK DEPARTMENT. THE CURB STOP WILL NOT BE TURNED ON/OPENED UNTIL ALL OF THE ABOVE HAS BEEN COMPLETED.

GENERAL REQUIREMENTS

1. ALL INTERNAL PLUMBING WORK SHALL BE AS PER THE REQUIREMENTS OF PART 7 OF THE ONTARIO BUILDING CODE.

2. WATER METER

- ALL WATER METERS ARE TO BE INSTALLED IN THE HORIZONTAL POSITION AND ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. BY-PASS PIPING MAY BE INSTALLED IN THE HORIZONTAL OR VERTICAL POSITION AROUND THE WATER METER. ALL BACKFLOW PREVENTION DEVICES ARE TO BE INSTALLED DOWNSTREAM OF THE WATER METER AND BY-PASS, WITH NO CONNECTIONS OR TEES AND SHALL BE INSTALLED AS PER THE ONTARIO BUILDING CODE ACT, S.O. 1992, C23, AS AMENDED, PART 7 AND CAN/CSA STANDARD B64.10, AS AMENDED.
- THE METER SHALL BE LOCATED 5 x PIPE DIAMETERS FROM THE UPSTREAM ISOLATION VALVE AND 3 x PIPE DIAMETERS FROM THE TEST TEE AND VALVE. THE OUTLET VALVE SHALL BE LOCATED AT LEAST 2 x PIPE DIAMETERS FROM THE TEST TEE AND VALVE.
- TEST TEE AND VALVE SHALL BE LOCATED BETWEEN THE OUTLET SIDE OF THE METER AND THE OUTLET SIDE ISOLATION VALVE.
- THE TEST TEE AND VALVE SHALL BE LOCATED DOWNSTREAM OF THE WATER METER AT LEAST 3 x PIPE DIAMETERS AFTER THE OUTLET OF THE WATER METER AND 2 x PIPE DIAMETERS BEFORE THE DOWNSTREAM ISOLATION VALVE AND WILL BE OF THE SAME SIZE AS THE WATER SERVICE PIPING.
- MECHANICAL SUPPORTS SHALL BE INSTALLED AS NECESSARY TO THE WATER SERVICE PIPE AROUND THE WATER METER. THE WATER METER ITSELF IS NOT TO BE SUPPORTED TO PREVENT DAMAGE TO THE METER MAINCASE.
- THE METER AND BYPASS VALVES SHALL BE SEALED/LOCKED BY THE TOWNSHIP OF MAPLETON OR ITS REPRESENTATIVE.

3. BACKFLOW PREVENTER

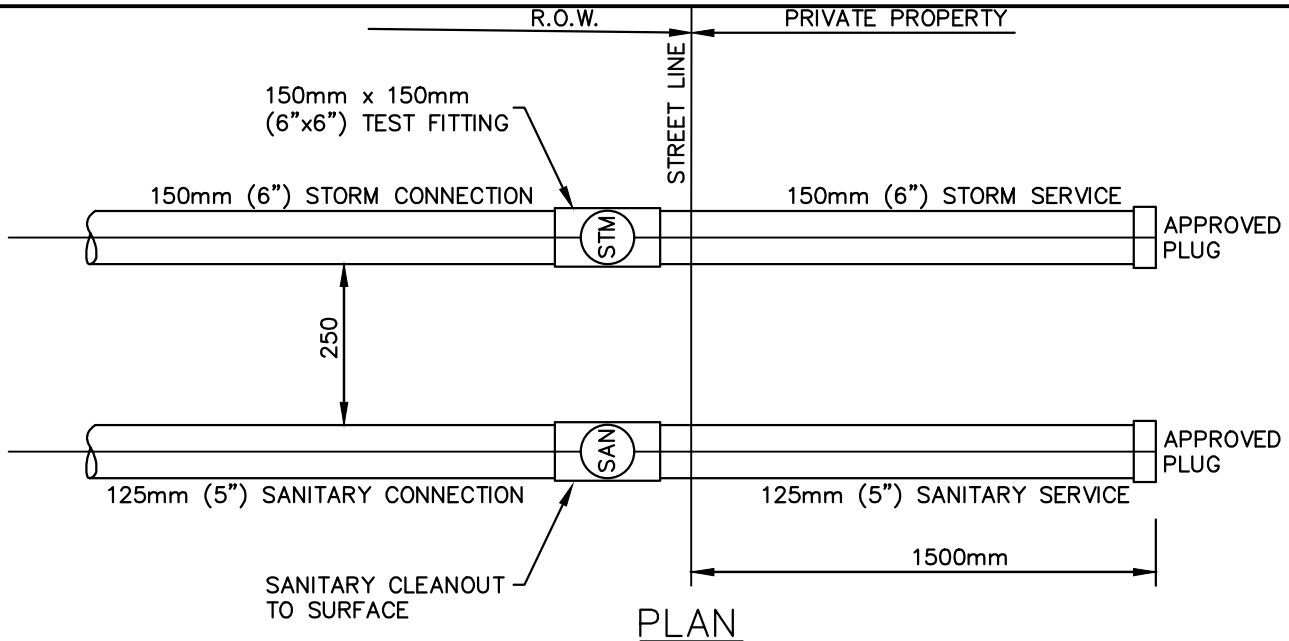
- BACKFLOW PREVENTER INSTALLATION TO BE AS PER THE ONTARIO BUILDING CODE ACT, S.O. 1992, C23, AS AMENDED, PART 7 AND CAN/CSA STANDARD B64.10, AS AMENDED.
- HOSE CONNECTIONS OR BRANCH CONNECTIONS BETWEEN THE WATER METER AND THE BACKFLOW PREVENTER ARE NOT PERMITTED.
- PROPER DRAINAGE TO A SANITARY SYSTEM IS REQUIRED FOR A REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTER. PROVISIONS ARE TO BE MADE FOR DISPOSAL OF WATER USED FOR IN-SITU TESTING
- IF PRESSURE REDUCING VALVE IS REQUIRED, IT MUST BE INSTALLED DOWNSTREAM OF THE BACKFLOW PREVENTER.

TOWNSHIP OF MAPLETON

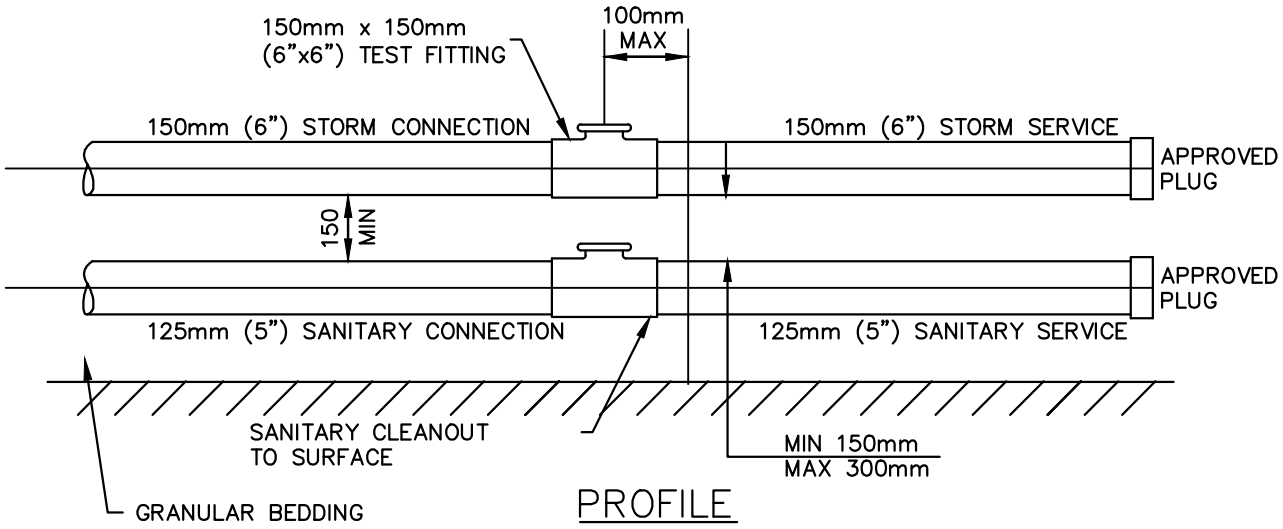
Mapleton

# INDUSTRIAL/COMMERCIAL/ INSTITUTIONAL WATER METER INSTALLATION NOTES

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | E-03 |




PLAN




PROFILE

NOTES:

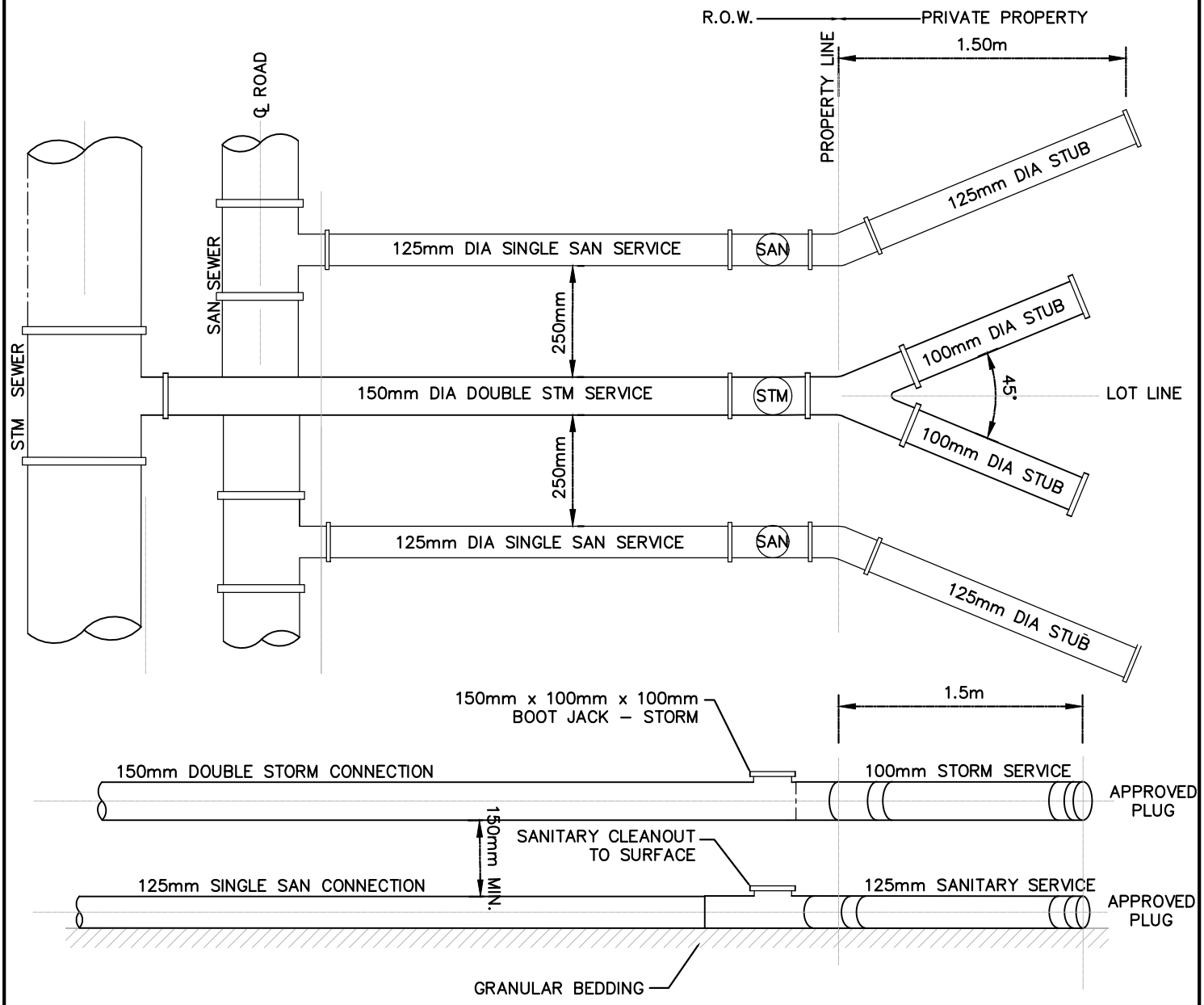
1. MIN TRENCH WIDTH TO BE 900mm.
2. SANITARY SERVICE SHALL HAVE A CLEAN OUT TO SURFACE AS PER DWG. NO. F-03
3. STORM TEST FITTINGS AND PLUGS TO BE MARKED "STM" (BY IPEX INC. OR APPROVED EQUAL).
4. ALL TEST FITTINGS TO BE COMPATIBLE WITH PIPE MATERIAL USED.
5. THE SANITARY SERVICE SHALL ALWAYS BE BELOW THE STORM SERVICE.
6. ALL PIPING TO MEET OPS REQUIREMENTS.
7. SANITARY SERVICE LATERAL PIPES SHALL BE PVC DR28, GREEN IN COLOUR.
8. STORM SERVICE LATERAL PIPES SHALL BE PVC DR28, WHITE IN COLOUR.
9. THE LOCATION OF THE WATERTIGHT PLUG FOR EACH SERVICE PIPE SHALL BE STAKED WITH A 50mmX100mm WOODMARKER PAINTED GREEN FOR SANITARY AND RED FOR STORM.

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED

TOWNSHIP OF MAPLETON

# STANDARD SEWER SERVICE CONNECTIONS IN COMMON TRENCH (SINGLE-SERVICE RESIDENTIAL)

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | F-01 |




NOTES:

1. MIN. TRENCH WIDTH TO BE 2000mm.
2. SANITARY SERVICE SHALL HAVE A CLEAN OUT TO SURFACE AS PER DWG. NO. F–03.
3. STORM TEST FITTINGS AND PLUGS TO BE MARKED "STM" (BY IPEX INC. OR APPROVED EQUAL.)
4. ALL TEST FITTINGS TO BE COMPATIBLE WITH PIPE MATERIAL USED.
5. THE SANITARY SERVICE SHALL ALWAYS BE BELLOW THE STORM SERVICE.
6. ALL PIPING TO MEET OPS REQUIREMENTS.
7. SANITARY SERVICE LATERAL PIPES SHALL BE PVC DR28, GREEN IN COLOUR.
8. STORM SERVICE LATERAL PIPES SHALL BE PVC DR28, WHITE IN COLOUR.
9. THE LOCATION OF THE WATERTIGHT PLUG FOR EACH SERVICE PIPE SHALL BE STAKED WITH A 50mmX100mm WOOD MARKER PAINTED GREEN FOR SANITARY AND RED FOR STORM

TOWNSHIP OF MAPLETON

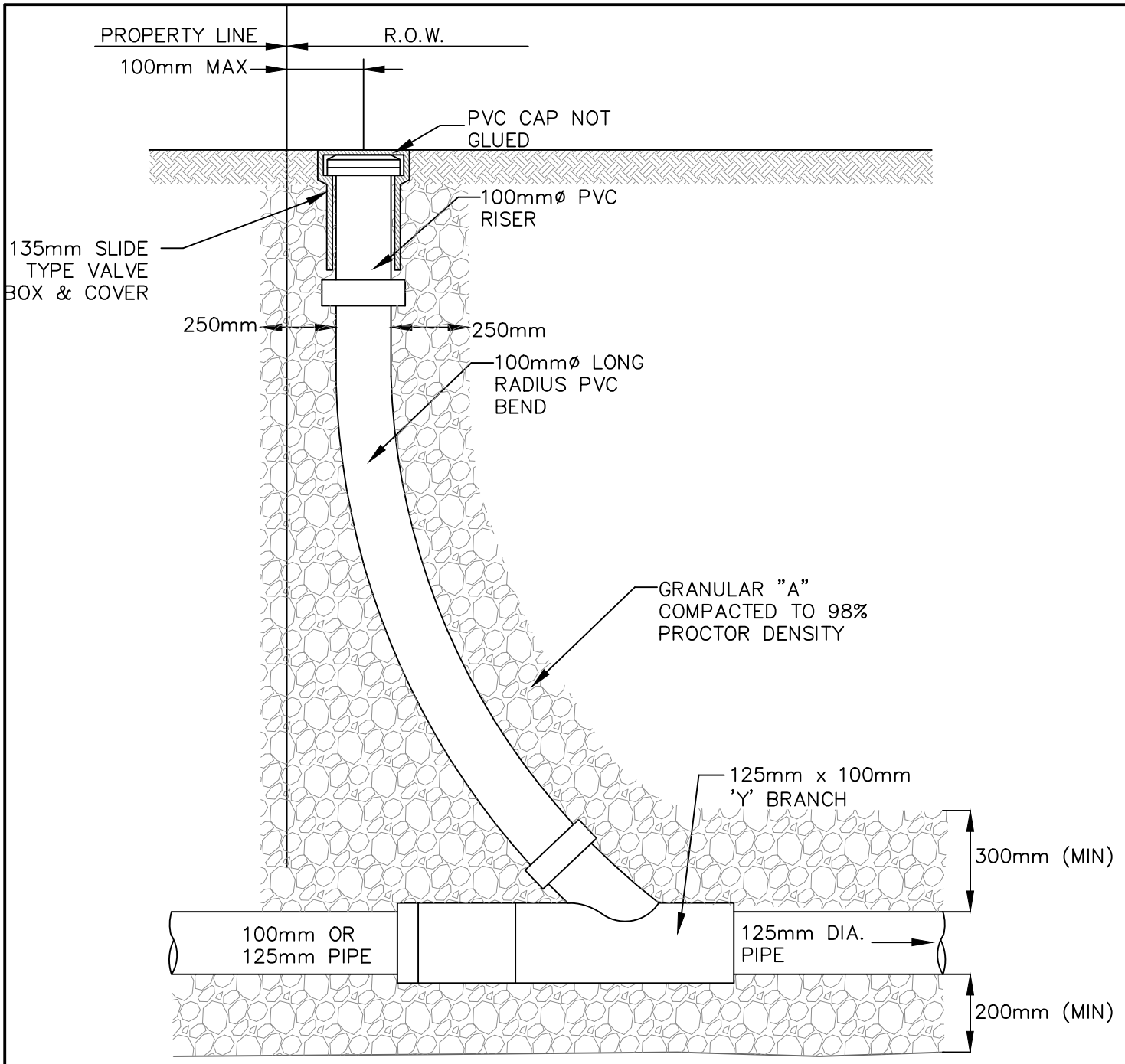
# STANDARD SEWER SERVICE CONNECTION IN COMMON TRENCH

DATE: ---

ISSUE NO. 0

SCALE: N.T.S.

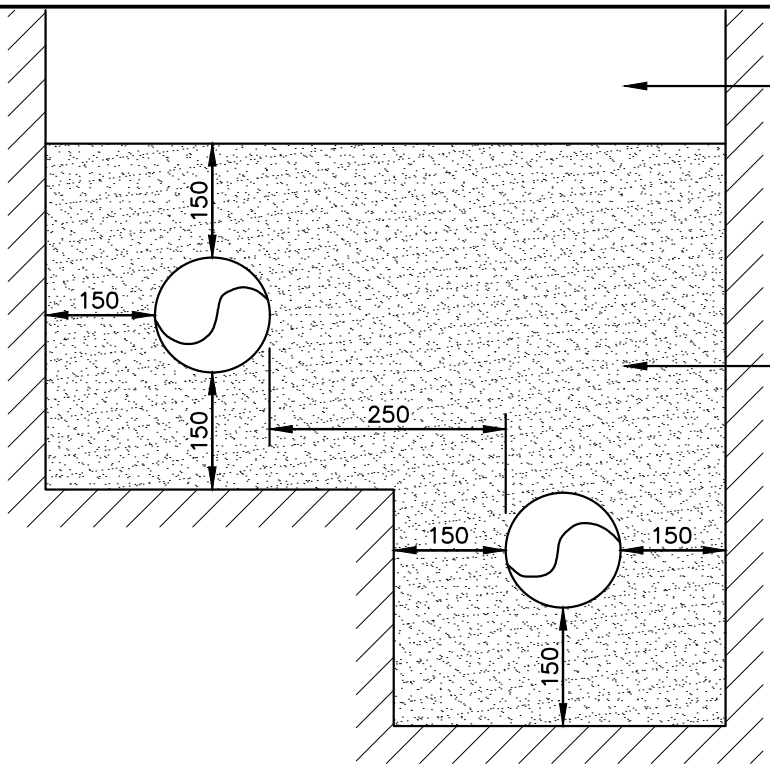
DWG. NO. F–02




NOTES:

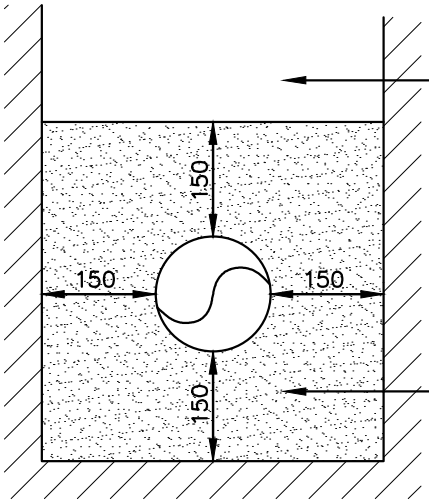
1. INSTALL 135mm SLIDE TYPE VALVE BOX AND COVER (MARKED SEWER) OVER PVC CAP, NOT GLUED.
2. USE EAST JORDAN IRON WORKS PRODUCT No. 85557126 WITH 06800006 SERIES DROP LID OR APPROVED EQUAL.
3. THIS CONFIGURATION FOR HOUSE CONNECTIONS ONLY.
4. INSTALLATIONS IN GRASS DO NOT REQUIRE THE VALVE BOX AND COVER. A CAST IRON CAP SHALL BE UTILIZED AND CAN BE BURIED 0.10m BELOW GROUND.

| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | **SANITARY SEWER CLEANOUT FOR PAVED AREAS (RESIDENTIAL)** | DATE: --- |
| | | ISSUE NO. 0 |
| | | SCALE: N.T.S. |
| | | DWG. NO. **F-03** |




COMPACTED BACKFILL–
GRANULAR 'B' OR NATIVE
MATERIAL AS APPROVED
BY PUBIC WORKS DEPARTMENT
OR TOWNSHIP ENGINEER

BEDDING MATERIAL–
GRANULAR 'A' OR AS APPROVED
& COMPACTED TO 95%
PROCTOR DENSITY




COMPACTED BACKFILL–
GRANULAR 'B' OR AS APPROVED

BEDDING MATERIAL–
GRANULAR 'A' OR AS APPROVED
& COMPACTED TO 95%
PROCTOR DENSITY

NOTES:
1. BEDDING MATERIAL SHALL BE FULLY EXTENDED AND COMPACTED AGAINST TRENCH WALLS.
2. NO MECHANICAL COMPACTION EQUIPMENT SHALL BE USED ON TOP OF PIPE PRIOR TO PLACING A MINIMUM OF 300mm COVER.

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED

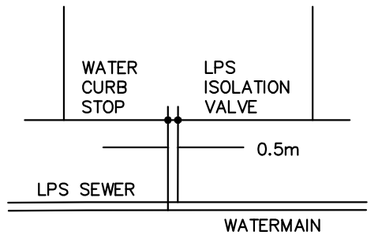
TOWNSHIP OF MAPLETON

# SERVICE CONNECTION BEDDING DETAILS

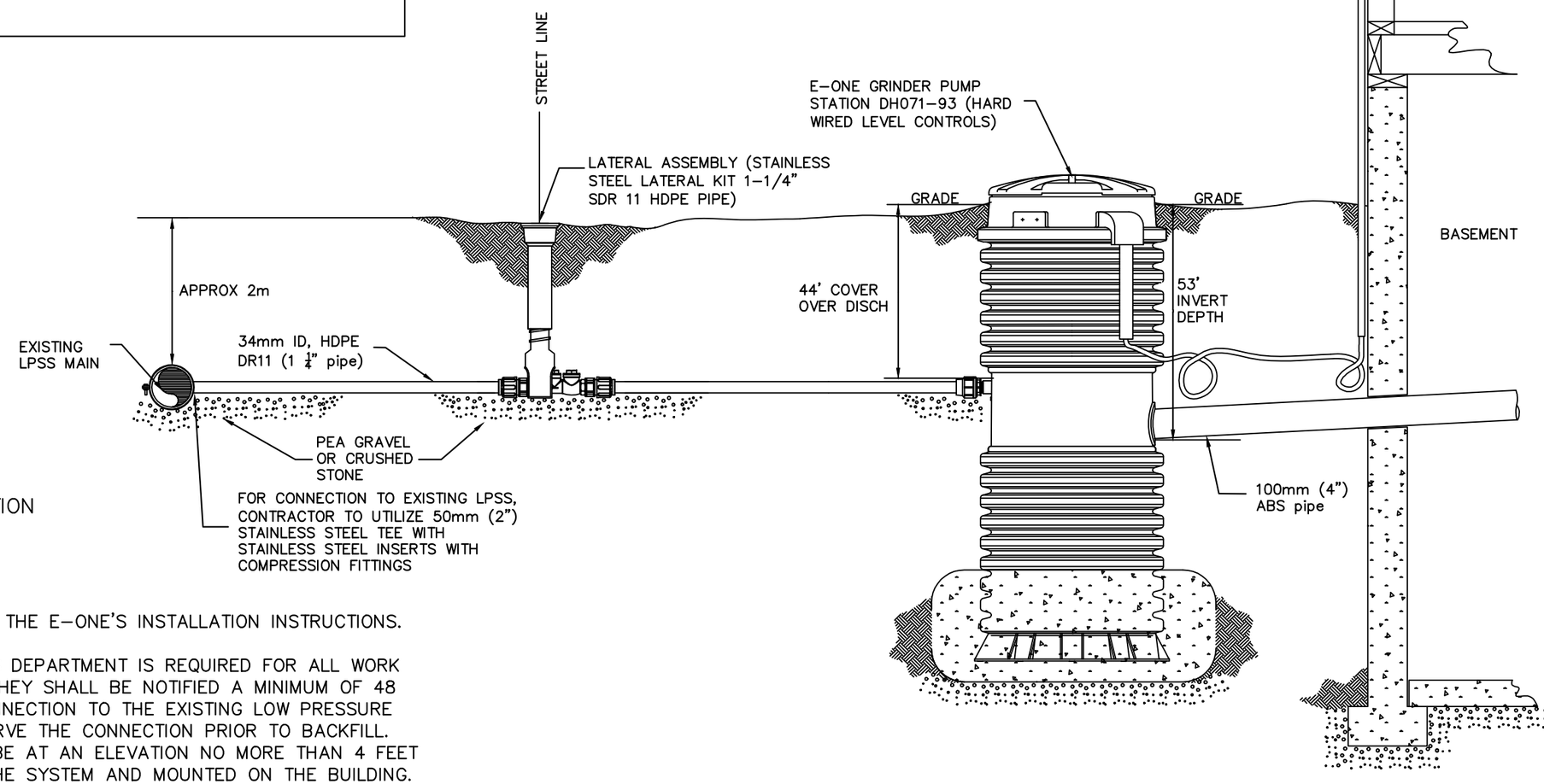
| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | F-04 |

ORIGINAL EQUIPMENT LIST(2005):
- GP 2010–93 Simplex Grinder Pump #KBB14BE10BF
- Simplex Alarm Panel MOD 250–1 #(PC0684G01)
- 1–1/4" Arch type, HDPE SDR 11 Lateral Kits, #PC0645G21, #PB0930G10
- Tank Wrench #PA1002G03

MODEL NUMBERS ABOVE ARE NO LONGER AVAILABLE. REFER TO DETAIL FOR CURRENT MODEL NUMBERS.




TYPICAL SINGLE SERVICE CONNECTION

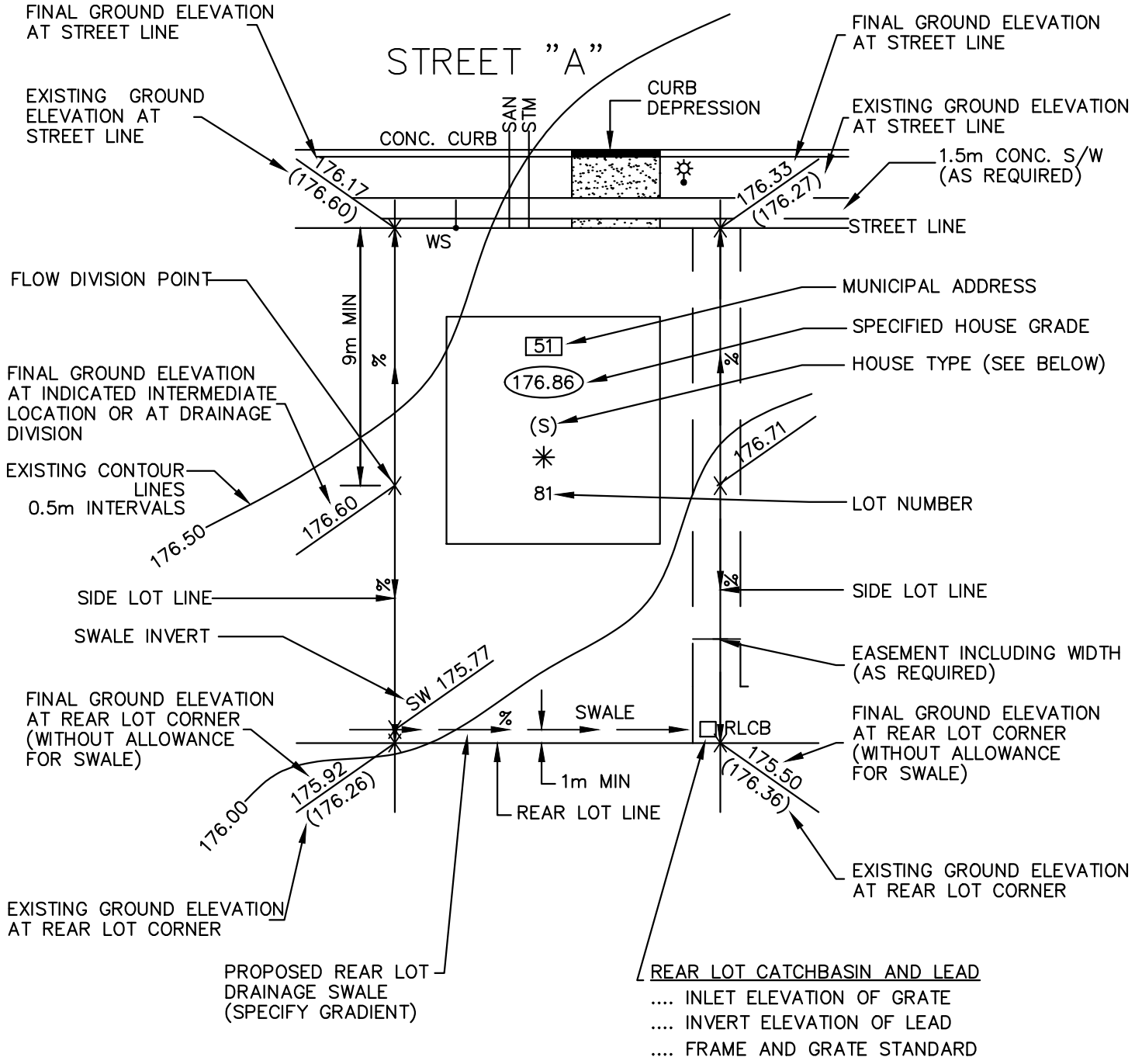



NOTES:
1. THE CONTRACTOR SHALL REFER TO THE E–ONE'S INSTALLATION INSTRUCTIONS. A CONCRETE ANCHOR IS REQUIRED.
2. A PERMIT FROM THE PUBLIC WORKS DEPARTMENT IS REQUIRED FOR ALL WORK WITHIN THE ROAD RIGHT OF WAY. THEY SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR COMPLETING THE CONNECTION TO THE EXISTING LOW PRESSURE SANITARY SEWER AND SHALL OBSERVE THE CONNECTION PRIOR TO BACKFILL.
3. THE PIPE FROM THE HOUSE MUST BE AT AN ELEVATION NO MORE THAN 4 FEET BELOW GRADE TO CONNECT INTO THE SYSTEM AND MOUNTED ON THE BUILDING.
4. ALL CONNECTIONS INTO THE E–ONE PUMP ARE TO BE APPROVED WATER–TIGHT, AT AN ELEVATION OF 4 FEET BELOW GRADE FOR THE BASEMENT WASHROOMS AND LAUNDRY AND SHALL BE PLUMBED TO AN INSIDE SEWAGE PUMP AND TANK WHICH WILL PUMP THE SEWAGE UP TO THE SEWER LINE CONNECTED TO THE E–ONE UNIT ALLOWING BELOW FOOTING HOOK UPS FOR DIRECT BASEMENT FLOW TO THE E–ONE UNITS.
5. THE E–1 PUMP STATIONS, PANEL & LATERAL ASSEMPLY ARE OWNED AND MAINTAINED BY THE TOWNSHIP OF MAPLETON. SHOULD THE PUMP REQUIRE REPLACEMENT DUE TO IMPROPER USAGE (I.E. FLUSHING OF FOREIGN OBJECTS), THE COST OF REPLACING SHALL BE BORNE BY THE PROPERTY OWNER.

TOWNSHIP OF MAPLETON

# TYPICAL RESIDENTIAL LATERAL INSTALLATION FOR INFILL CONNECTIONS TO MOOREFIELD LOW PRESSURE SANITARY SEWER

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | F–05 |



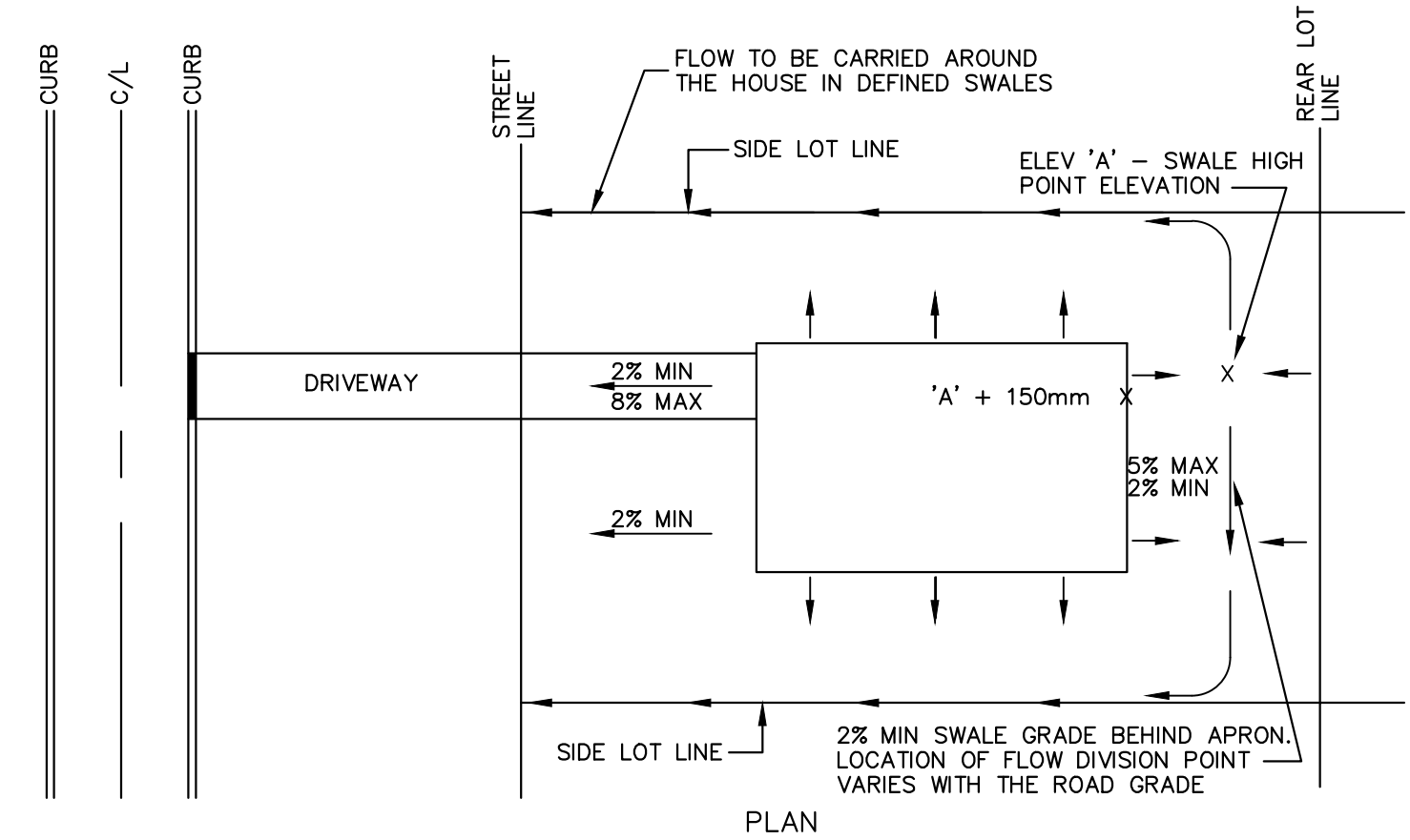

LEGEND:
(W.O.) = REAR WALKOUT BASEMENT TYPE
(F.W.O.) = FRONT WALKOUT BASEMENT TYPE
(S.) = SEMI-DETACHED LOTS
(B.S.) = BACKSPLIT
(F.S.) = FRONT SPLIT
(S.S.) = SIDE SPLIT
(B.) = BUNGALOW
✳ = ENGINEERED FILL LOT

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
ALL ABOVE GROUND FURNITURE TO BE INCLUDED ON THE DRAWING

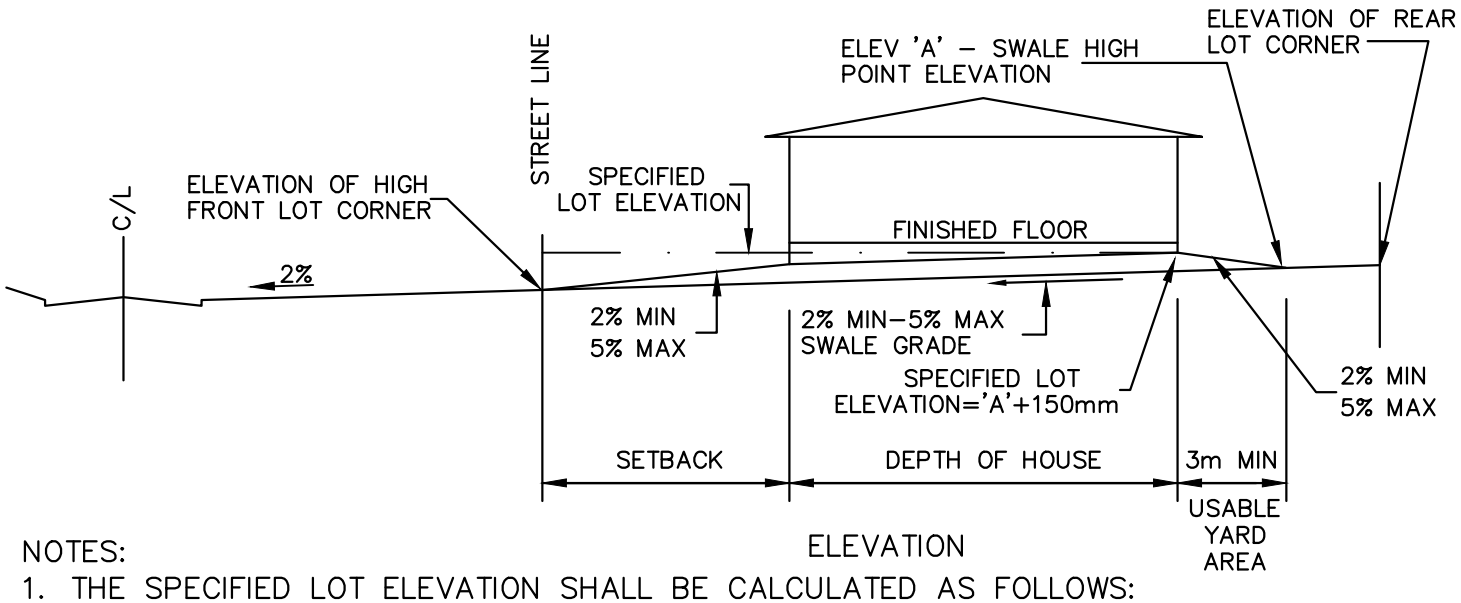
TOWNSHIP OF MAPLETON

# SUBDIVISION AREA GRADING PLAN REQUIREMENTS

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | G-01 |




PLAN




ELEVATION

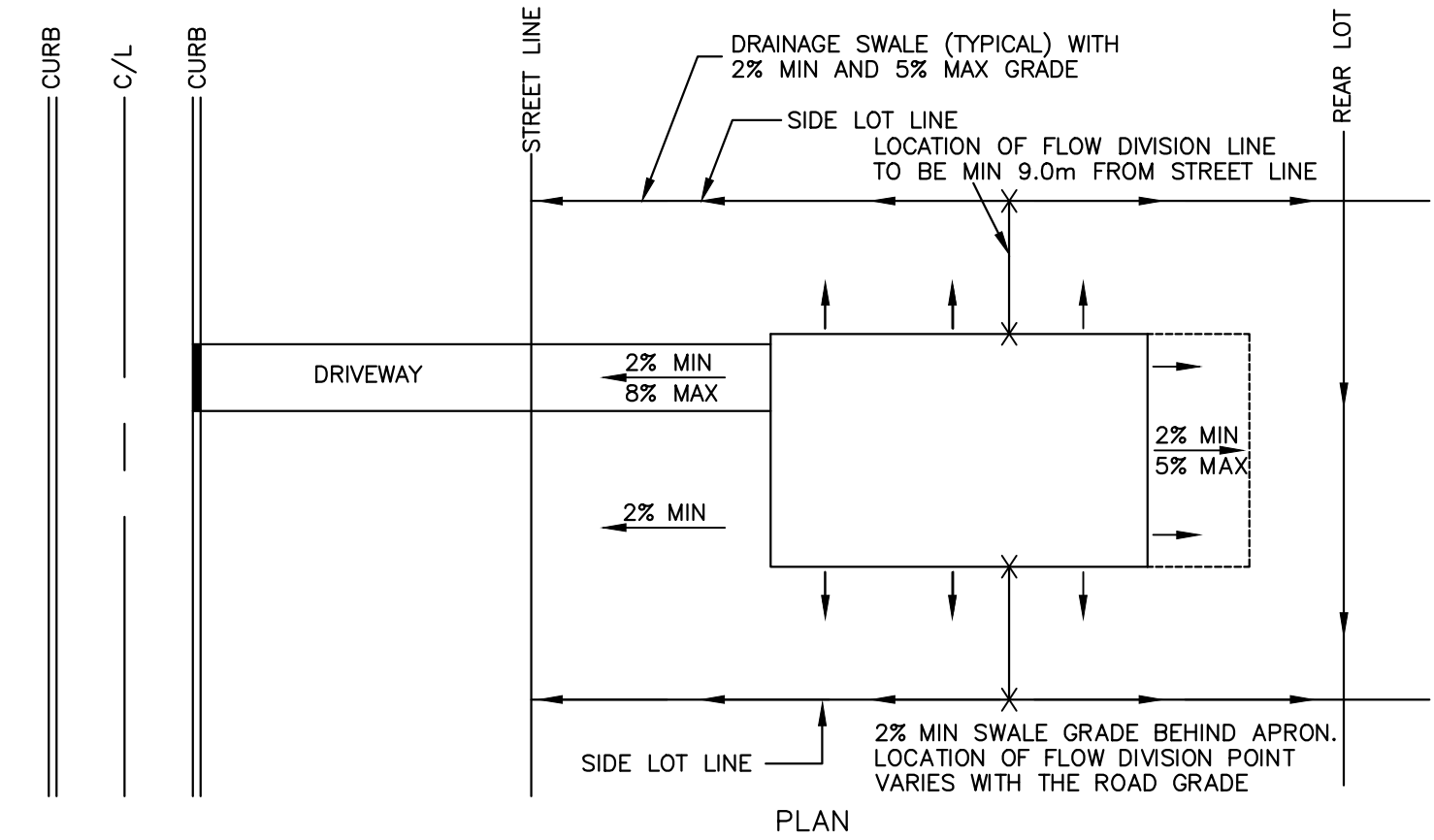
NOTES:

1. THE SPECIFIED LOT ELEVATION SHALL BE CALCULATED AS FOLLOWS:
   - A SWALE GRADIENT OF 2% MIN TO 5% MAX FROM THE FRONT HIGH LOT CORNER AT THE STREETLINE TO THE SWALE HIGH POINT ELEVATION 'A'.
   - LOT ELEVATION SHALL THEN BE SET A MINIMUM OF 0.15m HIGHER THAN SWALE ELEVATION 'A'.
2. DRIVEWAYS ARE NOT TO BE USED AS AN OUTLET FOR SIDEYARD SWALES.

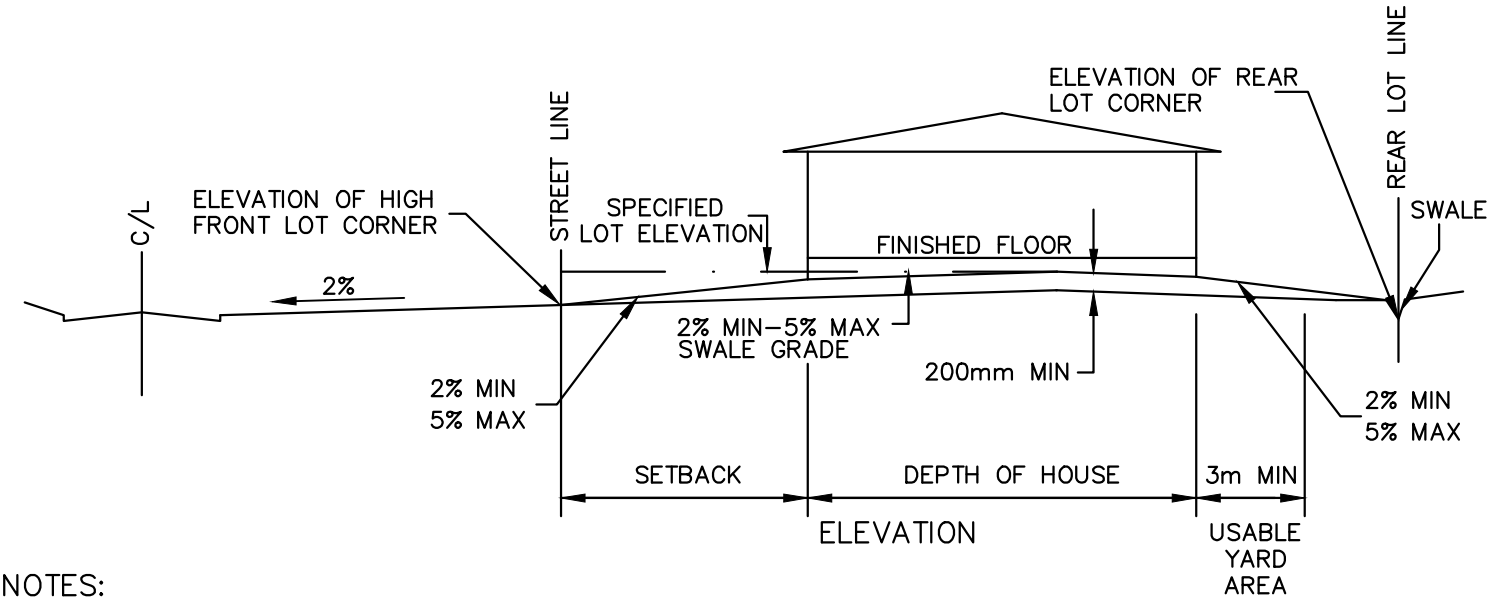
TOWNSHIP OF MAPLETON

# FRONT LOT DRAINAGE

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | G–02 |




PLAN




ELEVATION

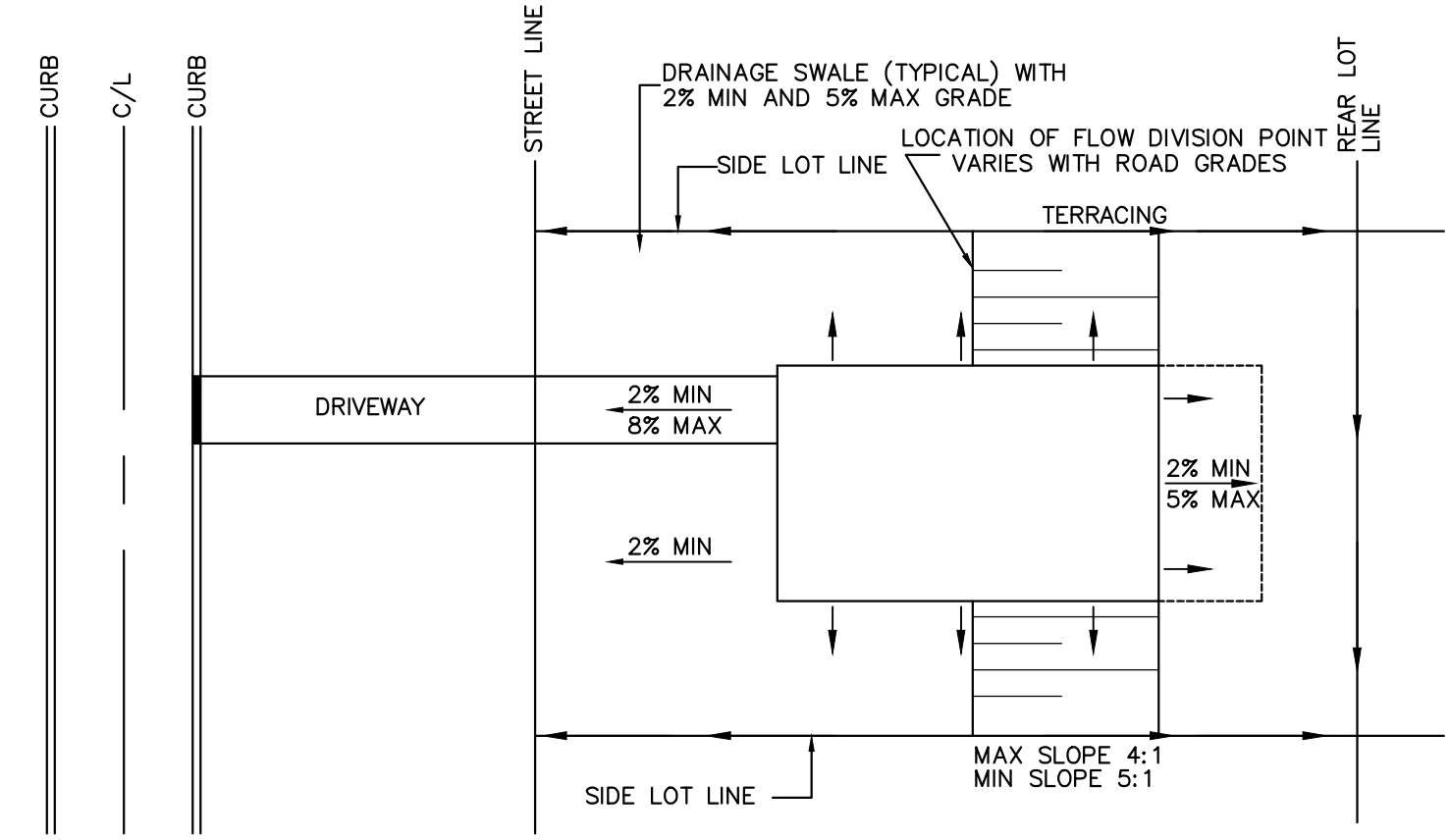
NOTES:

1. THE SPECIFIED LOT ELEVATION SHALL BE CALCULATED AS FOLLOWS:
   – A SWALE GRADIENT OF 2% MIN TO 5% MAX FROM THE FRONT HIGH LOT CORNER AT THE STREETLINE TO THE SWALE HIGH POINT ELEVATION 'A'. LOT ELEVATION SHALL THEN BE SET A MINIMUM OF 0.15m HIGHER THAN SWALE ELEVATION 'A'.
2. DRIVEWAYS ARE NOT TO BE USED AS AN OUTLET FOR SIDEYARD SWALES.
3. ALL ROOF LEADERS ARE TO DIRECT FLOW TO THE FRONT OF THE LOT WHERE SPECIFIED ON THE SUBDIVISION ENGINEERING DRAWINGS.

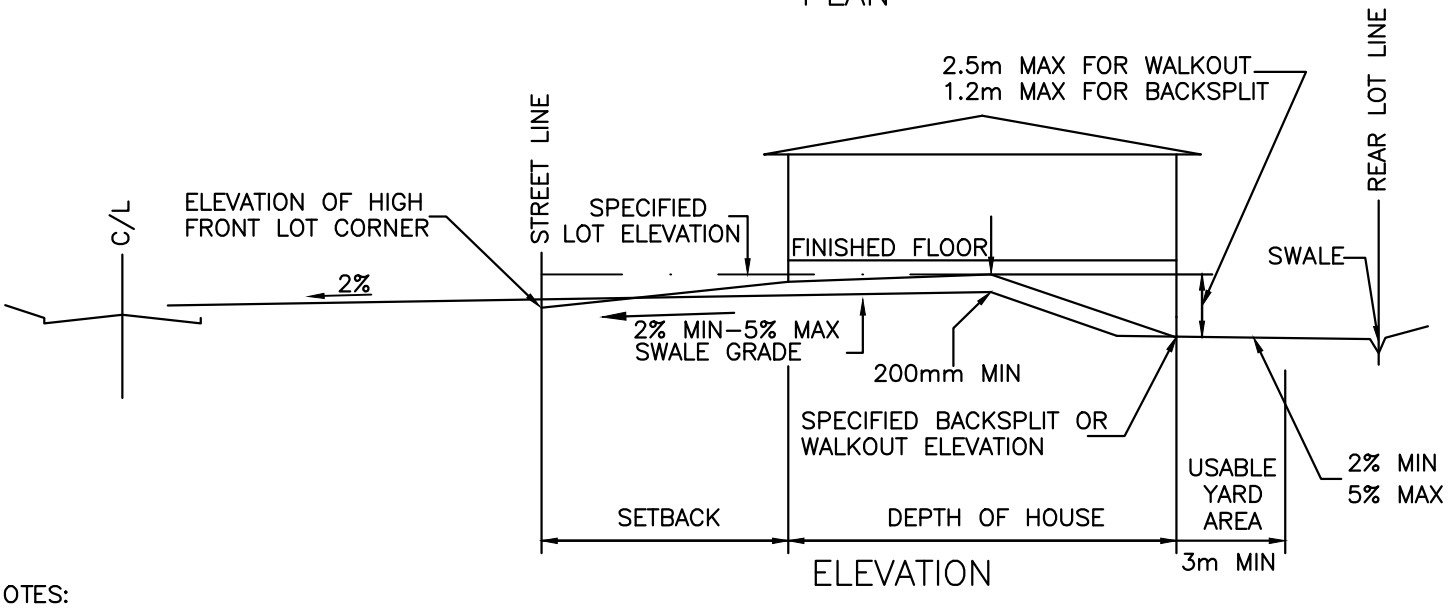
TOWNSHIP OF MAPLETON

# SPLIT LOT DRAINAGE

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | G–03 |




PLAN




ELEVATION

NOTES:

1. THE SPECIFIED LOT ELEVATION SHALL BE CALCULATED AS FOLLOWS:
   A. A SWALE GRADIENT OF 2% MIN TO 5% MAX FROM THE FRONT HIGH LOT CORNER AT THE STREETLINE TO THE SWALE HIGH POINT ELEVATION 'A'.
   B. THE SPECIFIED LOT ELEVATION SHALL THEN BE SET A MINIMUM OF 0.15m HIGHER THAN SWALE ELEVATION 'A'.
2. THE MAXIMUM SLOPE ON ALL EMBANKMENTS AND TERRACES SHALL BE 4:1
3. DRIVEWAYS ARE NOT TO BE USED AS AN OUTLET FOR SIDEYARD SWALES.

TOWNSHIP OF MAPLETON

# SPLIT LOT DRAINAGE FOR WALKOUT OR BACKSPLIT

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | G-04 |

## Colour System

**Consistent use of colour is a major factor in recognition and memorability of the Township of Mapleton logo. These colours have been carefully selected specifically for Township of Mapleton and care should be taken in the consistent use of the colours.**

THIS DOCUMENT WAS PRINTED ON A COLOUR LASER PRINTER, PRODUCED AS A PDF AND VIEWED ON SCREEN, OR REPRODUCED AS A SECOND GENERATION COPY. IT IS A REPRESENTATION ONLY OF THE SPECIFIED COLOURS AND MAY NOT BE ACCURATE TO THE 4C VALUES, RGB VALUES OR THE WEBSAFE COLOURS.

Mapleton TOWNSHIP Rooted in tradition. Growing for the future.

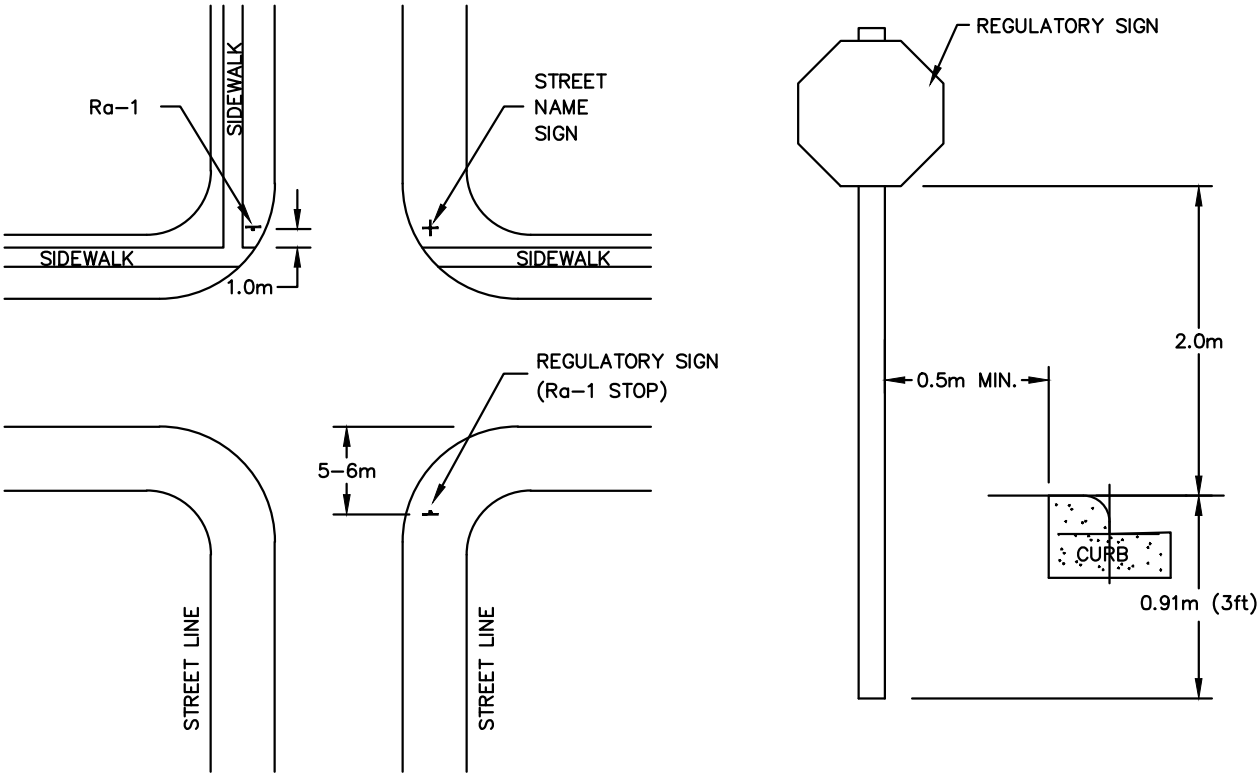
### Colour Breakdowns

| | | | | |
|---|---|---|---|---|
| **PANTONE®** | PANTONE® BLACK | PANTONE® 389 C | PANTONE® 172 C | PANTONE® 151 C |
| **4-colour process** | C 0<br>M 0<br>Y 0<br>K 90 | C 20<br>M 0<br>Y 100<br>K 0 | C 0<br>M 80<br>Y 95<br>K 0 | C 0<br>M 50<br>Y 100<br>K 0 |
| **RGB** | R 25<br>G 25<br>B 25 | R 214<br>G 223<br>B 34 | R 241<br>G 91<br>B 40 | R 247<br>G 147<br>B 29 |
| **Web** | #191919 | #D6DF22 | # F15B28 | #F7931D |

NOTES:

1. THE TOWNSHIP OF MAPLETON WILL PROVIDE A HIGH RESOLUTION FILE OF THEIR LOGO TO THE DEVELOPER SHOULD THEY HAVE TO PREPARE A SIGN FOR THEIR DEVELOPMENT.
2. THE COLOURS USED IN THE SIGN SHALL BE COHESIVE WITH THE COLOURS USED IN THE TOWNSHIPS LOGO WHICH ARE INCLUDED IN THIS DETAIL.

| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | **TOWNSHIP OF MAPLETON SIGN COLOURS** | DATE: ---<br>ISSUE NO. 0<br>SCALE: N.T.S.<br>DWG. NO. **H-01** |




LOCATION PLAN

INSTALLATION DETAIL

NOTES:

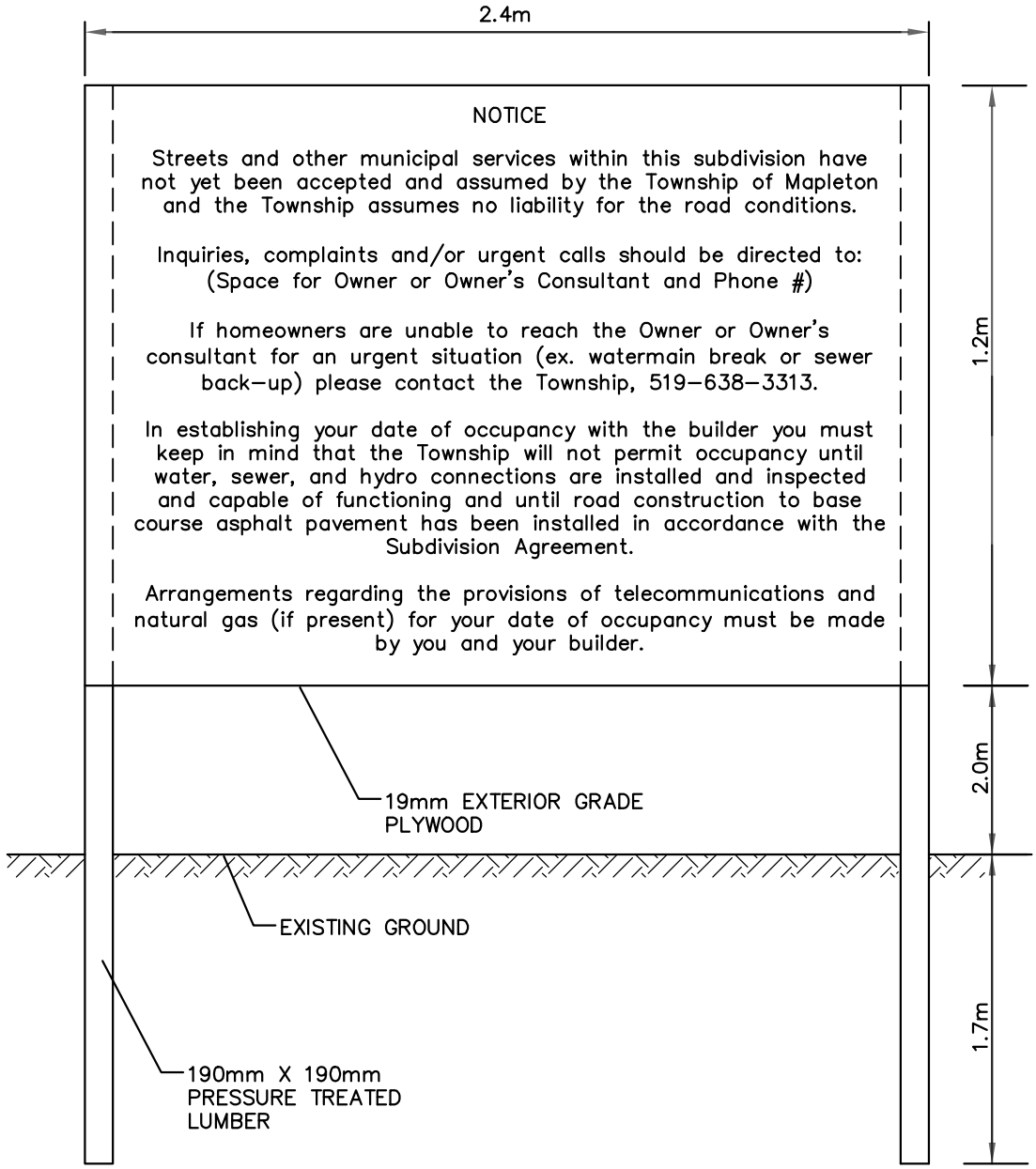
1. REGULATORY/WARNING SIGNS AS PER OHTA REG. 615/616 OR AMENDMENTS THEREOF.
2. ALL REGULATORY/WARNING SIGNS SHALL BE MOUNTED ON 150mm x 150mm PRESSURE TREATED LUMBER BURIED 1.5m INTO THE GROUND.
3. ALL REGULATORY AND WARNING SIGNS SHALL BE MOUNTED A MINIMUM OF 2m ABOVE FINISHED GROUND ELEVATION IN URBAN AREAS.
4. ALL REGULATORY AND WARNING SIGN BLANKS SHALL BE GALVANIZED STEEL AND BE OF HIGH DENSITY GRADE REFLECTORIZED SURFACES.
5. FASTEN SIGN TO POST WITH MINIMUM TWO (2) 12mm DIAMETER x 76mm LONG LAG BOLTS. LAG BOLTS TO BE LOCATED AT TOP AND BOTTOM OF SIGN. PROVIDE 51mm EDGE DISTANCE TO EDGE OF SIGN.
6. STREET NAME SIGNS:
   - -SIGN BLADES SHALL BE EXTRUDED ALUMINUM HAVING A MAXIMUM THICKNESS OF 2.3mm, A HEIGHT OF 150mm (URBAN) AND 200mm (RURAL) AND A LENGTH OF 610 TO 915mm.
   - -LETTERING FOR THE STREET NAME SHALL BE UPPERCASE 100mm IN HEIGHT. THE LETTERING FOR STREET (ST), DRIVE (DR), AVENUE (AVE), CRESCENT (CRES), ETC., SHALL BE ABBREVIATED AS NOTED, UPPERCASE 50mm IN HEIGHT.
   - -RURAL SIGNS ARE REQUIRED TO HAVE THE 911# ON THE BOTTOM.
   - -ALL SIGN MESSAGES SHALL BE WHITE LETTERING ON GREEN BACKGROUND. LETTERING AND BACKGROUND MATERIAL IS TO BE SCOTCHLITE REFLECTIVE SHEATHING, ENGINEERING GRADE AS MANUFACTURED BY 3M CANADA LTD. SIGNS TO BE MADE BY A 3M CERTIFIED FABRICATOR.
   - -THE TOWNSHIP OBTAINS THEIR SIGNS FROM CEDAR SIGNS INC

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.

TOWNSHIP OF MAPLETON

# STREET NAME SIGN HEIGHT AND LOCATION

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | H-02 |




SIGN SPECIFICATIONS:

1. SIGN MATERIALS – 1.2m HIGH x 2.4m WIDE (19mm EXTERIOR GRADE PLYWOOD).
2. LETTERING – BLACK LETTERING ON WHITE BACKGROUND, HELVETICA MEDIUM (OR SIMILAR).
3. SUPPORTS – 2–190mm X 190mm PRESSURE TREATED LUMBER BURIED 1.70m INTO THE GROUND, WITH SIGN MOUNTED 2.0m CLEAR OF GROUND.
4. THE OWNER SHALL POST UNASSUMED ROAD, USE AT OWN RISK SIGNS AT EVERY STREET ENTRANCE TO THE NEW SUBDIVISION.
5. SIGN TO BE REMOVED BY OWNER WHEN THE TOWNSHIP OF MAPLETON HAS ACCEPTED AND ASSUMED THE SUBDIVISION.
6. FASTEN PLYWOOD TO POSTS WITH 76mm COMMON NAILS SPACED AT 152mm. CENTRE NAILS ON POST AND PROVIDE A MINIMUM 30mm EDGE DISTANCE TO EDGE OF PLYWOOD.

THE ABOVE INDICATES MINIMUM REQUIREMENTS FOR THE SIGN. HOWEVER THE DEVELOPER SHALL ENSURE THE FINAL DESIGN AND INSTALLATION IS SUITABLE FOR THE SITE LOCATION AND ASSOCIATED DESIGN LOADS

ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.

TOWNSHIP OF MAPLETON

# DEVELOPMENT SIGN

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | H-03 |


THE ABOVE INDICATES MINIMUM REQUIREMENTS FOR THE SIGN. HOWEVER THE DEVELOPER SHALL ENSURE THE FINAL DESIGN AND INSTALLATION IS SUITABLE FOR THE SITE LOCATION AND ASSOCIATED DESIGN LOADS

NOTES:

1. SIGN SHALL BE PROVIDED BY THE DEVELOPER.
2. SIGN COLOUR AS DIRECTED BY THE TOWNSHIP.
3. SUPPORTS 140mm x 140mm SPF No. 2 PRESSURE TREATED LUMBER BURIED 1.50m INTO THE GROUND, WITH SIGN MOUNTED 2.0 m CLEAR OF GROUND (NUMBER OF SUPPORTS MAY VARY PENDING SIZE OF SIGN).
4. SIGN TO BE ERECTED PRIOR TO FIRST OCCUPANCY OR AS DIRECTED BY THE TOWNSHIP ENGINEER OR DIRECTOR OF PUBLIC WORKS.
5. EACH SIGN WILL BE DIFFERENT BASED ON THE FACILITY AND WHAT IT IS USED FOR. THIS SIGN IS REQUIRED BY THE MECP.
6. FASTEN SIGN TO POST WITH MINIMUM TWO (2) 12mm DIAMETER x 76mm LONG LAG BOLTS. LAG BOLTS TO BE LOCATED AT TOP AND BOTTOM OF SIGN. PROVIDE 51mm EDGE DISTANCE TO EDGE OF SIGN.

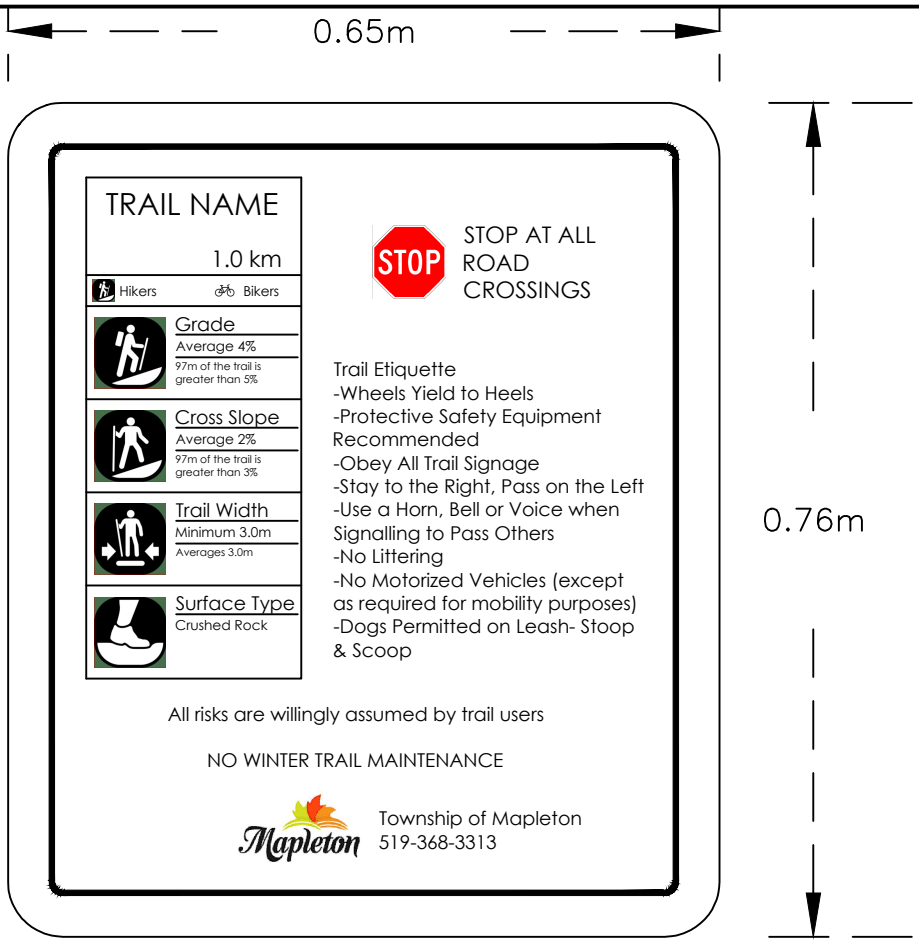
| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | **STORMWATER MANAGEMENT INFORMATION SIGN** | DATE: ---<br>ISSUE NO. 0<br>SCALE: N.T.S.<br>DWG. NO. **H-04** |


THE ABOVE INDICATES MINIMUM REQUIREMENTS FOR THE SIGN. HOWEVER THE DEVELOPER SHALL ENSURE THE FINAL DESIGN AND INSTALLATION IS SUITABLE FOR THE SITE LOCATION AND ASSOCIATED DESIGN LOADS

NOTES:

1. SIGN SHALL BE PROVIDED BY THE DEVELOPER.
2. SIGN COLOUR AS DIRECTED BY THE TOWNSHIP.
3. SUPPORTS – 1 – 140mm x 140mm SPF No. 2 PRESSURE TREATED LUMBER BURIED 1.50m INTO THE GROUND, WITH SIGN MOUNTED 2.0 m CLEAR OF GROUND.
4. SIGN TO BE ERECTED PRIOR TO FIRST OCCUPANCY OR AS DIRECTED BY THE TOWNSHIP ENGINEER OR DIRECTOR OF PUBLIC WORKS.
5. FASTEN SIGN TO POST WITH MINIMUM TWO (2) 12mm DIAMETER x 76mm LONG LAG BOLTS. LAG BOLTS TO BE LOCATED AT TOP AND BOTTOM OF SIGN. PROVIDE 51mm EDGE DISTANCE TO EDGE OF SIGN.

| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | **STORMWATER MANAGEMENT WARNING SIGN** | DATE: --- |
| | | ISSUE NO. 0 |
| | | SCALE: N.T.S. |
| | | DWG. NO. **H–05** |




NOTES:

1. SIGN SHALL BE PROVIDED BY THE DEVELOPER.
2. SIGN COLOUR AS DIRECTED BY THE TOWNSHIP.
3. EACH TRAIL HEAD SIGN SHALL INCLUDE THE FOLLOWING INFORMATION:
   - (A) THE LENGTH OF TRAIL.
   - (B) THE TYPE OF SURFACE OF WHICH THE TRAIL IS CONSTRUCTED.
   - (C) THE AVERAGE AND MAXIMUM TRAIL WIDTH.
   - (D) THE AVERAGE AND MAXIMUM RUNNING SLOPE AND CROSS SLOPE.
   - (E) THE LOCATION OF ANY AMENITIES
4. SUPPORTS–1–140mmX140mm SPF No.2 PRESSURE TREATED LUMBER BURIED 1.50m INTO THE GROUND, WITH SIGN MOUNTED 2.0m CLEAR OF GROUND.
5. FASTEN SIGN TO POST WITH MINIMUM TWO (2) 12mm DIAMETER x 76mm LONG LAG BOLTS. LAG BOLTS TO BE LOCATED AT TOP AND BOTTOM OF SIGN. PROVIDE 51mm EDGE DISTANCE TO EDGE OF SIGN.

THE ABOVE INDICATES MINIMUM REQUIREMENTS FOR THE SIGN. HOWEVER THE DEVELOPER SHALL ENSURE THE FINAL DESIGN AND INSTALLATION IS SUITABLE FOR THE SITE LOCATION AND ASSOCIATED DESIGN LOADS

TOWNSHIP OF MAPLETON

# RECREATIONAL TRAIL HEAD SIGN

| | |
|---|---|
| DATE: | JANUARY 2022 |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | H–06 |



THE ABOVE INDICATES MINIMUM REQUIREMENTS FOR THE SIGN. HOWEVER THE DEVELOPER SHALL ENSURE THE FINAL DESIGN AND INSTALLATION IS SUITABLE FOR THE SITE LOCATION AND ASSOCIATED DESIGN LOADS

NOTES:

1. SIGN SHALL BE PROVIDED BY THE DEVELOPER.
2. SIGN COLOUR AS DIRECTED BY THE TOWNSHIP.
3. SUPPORTS 2 – 140mm x 140mm CEDAR LUMBER BURIED 1.50m INTO THE GROUND, WITH SIGN MOUNTED 2.0m CLEAR OF GROUND.
4. SIGNS HAVE BEEN DEVELOPED IN THE PAST BY INNOVATIVE PRINT. DEVELOPERS MAY CHOOSE TO USE ALTERNATE VENDOR.
6. FASTEN SIGN TO POST WITH MINIMUM TWO (2) 12mm DIAMETER x 76mm LONG LAG BOLTS. LAG BOLTS TO BE LOCATED AT TOP AND BOTTOM OF SIGN. PROVIDE 51mm EDGE DISTANCE TO EDGE OF SIGN.

TOWNSHIP OF MAPLETON

Mapleton

# TRAIL SIGN EXAMPLES

| | |
|---|---|
| DATE: | JANUARY 2022 |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | H–07 |


THE ABOVE INDICATES MINIMUM REQUIREMENTS FOR THE SIGN. HOWEVER THE DEVELOPER SHALL ENSURE THE FINAL DESIGN AND INSTALLATION IS SUITABLE FOR THE SITE LOCATION AND ASSOCIATED DESIGN LOADS

NOTES:

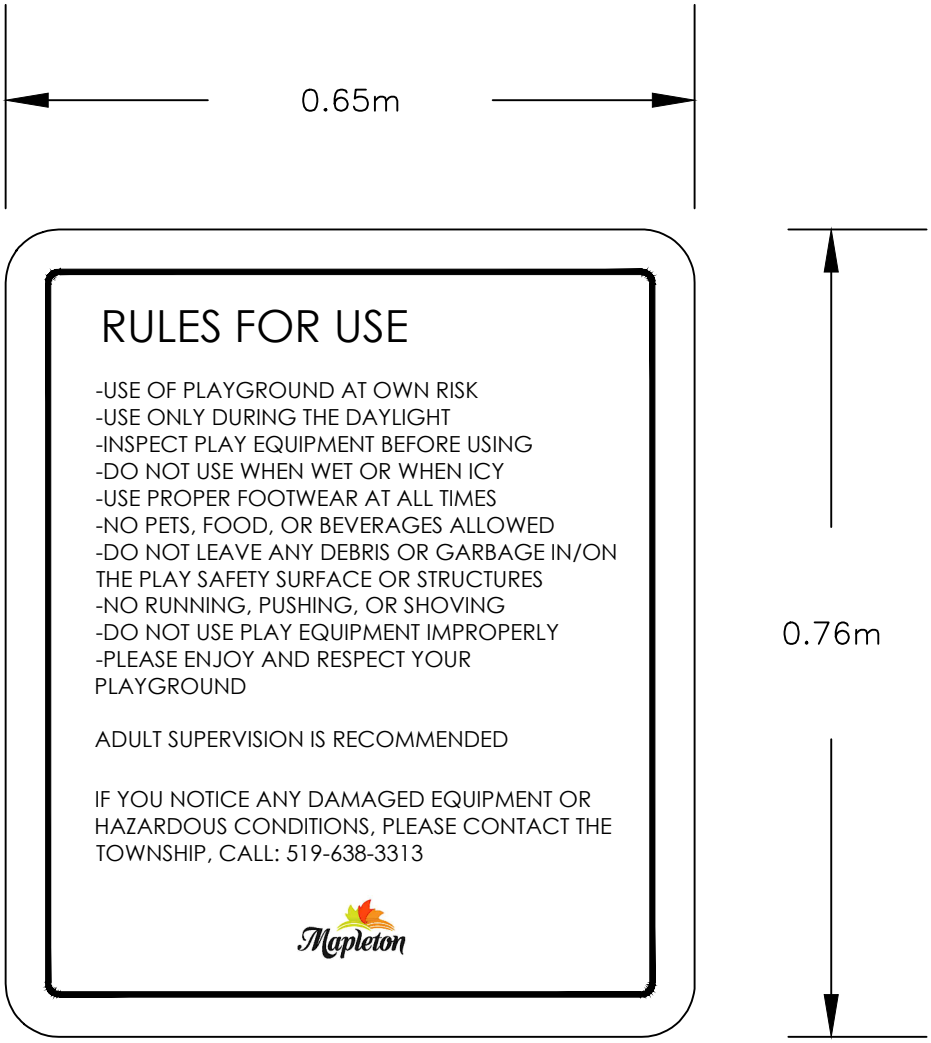
1. SIGN SHALL BE PROVIDED BY THE DEVELOPER.
2. SIGN COLOUR AS DIRECTED BY THE TOWNSHIP.
3. SUPPORTS 2 – 140mm x 140mm CEDAR LUMBER BURIED 1.50m INTO THE GROUND, WITH SIGN MOUNTED 2.0m CLEAR OF GROUND.
4. SIGNS HAVE BEEN DEVELOPED IN THE PAST BY INNOVATIVE PRINT. DEVELOPERS MAY CHOOSE TO USE ALTERNATE VENDOR.
5. FASTEN SIGN TO POST WITH MINIMUM TWO (2) 12mm DIAMETER x 76mm LONG LAG BOLTS. LAG BOLTS TO BE LOCATED AT TOP AND BOTTOM OF SIGN. PROVIDE 51mm EDGE DISTANCE TO EDGE OF SIGN.

TOWNSHIP OF MAPLETON

Mapleton

# PARK ENTRANCE SIGN

| | |
|---|---|
| DATE: | JANUARY 2022 |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | H-08 |

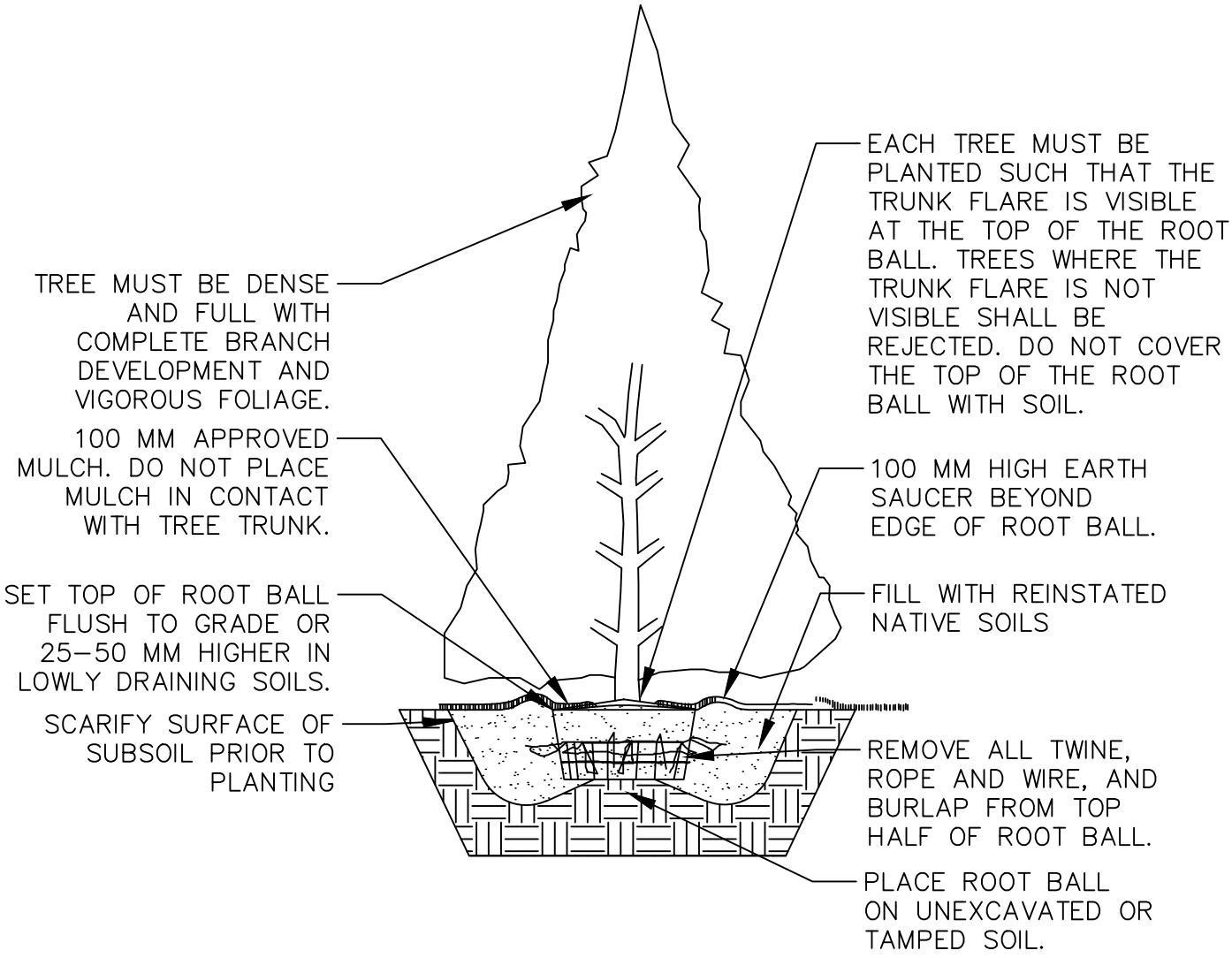



THE ABOVE INDICATES MINIMUM REQUIREMENTS FOR THE SIGN. HOWEVER THE DEVELOPER SHALL ENSURE THE FINAL DESIGN AND INSTALLATION IS SUITABLE FOR THE SITE LOCATION AND ASSOCIATED DESIGN LOADS

NOTES:

1. SIGN SHALL BE PROVIDED BY THE DEVELOPER.
2. SIGN COLOUR AS DIRECTED BY THE TOWNSHIP.
3. SUPPORTS – 1 – 140mm x 140mm SPF No.2 PRESSURE TREATED LUMBER BURIED 1.50m INTO THE GROUND, WITH SIGN MOUNTED 2.0 m CLEAR OF GROUND.
4. SIGN TO BE ERECTED PRIOR TO FIRST OCCUPANCY OR AS DIRECTED BY THE TOWNSHIP ENGINEER OR DIRECTOR OF PUBLIC WORKS.
5. A NO SMOKING OR VAPING SIGN SHALL BE ADDED UNDER THE RULES FOR USE SIGN.
6. FASTEN SIGN TO POST WITH MINIMUM TWO (2) 12mm DIAMETER x 76mm LONG LAG BOLTS. LAG BOLTS TO BE LOCATED AT TOP AND BOTTOM OF SIGN. PROVIDE 51mm EDGE DISTANCE TO EDGE OF SIGN.

| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | **PARK RULE SIGN** | DATE: ---<br>ISSUE NO. 0<br>SCALE: N.T.S.<br>DWG. NO. **H–09** |




NOTES:

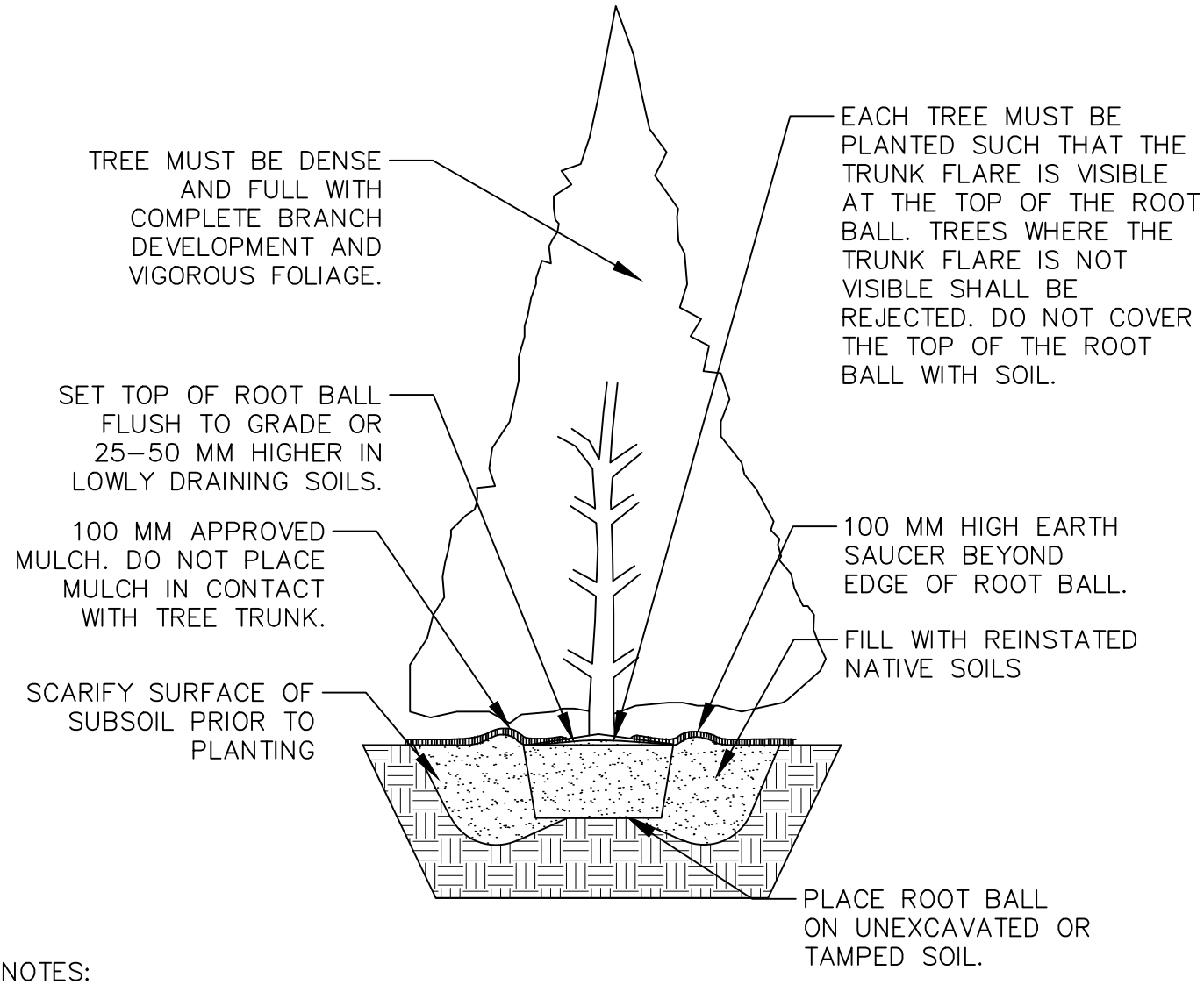
1. DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS. CO–DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. TREES ARE TO BE PLANTED 1.2m FROM PROPERTY LINES. TREES SHALL ALSO BE SETBACK A SUFFICIENT DISTANCE AS TO NOT OVERHAND INTO THE ROAD RIGHT OF WAY.
3. TREES SHALL NOT BE PLANTED WITHIN 3m OF ANY STREET LIGHT POLES, FIRE HYDRANTS, OR TRANSFORMERS
4. REMOVE ALL LABELS AND TAGS FROM PLANTS

TOWNSHIP OF MAPLETON

Mapleton

# CONIFEROUS TREE WIRE BASKET

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I–01 |




NOTES:

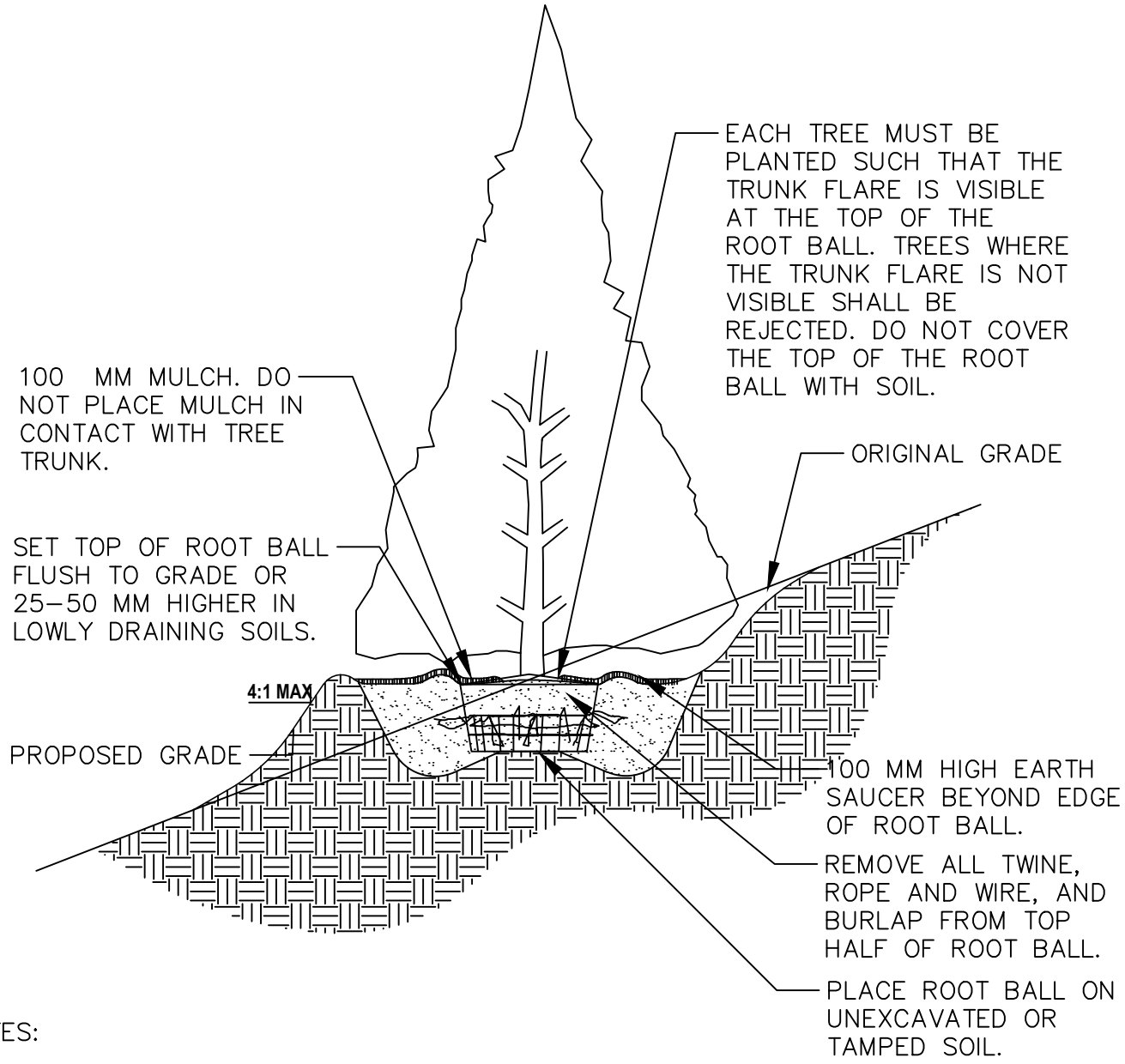
1. DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS. CO–DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. TREES ARE TO BE PLANTED 1.2m FROM PROPERTY LINES. TREES SHALL ALSO BE SETBACK A SUFFICIENT DISTANCE AS TO NOT OVERHAND INTO THE ROAD RIGHT OF WAY.
3. TREES SHALL NOT BE PLANTED WITHIN 3m OF ANY STREET LIGHT POLES, FIRE HYDRANTS, OR TRANSFORMERS
4. REMOVE ALL LABELS AND TAGS FROM PLANTS

TOWNSHIP OF MAPLETON

Mapleton

# CONIFEROUS TREE POTTED

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I–02 |




NOTES:

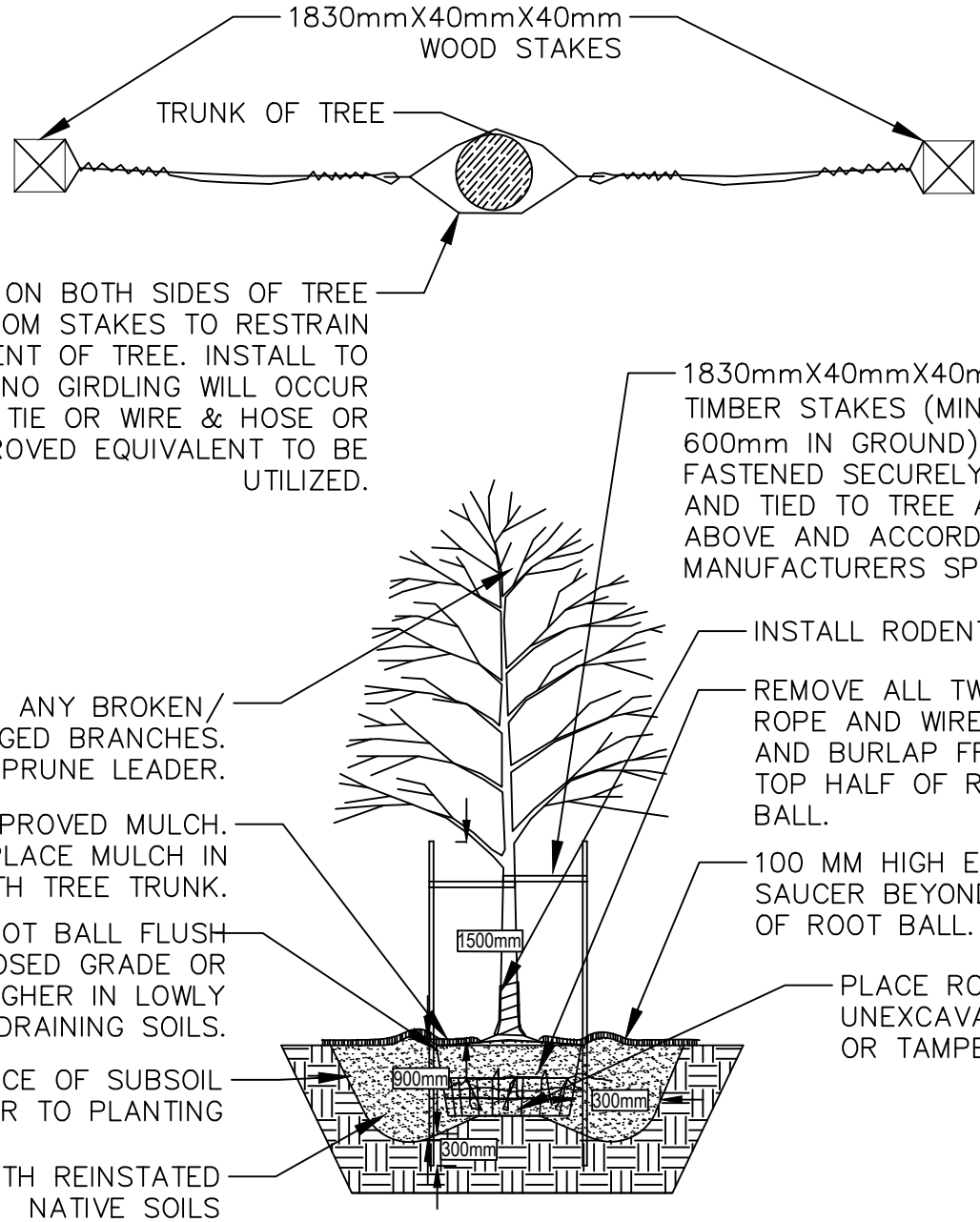
1. DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS. CO–DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. STAKE TREES ONLY UPON THE APPROVAL OF THE CONSULTANT. TREES UNDER 70mm REQUIRE TWO STAKES, TREES 70mm CALIPER AND OVER REQUIRE 3 STAKES.
3. TREES ARE TO BE PLANTED 1.2m FROM PROPERTY LINES. TREES SHALL ALSO BE SETBACK A SUFFICIENT DISTANCE AS TO NOT OVERHAND INTO THE ROAD RIGHT OF WAY.
4. TREES SHALL NOT BE PLANTED WITHIN 3m OF ANY STREET LIGHT POLES, FIRE HYDRANTS, OR TRANSFORMERS
5. REMOVE ALL LABELS AND TAGS FROM PLANTS

TOWNSHIP OF MAPLETON

Mapleton

# CONIFEROUS TREE ON SLOPE

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I–03 |




NOTES:

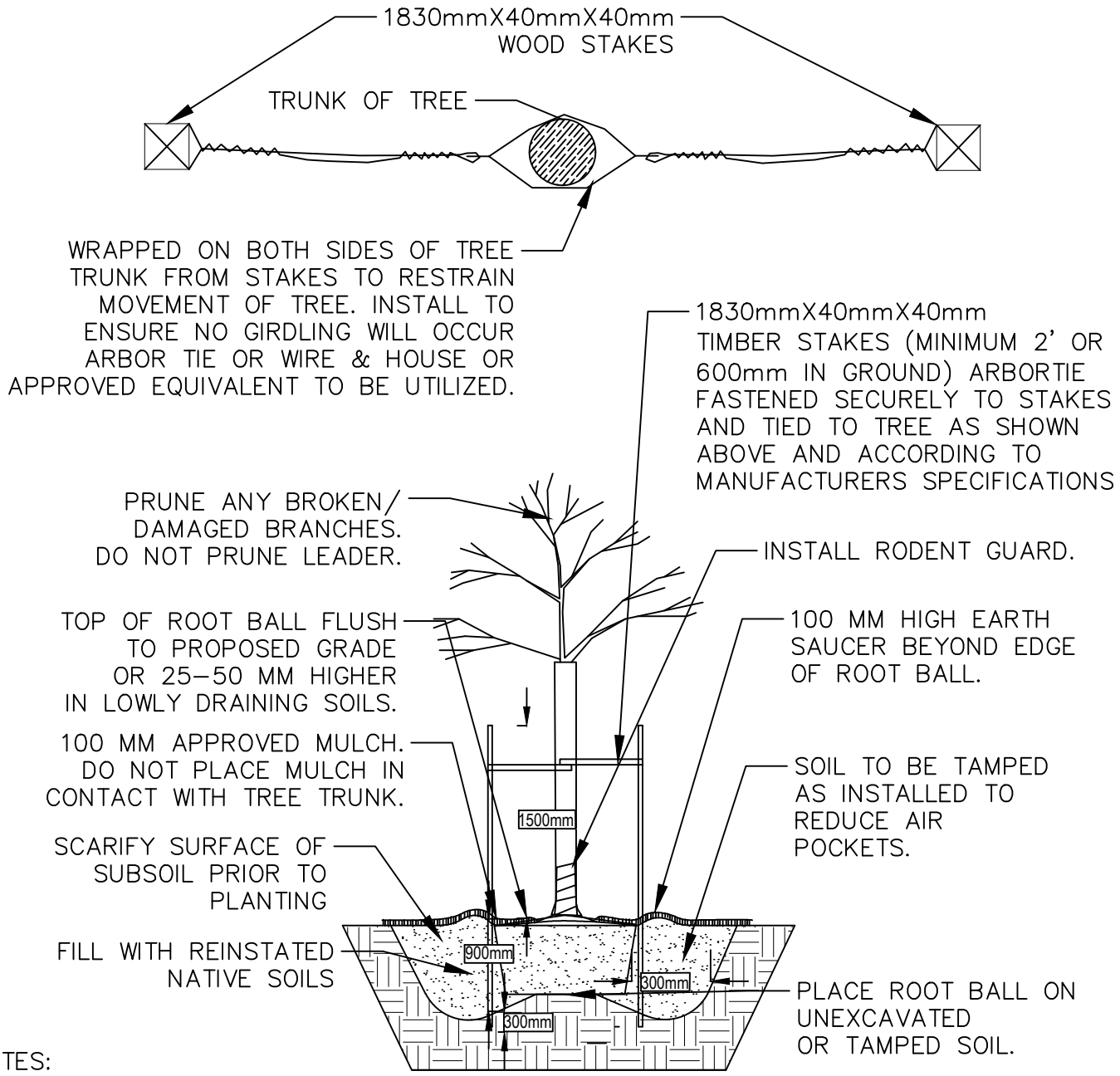
1. DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS. CO–DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. STAKE TREES ONLY UPON THE APPROVAL OF THE CONSULTANT. TREES UNDER 70mm REQUIRE TWO STAKES, TREES 70mm CALIPER AND OVER REQUIRE 3 STAKES.
3. TREES ARE TO BE PLANTED 1.2m FROM PROPERTY LINES. TREES SHALL ALSO BE SETBACK A SUFFICIENT DISTANCE AS TO NOT OVERHAND INTO THE ROAD RIGHT OF WAY.
4. TREES SHALL NOT BE PLANTED WITHIN 3m OF ANY STREET LIGHT POLES, FIRE HYDRANTS, OR TRANSFORMERS
5. REMOVE ALL LABELS AND TAGS FROM PLANTS

TOWNSHIP OF MAPLETON

Mapleton

# DECIDUOUS TREE WIRE BASKET

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I–04 |




NOTES:

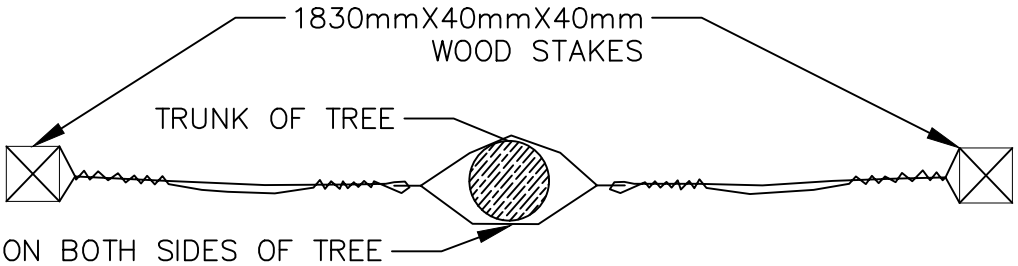
1. DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS. CO–DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. STAKE TREES ONLY UPON THE APPROVAL OF THE CONSULTANT. TREES UNDER 70mm REQUIRE TWO STAKES, TREES 70mm CALIPER AND OVER REQUIRE 3 STAKES.
3. TREES ARE TO BE PLANTED 1.2m FROM PROPERTY LINES. TREES SHALL ALSO BE SETBACK A SUFFICIENT DISTANCE AS TO NOT OVERHAND INTO THE ROAD RIGHT OF WAY.
4. TREES SHALL NOT BE PLANTED WITHIN 3m OF ANY STREET LIGHT POLES, FIRE HYDRANTS, OR TRANSFORMERS
5. REMOVE ALL LABELS AND TAGS FROM PLANTS

TOWNSHIP OF MAPLETON

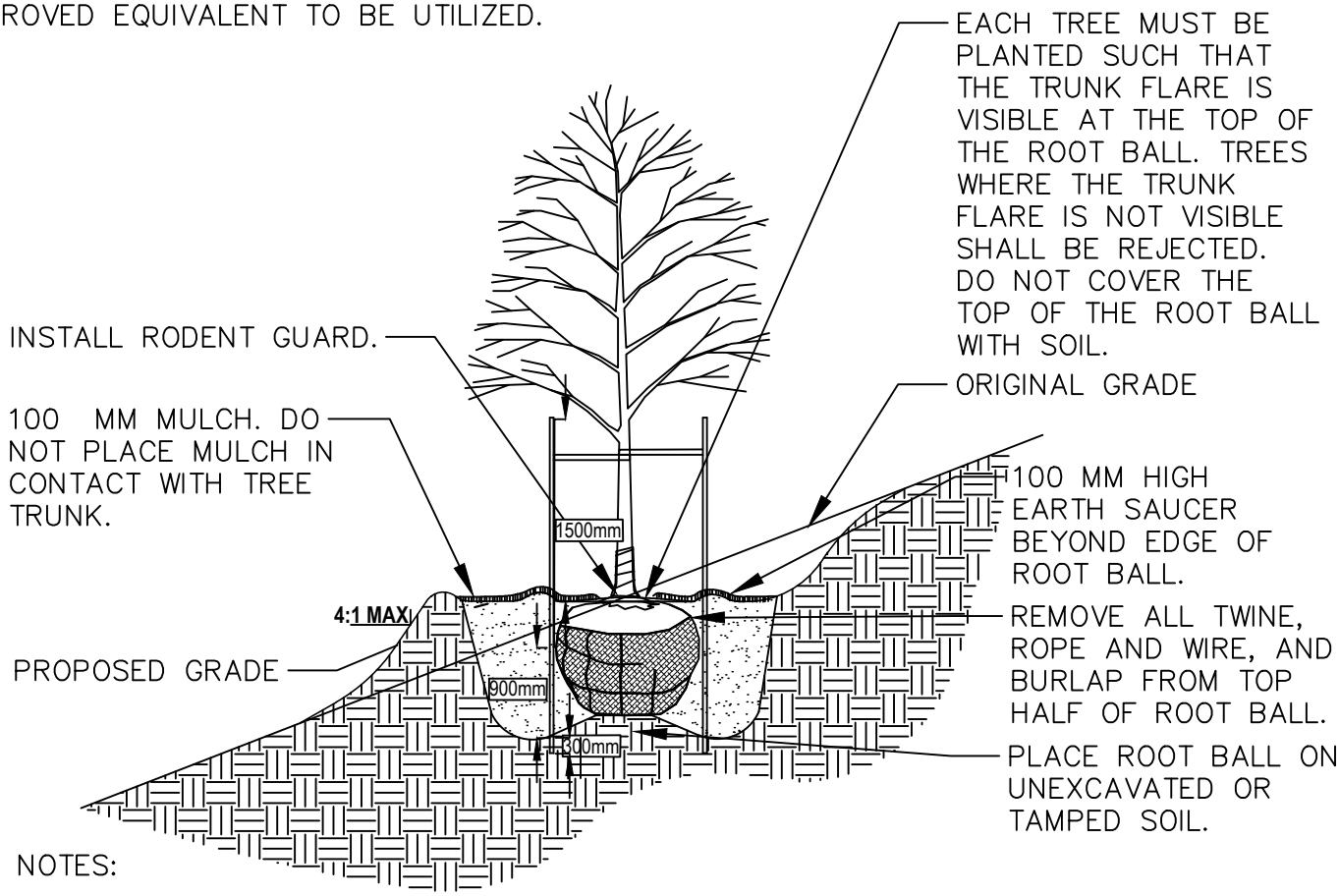
Mapleton

# DECIDUOUS TREE POTTED

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I–05 |




WRAPPED ON BOTH SIDES OF TREE TRUNK FROM STAKES TO RESTRAIN MOVEMENT OF TREE. INSTALL TO ENSURE NO GIRDLING WILL OCCUR ARBOR TIE OR WIRE & HOUSE OR APPROVED EQUIVALENT TO BE UTILIZED.




NOTES:

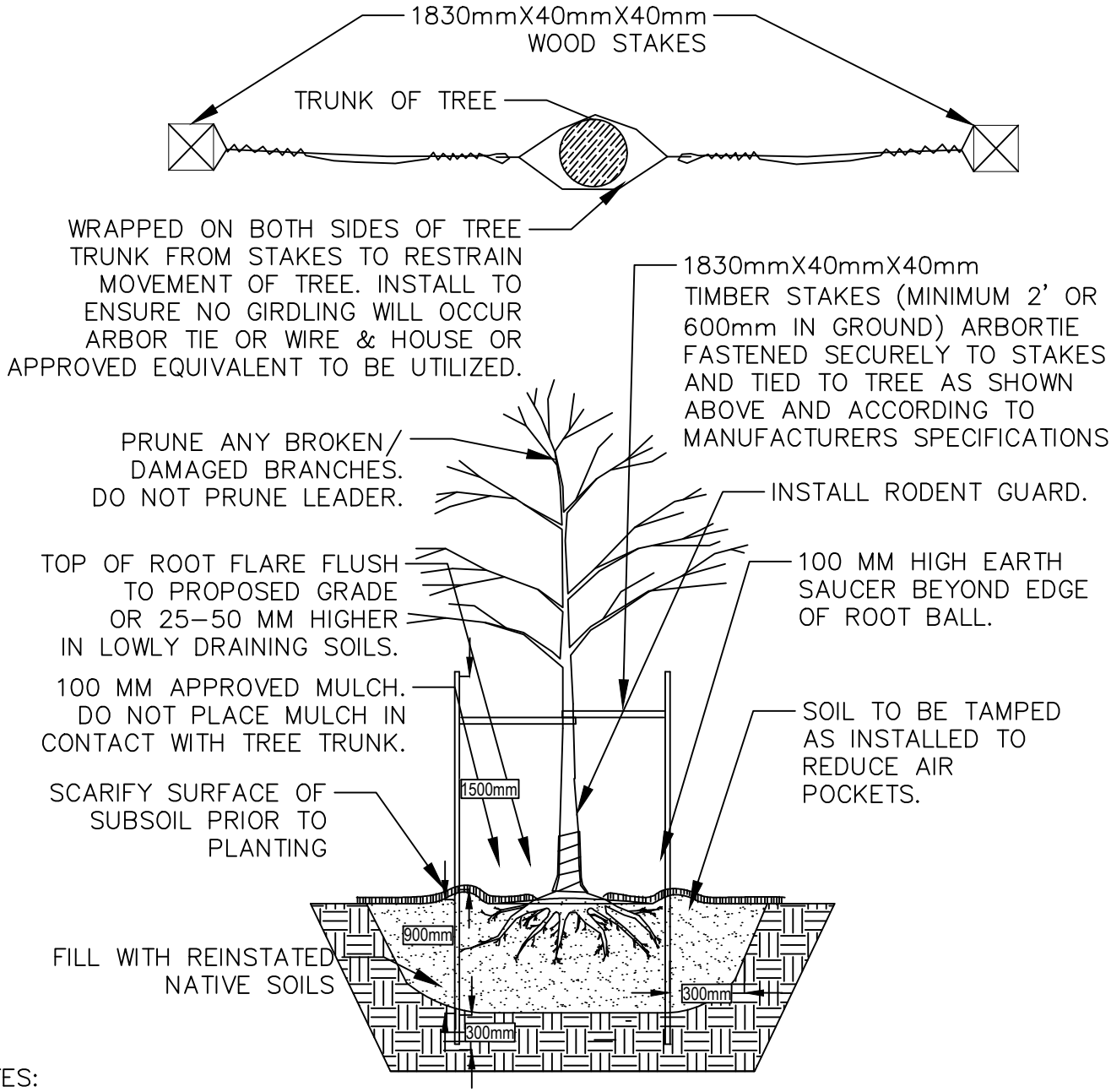
1. DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS. CO–DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. STAKE TREES ONLY UPON THE APPROVAL OF THE CONSULTANT. TREES UNDER 70mm REQUIRE TWO STAKES, TREES 70mm CALIPER AND OVER REQUIRE 3 STAKES.
3. TREES ARE TO BE PLANTED 1.2m FROM PROPERTY LINES. TREES SHALL ALSO BE SETBACK A SUFFICIENT DISTANCE AS TO NOT OVERHAND INTO THE ROAD RIGHT OF WAY.
4. TREES SHALL NOT BE PLANTED WITHIN 3m OF ANY STREET LIGHT POLES, FIRE HYDRANTS, OR TRANSFORMERS
5. REMOVE ALL LABELS AND TAGS FROM PLANTS

TOWNSHIP OF MAPLETON

Mapleton

# DECIDUOUS TREE ON SLOPE

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I–06 |




NOTES:

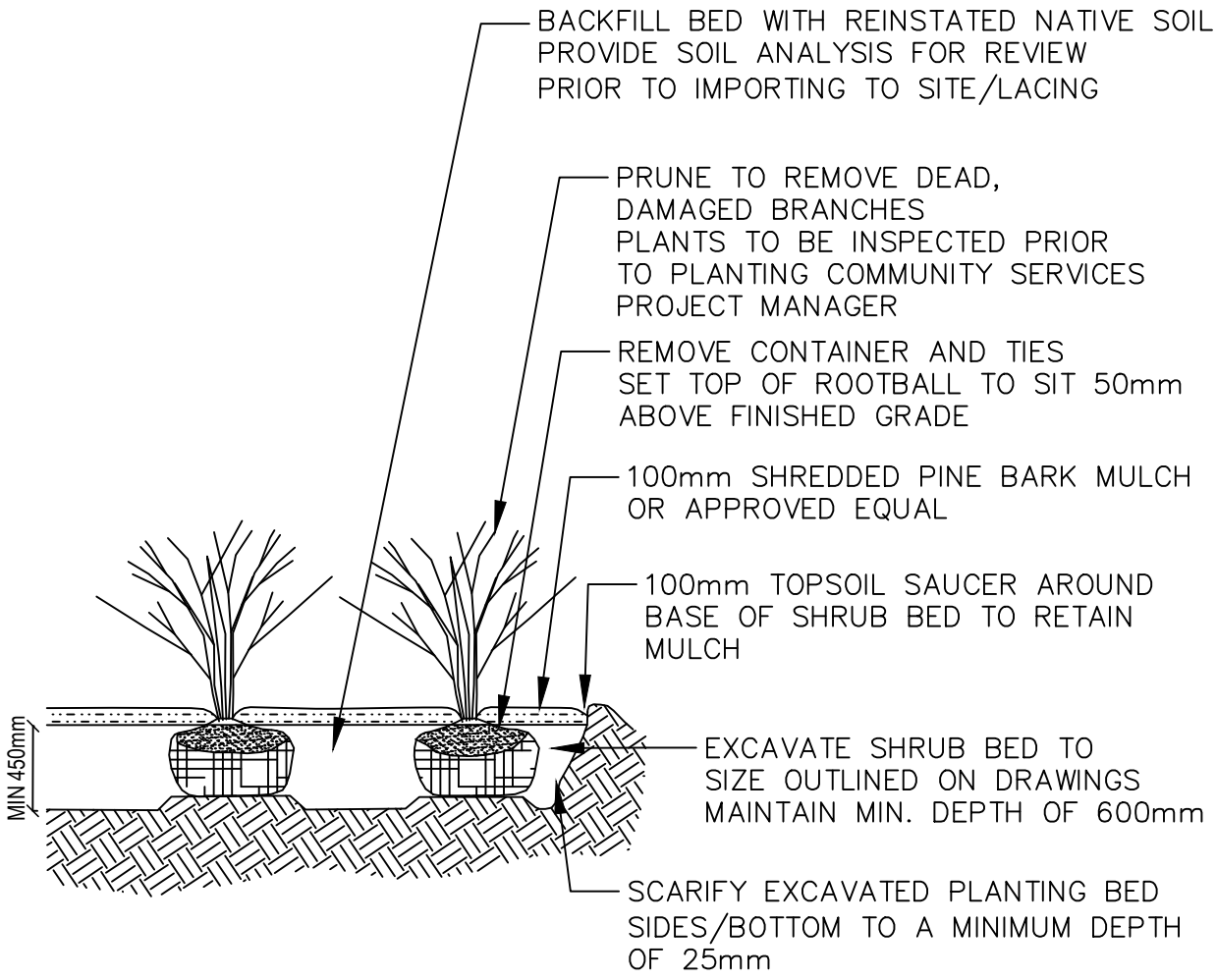
1. DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS. CO–DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. STAKE TREES ONLY UPON THE APPROVAL OF THE CONSULTANT. TREES UNDER 70mm REQUIRE TWO STAKES, TREES 70mm CALIPER AND OVER REQUIRE 3 STAKES.
3. TREES ARE TO BE PLANTED 1.2m FROM PROPERTY LINES. TREES SHALL ALSO BE SETBACK A SUFFICIENT DISTANCE AS TO NOT OVERHAND INTO THE ROAD RIGHT OF WAY.
4. TREES SHALL NOT BE PLANTED WITHIN 3m OF ANY STREET LIGHT POLES, FIRE HYDRANTS, OR TRANSFORMERS
5. REMOVE ALL LABELS AND TAGS FROM PLANTS

TOWNSHIP OF MAPLETON

Mapleton

# DECIDUOUS TREE BARE ROOT

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I–07 |




NOTES:

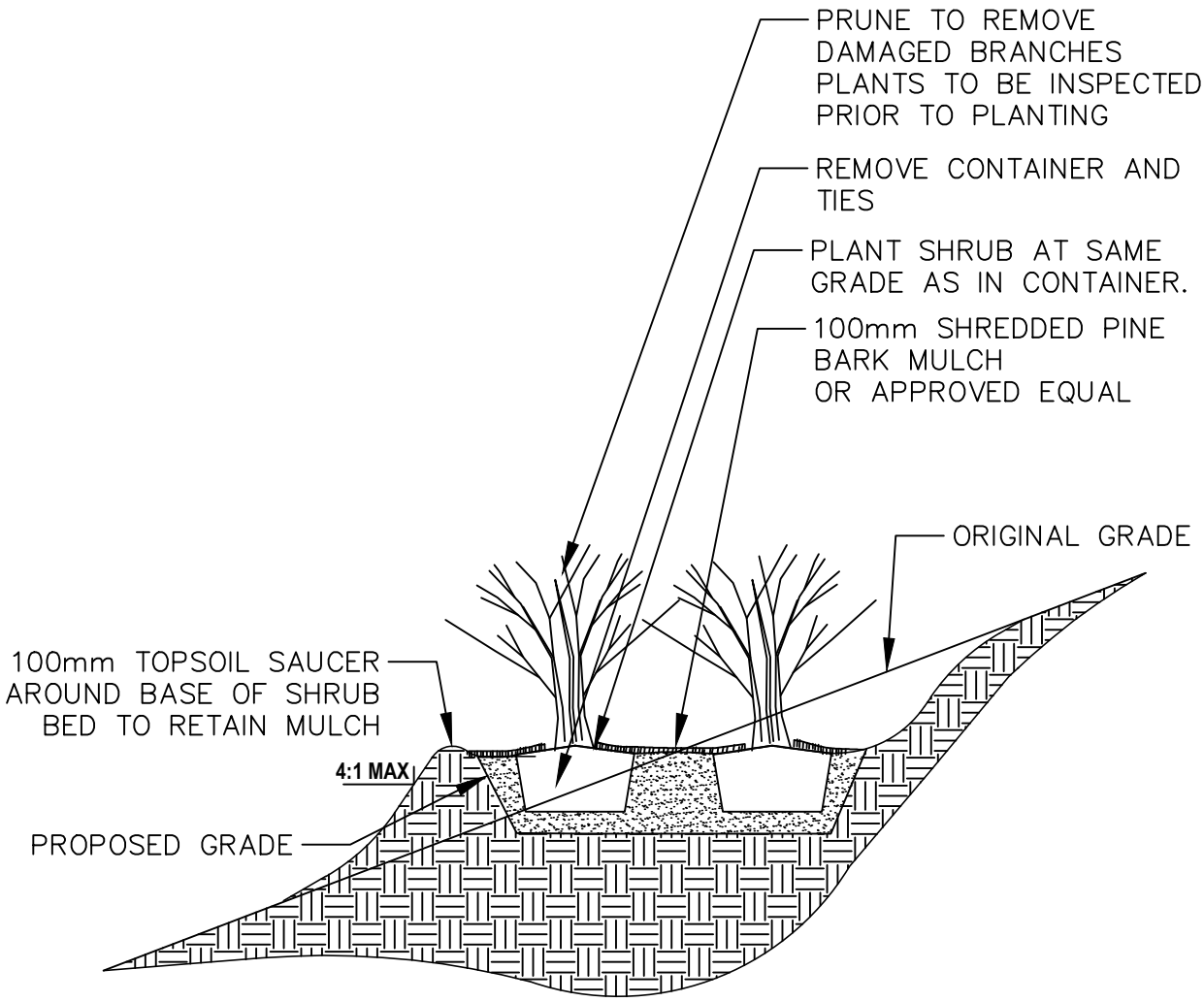
1. DO NOT HEAVILY PRUNE THE SHRUB AT PLANTING. PRUNE BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. APPLY APPROVED WATER SOLUBLE FERTILIZER AT A RATE OF 9kg/100sq.m. ENSURE FERTILIZER IS CONTAINED WITHIN SAUCER AND EVENLY RAKED INTO PLANTING SOIL MIXTURE.
3. SHRUBS PLANTED IN GROUPS SHALL BE SET IN CONTINUOUS BEDS.
4. REMOVE ALL LABELS AND TAGS FROM PLANTS

TOWNSHIP OF MAPLETON

Mapleton

# SHRUB
# POTTED CONTINUOUS

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I-08 |




NOTES:

1. DO NOT HEAVILY PRUNE THE SHRUB AT PLANTING. PRUNE BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED. HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
2. APPLY APPROVED WATER SOLUBLE FERTILIZER AT A RATE OF 9kg/100sq.m. ENSURE FERTILIZER IS CONTAINED WITHIN SAUCER AND EVENLY RAKED INTO PLANTING SOIL MIXTURE.
3. SHRUBS PLANTED IN GROUPS SHALL BE SET IN CONTINUOUS BEDS.
4. REMOVE ALL LABELS AND TAGS FROM PLANTS

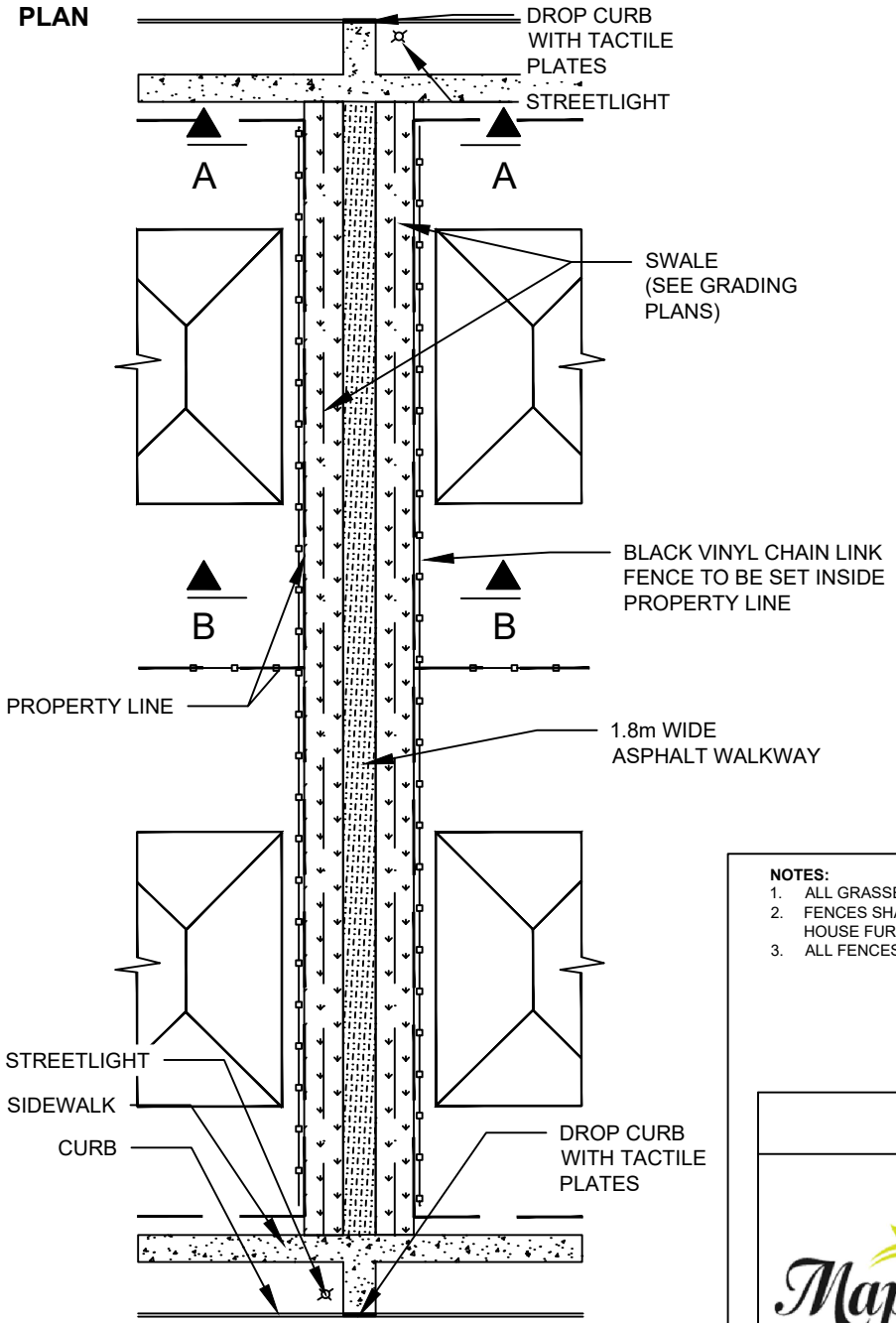
TOWNSHIP OF MAPLETON

Mapleton

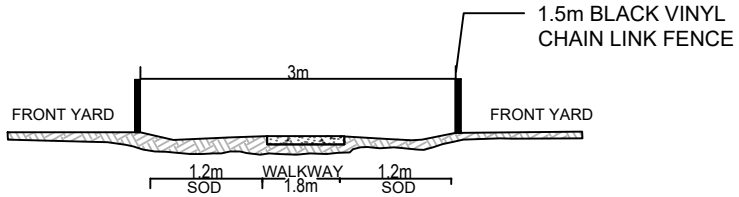
# SHRUB ON SLOPE

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I-09 |

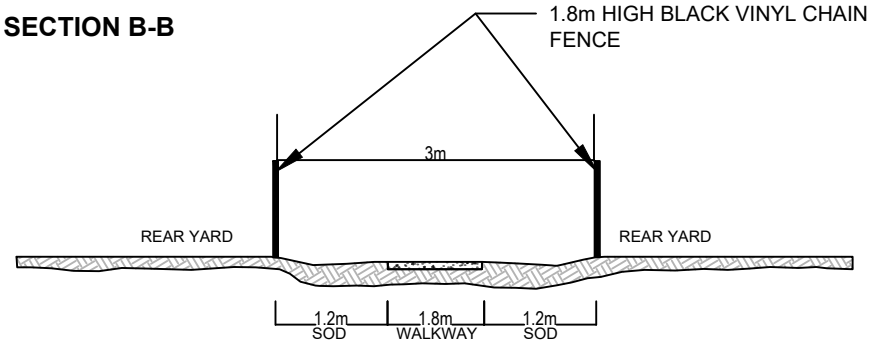
**PLAN**




**SECTION A-A**




**SECTION B-B**




**NOTES:**

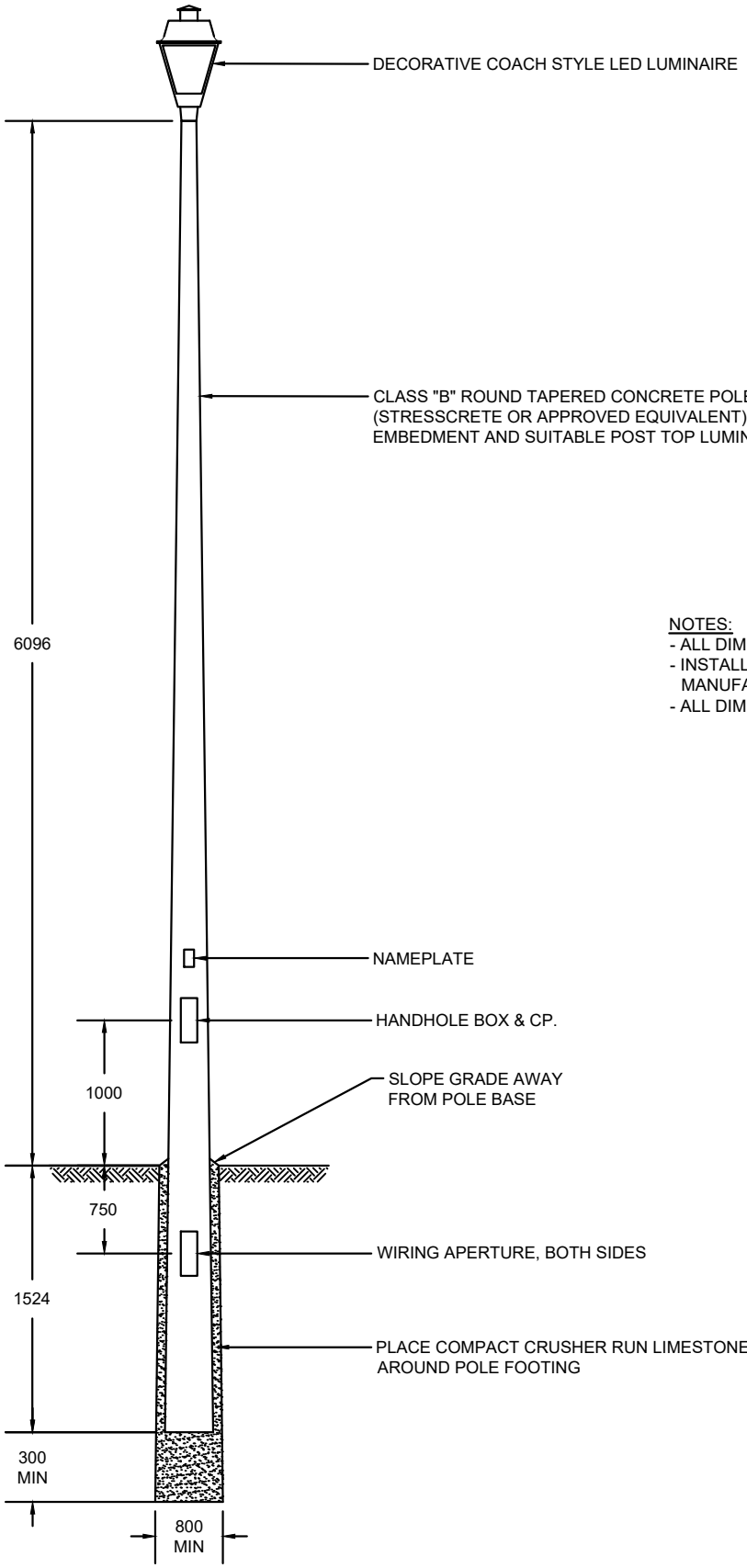
1. ALL GRASSED AREAS TO BE SODDED ON 150mm TOPSOIL WITH NO. 1 NURSERY SOD.
2. FENCES SHALL BE BLACK VINYL CHAIN LINK FENCE. 1.8m IN HEIGHT IN REAR YARDS. TRANSITIONING TO 1.5m AT THE FRONT FACE OF THE HOUSE FURTHEST BACK FROM THE STREET.
3. ALL FENCES TO BE INSTALLED ON PRIVATE PROPERTY.

TOWNSHIP OF MAPLETON

Mapleton

# 3m WALKWAY LANDSCAPING

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | I–10 |

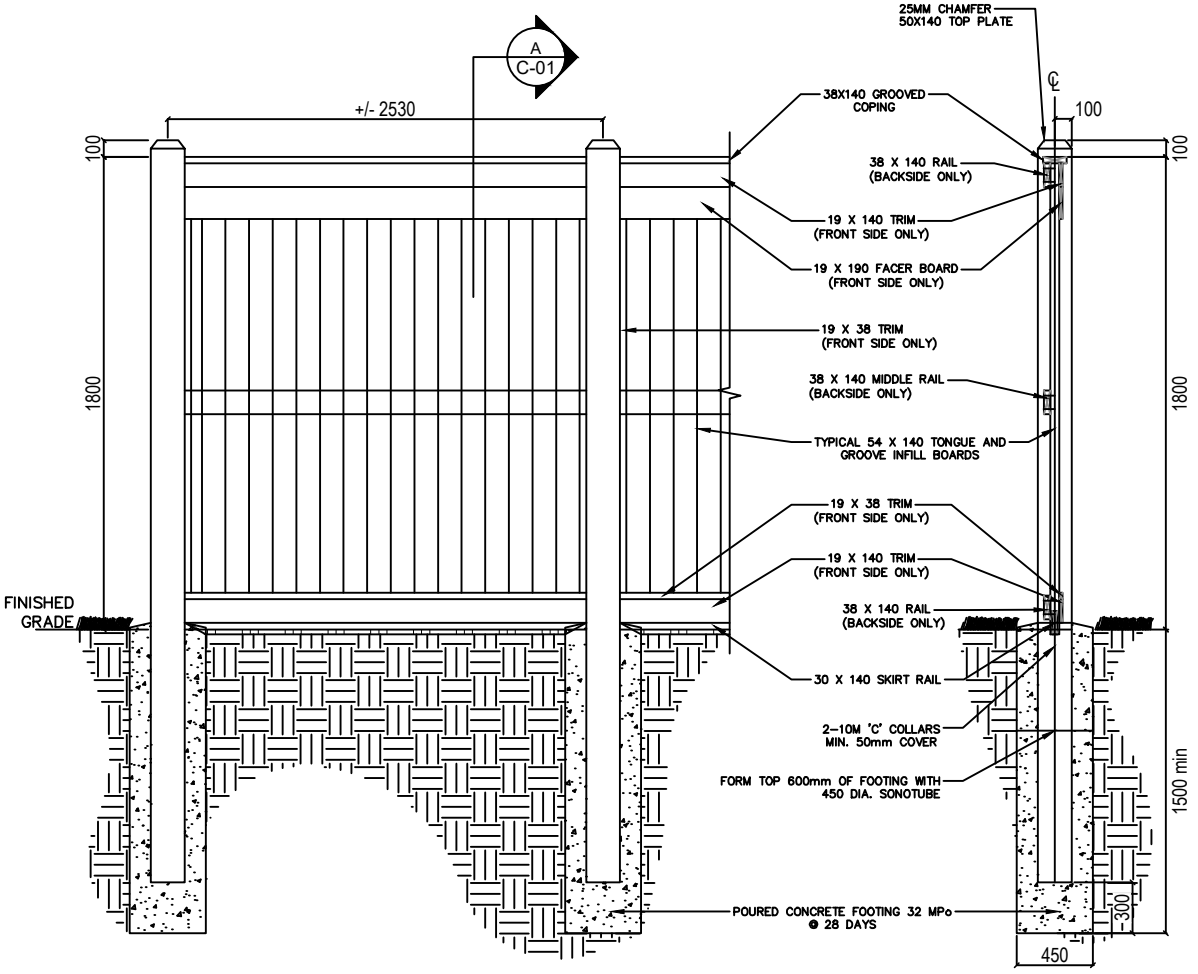



NOTES:
- ALL DIMENSIONS ARE FOR REFERENCE ONLY.
- INSTALLATION OF POLE AND LUMINARIES TO BE AS PER MANUFACTURERS' RECOMMENDATIONS.
- ALL DIMENSIONS ARE IN MILLIMETERS

TOWNSHIP OF MAPLETON

# RESIDENTIAL LIGHTING STANDARD

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | K-01 |




ELEVATION – FRONT SIDE

SECTION – A

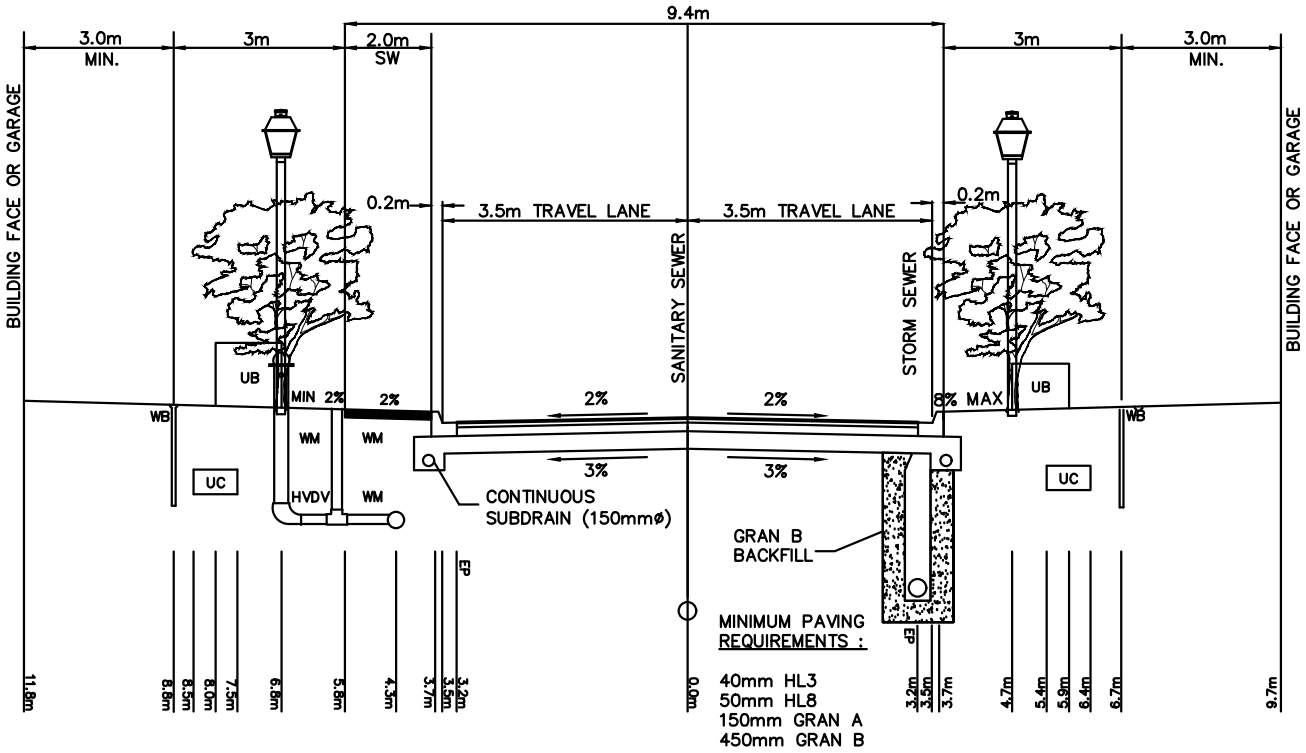
NOTES:

1. ALL WOOD COMPONENTS SHALL BE NO. 1 CONSTRUCTION GRADE WESTERN RED CEDAR OR PRESSURE TREATED PINE, SELECTED FOR GOOD APPEARANCE AND FREE OF WANE BARK AND PITCH POCKETS.
2. ALL WOOD COMPONENTS SHALL BE TREATED WITH 2 COATS OF CLEAR STAIN. TO BE APPLIED WITHIN 7 DAYS.
3. FENCE SHALL BE CONTINUOUS WITH NO GAPS AND HAVE A MINIMUM SURFACE DENSITY OF 20 kg/m2

TOWNSHIP OF MAPLETON

# 1.8m HIGH WOOD PRIVACY FENCE

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | L-01 |




NOTES:

1. WATERMAIN TO HAVE MINIMUM COVER OF 1.8m.
2. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TOWNSHIP.
3. A 0.4m–0.6m CLEARANCE MUST BE MAINTAINED BETWEEN CABLES AND HYDRANTS.
4. ROAD WIDTH IS MEASURED FROM FACE OF CURB TO FACE OF CURB AS DEFINED ON OPSD CURB AND GUTTER STD. 600.040. PAVEMENT WIDTH IS MEASURED FROM EDGE OF PAVEMENT (EP) TO EDGE OF PAVEMENT (EP).
5. SIDEWALK MUST BE AODA COMPLAINT.
6. CONTINUOUS SUBDRAIN ON EACH SIDE OF ROAD TO BE PROVIDED.
7. NO PARKING SIGNS/FIRE ROUTE SIGNS TO BE INSTALLED ON BOTH SIDES OF THE ROAD.

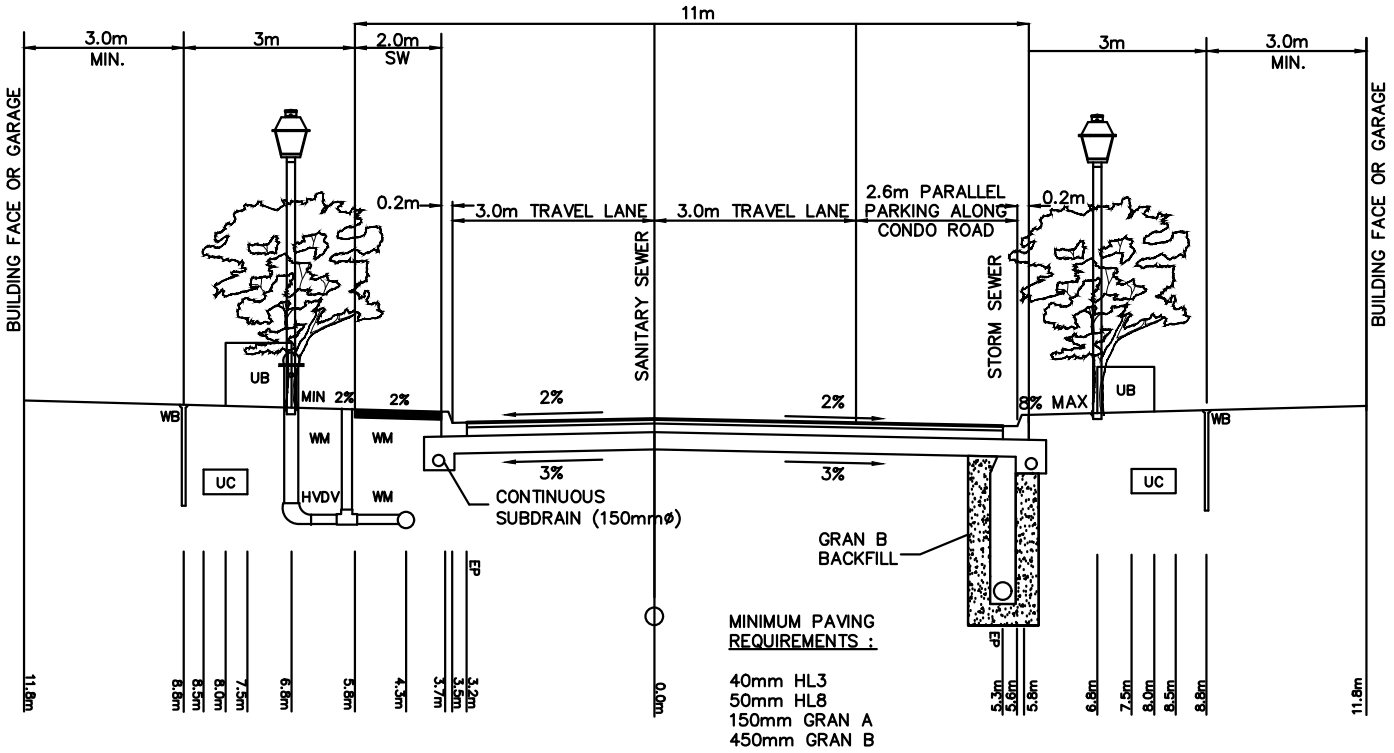
LEGEND:

WM – WATERMAIN
WB – WATERBOX
VB – VALVEBOX

TOWNSHIP OF MAPLETON

# PRIVATE ROAD CROSS SECTION FOR A CONDOMINIUM WITH OFF–STREET PARKING

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | M–01 |




NOTES:

1. WATERMAIN TO HAVE MINIMUM COVER OF 1.8m.
2. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TOWNSHIP.
3. A 0.4m–0.6m CLEARANCE MUST BE MAINTAINED BETWEEN CABLES AND HYDRANTS.
4. ROAD WIDTH IS MEASURED FROM FACE OF CURB TO FACE OF CURB AS DEFINED ON OPSD CURB AND GUTTER STD. 600.040. PAVEMENT WIDTH IS MEASURED FROM EDGE OF PAVEMENT (EP) TO EDGE OF PAVEMENT (EP).
5. SIDEWALK MUST BE AODA COMPLAINT.
6. CONTINUOUS SUBDRAIN ON EACH SIDE OF ROAD TO BE PROVIDED.
7. NO PARKING SIGNS ON ONE SIDE OF ROAD.

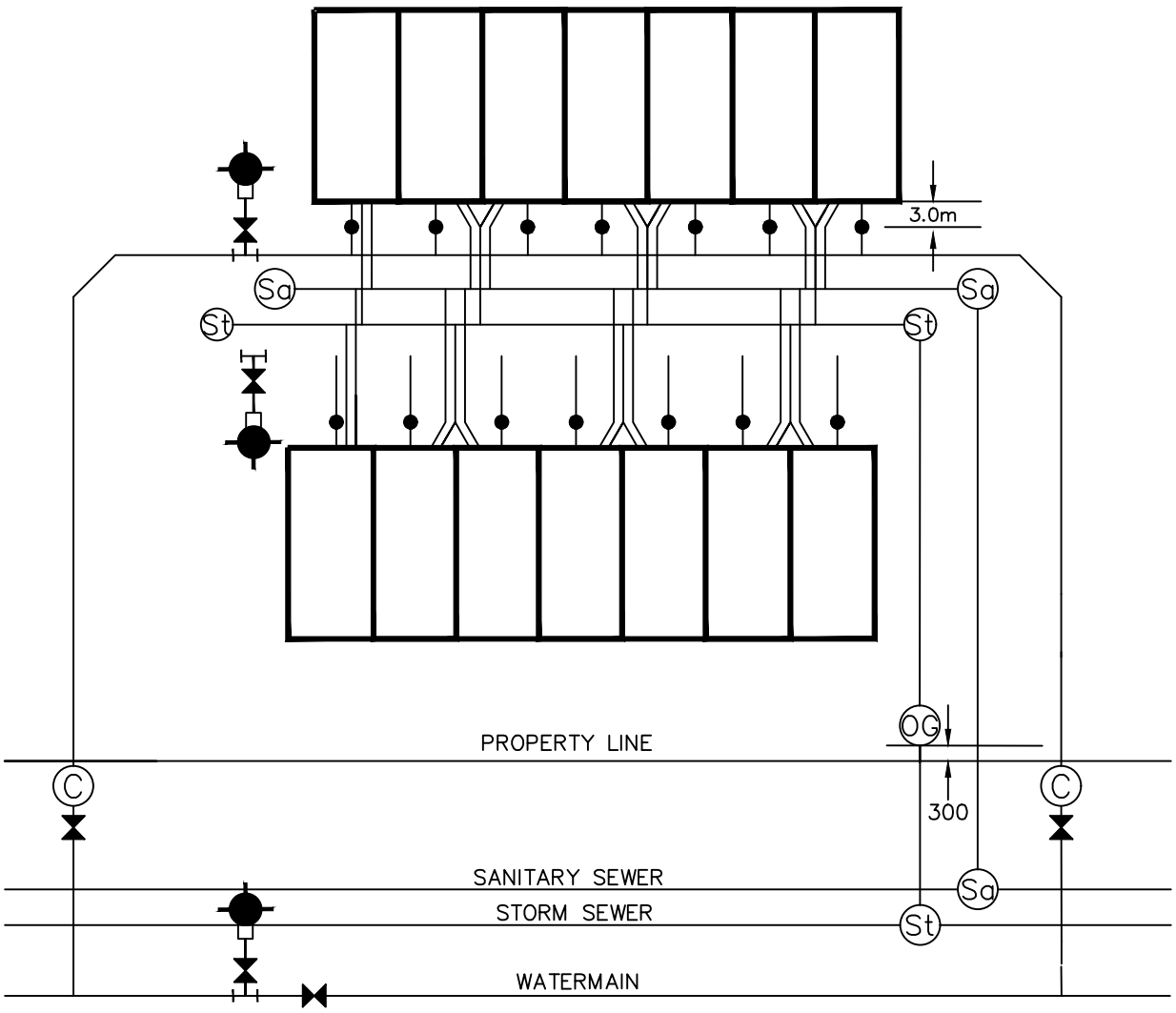
LEGEND:

WM – WATERMAIN
WB – WATERBOX
VB – VALVEBOX

TOWNSHIP OF MAPLETON

# PRIVATE ROAD CROSS SECTION FOR A CONDOMINIUM WITH ON-STREET PARKING

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | M-02 |




## LEGEND

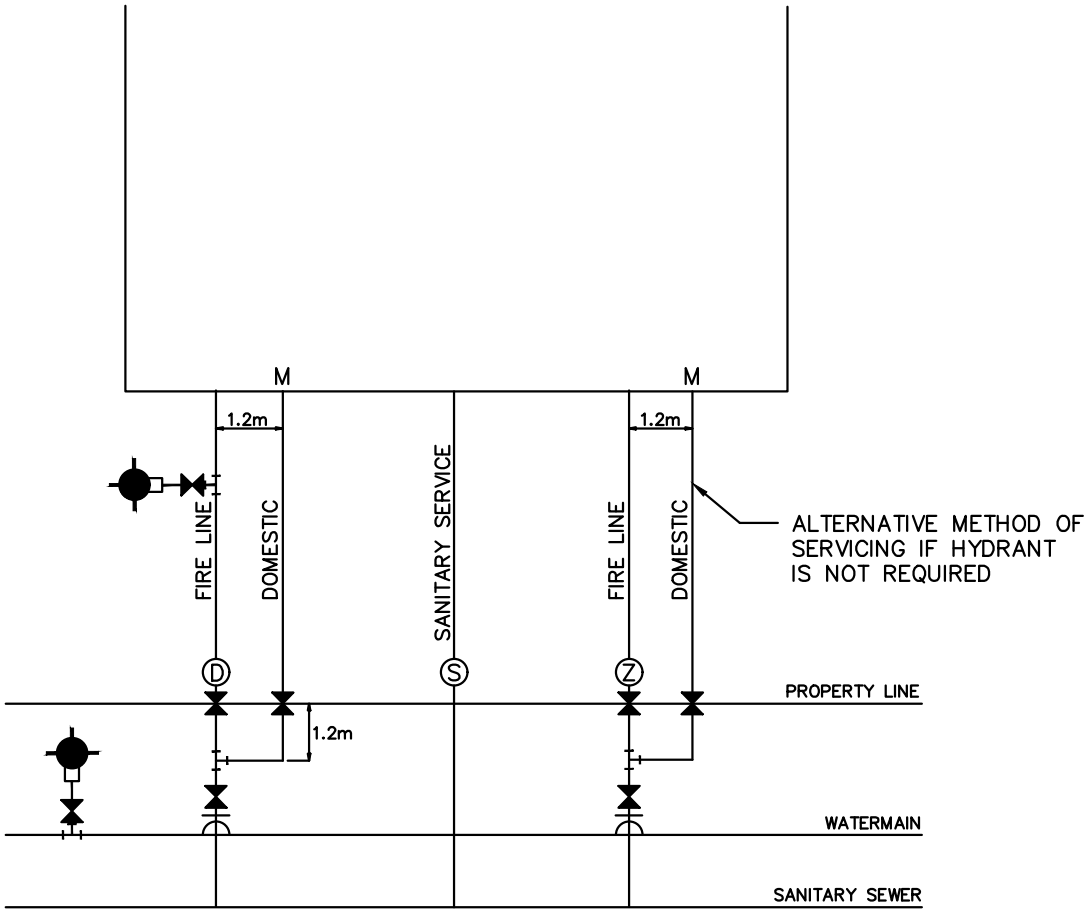
- ⋈ VALVE AND BOX
- Ⓒ CHECK VALVE IN CHAMBER
- Ⓢa SANITARY SEWER SAMPLING MAINTENANCE HOLE
- OG OIL/GRIT SEPARATOR (SAMPLING MAINTENANCE HOLE)

ALL DIMENSIONS ARE EXPRESSED IN MILLIMETRES (mm) UNLESS OTHERWISE NOTED.

NOTES:

1. ALL INSTALLATIONS ON THE PRIVATE PROPERTY SHALL ADHERE TO THE ONTARIO BUILDING CODE.

| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | **SCHEMATIC OF SERVICING TO CONDOMINIUM TOWNHOUSE** | DATE: ---<br>ISSUE NO. 0<br>SCALE: N.T.S.<br>DWG. NO. **M-03** |



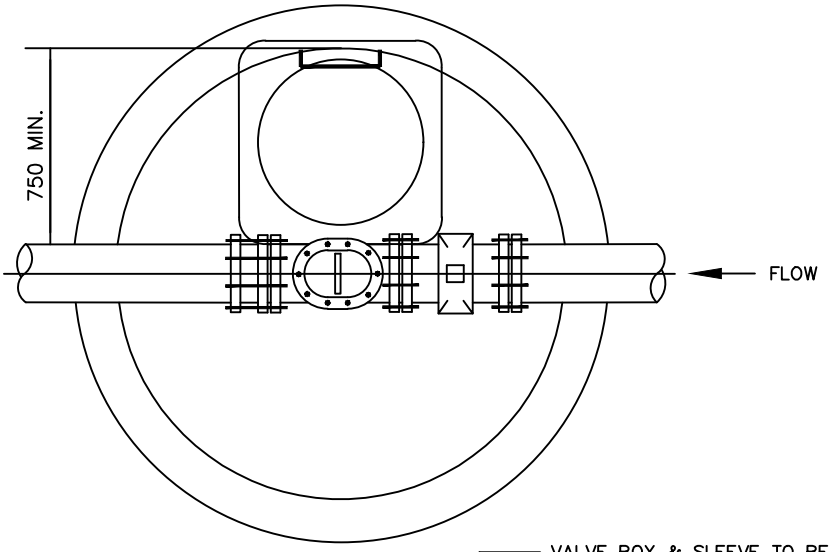

## LEGEND

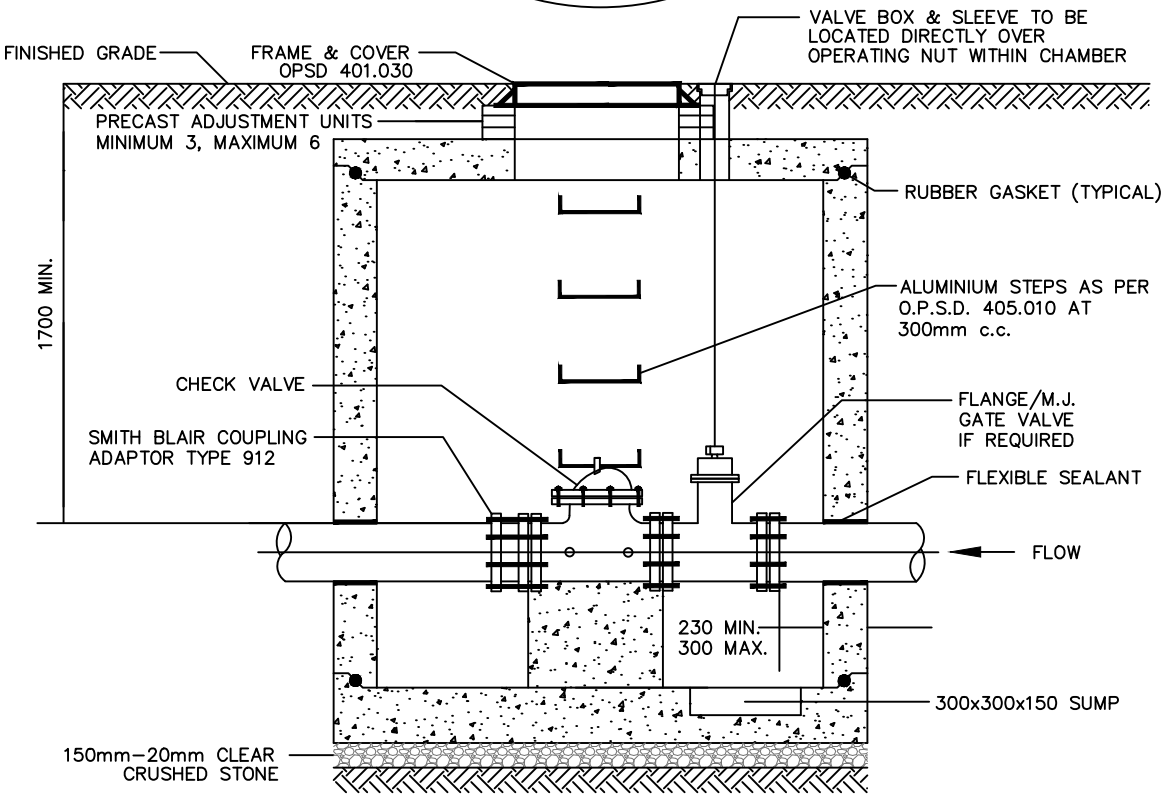
- VALVE AND BOX
- (D) DETECTOR CHECK VALVE IN CHAMBER
- (Z) CHECK VALVE IN CHAMBER
- TAPPING SLEEVE AND VALVE AND BOX
- TEE
- FIRE HYDRANT c/w VALVE AND BOX
  DIRECTION OF PUMPER NOZZLE
- (M) METER IN CHAMBER
- M METER
- (S) SAMPLING SANITARY MAINTENANCE HOLE

NOTE: ALTERNATIVE ARRANGEMENTS MAY BE ACCEPTABLE AS APPROVED BY TOWNSHIP.

| TOWNSHIP OF MAPLETON | | |
|---|---|---|
| Mapleton | SERVICING FOR BUILDINGS WITH FIRE LINES | DATE: ---<br>ISSUE NO. 0<br>SCALE: N.T.S.<br>DWG. NO. M-04 |

| CHECK VALVE CHAMBER SIZING | |
|---|---|
| VALVE SIZE | CHAMBER DIA. |
| 150 | 1500 |
| 200 | 1500 |
| 250 | 1800 |
| 300 | 1800 |




NOTES

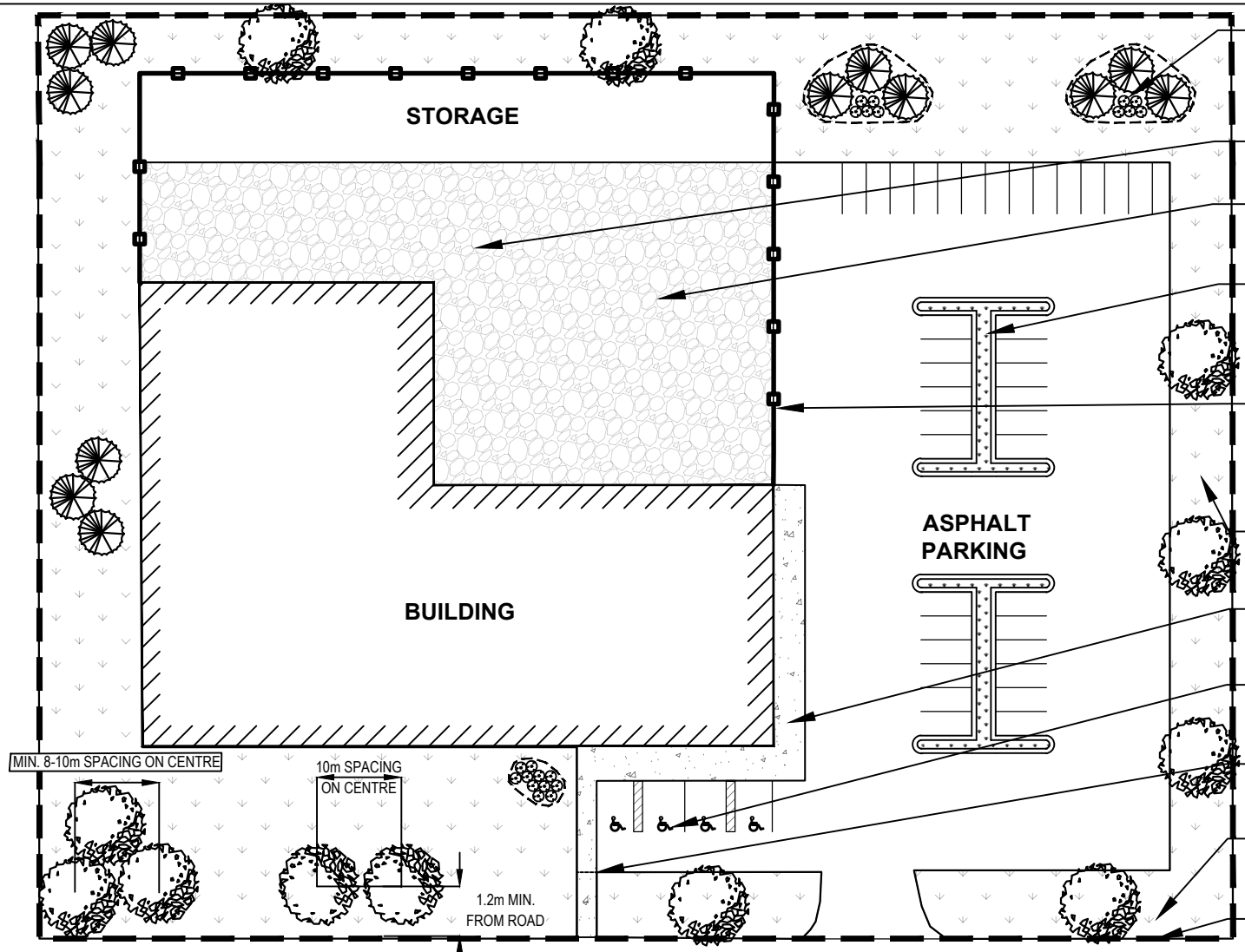
1. PRECAST SECTIONS TO BE MANUFACTURED TO A.S.T.M. C-478 SPECIFICATIONS.
2. FILL ALL JOINTS & LIFT HOLES WITH 1:3 NON-SHRINK MORTAR MIX BEFORE BACKFILLING.
3. PRECAST ADJUSTMENT UNITS SHALL BE EXTERNALLY PARGED ALL AROUND.
4. VALVES & FITTINGS IN CHAMBERS SHALL BE PROTECTED FROM CORROSION BY PROTECTO CAPS ON EVERY BOLT.
5. ALL CHAMBERS SHALL BE BUILT TO CONTAIN A POSITIVE DRAINAGE SYSTEM, CONNECTING INTO THE STORM SEWER WITH A BACK-FLOW PRVENTOR. WHERE A STORM SEWER CONNECTION IS NOT POSSIBLE, THE CHAMBER SHALL INCLUDE A 300 X 300 X 150 SUMP.

ALL DIMENSIONS ARE EXPRESSED IN MILLIMETRES (mm) UNLESS OTHERWISE NOTED.

TOWNSHIP OF MAPLETON

# CHECK VALVE AND CHAMBER DETAIL

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | M-05 |




**NOTES:**

1. THIS IS CONCEPTUAL AND IS NOT INTENDED TO REPRESENT ANY SITE OR REQUIRED LAYOUT, BUT TO PROVIDE THE MINIMUM EXPECTATIONS FOR LANDSCAPING.
2. ALL GRASSED AREAS TO BE SODDED ON 150mm TOPSOIL WITH NO. 1 NURSERY SOD.
3. ALL PLANT BEDS TO INCLUDE 450mm TOPSOIL DEPTH WITH 100mm OF SHREDDED BARK MULCH ON TOP.
4. LANDSCAPING IS ALSO ENCOURAGED ON SIDE YARDS WHEN SPACE PERMITS OR ABUTS RESIDENTIAL PROPERTY.
5. PLANS ARE TO BE PREPARED BY A QUALIFIED LANDSCAPE ARCHITECT.
6. ALL MAINTENANCE HOLES, CATCHBASINS, HYDRANTS, VALVES, STREET LIGHTS, AND FENCING THAT APPEAR ABOVE GRADE SHOULD BE SHOWN IN THE LANDSCAPE PLAN.
7. IF ON-SITE SEWAGE SYSTEM IS PRESENT, TREES SHOULD BE PLANTED MINIMUM 6m FROM THE INGROUND LEACHING OR FILTER BED.

TOWNSHIP OF MAPLETON

Mapleton

# MINIMUM LANDSCAPE REQUIREMENTS FOR INDUSTRIAL / COMMERCIAL SITES

| | |
|---|---|
| DATE: | --- |
| ISSUE NO. | 0 |
| SCALE: | N.T.S. |
| DWG. NO. | M-06 |

# Appendix B

# Checklists

# TOWNSHIP ENGINEER MINIMUM OBSERVATION REQUIREMENTS

The Township Engineer must observe the construction of the subdivision periodically observing components of the works. Communication between the Developer's Engineer and Township Engineer is critical to ensure timing of the site visits are coordinated to observe these specific items.

| ITEM | Aspect |
|---|---|
| | **MEETINGS** |
| 1 | Invitation to construction meetings |
| | **EROSION AND SEDIMENT CONTROL** |
| 2 | When all initial erosion & sediment control measures have been installed prior to disturbance of any land |
| | **STORMWATER MANAGEMENT FACILITY CONSTRUCTION** |
| 3 | When construction of the SWM Facility has commenced |
| 4 | When maintenance access path has commenced |
| | **SANITARY SEWER** |
| 5 | When sanitary sewer installation has commenced |
| | * Must be contacted to observe a full MH, section of sewer installation, and service installation and when testing occurs |
| | **STORM SEWER** |
| 6 | When storm sewer installation has commenced |
| | *Must be contacted to see full MH, section of sewer installation and service installation and when testing occurs |
| | **WATERMAIN** |
| 7 | When watermain installation has commenced |
| | *Must be contacted to see backflow preventer testing, and components of the watermain installation (watermain, service, valve, hydrant, installation). During watermain commissioning must be on site for any temporary connections, swabbing, pressure testing, pre/post chlorine residual, disinfection, and final connection. |
| | **ROADS & SURFACE WORKS** |
| 8 | Contact to observe proof roll of subgrade |
| 9 | Contact when Granular B placement has commenced |
| 10 | Contact when Granular A placement has commenced |
| 11 | Contact when curb/gutter installation has commenced |
| 12 | Must observe base course asphalt placement |
| 13 | Must observe marking of curb/base course asphalt and curb and gutter to be replaced prior to top course asphalt |
| 14 | Contact when repairs are being made |
| 15 | Must observe top course asphalt placement |
| 16 | Must observe portion of sidewalk placement |
| | **LANDSCAPING/PARKS/WALKWAYS** |
| 17 | Contact when any pathway construction commences |
| 18 | Must observe some landscape installation (street trees and landscape plantings in other blocks) |
| | **KEY OVERALL SITE VISITS** |
| 19 | Stage 1 - Preliminary Acceptance Site Visit |
| 20 | Stage 2 - Street Lights & Utilities |
| 21 | Stage 3 - Final to top course asphalt placement |
| 22 | Stage 4 - Final Acceptance Site Visit |

# PRELIMINARY ACCEPTANCE CHECKLIST

Subdivision Name: _____

Developer: _____ Original Date: _____

Engineering Consultant: _____ Rev. 1 Date: _____

Subdivision File: 23T-_____ Rev. 2 Date: _____

| ITEM | Aspect | Inspected By | Sign Off Initials | Date | Comments |
|---|---|---|---|---|---|
| **WATERMAIN** | | | | | |
| 1 | All valves and hydrants have been confirmed operable by the Township's Water Operating Authority. | Township Water Operating Authority | | | |
| 2 | All sampling stations have been confirmed operable by the Township's Water Operating Authority and are locked. Concrete pad shall be in place for any sampling station. | Township Water Operating Authority | | | |
| **SANITARY SEWER** | | | | | |
| 3 | Maintenance hole inspection | Township Engineer w Developer's Engineer | | | |
| **STORM SEWER** | | | | | |
| 4 | Maintenance hole inspection | Township Engineer w Developer's Engineer | | | |
| 5 | CB/DI/RYCB inspection | Township Engineer w Developer's Engineer | | | |
| **STORMWATER MANAGEMENT FACILITIES** | | | | | |
| 6 | If fencing has been requested in relation to the SWM pond it shall be constructed | Township Engineer w Developer's Engineer | | | |
| 7 | All SWM Warning Signs/Information signs have been erected | Township Engineer w Developer's Engineer | | | |
| **ROADS & SURFACE WORKS** | | | | | |
| 8 | Curbs and gutter completed | Township Engineer w Developer's Engineer | | | |
| 9 | Base asphalt completed | Township Engineer w Developer's Engineer | | | |
| 10 | Line painting of base course asphalt (if required) | Township Engineer w Developer's Engineer | | | |
| 11 | Regulatory signs as required are installed including street name signs | Township Engineer w Developer's Engineer | | | |
| 12 | (LOT / CIVIC ) Numbers have been posted at each lot | Township Engineer w Developer's Engineer | | | |
| 13 | Dead end barricades on any dead ends have been installed | Township Engineer w Developer's Engineer | | | |
| 14 | Unassumed Roads signs in place at all street entrances to the subdivision | Township Engineer w Developer's Engineer | | | |
| 15 | Development Sign has been installed | Township Engineer w Developer's Engineer | | | |

# PRELIMINARY ACCEPTANCE CHECKLIST

| ITEM | Aspect | Inspected By | Sign Off Initials | Date | Comments |
|---|---|---|---|---|---|
| **LIST OF ITEMS TO BE PROVIDED TO TOWNSHIP ENGINEER PRIOR TO PRELIMINARY ACCEPTANCE** | | | | | |
| (a) | Copy of all Geotechnical Testing Results | | | | |
| (b) | Letter (with copy of reports/samples in relation to O.Reg. 406/19) from Site's Qualified Person indicating that all fill imported to the site complies with O.Reg. 406/19 and that the quality of the soil is acceptable for the site in accordance with the fill managment plan. | | | | |
| (c) | CCTV and reports for storm and sanitary sewers | | | | |
| (d) | Confirmation that Infiltration/exfiltration/low pressure testing has been completed and is satisfactory | | | | |
| (e) | Mandrel testing report of all flexible mainline sewers | | | | |
| (f) | Watermain Test Form and related documents | | | | |
| (g) | ECA Form (For Authorized Work) | | | | |
| (h) | Confirmation of Conductivity testing | | | | |
| (i) | Interim As-Constructed Drawing set (PDF and AutoCAD) with the following:<br>- as-constructed inverts<br>- sanitary and storm service inverts<br>- civic addresses<br>- as-constructed locations of assets | | | | |
| (j) | Updated design spreadsheets with as-built inverts and sewer lengths | | | | |
| (k) | Copy of all utility drawings | | | | |
| (l) | Developer's Engineer provides a certificate certifying that the servicing works have been completed under their supervision and in accordance with the design drawings, applicable specifications and good engineering practices | | | | |
| (m) | Letter requesting Preliminary Acceptance | | | | |
| (n) | Statutory Declaration from Developer | | | | |

# FINAL ACCEPTANCE CHECKLIST

Subdivision Name: _____

Developer:_____ Original Date: _____

Engineering Consultant: _____ Rev. 1 Date: _____

Subdivision File: 23T-_____ Rev. 2 Date: _____

*Development not eligible for final acceptance until at least 1 year after placement of top course asphalt

| ITEM | Aspect | Provide To / Inspected By | Sign Off Initials | Date | Comments |
|---|---|---|---|---|---|
| **WATERMAIN** | | | | | |
| 1 | All valves, curb stops and hydrants have been confirmed operable by the Township's Water Operating Authority | Township Water Operating Authority | | | |
| 2 | All sampling stations have been confirmed operable by the Township's Water Operating Authority and are locked | Township Water Operating Authority | | | |
| 3 | Curb stops and valves to finish grade | Township Engineer w Developer's Engineer | | | |
| 4 | Hydrant painting is adequate | Township Engineer w Developer's Engineer | | | |
| **SANITARY SEWER** | | | | | |
| 5 | Maintenance hole inspection | Township Engineer w Developer's Engineer | | | |
| **STORM SEWER** | | | | | |
| 6 | Maintenance hole inspection | Township Engineer w Developer's Engineer | | | |
| 7 | CB/DI/RYCB inspection | Township Engineer w Developer's Engineer | | | |
| **STORMWATER MANAGEMENT FACILITIES** | | | | | |
| 8 | All SWM Warning Signs/Information signs remain in place | Township Engineer w Developer's Engineer | | | |
| 9 | Travelled surfaces & slopes inspected (no erosion visible - all surfaces stabilized) | Township Engineer w Developer's Engineer | | | |
| 10 | Safety devices (including fences/handrail) in place | Township Engineer w Developer's Engineer | | | |
| 11 | Structures inspected | Township Engineer w Developer's Engineer | | | |
| 12 | Vegetated ground cover and landscaping completed | Township Engineer w Developer's Engineer | | | |

# FINAL ACCEPTANCE CHECKLIST

| ITEM | Aspect | Provide To / Inspected By | Sign Off Initials | Date | Comments |
|---|---|---|---|---|---|
| **ROADS & SURFACE WORKS** | | | | | |
| 13 | Sidewalks inspected (adjacent boulevard allows for positive drainage across the sidewalk) | Township Engineer w Developer's Engineer | | | |
| 14 | Canada Post mailbox pads inspected | Township Engineer w Developer's Engineer | | | |
| 15 | Curbs inspected | Township Engineer w Developer's Engineer | | | |
| 16 | Surface course asphalt inspected and certificate provided for repairs, cracks and structural integrity | Township Engineer w Developer's Engineer | | | |
| 17 | Line painting in place | Township Engineer w Developer's Engineer | | | |
| 18 | All regulatory and street signs in place | Township Engineer w Developer's Engineer | | | |
| 19 | Boulevards all graded and sodded | Township Engineer w Developer's Engineer | | | |
| 20 | Confirm that all temporary erosion and sediment control measures have been removed | Township Engineer w Developer's Engineer | | | |
| 21 | Confirm that all easements remain clear of structures and any easements that contain swales remain clear and not filled in | Township Engineer w Developer's Engineer | | | |
| **STREET LIGHTING** | | | | | |
| 22 | Street lights and poles inspected | Township Engineer w Developer's Electrical Engineer) | | | |
| 23 | Operation checked | Township Engineer w Developer's Electrical Engineer) | | | |
| 24 | Lens and photocells cleaned | Township Engineer w Developer's Electrical Engineer) | | | |
| **TRAFFIC SIGNALS (IF APPLICABLE)** | | | | | |
| 25 | Operation checked | Township Engineer w Developer's Electrical Engineer) | | | |
| **TRAILS/WALKWAYS** | | | | | |
| 26 | Trails inspected and any required signage installed | Township Engineer w Developer's Engineer | | | |
| 27 | Walkways inspected | Township Engineer w Developer's Engineer | | | |
| 28 | Drainage inspected | Township Engineer w Developer's Engineer | | | |

# FINAL ACCEPTANCE CHECKLIST

| ITEM | Aspect | Provide To / Inspected By | Sign Off Initials | Date | Comments |
|---|---|---|---|---|---|
| **LANDSCAPING** | | | | | |
| 29 | Comparison of Drawings with installed landscape components | Township Engineer w Developer's Landscape Architect | | | |
| 30 | Park and vacant areas graded, seeded/sodded as required | Township Engineer w Developer's Landscape Architect | | | |
| 31 | Confirmation that all landscaping is healthy/disease free | Township Engineer w Developer's Landscape Architect | | | |
| 32 | Confirmation that all wood stakes have been removed | Township Engineer w Developer's Landscape Architect | | | |
| **LIST OF ITEMS TO BE PROVIDED TO TOWNSHIP ENGINEER PRIOR TO FINAL ACCEPTANCE** | | | | | |
| (a) | Copy of all Geotechnical Testing Results (from final asphalt surfacing and/or other repairs) | | | | |
| | **Watermain** | | | | |
| (b) | Confirmation of Conductivity testing | | | | |
| | **Sewers** | | | | |
| (c) | Flushing of sanitary and storm sewers with copy of CCTV and reports | | | | |
| (d) | Services CCTV'd if requested | | | | |
| | **SWM Facility Related** | | | | |
| (e) | Final SWM Operation & Maintenance Report (digital and PDF) | | | | |
| (f) | Final SWM Performance/Monitoring Report (digital and PDF). | | | | |
| (g) | Certificate letter from Development Engineer confirming silt removal and volumes including verification of adequate performance based on Monitoring Report. Silt removal to take place after storm sewers have been flushed | | | | |
| (h) | Cleanout of OGS prior to final assumption and all CB sumps to be cleaned (copy of any invoices to be provided) | | | | |
| (i) | Developer's Engineer on-site instructional workshop to the Township's Public Works Department about SWM facility, O&M, and how to perform any monitoring requirements | | | | |
| | **Excess Soils** | | | | |
| (j) | Letter, if applicable (with copy of reports/samples in relation to O.Reg. 406/19) from Site's Qualified Person indicating that all fill imported to the site complies with O.Reg. 406/19 and that the quality of the soil is acceptable for the site in accordance with the fill managment plan. | | | | |

# FINAL ACCEPTANCE CHECKLIST

| ITEM | Aspect | Provide To / Inspected By | Sign Off Initials | Date | Comments |
|---|---|---|---|---|---|
| | **Light Standard** | | | | |
| (k) | Additional light standard to be delivered to the Township. Location to be confirmed by Director of Public Works. | | | | |
| | **Ontario Land Surveyor** | | | | |
| (l) | Certificate that survey monumentation have been found or replaced | | | | |
| (m) | Confirmation that the new survey control monument is in place | | | | |
| (n) | Establishment of benchmarks | | | | |
| | **Lot Grading** | | | | |
| (o) | All final lot grading forms (and as-constructed plans have been submitted) for all occupied lots | | | | |
| (p) | All lots have been visited by the Developer's Engineer & Township Engineer | | | | |
| | **Final As-Constructed Drawings** | | | | |
| (q) | Final As-Constructed Subdivision Drawing set (PDF, Mylar and AutoCAD) | | | | |
| | **Certification letters** | | | | |
| (r) | Landscape Architect | | | | |
| (s) | Developer's Engineer provide a certificate certifying that the servicing works have been completed under their supervision and in accordance with the design drawings, applicable specifications and good engineering practices | | | | |
| (t) | Playground Equipment Inspection Report (if applicable) | | | | |
| | **Other** | | | | |
| (u) | Letter requesting Final Assumption | | | | |
| (v) | Statutory Declaration from Developer | | | | |

Other items may be requested by the Township Engineer.

# Appendix C

# Approved Material and Product List

# APPROVED MATERIAL AND PRODUCT LIST

All supplied products shall be in accordance with the list below. Products shall be identified by Contractors prior to site delivery. The Developer's Engineer shall verify onsite and document information for the purpose of input to the Township's asset management system. Alternatives may be accepted by the Township at their discretion. The Developer's Engineer will need to verify that the proposed alternative is equivalent or better.

| Service | Product | Specification/Description/Manufacturer/ Model | Last Revision |
|---|---|---|---|
| **STORM** | **STORM SEWER PIPE** | | |
| | PVC Gravity Sewer Pipe | • up to 375 mm dia – OPSS.MUNI 1841. All pipe must be white in colour solid wall DR 35 CSA B182.2 | |
| | | IPEX | |
| | | Rehau Industries | |
| | | Royal Pipe Systems | |
| | Concrete Gravity Sewer Pipe | • up to 375 mm dia. - CSA A257.1 Class 3 for nonreinforced, OPSS.MUNI 1820<br>• 450 mm and larger dia. - CSA A257.2, minimum Class 65-D for reinforced | |
| | | Con Cast Pipe | |
| | | Forterra | |
| | | M-Con Products | |
| | | Decast | |
| | **SERVICE PIPE – Gravity Sewer Pipe – Polyvinyl Chloride (PVC)** | • OPSS.MUNI 1841. All pipe must be white in colour solid wall DR 28,CSA B182.2 | |
| | | IPEX | |
| | | Rehau Industries | |
| | | Royal Pipe Systems | |
| | **CONNECTIONS** | • Kor-N-Seal (PVC) Adaptor with band (ribbed) prefab tee or Kor-N-Tee (services) | |
| | **TEST FITTING (DOUBLE STORM SERVICES)** | • IPEX Boot Jack – Storm (6x4x4x4) | |
| | **TEST FITTING (SINGLE STORM SERVICES)** | • IPEX Test Tee – Storm (6x6x4) | |
| | **CATCH BASINS (Precast concrete)** | • OPSS.MUNI 1351 | |
| | | Brooklin Concrete | |
| | | Con Cast Pipe | |
| | | Forterra | |
| | | M-Con Products | |

# APPROVED MATERIAL AND PRODUCT LIST

| Service | Product | Specification/Description/Manufacturer/ Model | Last Revision |
|---|---|---|---|
| | | Decast | |
| | **CATCH BASIN FRAME & COVER** | • ASTM A48 | |
| | | Cedar Infrastructure Products Inc. & CIP | |
| | | Bibby Ste. Croix/Domestic Foundry | |
| | | McCoy Foundary | |
| | | Mueller Canada | |
| | **CULVERTS** | | |
| | Corrugated Steel Pipe (CSP) | • Aluminized TYPE 2, CSA G401 (min 0.3m cover) | |
| | | Armtec/Canada-Culvert (WGI Westman Group) | |
| | | Atlantic Industries | |
| | High Density Polyethylene (HDPE) | • HDPE corrugated Boss 2000, 320 kPa stiffness c/w Ultra Stab 75 joint system (min 0.6m cover) | |
| | | Armtec | |
| | **SUBDRAINS** | • 150 mm Big “O” subdrain tubing with geotextile sock<br>• 150mm BOSS 2000 perforated with geotextile sock | |
| | | Armtec | |
| | **OIL & GRIT SEPARATORS** | • ETV Canada verification required to meet “enhanced” total suspended solids removal<br>• Pre-Cast Concrete | |
| | | Imbrium Systems Inc. – Stormceptor concrete models | |
| **SANITARY** | **SANITARY SEWER PIPE** | | |
| | PVC Gravity Sewer Pipe (shall be used for 200 mm – 375 mm dia.) | • OPSS.MUNI 1841. All pipe must be green in colour solid wall DR 35 CSA B182.2 | |
| | | IPEX | |
| | | Rehau Industries | |
| | | Royal Pipe Systems | |
| | Concrete Gravity Sewer Pipe (450 mm and larger dia.) | • 450 mm and larger dia. - CSA A257.2, minimum Class 65-D for reinforced | |
| | | Con Cast Pipe | |
| | | Forterra | |
| | | M-Con Products | |
| | | Decast | |

# APPROVED MATERIAL AND PRODUCT LIST

| Service | Product | Specification/Description/Manufacturer/ Model | Last Revision |
|---|---|---|---|
| | **SERVICE PIPE – Gravity Sewer Pipe – Polyvinyl Chloride (PVC)** | • OPSS.MUNI 1841. All pipe must be green in colour, solid wall DR 28, CSA B182.2 | |
| | | IPEX | |
| | | Rehau Industries | |
| | | Royal Pipe Systems | |
| | **CONNECTIONS** | • Connections Kor-N-Seal (maintenance holes) prefab tees or Kor-N-Tee (services) | |
| | **WATERPROOFING – Sanitary maintenance holes and moduloc** | • All maintenance hole section joints, pipe connection joints (minimum 0.3 m each side of joint) and the exterior of moduloc adjustment units are to be wrapped and treated between moduloc units | |
| **STORM/ SANIATARY** | **COUPLINGS – Gravity Sewers** | Crowle Fittings | |
| | | Fernco Connectors – Plum Quick | |
| | | Victaulic – coupling style #44 | |
| | **INSULATION** | • Closed cell extruded polystyrene with minimum compression strength of 275 kPa | |
| | | Dow Corning Canada – polystyrene HI40 | |
| | **MAINTENANCE HOLE ADJUSTERS** | • Concrete Moduloc up to a maximum of 300 mm<br>• OPSS.MUNI 1853 | |
| | | Brooklin Concrete | |
| | | Cedar Infrastructure Products Inc. & CIP | |
| | | Forterra | |
| | | M-Con Products | |
| | | Decast | |
| | **MAINTENANCE HOLE FRAMES AND COVERS** | Bibby Ste. Croix/Domestic Foundry | |
| | | McCoy Foundry Co. | |
| | | Mueller Canada | |
| | **MAINTENANCE HOLE SECTIONS** | • Pre-cast concrete per CSA A257.4, OPSS.MUNI 1351 | |
| | | Con Cast Pipe | |
| | | Forterra | |
| | | M-Con Products | |
| | | Decast | |
| | **MAINTENANCE HOLE LADDER RUNGS** | MSU Mississauga | |
| | **MAINTENANCE HOLE SAFETY GRATES** | MSU Mississauga | |

# APPROVED MATERIAL AND PRODUCT LIST

| Service | Product | Specification/Description/Manufacturer/ Model | Last Revision |
|---|---|---|---|
| **WATER** | **PIPE – Watermain Pressure Pipe – Polyvinyl Chloride (PVC) – install by open cut** | • 100 mm to 300 mm dia. – AWWA C900, min. Class 150, DR 18, CSA B137.3 | |
| | | IPEX – Blue Brute, CL 150, DR 18 | |
| | | NEXT Polymers Inc. – Aqualogic, CL 150, DR 18 | |
| | | Royal Pipe Systems, CIOD pressure pipe and fittings, DR14, DR 18 | |
| | **WATER SERVICE PIPE– Watermain** | | |
| | Copper | • 25 mm to 50 mm ASTM B88, Type K soft copper | |
| | Municipex | • 25 mm to 50 mm as manufactured by Rehau | |
| | **FITTINGS – Ductile Iron** | • AWWA C104/A21.4, C110/A21.10, C111/A21.11<br>• Class 350 Ductile Iron<br>• Mechanical Joint | |
| | | Bibby/Tyler/Union Foundry | |
| | | Sigma | |
| | | Star Pipe Products | |
| | **FITTINGS – Polyvinyl Chloride (PVC)** | • 150 mm to 300 mm DR18<br>• AWWA C900, C907, CSA B137.3 | |
| | | Harco | |
| | | IPEX | |
| | | Rehau Industries | |
| | | Royal Pipe Systems | |
| | **FLANGES/ RESTRAINERS** | • Mechanical restrainers per ASTM F1674, Uni-Bell-13 | |
| | | Clow Canada – series 400, 1300, 1350 | |
| | | EBAA Iron – series 1100, 1600, 2100, 2500, 2800, 3800 | |
| | | Romac Industries – Grip Ring | |
| | | Sigma – PV-Lok, One-Lok | |
| | | Star Pipe Products – series 400-C, 1000-C, 1200-C, 3000, 3500 | |
| | | Uni-Flange – series 400, 1300, 1350, 1360, 1500 | |
| | **HYDRANTS** | • Only Mueller Canada - Canada Valve “Century” hydrants are accepted.<br>• All hydrants shall be fitted with 2-65 mm hose nozzles and 1-100 mm ‘Storz’ type pumper nozzle. | |

# APPROVED MATERIAL AND PRODUCT LIST

| Service | Product | Specification/Description/Manufacturer/ Model | Last Revision |
|---|---|---|---|
| | | • All hydrants are to open counter-clockwise and be coated with high quality (Tremclad) yellow paint. | |
| | **HYDRANT MARKER** | Stinson Owl-Lite 4' Yellow Hydrant Marker | |
| | **COUPLINGS – Watermain** | • Center sleeves and end rings to be DI and meet AWWA C219 and shall be shop coated<br>• Bolts and nuts shall be high strength (>#6), low alloy steel<br>• Meet ASTM 1476 | |
| | | Robar Industries – Style 1408 | |
| | | Romac Industries – Style 501 | |
| | | Smith Blair – Quantom, Series 441 | |
| | | Viking Johnson – Maxi-fit Universal Coupling (50 mm to 300 mm Rilsan Coated) | |
| | **CURB STOPS – Water Services** | • Compression joint, ball valve, stop only, no drain; per AWWA C800 | |
| | | Cambridge Brass – 202 | |
| | | Mueller Canada – B25209 | |
| | **ANODES** | • Z-24-48 (24 lbs) ASTM B418 Type II<br>• Z-12-24 (12 lbs) ASTM B418 Type II<br>Supplied with AWG #10/7 stranded copper cable with RWU-90 insulation | |
| | **REPAIR CLAMPS – Watermain** | • Repair clamps must be stainless steel; clamps >25 mm shall have 3 bolts | |
| | | Cambridge Brass / Smith Blair – series 425, 435 with side outlet, C30, 521, 522 up to 25 mm | |
| | | Robar Industries | |
| | **SADDLES** | Clow Canada – Cast Iron universal type | |
| | | Crowle Fittings - Cast Iron universal type in 100 mm, 125 mm and 150 mm | |
| | | IPEX – PVC Strap-On, Inserta tee | |
| | | Rehau Industries | |
| | | Royal Pipe Co. | |
| | **SERVICE BOXES & COMPONENTS** | • 25 mm and 50 mm, stainless steel rod and brass cotter pin | |
| | | Clow Canada – 9D1 | |
| | | Mueller Canada - <25 mm, A726; > 25 mm, A728 | |

# APPROVED MATERIAL AND PRODUCT LIST

| Service | Product | Specification/Description/Manufacturer/ Model | Last Revision |
|---|---|---|---|
| | **SERVICE SADDLES – PVC Pipe** | • All shall be stainless steel, 2 bolts, tapered rubber gasket and have a minimum 150 mm wide band | |
| | | Cambridge Brass – 406, 407 | |
| | | Robar Industries – series 2606 – styles 2626DB | |
| | | Romac Industries – model nos. 305 and 306 | |
| | **TRACER WIRE** | • Tracer wire shall be #8 gauge TWU multi-strand copper | |
| | **VALVE – Watermain Air Release Valve** | • Air Release Valve AWWA C512, close clockwise; open counter-clockwise | |
| | | Dezurik of Canada/Apco – 200A | |
| | | Val-Matic - Valve/Vent-O-Mat/Vacuum Break Valves | |
| | **VALVE – Watermain Resilient Seat Gate Valve** | • 150 mm to 400 mm AWWA C509, close clockwise, open counter-clockwise | |
| | | Clow Canada – F6100 series, McAvity 2000 series | |
| | | Mueller Canada – A-2360 series | |
| | **VALVE BOXES and COMPONENTS – Watermain** | • 135 mm slide type, minimum 125 mm inside dia., 750 mm upper section, 1200 mm lower section, 6 mm pre-drilled round hole with grommet for tracer wire in upper section | |
| | | Clow Canada | |
| | | Bibby Ste-Croix | |
| | | Mueller Canada – bottom section only | |
| | **VALVE EXTENSION** | • Less than or equal to 1.8 m in length | |
| | | Fiberplas | |
| | | | |
| | **WATERPROOFING – Valves and fittings** | Denso - Petrolatum tape, AWWA C-217-09 | |
| | | Trenton Corporation – wax tape | |
| | **MAIN STOPS – Watermain** | • Ball valve, compression joint – AWWA C800 | |
| | | Cambridge Brass – Series 301 | |
| | | Mueller Canada – B25008 | |
| | **TAPPING SLEEVES** | • For PVC pipe use stainless steel tapping sleeves only | |
| | | Clow Canada – Concord-Daigle TS100 | |
| | | Mueller Canada – H-615 and all stainless steel | |
| | | Robar Industries – 6606SS | |

# APPROVED MATERIAL AND PRODUCT LIST

| Service | Product | Specification/Description/Manufacturer/ Model | Last Revision |
|---|---|---|---|
| | | Romac Industries – Model SST304, FTS420 | |
| | | Smith Blair – 622, 663 SS | |
| **ROADS** | **TACTILE PLATES** | Tuftile Cast Iron Tactile Plate Yellow (Wet Set)<br>Stinson Owl-Lite<br>- 24” x 24” DI-TTC12424YEL<br>- 24”x12” DI-TTC12412YEL<br>- Radius Plates as Required | |
| | **STREET NAME SIGNS** | Cedar Signs Inc. | |

# Appendix D

# Asset Management Form

# ASSET ID# REQUEST FORM

Subdivision Location: _____

_____

| Asset Type | | | |
|---|---|---|---|
| **Short** | **Long** | **Total No. of ID's Requested (Column Filled in by Developer's Engineer)** | **ID Nos. Assigned (Column Filled in by Township Staff)** |
| **Sanitary** | | | |
| SANMH | Maintenance hole | | |
| | | | |
| **Storm MH's** | | | |
| STMH(MUN) | Maintenance hole | | |
| | | | |
| **Storm Appurtenances** | | | |
| CB(MUN) | Catchbasin | | |
| DCB(MUN) | Double Catchbasin | | |
| DICB(MUN) | Ditch Inlet Catchbasin | | |
| RYCB(MUN) | Rear Yard CB | | |
| SFHW(STREET)(MUN) | Outfall Headwall | | |
| SFIL(STREET)(MUN) | Inlet Headwall | | |
| OGS | Oil Grit Separator | | |
| SC(STREET)(MUN) | Culvert | | |
| SFOL(STREET)(MUN) | Outlet (Pond) | | |
| SFFS(STREET)(MUN) | Flow Splitter | | |
| CS | Control Structure | | |
| **Watermain** | | | |
| VA | Valve and Box | | |
| VC | Valve and Chamber | | |
| HYD | Hydrant | | |
| THYD | Temporary Hydrant | | |
| WSS | Water Sampling Station | | |
| | | | |
| **Light Standards** | | | |
| LS | Light Standard | | |
| | | | |

Notes: (MUN) = Municipality Name: ALMA, DRAY or MOOR

# ASSET INFORMATION FORM

TO BE SUBMITTED
PRIOR TO PRELIMINARY ACCEPTANCE

**SUBDIVISION NAME:** _____

**STRUCTURES**

| ASSET ID# | YEAR OF INSTALLATION | COST OF ASSET (FROM TENDER) | OPSD REFERENCES (ex. MH OPSD# & FRAME OPSD#) | Model Numbers if applicable (Street Light Pole/Luminaires, OGS model no. etc.) |
|---|---|---|---|---|
| **Sanitary MH's** | | | | |
| | | | | |
| | | | | |
| | | | | |
| **Storm MH's** | | | | |
| | | | | |
| | | | | |
| | | | | |
| **Storm Appurtenances** | | | | |
| | | | | |
| | | | | |
| | | | | |
| **Watermain Appurtenances** | | | | |
| | | | | |
| | | | | |
| | | | | |
| **Light Standards (to be provided at a later date if not installed prior to preliminary acceptance)** | | | | |
| | | | | |
| | | | | |
| | | | | |

**PIPES**

| SIZE | YEAR OF INSTALLATION | FROM MH ASSET ID# | TO MH ASSET ID# | COST OF PIPE SEGMENT (FROM TENDER) | PIPE MATERIAL |
|---|---|---|---|---|---|
| **Sanitary Sewers** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| **Storm Sewers** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| **Watermains** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

# Appendix E

# Water System Information & Forms

# WATERMAIN COMMISSIONING QUESTIONS & ANSWERS

| | |
|---|---|
| Who approves the Watermain Commissioning Plan? | • The plan (typically prepared by the Contractor) is to be pre-approved by Developer's Engineer prior to submission to Township<br>• This plan can be submitted early in construction in preparation for the watermain commissioning<br>• The plan is to be reviewed and accepted by the Township Engineer and Township's Water Operating Authority |
| What notice/arrangements are required for watermain shutdowns? | • Watermain shutdowns cannot start earlier than 9 am<br>• One week advanced notice to impacted customers is preferable for any planned shutdowns, however a minimum 48 hour notice may be acceptable in certain circumstances<br>• The Developer's representatives are required to hand deliver the notices to impacted customers<br>• The Township will complete any additional notifications including the Fire Chief, the Township's Water Operating Authority (who has to operate any valves), etc. |
| Who is onsite during all the testing/commissioning? | • Developer's Engineer |
| Who is to witness the following:<br>• all temporary connections and backflow device testing<br>• swabbing<br>• pressure testing<br>• pre/post chlorine residuals | • Developer's Engineer<br>• Township Engineer<br>• Township's Water Operating Authority (witness the testing of backflow prevention device) |
| Who takes the Microbiological Samples? | • Township's Water Operating Authority<br>• First sampling round shall be completed before 11am, with second sampling round taken 24 hours later, and completed no later than 12:00 pm. Samples will only be taken between Mondays-Thursdays. |
| Who is required to witness the final connection? | • Developer's Engineer<br>• Township Engineer<br>• Township's Water Operator Authority |

**Step 1: Commissioning Plan**

Provide a commissioning plan that outlines all testing requirements (per steps below). The plan shall include calculations showing the allowable leakage, the chlorine dosage, and include a plan that identifies all sampling locations. The plan is to be approved by the Developer's Engineer prior to submitting it to the Township Engineer and the Township's Water Operating Authority for approval.

Chlorine residual and bacteriological testing samples shall be taken at:

- Backflow preventer (only used to test chlorine not to sample for bacteria)
- At the end of each branch or stub (excluding fire hydrants)
- At the end of services 100 mm or larger
- A maximum of every 350 m along the watermain test section
- A maximum of 150 m from the source water connection
- Any additional locations as required to ensure that adequate chlorination is achieved (e.g., to ensure that both sides of a crescent are chlorinated)
- As requested by Township's Water Operating Authority or Township Engineer

All sampling ports shall be copper or stainless steel lines 25 mm or smaller and brought a minimum of 1.0 m above the surface.

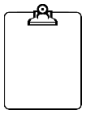
All plans shall adhere to the Ministry of the Environment, Conservation and Parks 2020 Watermain Disinfection Procedure or latest amendment.

**Any valves or hydrants that are part of the Township's water system are only to be operated by the Township's Water Operator.**

---

**Step 2: Temporary connection**

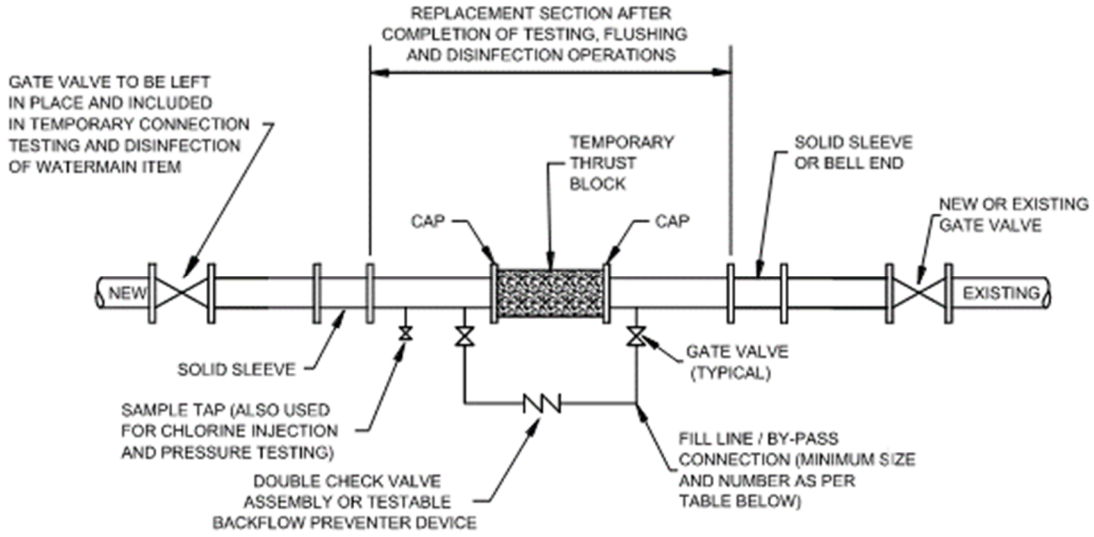
Developer's Engineer
Township Engineer
Township's Water Operator
(witness testing of backflow prevention device)



Water
Test Form

The new watermain shall be kept isolated from the existing water system using a physical separation. A schematic of a typical separation is shown below. The temporary connection shall include a backflow prevention device. The testing of this device shall be witnessed by the Township's Water Operating Authority. The Developer's Engineer shall provide a copy of the backflow prevention device test report completed by a certified tester to the

Township's Water Operating Authority and Township Engineer.




Should any nearby valves need to be turned off to complete the temporary connection, the Township considers this work to be non-urgent and a minimum one week notice should be provided for impacted customers if a water shut down is required.

The final connection of the new watermain to the existing watermain shall not be completed until all testing procedures have been completed and approved by the Developer's Engineer, Township Engineer, and the Township's Water Operating Authority.

---

**Step 3: Swabbing**

Developer's Engineer
Township Engineer

Water Test Form

All watermains and services 100 mm diameter and greater shall be swabbed. The new watermain and service connections shall be filled with water a minimum of 24 hours in advance of the swabbing operation. Swabbing outlets will connect to the new mains and connections using a 45 degree vertical bend and riser pipe that extends above the surrounding ground surface. Swabbing outlets shall be the same diameter as the pipe to which they are connected. Swabbing outlets will be mechanically capped prior to and after swabbing to prevent entry of debris into watermains and service connections.

Swabs shall have a diameter 50 mm larger than the pipe that is going to be swabbed. Swabs shall be propelled using potable water with sufficient velocity to remove debris from the watermain. The swabbing operation should continue until the discharge water runs clear and the last swab is clean.

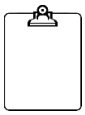
The Developer's Engineer shall record the number of swabs launched and verify that the same amount have been retrieved. The results are to be recorded on the Water Test Form.

The exit locations are to be protected using erosion control measures such as filter cloth, silt fencing, temporary basis or diversion swales to direct discharge water away from any environmentally sensitive areas. De-chlorination measures are to be implemented if required such as sodium thiosulfate pucks at the discharge location.

---

**Step 4: Pressure Testing (OPSS.MUNI 441)**

Developer's Engineer
Township Engineer



Water Test Form

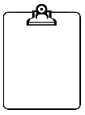
Hydrostatic testing shall be conducted under the supervision of the Developer's Engineer and Township Engineer. The allowable leakage should be determined and recorded in the Water Test Form. The test pressure shall be 1035 kPa and the test section shall be subjected to the specified continuous test pressure for 2 hours. The measured leakage shall be compared with the allowable leakage as calculated on the Water Test Form.

If the measured leakage exceeds the allowable leakage, all leaks shall be located and repaired, and the test section shall be retested until a satisfactory result is obtained.

---

**Step 5: Disinfection (Ministry of the Environment, Conservation and Parks 2020 Watermain Disinfection Procedure or latest amendment)**

Developer's Engineer
Township Engineer



Water Test Form

Chlorine will be introduced into the new main at the source water location and shall be monitored to ensure residual is at least 50 mg/l. All hydrants, stubs and services are also to be chlorinated. The Developer's engineer shall record the residual at each sampling location.

After a minimum of 24 hours, the chlorine residual will be tested on site and shall not decrease more than 40% as per MECP 2020 disinfection procedures.

Example: An initial chlorine concentration of 50 mg/L, the maximum allowable decrease in chlorine concentration is 40% of 50 mg/L, or 20 mg/L. Therefore, at least 30 mg/L of chlorine must be present after 24 hours.

| Disinfection Method | Minimum contact time | Initial chlorine concentration | Maximum allowable decrease in chlorine concentration |
|---|---|---|---|
| Tablet or continuous Feed | 24 hours | ≥ 25 mg/L | 40% of the Initial Chlorine Concentration to a maximum of 50 mg/L |

If the test does not meet the requirements; the chlorination procedure shall be repeated until satisfactory results are obtained.

---

**Step 6: Flushing**  Developer's Engineer

The watermain requires flushing of the heavily chlorinated water. The water main will be flushed and the discharge water neutralized prior to disposal using sodium thiosulfate or hydrogen peroxide. Where detrimental effects may be suffered by plants or animals in the natural environment, the discharge water shall be neutralized to less than 0.002 mg/l total chlorine at the outfall. All hydrants, stubs and services shall be thoroughly flushed.

---

**Step 7: Sampling** 

Developer's Engineer
Township's Water Operating Authority

After flushing, chlorine residuals are to be checked to ensure a free residual of at least 0.05 mg/l or a combined residual of at least 0.25 mg/l, and a total within 0.2 mg/l of the source water residual. Residuals will be checked before the first round and second round sampling. Acceptable results will allow bacteriological samples to be taken.

The first set of samples must be taken no later than 11:00 am, and the second set of samples taken no later than 12:00 pm each day to allow for pick up and delivery to lab within the 48 hour holding time. Samples will only be taken between Mondays-Thursdays. These samples are taken by the Township's Water Operating Authority and advanced notification is required.

After the first round of samples, the test section will be shut down (i.e. the watermain shall not be disturbed or flushed during the period between the first and second round of sampling). After a minimum of 24 hours the chlorine residuals at each sampling point will be tested again. If acceptable, the second round of samples can be taken.

Results of bacteriological sample analysis will be reported by the Township's Water Operating Authority to the Township Engineer, Developer's Engineer, and Developer's Contractor. Acceptable results are as follows:

| Microbiological Parameter | Standard |
|---|---|
| Escherichia coli (E. coli) | 0 cfu/100 mL |
| Total coliforms | 0 cfu/100 mL |
| Background Colony Counts | < 100 CFU/100 mL |

---

**Step 8: Final Connection**

Developer's Engineer
Township Engineer
Township's Water Operating Authority

Upon acceptable testing results, the final connection can be made. The date is to be arranged within 7 days after the 2nd round of lab results have been confirmed satisfactory and a minimum 48 hours notice shall be given to the Township Engineer and the Township's Water Operating Authority. The preparation of water interruption notices shall be prioritized to ensure impacted residents/businesses are provided with as much notice as possible.

The watermain connection shall be completed in good weather conditions (no precipitation). The connection cannot proceed unless the Township's Water Operating Authority is present.

A 450mm – 600mm sump shall be excavated and filled with ¾" stone directly beneath the watermain connection point. The water discharged will be neutralized of chlorine as above and a pump will be installed within the stone to remove water discharged from the watermain away from the work area.

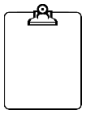
All pipes and fittings are required to be hand swabbed or sprayed with a 1-5% chlorine solution prior to installation. Once completed all connections are to be inspected both audibly and visually for leaks under pressure prior to backfill.

Once the final connection is completed, at the discretion of the Township's Water Operating Authority a third round of samples may be required.

**Once the final connection is made, the watermain is to be fully operated by the Township's Water Operating Authority as the new mains are now part of the Township's water system.**

---

**Step 9: Finalize Water Test Form**



The Water Test Form and attachments required shall be completed by the Developer's Engineer and shall be submitted electronically (in the same submission) to the Director of Public Works, the Township Engineer, and the Township's Water Operating Authority.

# WATER INTERRUPTION

## YOUR WATER WILL BE TURNED OFF FROM APPROXIMATLEY < 9 am or later> TO <TIME> ON

## <DAY OF WEEK, MONTH DAY, YEAR>

This is to allow for _____

**If inclement weather prevents the work proceeding on the scheduled day, water will be shut off the following day at the same time. You will be notified if this delay occurs.**

**Before Shut Down:**

- Fill a container with water for drinking and cooking
- Store water (e.g., Fill bathtub) to be used in your toilet bowl to allow you to flush
- Complete water use activities (example, dishwashing, clothes washing, showering etc. prior to <insert water shut off time>.

**After Shutdown:**

- Please run the cold water for a few minutes to clear any potential water discolouration from your service
- If installed, please remove the tap filter prior to flushing your water.
- It is recommended to flush from the tap closest to your water meter (laundry tub or lower washroom)
- If you have a water softener or water purification system. Please place it on bypass prior to flushing the cold water

We apologize in advance for this inconvenience.

If you have any questions or concerns, please contact:

| **Developer's Engineer**<br>(Consultant)<br>(Contact Name)<br>(Phone number & email) | **Contractor**<br>(Contractor)<br>(Contact Name)<br>(Phone number & email) | **Township Contact**<br>(Contact Name)<br>(Phone number & email) |
|---|---|---|

# WATER TESTING FORM

Subdivision: _____

Street Names: _____ Contractor: _____

_____ Developer's Engineer: _____

_____ Pipe Material: _____

_____

**Swabbing**

Number of Swabs launched: _____ Number of Swabs Retrieved: _____

Swab velocity achieved _____ (0.78 to 0.91m/sec) _____

**Swabbing** Satisfactory ☐ Unsatisfactory ☐

**Pressure Testing (OPSS.MUNI 441)**

Allowable Leakage

| Watermain Dia. (mm) | Length | Allowable Leakage (Litres) |
|---|---|---|
| 150mm | | |
| 200mm | | |
| 250mm | | |
| 300mm | | |
| | Total: | |

Equation: Allowable Leakage in litres = 0.082 x _____ Dia. (mm) x $\frac{\text{_____Length (m)}}{1000}$

Test Pressure shall be: 1035 kPa (150 psi)

Minimum time test required: 2 hours Minimum volume loss allowed: _____ litres

Start Time: _____ am/pm End Time: _____ am/pm Duration: _____ hours

Actual measured volume loss: _____ litres

**Pressure Test** Satisfactory ☐ Unsatisfactory ☐

**DISINFECTION INFORMATION**

Disinfection shall adhere to the MECP 2020 Watermain Disinfection Procedure.

# WATER TESTING FORM

Residual Chlorine Test

| Test Section | Test Length (m) | Pipe Dia. (mm) | Pre-24 hr Test (min. 50 mg/L) | | Post 24 hr Test* | |
|---|---|---|---|---|---|---|
| | | | Chlorine Residual | Time | Chlorine Residual | Time |
| | | | | | | |
| | | | | | | |
| | | | | | | |

* Post 24 hr Test Results must be no less than 40% of Pre-24 hr test result (the 40% cannot exceed 50 mg/L). If results are unsatisfactory, re-chlorination of the watermains will be required (Assumes use of the Continuous Feed Disinfection Method)

**Residual Chlorine Test** Satisfactory ☐ Unsatisfactory ☐

**Microbiological Sampling**

Sampling takes place after flushing, with chlorine residuals checked to ensure a free residual of at least 0.05 mg/l or a combined residual of at least 0.25 mg/l, and a total within 0.2 mg/l of the source water, as per MECP guidelines. Two rounds of water samples will be taken a minimum of 24 hrs apart.

**First Round of Sampling** Satisfactory ☐ Unsatisfactory ☐

**Second Round of Sampling** Satisfactory ☐ Unsatisfactory ☐

**Additional Notes (if necessary- regarding any re-tests)**

_____

_____

_____

**Documents Attached:**

The form along with the documents below are to be provided electronically in one compiled email and sent to the Township's Director of Public Works, the Township Engineer, and the Township's Water Operating Authority.

| | | | |
|---|---|---|---|
| General Servicing Plan | ☐ | Watermain Commissioning Plan | ☐ |
| Signed Form 1 | ☐ | Microbiological Lab Results | ☐ |
| Backflow Prevention Test Report | ☐ | | |

**DEVELOPER'S ENGINEER:**

Based on the results the results of the testing, the new watermain is acceptable for final connection to the Township's water system.

_____ _____

Name: Date:

# BACKFLOW PREVENTION DEVICE TEST REPORT

| | | | |
|---|---|---|---|
| Address | | | Postal Code: |
| Occupant | Emergency Contact Person | | Telephone:<br>Email: |
| Owner | | | Telephone: |
| Address of Owner | | | Postal Code: |
| Name of Certified Tester | Tester Certification Number | | Telephone |
| Business Name | Business Address | | Email |
| Make of TEST KIT | Model Number | Serial Number | Date of Last Calibration |

Device Location_____ Purpose of Device_____

Test Date____/____/_____ RP ☐ DCVA ☐ PVB ☐

Make_____Model _____Serial # _____Size _____

Initial Test ☐ Annual Test ☐ Passed ☐ Failed ☐ Line Pressure _____

REDUCED PRESSURE BACKFLOW ASSEMBLY

**Check Valve No. 1**
☐ Leaked ☐ Closed Tight
Pressure Differential
Across No. 1 Check _____

**Check Valve No. 2**
☐ Leaked ☐ Closed Tight
Pressure Differential
Across No. 2 Check_____

**Relief Valve**
☐ Failed to Open

Opened at _____
Buffer Number + 3
Buffer Total = ☐

Shut off valve No. 2 ☐ Leaked ☐ Closed Tight

**(Total should be = or Less than Diff. Valve 1)**

DOUBLE CHECK VALVE

**Check Valve No. 1**
With Flow ☐ Leaked ☐ Closed Tight
Against Flow ☐

**Check Valve No. 2**
With Flow ☐ Leaked ☐ Closed Tight
Against Flow ☐

Pressure Differential
Across No. 1 Check _____

Pressure Differential
Across No. 2 Check _____

PRESSURE VACUUM BREAKER
Air Inlet Valve

Opened At ____ ☐ Failed to Open

Check Valve ☐ Leaked ☐ Closed Tight

Pressure Differential
Across Check Valve _____

If assembly fails test, complete this section and note repairs: (If Device replaces an existing device, list Serial # of existing device.)

Tester Signature: _____ Date: _____

**Township of Mapleton**
**7275 Sideroad 16**
**P.O. Box 160**
**Drayton, ON N0G 1P0**
**T** 519.638.3313 x044
**F** 519.638.5113
Email:

# Appendix F
# Consolidated Linear Infrastructure Environmental Compliance Approval Form

# ECA FORM (FOR AUTHORIZED WORK)

The checklist below shall be submitted to the Township Engineer and Director of Public Works pre-construction and post-construction. This is to ensure the Township has all the required documentation needed for any future MECP inspections/audits related to the Township's CLI-ECAs for their stormwater management system and sewage collection system.

**Description of Authorized Work**

_____
_____
_____
_____
_____

**Pre-Construction**

| | |
|---|---|
| **Detail Engineering Drawings** (signed and stamped by a professional engineer) | ☐ |
| **Design Brief/Functional Servicing Report**, including but not limited to:<br>• Hydraulic calculations<br>• Approval requirements<br>• Pipe Data Form PIBS 6238e<br>• Source water protection review (threat assessment)<br>• Sanitary Sewers/forcemains/conveyance ditches/swales<br>  - Design sheets (sewers)<br>  - Summary of design decisions including review of groundwater and/or other inflow and infiltration risk factors<br>  - Contingency plans for possible overflows (applicable to forcemains or siphons)<br>• Maintenance Plan (sanitary sewer system, storm sewer system, forcemains) | ☐ |
| **Stormwater Management Report** (Refer to C3.00 of Design Standards for additional requirements)<br>• Description of water quality and quantity criteria<br>• Hydraulic performance of the system verifying storm sewer capture rates and major and minor system capacities<br>• Oil/Grit separator – design brief, calculations and manufacturers specifications<br>• Source water protection review (threat assessment) | ☐ |
| **Sewage Pumping Stations Design Brief**, including but not limited to:<br>• Buoyancy calculations, forcemain hydraulic calculations, assessment of transient pressures, wet well and emergency storage tank sizing, design flows and firm capacity, headworks<br>• Electrical systems including standby power, controls and instrumentation description including alarms<br>• HVAC systems and hazard ratings throughout the station – risk assessment<br>• Contingency plans for emergency situations<br>• Source Water Protection Review (threat assessment) | ☐ |
| **Stormwater Management Facility Operation and Maintenance Manual** | ☐ |
| **Sewage Pumping Station Operation and Maintenance Manual** | ☐ |
| **Monitoring Plan for SWM Facility (for future performance report)** | ☐ |

# ECA FORM (FOR AUTHORIZED WORK)

**Forms**

| | | | |
|---|---|---|---|
| Stormwater Management System | | Sewage Collection System | |
| SW1 Storm Sewers/Ditches/Culverts | ☐ | SS1 Sanitary Sewers and Forcemains | ☐ |
| SW2 Stormwater Management Facilities | ☐ | SS2 Components of the Collection System | ☐ |
| SW3 Third Pipe Collection System | ☐ | A1 Equipment discharging a contaminant of concern to the atmosphere | ☐ |

**Within 30 Days of Infrastructure being placed into service**

The form with the documents below is to be provided electronically in one compiled email and sent to the Township's Director of Public Works and the Township Engineer.

| | |
|---|---|
| Copy of Inspection and testing plans; procedure, equipment, schedule, safety requirements, and emergency response plan (required before inspection/testing) | ☐ |
| Inspection/ Testing Records (per Design Criteria)<br>• CCTV and report (sanitary and storm sewers, MHs)<br>• Leakage testing results (all sanitary sewers and MHs)<br>• Deflection testing (all flexible sanitary and storm sewers at least 30 days after backfilling)<br>• Hydrostatic testing (forcemains) | ☐ |
| Completion of the Director Notification Forms for signing by the Township if applicable | ☐ |

**DEVELOPER'S ENGINEER:**

I can confirm that the works complied with inspection and testing requirements set out in the MECP publication "Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval". All low impact development or end of pipe stormwater management facilities and components of the sewage collection system as applicable to this project have been inspected before operation to ensure that the works as constructed will continue to conform to the Design Criteria and the Township's ECA. I have provided documentation of the inspection and testing results to the Township.

Name: _____ Date: _____

Signature _____

Township Use Only: Upon receiving the above information, the Township shall sign the post construction verification section on SW1, SW2, SW3, SS1 and/or SS2 as applicable. Director Notification Forms as required are to be signed by the Township and submitted to MECP.

# ECA FORM (FOR AUTHORIZED WORK)

**Prior to Final Acceptance**

| | |
|---|---|
| Record Drawings | ☐ |
| Final O&M Manual Documents (PDF and digital) | ☐ |
| Performance Report (related to SWM Facilities) | ☐ |
| ES&C Inspection Records (Consolidated in a folder) | ☐ |
| O&M Inspection Records (Consolidated in a folder) | ☐ |
| Completion of the Director Notification Forms for signing by the Township if applicable (for SWM Facilities) | ☐ |

| |
|---|
| Township Use Only: Within 30 days of the SWM Facility being assumed (approved by Council), the Director Notification Form will need to be completed. |

**EROSION AND SEDIMENT CONTROL INSPECTION REPORT**

| General Site Information | |
|---|---|
| **Subdivision Name:** | |
| **Developer's Engineer:** | |
| **CLI-ECA Number(s):** | **Storm Water: 105-S701** ☐<br>**Sewage Collection: 105-W601** ☐ |

| General Inspection Information | | | |
|---|---|---|---|
| Inspector: | | | |
| Inspection Date: | | Weekly/Monthly Inspection | ☐ |
| Inspection Time: | | Significant Storm Event | ☐ |
| Current Weather Conditions: | | Rainfall/Snowmelt Event | ☐ |
| Date of Last Inspection: | | As a result of a request to Inspect | ☐ |
| Previous Weather Conditions Since Last Inspection: (Rainfall/Snowfall amounts) | | Weather Forecast Over Next 7 Days: Dry ☐ Rain or Snow Melt Event ☐ | |
| Environment Canada Climate ID: | 6145504 (Mount Forest) | | |

| Questions | | YES | NO | N/A |
|---|---|---|---|---|
| 1. | Is there evidence of a pollutant discharging from the site? (fuel, portable toilet waste, etc.) | ☐ | ☐ | ☐ |
| 2. | Do installation, repair and/or maintenance of E&SC measures need to occur? | ☐ | ☐ | ☐ |
| 3. | Do installation, repair and/or maintenance of in-stream control E&SC need to occur? | ☐ | ☐ | ☐ |
| 4. | Is there evidence of sediment discharging off the construction site and onto a downstream location? | ☐ | ☐ | ☐ |
| 5. | Are vehicles tracking sediment off the construction site? | ☐ | ☐ | ☐ |
| 6. | If applicable, is soil, sediment, or other debris evident on the streets? | ☐ | ☐ | ☐ |
| 7. | Do the streets require cleaning? (Consider the forecasted weather and likelihood of sediment being washed off site or in the storm sewer system) | ☐ | ☐ | ☐ |
| 8. | Are photo's available from this inspection? If Yes, the Township may request a copy. | ☐ | ☐ | ☐ |
| 9. | Does your site evaluation indicate a need to possibly update or enhance E&SC measures within the next 7 days? | ☐ | ☐ | ☐ |
| 10. | Have all previous inspection items been addressed within 7 days after the last inspection or the required completion date? | ☐ | ☐ | ☐ |

| Erosion and Sediment Control Assessment | | | | | | | |
|---|---|---|---|---|---|---|---|
| **E&SC Measure** | | **Is it effective?** | | **Is Maintenance Required?** | | **Actions Required?** | **Actions Required by** |
| | **N/A** | **YES** | **NO** | **YES** | **NO** | | |
| Mud Matt | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| Silt Fencing | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| Sediment Basins & Hicken Bottoms | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| ESC at RYCBs | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| Silt Sacs | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| Rock or Straw Bale Check Dams | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | ☐ | ☐ | ☐ | ☐ | ☐ | | |

**General Comments or Critical Action Items**

Note: The Inspector shall identify/make recommendations for E&SC enhancements to address erosion and sediment control issues that may arise. This may include more measures than noted on the approved erosion and sediment control drawings.

# Appendix G
# Lot Grading Forms

# TOP OF FOUNDATION CERTIFICATE

Date: _____

Subdivision: _____

Municipal Address: _____

Registered Plan: _____

Being Lot/Block: _____

This letter is to confirm that we have completed a survey of the foundation location and height for the above noted property. The foundation location and height measured are as follows:

**Top of Foundation Height**

| | From approved site specific grading plan | Actual constructed elevation | Difference |
|---|---|---|---|
| Front Left | | | |
| Rear Left | | | |
| Front Right | | | |
| Rear Right | | | |
| Other: | | | |

**Closest Foundation Locations to Boundaries**

| | Measured | Minimum Required per Zoning By-Law | Complies | |
|---|---|---|---|---|
| | | | Yes | No |
| To Street Line (Garage) | | | ☐ | ☐ |
| To Street Line (Other) | | | ☐ | ☐ |
| To Left Side Line | | | ☐ | ☐ |
| To Right Side Line | | | ☐ | ☐ |
| To Rear Line | | | ☐ | ☐ |

These heights and locations have been reviewed by our office and are in general conformance with the approved site specific Grading Plan. It is our opinion the location and height of the foundation will allow a drainage pattern that is in reasonable compliance with the approved site specific grading plan and the Ontario Building Code and comply with minimum zoning setbacks,

_____ _____

Company:

_____ _____

Name: Company Address:

_____ _____

Signature: Date:

# FINAL LOT GRADING APPROVAL FORM
# DEVELOPER'S ENGINEER

Date: _____ Pin: _____

Subdivision: _____ Registered Plan _____

Municipal Address: _____ Being Lot/Block _____

The undersigned, a Professional Engineer licensed in the Province of Ontario hereby certifies to the Township of Mapleton that the final grading (which is sodded) on the above-noted property has been graded in general conformance with the Approved Grading Plan registered against the title of the said property.

| The undersigned further certifies to the Township that: | NO | YES |
|---|---|---|
| The final grading of the above referenced property has been completed in substantial compliance with the Approved Individual Grading Plan. | ☐ | ☐ |

If No to the above, complete the following:

| | | |
|---|---|---|
| Does the grading still conform to the master grading plan? | ☐ | ☐ |

Describe the changes: _____

_____

_____

| The undersigned further certifies to the Township that: | YES |
|---|---|
| The grade elevation of all lot boundaries, corners, and transitional change points of the property are in substantial conformance with the Approved Individual Grading Plan. | ☐ |
| The lot has been graded to provide positive drainage in the front, rear and side yard in substantial conformance with the Approved Individual Grading Plan. | ☐ |
| The location of drainage swales, be it in the rear and/or side yard of the property are installed and in substantial conformance with the Approved Individual Grading Plan. | ☐ |
| The rainwater leaders discharge approximately 1 m from the foundation (Clean and Clear By-Law 2021-013). | ☐ |
| The sump pump discharge (if not directed to a storm service) is discharged to the rear yard 1 m from the foundation (Clean and Clear By-Law 2021-013). | ☐ |
| The sump pump discharge configuration is consistent with the detail on the approved engineering drawings for the subdivision or alternate approved by the Building Department. | ☐ |
| The elevation at the house complies with the Ontario Building Code | ☐ |

This certificate is given and delivered to the Township in full knowledge that the Township relies on this certification. This certification shall not relieve the Developer of their responsibility to correct any lot settlements or deficiencies that may occur.

Enclosed: As-Constructed Plan

_____

**PROFESSIONAL (Signature/Seal/Date)**