



TOWNSHIP OF
Southwold

Design Guidelines Manual
2022 Edition



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1. INTRODUCTION:

1.0. About the Township of Southwold

The Township of Southwold (the Township) is a lower tier Municipality within Elgin County located on the north shore of Lake Erie. The Township is the operating authority for all municipal owned roads, storm sewers, sanitary sewers and watermains that are to be installed within all road allowances and registered easements within the Township of Southwold. The Township is also responsible for all parks and open space on municipally owned lands.

It is the Township's objective to work collaboratively with developers on site plans and subdivisions towards the end goal of creating private and public infrastructure and neighbourhoods.

1.1. Purpose of Design Criteria

The design information contained in this guideline is intended to provide guidance beyond legislative and standard design practices for use in the Township. There will be site specific situations where the design will depart from these practices as it is not possible nor is it the intention of the Township to anticipate every situation. The Township intends to review and revise the design guideline from time to time.

Additional items may be required to address specifics for any given development. Each property is reviewed and may require items above the existing policies and design requirements depending on the uniqueness of the site and development.

Where it is deemed appropriate or necessary the Drainage Act legislation and procedures therein shall be utilized to service the development.

1.2. Submissions

Submissions and circulation of planning applications and engineering drawings related to Planning Approvals are co-ordinated through the Township's Infrastructure and Development Services Department, directed to the Township's Planner (planning@southwold.ca).

Drawing approval must be obtained from the Infrastructure and Development Services Department prior to any work commencing on all sites.

2. GENERAL INFORMATION:

2.0. List of Contacts

See the Township's list of contacts on the website link below:

<https://www.southwold.ca/contact/>

2.1. Definitions

"Township" shall mean The Corporation of the Township of Southwold.

"Contractor" means a person, partnership, or corporation who is contracted to undertake the execution of work commissioned by the Township to install or maintain sewers, private drain connections, maintenance holes, catch basins and other appurtenances.

"Complete Streets" means any transportation facilities that are designed for all ages, abilities, and modes of travel. On Complete Streets, safe and comfortable access for pedestrians, bicycles, transit users and the mobility-impaired is not an afterthought, but an integral planning feature.

"Developer" shall mean the Owner or party specifically named in a Development Agreement or in a Subdivision Agreement.

"Engineer" shall mean the Township Engineer or the Engineer's authorized representative.

"Inspector" means the person(s) authorized and supplied by the Township to see that the installation is executed according to the specifications and the approved plan(s) in a good workmanlike manner according to the latest Township practices and standards.

"Main or watermain" means every water pipe, except services and portions of private mains as herein defined, installed on the public road allowance or on any other land upon which the Township has obtained easements.

"Private Hydrant" means a hydrant connected to a watermain and installed on private property. (Fire Department has full rights of connection.)

"Private Watermain" means a pipe connected to a watermain and installed on private property and from which more than one service and/or hydrant lateral are connected.

"Service" means every water pipe installed from a connection on a watermain or private watermain to the meter location or, for a fire service, to the inside of the exterior wall of a structure.



“Service Extension” means the portion of a service from the property line to the meter location, or for a fire service to the inside of the exterior wall of a structure. (i.e.; an extension of a service stub)

“Service Stub” means the portion of a service from a watermain to the property line which will always include one control valve.

“Structure” means a building of any kind, including but not restricted to, apartments, condominiums, single-family homes, town housing, row housing, industrial, commercial, and institutional.

“Subdivider” means the Developer, Owner, or party specifically named in a Subdivision Agreement.

“OPSD” means Ontario Provincial Standard Drawings.

“Owner” shall include any person who or any firm or corporation that is the registered owner of the property under consideration or any agent thereof, a person entitled to a limited estate in land, a trustee in whom land is vested, a committee of the estate of a mentally incompetent person, an executor, an administrator and a guardian.

“OBC” means Ontario Building Code.

“ROW” means Right-of-way; the width of a road from property line to property line.

“Street Line” means limit of the right-of-way; property line

“PDC” means a private drain connection.

2.2. Acknowledgements of Sources

The Township of Southwold’s design guidelines were created in compilation using the City of St. Thomas’ design guidelines, the City of London’s design specifications & requirements manual, and Dutton Dunwich’s design and construction standards.

3. ENGINEERING REVIEW FOR DEVELOPMENT

3.0. Consultation Process

An applicant for a new development shall arrange for a consultation meeting with Township staff through the Township Planner or County planner depending on the application type, to discuss the development or planning application.

Plans shall be circulated to Township staff two weeks prior to the consultation.

Meetings are held at the Township administrative office or online, and the setting is meant to be informal. Township staff will comment on the proposed development and inform the applicant of the report and studies that are required for the specific development application.

The applicant will be required to provide the required studies, reports and drawings and other submission requirements as deemed necessary by the Township to support the development application.

The submission requirements will be broken out below for the subdivision and site plan drawing review process and include typical approval agencies.

3.1. Subdivisions

Subdivision submissions should include reports and engineering drawings that are prepared by the developer's consulting engineer. Depending on the nature of the application, the Township may request the first submission only include the focused design studies and reports to allow for a more complete review prior to the engineering drawing review. Submissions are reviewed by the Township Departments and consultants as required.

3.1.1. Design submissions

Design submissions are to be accompanied by any supporting documentation required for the completeness of the design of the subdivision development. Such documentation may include but not limited to copies of the following reports:

- Geotechnical report
- Hydrogeological report
- Traffic Impacts Assessment Report
- Photometric Lighting Report (external works)
- Tree Preservation Report
- Environmental Assessment
- Natural Heritage Investigations



- Copies of reports submitted to the Conversation Authority
- Storm Water Management Report
- Noise Report
- Functional Servicing Report
- Vibration Report
- Archeological Report
- Legal Survey, including deed
- Planning Justification Report

3.1.2. Drawing standards

The following AutoCAD Drawing Standards shall be used in new development submissions:

- The drawing scale for plan and profile drawings shall be in metric, using a scale of 1:250 horizontally and 1:50 vertically. A scale of 1:250 horizontally should be used in congested areas.
- Drawings shall be oriented such that North points up and/or to the right (or left if required).
- Dimensions and elevations shall be provided in metric units.
- Existing conditions should appear faded in comparison to the proposed work, and use a text size of 1.6mm of the final hard copy.
- The various utility lines should be identified and appear slightly darker than existing topography.
- Proposed work should appear heavier than existing conditions and use a text size of 2.0mm for notes, elevations and dimensions.
- All linework and text should be drawn using a bylayer colour and line type to facilitate easy modifications.

3.1.3 Engineering Drawings

A complete set of Engineering Drawings, in addition to the reports required in section 3.1.1. shall be comprised of the following in the order shown below:

- The approved draft plan
- The proposed plan for registration showing all lot and block numbering and dimensioning
- Cover sheet (should include the name of development, the owner/developer name, drawing index and key plan showing site location)
- Phasing drawing, if applicable
- General plan of services



- Plan and profile drawings
- Area and lot grading plan
- Sediment and erosion plan, including stockpile locations
- Storm drainage plans, including existing servicing in the area
- Storm sewer design sheets
- Storm water management facility
- Storm water management facility miscellaneous notes and details
- Sanitary drainage plans, including existing servicing in the area
- Sanitary sewer design sheets
- Water distribution plan, including all existing servicing in the area
- Landscape plan
- Park grading plan, if necessary
- Composite utility plan, including hydro distribution system and street lighting
- Photometric drawings, external works
- Street signage and traffic control plan
- All detail drawings other than the O.P.S. Detail Drawings
- All drawings pertinent to the design
- All other calculations necessary to check the design, and;

3.1.3.1 General Plan of Services

The general plan of services will indicate the general overall scope of the project and the geographic relationship to surrounding lands:

- North arrow
- A general plan of services or master plan drawing should be prepared for all developments at a scale not greater than 1:2000.
- When more than one general plan is required, the layout of the general plan shall reflect similar layout as the reference plan.
- The reference Geodetic Bench Mark and the site bench mark are to be used for construction and shall be identified on the general plan of services
- Road allowances, lots, blocks and easements are to be depicted in a similar fashion as the reference plan.
- All existing services and proposed services are to be shown if possible.
- All Township and utility infrastructure (road, sidewalk, curb, pedestals, sewers, manholes, valves, hydrants, etc) are to be shown and labelled properly.
- Registered plan number must be shown on the as-constructed general plan of services.
- All site information for parks, schools, churches, commercial and industrial development blocks must be shown.

3.1.3.2 Plan and Profile Drawings

Plan and profile drawings will provide the detailed information required for construction of roads and municipal services. The following are the requirements for the plan and profile drawings:

- North arrow
- Consulting engineer must confirm with Township the proper layer style for the engineering drawing for plotting purposes prior to submitting for engineering design review.
- Scale shall be 1:250 horizontal, 1:50 vertical.
- Plan and Profile drawings are required for all roadways, blocks and easements within the development, for all outfalls beyond the development to the permanent outlet, for all boundary roadways abutting the development and for other areas where utilities are being installed below grade.
- Plan and profile drawings, as well as cross sections are required for rear yard catch basin leads.
- Geodetic benchmark monument location and information.
- All existing or future services, utilities and abutting properties are to be shown.
- All proposed services to be constructed are to be shown.
- The profile portion of the drawing shall be a vertical projection of the plan portion whenever possible.
- All road allowances, lots, blocks, easements and reserves are to be shown and are to be identified in the same manner as the Registered Plan. Lot and block frontages are to be shown.
- All curb and gutter and sidewalks shall be shown and dimensioned on the plan portion of the drawing.
- All storm and sanitary sewers and watermains shall be shown and dimensioned on the plan and shall also be plotted on the profile of the drawings. The sewers shall have a complete description on the plan and/or profile portion of the drawing including length, grade, diameter, flow direction arrow, material, class of pipe, and bedding requirements. The size of the pipe shall be plotted to full scale on the profile.
- All sewer manholes shall be shown on the plan and on the profile portions of the drawing. The manholes shall be identified number on the plan and on the profile portion of the drawing. All invert elevations shall be shown on the profile with each having reference to the north arrow.
- All catchbasins and catchbasin connections shall be shown. Catchbasins are to be identified by number.



- All rim and invert elevations for manholes are to be shown. Catchbasins shall have rim elevations only.
- All sewer manholes which have safety platforms are to be noted.
- All drop connections are to be noted and referred to the applicable O.P.S. specification, drawing or detail sheet.
- All watermains, hydrants, valves, blow-offs, etc. shall be shown, described and dimensioned on the plan portion of the drawing. In addition, the watermain shall be plotted to true scale size on the profile portion of the drawing and labelled with the pipe size, material and depth of cover.
- The location of all storm, water and sanitary service connections shall be shown on the plan portion of the drawing using different symbols, and line types for each service type. The connections to all blocks in the development shall be fully described and dimensioned (size, length, grade, invert elevations, material, class of pipe, bedding, etc.).
- The centreline of construction with 20 metre stations noted by a point or small cross shall be shown on the plan portion of the drawing.
- The original ground at centreline and the proposed centreline road grade shall be plotted on the profile. The proposed centreline and centreline grades shall be fully labeled including length, grade, P.I. stations and elevations, vertical and horizontal curve data, etc.
- Details of the gutter grades around all 90 degree bends, crescents and cul-de-sacs shall be provided on the plan portion of the drawing.
- Special notes necessary to detail construction procedures or requirements are to be shown.
- Chainages for the centreline of construction are to be shown on the profile portion of the drawing. The P.I., B.H.C., E.H.C., B.V.C., and, E.V.C. chainages shall also be noted.
- Any test pit or borehole locations and soil profile information shall be shown.
- The basement elevation of all existing dwellings on the streets where sewers are to be constructed shall be noted.
- All of the proposed services and features are to be shown on the plan portion of the drawing. Those services below grade that are critical to the new construction shall also be shown in the profile. Test holes may be required to determine actual elevation of these services.
- The curb radii at all intersections shall be shown on the plan portion of the drawing.
- Profiles of roadways shall be produced sufficiently beyond the limits of the proposed roads, to confirm the feasibility of possible future extensions.
- The location of all streetlights and transformers shall be clearly shown on the plan portion of the drawings.



3.1.3.3 Area and Lot Grading Plans

The lot grading plan shall establish the final grade control for all lots and blocks within the development in accordance with the Township's current lot grading standards.

- North arrow
- The Lot Grading Plan shall be prepared at a scale of 1:500 for single family, semi-detached areas and for multi-family areas.
- All lots and blocks within the subdivision are to be shown and are to be identified in the same manner as the Registered Plan.
- Geodetic benchmark monument location and information.
- Existing contours are to be shown at maximum 0.5 m intervals within the subdivision limits and 30 metres beyond the subdivision limits. Existing overland flow route.
- 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 chainage on the profile drawings.
- Proposed elevations are to be shown for all lot corners and intermediate points of grade change, building corner elevations. On larger blocks, a proposed elevation is to be shown at 15 m intervals along the frontage of the block and at reasonable intervals along the sides and rear of the block to clearly illustrate the grading of the block in relation to the surrounding lands and house type.
- The specified lot grade shall be shown at a location 6.0 m minimum from the street line. For "split" type drainage patterns, the specified rear house grade shall be shown. The specified minimum top of foundation elevation for each lot shall also be shown.
- The direction of the surface water runoff from the rear of all the lots shall be indicated by means of an arrow pointing in the direction of the runoff.
- All swales, other than the normal side yard swales, are to be shown along with the invert elevation of the swale at regular intervals (i.e. centreline of each lot for rear yard swales) and include slopes for all swales.
- All rear yard catchbasins shall be shown along with the rim elevation of the catchbasin grate and the invert elevation of the outlet pipe.
- All curbs, sidewalks, catchbasins, valves, hydrants, streetlight poles, transformers, Canada Post community mailbox locations and easements shall be shown on the lot grading plans. Driveways must have a minimum 1.5 m clearance to these utilities.
- All 3:1 slopes (terracing) required shall be shown with the intermediate grades specified.
- Existing elevations are to be shown on adjacent lands approximately 30 metres from the subdivision limit to enable assessment of the grading between the subdivision and the adjacent areas. The interval of those elevations shall be dependent upon the degree of



development of the adjoining lands with the developed areas requiring the most information.

- For all design lots, the top of foundation wall shall be shown and labeled on the approved grading plan.
- For all design lots, the underside of footing shall be shown (if required).
- The grading along the limit of the subdivision shall be carefully controlled to avoid disturbance to the adjoining areas.
- Temporary silt fencing shall be installed along the limit of subdivision and maintained for the duration of the contract until such time as seeding or sodding takes place. This fencing shall be noted on the grading plan.
- All semi-detached lots shall be indicated with SD on all drawings.
- The lot grading plans shall show proposed locations for building envelopes, enveloped for private sewage disposal systems and private water supply systems for rural estate developments.
- All culverts shall be designed and shown on the lot grading plans identifying culvert diameter, gauge, minimum length, invert, and type.
- All typical grading details and specifications shall be shown on the Lot Grading Plan.
- Masked imaging of the Storm Drainage Areas shall be shown.
- Overland flow route for the entire development
- Ponding limits for 100 year storm at catch basins, rear yard catch basins.

3.1.3.4 Detail Plan

A detail plan will be required when there is not sufficient space on the plan and profile drawings or other drawings to fully describe the necessary works.

- North arrow
- A typical road cross section shall be shown on the Detail Plan, illustrating R.O.W. dimensions, pavement structure, sewer and watermain locations, curb and sidewalk locations, and proposed utility locations.
- Horizontal separation between sewers and watermain.
- Details of special chambers, such as metering chambers shall be shown.
- Details of special structures, such as storm sewer inlets and outlets or retaining walls shall be shown.
- Details of special drainage features, including stormwater retention/detention ponds shall be shown.
- Pumping station details shall be shown.
- Any other details or notes as required shall be shown, such as drop structures in manholes

3.1.3.5 Storm and Sanitary Drainage Plans

A separate drainage area plan for storm and sanitary drainage shall be prepared and as follows:

- North arrow
- Scale to suit drawings but needs to be legible.
- The street and lot layout of the subdivision, street names and property descriptions shall be shown on the Drainage Plans.
- All existing and proposed sewers, manholes, catchbasins shall be shown and labeled with identifying numbers, sizes, lengths, grades and direction of flow.
- All external areas shall be shown on the Drainage Plans. If the external areas are too large to be accommodated, a separate drawing for the external storm areas shall be included in the set.
- Storm drainage areas shall be delineated on an actual contributing drainage area and manhole to manhole basis.
- Sanitary drainage areas shall be delineated on a lotline by lotline and manhole to manhole basis.
- All drainage areas shall be numbered and shall include area in hectares, run-off coefficients for storm or population densities for sanitary.
- The design sheet shall be shown on the Drainage Plans. If the design sheet cannot be accommodated on the area plan, the design sheets can be shown on their own drawing.

3.1.3.6 Utility Plan

The development will require a utility plan for utilities other than water and sewer, from the requirements of various public and private utility agencies. The utility plans shall also include detail layout for street lighting.

- North arrow
- Maximum drawing scale of 1:750.
- A legend using standard symbols shall be shown on the Utility Plan.
- The location of all existing and proposed utilities (Hydro, Telephone, Cable TV, Gas, Streetlight), including those in common trenches, shall be shown on the Utility Plan.
- The location of all existing and proposed utility structures and pedestals, including Canada Post community mailboxes shall be shown and labeled.
- Typical utility trench details and duct locations shall be shown.
- Any specific duct and trenches cross section details for road crossing shall be shown.
- Any other utility details or notes shall be shown on the Utility Plan.

3.2. Site Plan Control

To start the site plan process, the applicant must contact the Township planner to arrange a pre-consultation meeting to discuss the site plan objectives and submission requirements for the Township. Site plan submissions will include detailed reports and site plan drawings prepared by the developers consulting engineer.

3.2.1 Design Submissions

Design submissions are to be accompanied by any supporting documentation required for the completeness of the design of the site plan development. Such documentation may include but not limited to copies of the following reports:

- Geotechnical (soils) report
- Hydrogeological report
- Traffic Impacts Assessment Report
- Photometric Lighting Report (external works)
- Tree Preservation Report
- Natural Heritage Investigations
- Copies of reports submitted to the Conversation Authority
- Storm Water Management Report
- Noise Report
- Functional Servicing Report
- Vibration Report
- Archeological Report
- Legal Survey, including deed
- Planning Justification Report

3.2.2 Site Plan Drawings

A complete set of engineering and architectural drawings will be required for the site plan application. Engineer drawings that are required, but not limited to, can include the following:

- Site plan drawings
- Site grading and drainage
- Site services plan and profile
- Landscape plan
- Electrical services and utilities plan
- Lighting layout and distribution plan
- Building elevations plan
- External works plan, as required

3.3 Approval Agencies

Depending on the location of the development, the developer will be required to obtain Township approval and may be required to obtain approval from various other regulatory agencies which include but not limited to:

- The Department of Fisheries and Oceans (DFO)
- The Ministry of Environment, Conservation and Parks (MECP)
- The Ministry of Natural Resources (MNR)
- The Ministry of Transportation (MTO)
- The Ministry of Municipal Affairs and Housing (MMAH)
- The Ministry of Tourism, Culture and Sport (MTC)
- Elgin County
- Kettle Creek Conservation Authority
- Lower Thames Regional Conservation Authority
- Elgin St. Thomas Public Health
- Adjacent municipalities where appropriate

It is the responsibility of the developer to provide the Township with suitable written documentation of the approval from the regulatory agencies. The development will be subject to the requirements of all by-laws within the Township.

The developer shall be required to enter into a Development Agreement (i.e. Subdivision Agreement or Site Plan Agreement) with the Township and pay fees to the Township such as application fees for zoning and administration fees applicable to the development application.

4. ENGINEERING STANDARDS

4.0. Civil 3D design

Computer-Aided Design (CAD) shall be used to generate all engineering drawings, specifically AutoCAD Civil 3D. Vector form DWGS files shall be supplied to the Township with no X-Refs. All as-built CAD drawings must be submitted in this version.

Georeferenced plans are required for each application.

4.1. Drawing Sizes

Full sized drawings to be ANSI D 22" x 34" (559mm x 864mm). Reduced drawings are to be 11" x 17" (279mm x 432 mm)

4.2. GIS/Asset Management Requirements

The Final Submission Requirements shall consist of one USB stick of digital submission (Preferred format is AutoCAD .dwg file, which may include Civil 3D) The following information should be included in the GIS data base:

- Road Section Number
- Street Name
- Road Surface Length (m)
- Road Surface Width (m)
- Asphalt Type Base
- Asphalt Type Topcoat
- Asphalt Base Depth (mm)
- Asphalt Depth Topcoat (mm)
- Road Surface Condition
- Road Surface Useful Life
- Year Constructed
- Cost of Initial Pavement
- Year of Maintenance
- Cost of Preservation (Betterment)
- Type of Maintenance
- Traffic Counts
- Design Mixes
- Soils Reports
- Traffic Signal (Pole and Fixture)
- Street Light (Pole and Fixture)
- Sidewalks

- Traffic Signs
- Underground services
- Curb

4.3. As-Built Drawing Requirements

Prior to assumption, the applicant is required to provide a complete project package to the Township. This package should include the following:

- Digital "As Constructed Drawing Set" in an Adobe format (.pdf file), (complete with all required signatures);
- Digital "As Constructed Drawing Set" in AutoCAD format (.dwg file, which may include LDD or Civil 3D)
 - provide all Paper Space Title Blocks and Plot Style Tables
 - all existing survey points are to be contained in the drawing
 - all proposed TIN's, grading models and/or contour lines are to be contained in the drawing
 - all line work must be in Model Space at 1:1 scale and unrotated in a World Coordinate System (WCS)
 - drawing units are to be in metric
 - purge all old or extra drawing layers
 - bind all XRef files (no external attachments upon submission)
 - georeferenced plans are preferred, but not mandatory for submission
 - All digital "Project" support files which do not reside in AutoCAD such as stormwater calculations, technical reports, etc.
 - The digital formats may be from industry standard software including Microsoft Office, Adobe, Synchro Traffic, etc.

4.4. Recording Service Connections

Once a private drain connection or water service is placed, a record of its location must be produced for as-constructed drawings and provided digitally to the Township. Water, Sanitary and Storm laterals are to be included on drawings, showing proper plan view which include bends and sweeps. Also, required is the pipe invert elevation at property line. Drawings standards page will have a sample building report required for recording service connections.

5. TRANSPORTATION

All roads shall be designed and constructed in accordance with the current edition of the Manual of Geometric Design Standards for Canadian Roads, as well as the standards within the National Association of City Transportation Officials. Road design shall incorporate a complete street approach and should promote a healthy and safe community.

5.0. Road Design

5.0.1. Referenced Design Standards and Guidelines

Road design shall be in accordance with the following standards and guidelines, as amended or expanded upon within the Township of Southwold Design Guidelines.

Transportation Association of Canada (TAC)

- Geometric Design Guide for Canadian Roads (TAC Standards)
- Manual of Uniform Traffic Control Devices for Canada (MUTCD)
- Guide for the Design of Roadway Lighting
- Pedestrian Crossing Control Manual
- Canadian Guide to Neighborhood Traffic Calming

Ministry of Transportation

- Geometric Design Standards for Ontario Highways, 1985 (latest revision)
- Ontario Traffic Manual (OTM) (latest edition)
- OTM Book 12 – Traffic Signal Design
- Ontario Provincial Standards (OPS) (latest edition)

Institute of Transportation Engineers (ITE)

- Trip Generation Manual
- Transportation and Land Development
- Traffic Access and Impact Studies for Site Development – Recommended Practice

5.1.2. Design Speed

Posted Speed (km/h)	Design Speed (km/h)
40	40
50	50
60	70
70	80



80	90
90	110

Design speeds for all local and minor collectors shall be 50km/h unless adjacent to schools or high pedestrian generators such as parks, where the design speed is 40km/h.

5.1.3. Road Classification

Road Type	General Function	Typical Right of Way	Pavement Width (m)
Local	Light volumes of resident traffic. Connect to collector roads that provide ingress and egress into a subdivision or neighbourhood	20m	7.0 (0-44 units) 7.5 (45 units or greater)
Collector	Moderate volumes of resident traffic, primarily moving residents between points of origin and arterial roads	26m	9.0 (parking, no bike lanes) 12.5 (1.5m bike lane, 0.5m buffer)
Arterial	Large to moderate volumes of traffic. Larger vehicle traffic.	30m	10 (no bike lanes) 14 (1.5m boulevard bike lane, 0.5m buffer)
Industrial	Larger vehicles with less pedestrian activity	26m	8.5

Note: All development applications shall try to accommodate two public accesses. Where this cannot be accommodated, the Township may consider a secondary emergency access, and consultation with the Township Engineer will be required.

5.1.4. Centreline Radii

Centerline Radii shall be in accordance with TAC Design Guidelines. Bends of 90 degrees are only permitted on local streets. Local streets with bends of approximately 90 degrees are to have a minimum inside street-line radius of 10.0m

For reconstruction of existing roads, the centreline horizontal alignments shall be reviewed by the Township Staff on a site specific basis.

5.1.5. Radii for Curb & Gutter

Intersection radii for curb and gutter should be measured at edge of pavement. The following chart illustrates the required radii:

From:	To:		
	Arterial	Collector	Local
Arterial	13.5m	12m	10m
Collector	12m	7.5m	6.0m
Local	7.5m	6.0m	6.0m

Note: daylight triangles are required for any road type connection at intersections, and will be determined based on Township zoning by-law.

Design vehicles for the following road classification should be considered in the design of all projects and developments to provide the minimum radii appropriate for the specific road geometry. If the design vehicle results in a small curb radii, the smaller curb radii shall be used.

DL-23	Local and most collector roads
WB-20	Collector (near commercial and downtown) and arterial roads

5.1.6. Minimum Pavement Design

The minimum pavement design shall follow details provided under each of the Township's standard ROW cross sections. Deviations from these minimum standards shall be based on the recommendations from a geotechnical report by a professional engineer.

5.1.7. Concrete Curb and Gutter

Concrete curb and gutter used in the Township of Southwold shall be OPSD 600.040 for all road types. Any deviation from this standard shall be approved by the Township Engineer. Concrete curb setbacks are required for all catch basins and the frame of the catch basin should be outside of the asphalt roadway.

5.1.8. Concrete Sidewalk

Concrete sidewalk in the Township of Southwold shall be 1.8 metre minimum width with a thickness of 125mm. Concrete sidewalk adjacent to curb shall only be considered in constrained road reconstruction project, with a minimum width of 2.0 metre.

The thickness of sidewalk at residential driveways shall be 150mm and at commercial/industrial driveways shall be 200mm.

All Township sidewalks are to have the contraction and dummy joints sawcut with expansion joints.

5.1.9. Maximum and Minimum Road Grades

Road Type	Maximum Grade (%)
Industrial	6
Arterial	6
Collector	6
Local	8

Note: The minimum road grades shall be 0.5%. Max grade across intersections 2%

Flat see-saw profiles (identical high and low points) will not be allowed in either road profile design or rear yard swale designs. See-saw profiles must flow in a cascade that allows major storm flows (Overland Flows) to drain along the road and lots to the acceptable Overland Flow Outlet.

Boulevard grades 2%-6%

Shoulder grades 6%

5.1.10. Vertical Alignment

Sag and crest curves shall be in accordance with TAC guidelines. Curves shall be required when the change in grade is greater than 1% as per the below equation:

$$\Delta\% = SS1 - SS2 > 1\%$$

Where: S1 = Slope 1

S2 = Slope 2

5.1.11. Utility Location

The location of all utilities within the road allowance shall be as detailed on the typical cross-section. Utility drawings shall be submitted to the Township Engineer or designate for approval. All new development utilities are to be constructed underground. Hydro transformers are to be housed in suitable enclosures and mounted on transformer pads installed at the final ground elevation. Bell telephone junction boxes may be mounted at the surface in approved standard enclosures.

5.1.12. Cul-de-sacs and Bulbs

Subdivision street pattern design shall avoid use of cul-de-sacs and bulbs. All street design shall promote connectivity within the new development.

5.1.13. Signage Posts

Regulatory sign posts shall be steel u-channel or 100mm x 100mm pressure treated posts, with the preference of steel u-channel. The location and size of the sign will also dictate the required posts as per OTM book 5.

5.1.14. Road Sub-Drains

Sub-drains will be required on all developments within the Township of Southwold.

5.1.15. Snow Clearing/Snow Storage

Snow clearing operations will be carried out by the Township of Southwold after the roads have been fully assumed and the warranty period is passed. Depending on the development agreement, the Township may coordinate snow clearing at the developers expense.

In general, all snow clearing for development is to be carried out at the developers expense. For site plan control applications, snow storage areas shall be shown on the drawings.

5.1.16. Road Occupancy Permit

Any work required by a developer, utility company, or contractor working on Township's right of way is subject to obtaining a road occupancy permit. If the work is being complete on a County Road, the developer, utility company or contractor will require an Elgin County road occupancy permit.

Permission is required from the Township for any proposed detours and road closures. Details and/or road closures need to be submitted and reviewed by the Township prior to approval.

Where the proposed route utilizes roads that are not part of the Township's road system, approval from the appropriate road authority will also be necessary.

In all cases, a road closure notification shall be circulated to emergency services and other affected agencies a minimum of 48 hours prior to the road closure. All work will be done in accordance with ordinances, by-laws of the Township of Southwold and in accordance with OTM Book 7.

All disturbed areas shall be restored to its original conditions or better, including but not limited to roadway, sidewalks, traffic loops, etc.

5.1.17. Community Mailboxes

Community mailbox locations will be the responsibility of Canada Post. The consulting engineer for the developer is to ensure that no utility conflict exists with the proposed mailbox location. Location of the community mailbox shall be reviewed and approved by the Township.

5.2 Intersection Design

5.2.1. Road/Road Approach Grades

Designers are to refer to TAC – Geometric Design Guide for Canadian Roads (Figure 2.3.2.2).

5.2.2. Road Layout

When two streets connect at an intersection they shall connect at 90 degrees with 10 metre straight section measured from the street line.

5.2.3. Curb Extensions

Curb extensions are the delineation of the parking lane, and used to reduce the pedestrian walking distance at intersections. Tangent sections should be 10 metre with a minimum taper of 30 metre. Reduced radii are used on the inbound radius into a local street.

The designer should reference NACTO and TAC for additional guidance when designing curb extensions.

5.2.4. Intersection Geometric Design Improvements – Signalized

The basic configuration on MAIN ROAD approaches for proposed signal-controlled intersections must include directly-opposing, dedicated Left turn lanes for 4-legged intersections or one dedicated Left turn lane at T intersections; regardless of actual volume demands or capacity analysis results.

The basic configuration on SIDEROAD approaches for proposed signal-controlled intersections should include directly-opposing, dedicated Left turn lanes for 4-legged intersections; unless physical limitations make their implementation injudicious.

On SIDEROADS for T intersections, separate Left & Right turn lanes would be preferred, but may be governed by actual volume demands or capacity analysis.

Consideration may be given to the provision of a dedicated Right turn lane where peak hour turning traffic demands exceed 200 vph and Synchro capacity analysis of the Thru lane produces results nearing or exceeding the threshold of acceptability.

Justification for a free-flow (uncontrolled) right turn channelization requires peak hour demands > 600 vph. The proper design to provide free-flow operation requires a parallel Right turn deceleration lane into the Channelization and, either a Right turn acceleration taper away (minimum) or a parallel lane away (preferred). If a Right turn channelization is justified, it should not be provided with a sub-standard geometric design necessitating Yield control.

5.2.5. Intersection Geometric Design Improvements – Unsignalized

MTO Left Turn Lane Warrant Chart analysis is required to justify provision of a dedicated Left turn lane on the MAIN ROAD of any unsignalized intersection. Synchro capacity analysis results are not acceptable in determining Left turn lane requirements for unsignalized intersections.

Where a dedicated Left turn lane becomes warranted in any one direction on the MAIN ROAD approaches of an unsignalized 4-legged intersection, implementation of a directly-opposing Left turn lane with minimum 15m storage will also become justified.

A dedicated Left turn lane (or multi-lane configuration) is not permitted on any SIDEROAD approach to an unsignalized 4-legged intersections.

At T intersections, a multi-lane configuration (separate Left and Right turn lanes) is permitted on the SIDEROAD (stub) approach only if the intersection is located within an urban, low speed (Posted Speed < 60 km/hr).

5.2.6. Roundabouts

A roundabout is a raised island located in the centre of an intersection, which required vehicles to travel through the intersection in a counter-clockwise direction around the island. The Township of Southwold will consider the installation of roundabout at the following locations:

- All Collector/Arterial Roads intersecting with other Collector/Arterial Roads should be considered for the installation of a roundabout.

All roundabouts are to be designed to TAC standards with signage as per OTM book standards.

For maintenance purposes, sanitary maintenance holes are not permitted to be located within the raised centre island of the roundabout. The sanitary maintenance hole is to be located within the apron of the island. Storm maintenance holes may be located within the centre island of the roundabout, provided the proposed landscaping does not hinder access to the maintenance hole.

5.3 Driveways

The maximum driveway width is 6.0m. The maximum driveway for commercial/industrial development is 9.0 metre.

All driveway approaches shall be hard surfaced (ie. Asphalt, concrete, paving stone) from the edge of road or back of curb to property line.

The minimum driveway grade is 2% with a maximum acceptable grade of 8%. The maximum grade is not recommended for new developments and only to be used for reconstruction projects due to constraints. The desired maximum in new developments should be 4%. All grades shall be directed towards the road and reverse fall driveways are not permitted.

Single Family Residential

- Asphalt – 75mm (two lifts) HL3 surface
- Granular base – 250mm of Granular 'A'

Commercial/Light Industrial

- Asphalt – 40mm HL3 surface and 50mm HL8 surface
- Granular base – 150mm of Granular 'A' and 300mm of Granular 'B' with type II gradation

Heavy Industrial

- Asphalt – 50mm HL3 surface and 75mm HL8 surface
- Granular base – 150mm of Granular 'A' and 300mm of Granular 'B' with type II gradation

5.4 Traffic Signals

Developments and projects where traffic signals are being considered will require a separate signal wiring plan and signalized intersection plan showing location of all poles and mounted hardware, handwells, ducts/cables, the controller and the full lane configuration.

6. STORM SEWERS

This document outlines the minimum requirements for the design of a storm sewer system within the limits of the Township of Southwold. Storm sewer design shall also be designed in accordance with the design principles as outlined in the most current edition of the Ministry of Environment, Conservation, and Parks (MECP) guidelines for the design of storm sewers and storm water management facilities. The design of all new developments will consider a “treatment train” for stormwater design and management. Existing storm infrastructure in Township is municipal drain which is governed by the drainage act.

6.0 Storm Drainage Area Plans

Storm sewer design computations shall be completed on a standard Storm Sewer Design Sheet. A copy of the design sheet, together with a Storm Sewer Drainage Plan, showing the tributary areas shall be submitted as per the sample storm design sheet in this design guideline.

In lieu of precise information on development on the whole or any part of a watershed area, the latest zoning by-law and Official Plan issued by the Infrastructure and Development Services Department shall be used for all external areas in the design and to determine the specific areas to which these values apply.

The external drainage area plan shall be prepared and shall be submitted at the functional servicing report stage and prior to the commencement of the detailed storm sewer design.

In the case of large areas under single ownership of blocks requiring future site plan agreements, the design shall be prepared on the basis of the whole area being contributory to one manhole in the abutting storm sewer unless more than one private storm connection is necessary to serve the property in which case the appropriate area tributary to each connection shall be clearly shown and taken into account in the storm sewer design.

6.1 Design Flows

6.1.1 Design Storm Frequency

The design storm frequency shall be a 5-year storm for residential, industrial and commercial lands to a sufficient outlet or to a storm water management facility which will control post development peak flows to pre-development flows including the 2,5,25,50 and 100 year storm events.

Adjusted time of concentration shall be calculated using the formula:

$$T_{c-adj} = \frac{(T_{ct}Q_t) + (T_{cl}Q_l)}{(Q_t + Q_l)}$$

Where:

T_{c-adj} = adjusted time of concentration (min.)

T_{ct} = time of concentration in the trunk sewer (min.)

Q_t = design flow in the trunk sewer (l/s)

T_{cl} = time of concentration in the lateral sewer (min.)

Q_l = design flow in the lateral sewer (l/s)

6.1.5 Runoff Coefficients

Runoff coefficients (C) to be used in the rational formula as follows:

Land Use	C value
Open Space Areas/Parks	0.25
Single Family/Semi-detached	0.5
Townhouses/Condos	0.65
Apartments	0.65-0.7
Industrial/Institutional/Commercial	0.7-0.9
Paved Areas/Densely Built	0.9-1.0

No allowances for infiltration are required in storm sewer capacity determination.

6.2 Storm Sewer Pipe Design

6.2.1 Design Flow

The Manning Formular is used for calculating the sewer capacity and selecting pipe size. When determining the appropriate pipe size, designers shall upsize pipes when the capacity of the storm sewer approaches 90%.

$$Q = \frac{1}{N} \times A \times R^{2/3} \times S^{1/2}$$

Note: Actual sizes for PDC required for multi family, commercial, institutional block will depend on flow.

6.2.7 Minimum Grades for Pipes

The minimum grade for a 300mm diameter storm sewer is 0.54% and all other sewer sizes minimum grades shall achieve the minimum velocity of 1.0m/sec.

6.2.8 Minimum Depth and Bedding Material

The minimum depth for all storm sewers is 1.5m from the finished ground above the obvert of the pipe. Bedding Material is as per OPSS and the St. Thomas and Elgin Area Municipalities Supplemental Specifications.

6.3 Maintenance Hole Design

Changes to direction of flow greater than 90 degrees shall not be permitted in one maintenance hole.

Maintenance holes on sewers shall be located at every change in pipe size, grades, or direction of flow and shall not exceed the maximum spacing. Maintenance holes are to be installed for storm PDC's 300mm in diameter for larger, unless the storm sewer size is 900mm or larger, in which case the PDC may be connected directly into the sewer.

Spacing for maintenance holes will be ever 100m for pipes up to and including 900mm. For pipes, larger than 900mm in diameter, 150m spacing is required. A minimum of 300mm clearance is required between services within a maintenance hole. The locations of all maintenance holes are to be designed to be outside of the vehicles wheel path.

Allowances for bends in sewer alignments – fall through maintenance holes shall be calculated in accordance with the below:

- 45 degree bends – use $\frac{3}{4}$ of the losses for 90 degree bends
- For 22 $\frac{1}{2}$ degree bends – use $\frac{1}{2}$ of the loses for 90 degree bends

Safety grates are required at the mid-point depth of maintenance holes when the depth is between 5m and 10m. Additional safety grades are required at third point depths when the maintenance hold is equal to or greater than 10.0m to 15.0m deep. All incoming pipes are to below safety grates.



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 obvert of the inlet pipe(s) shall not be lower than the obvert of the outlet pipe.

The minimum drops across manholes are as follows:

- 0 degree change – 20mm drop
- 1 degree to 45 degree – 40mm drop
- 46 degree to 90 degree – 50mm drop

Where the difference in elevation between the invert of the inlet and obvert pipes exceeds 1.0m, a drop structure shall be placed on the inlet pipe, with the invert of the drop pipe located at the spring line of the outlet pipe. Design shall conform to OPSD's.

All sewers shall be benched as per IOSD 701.021.

6.4 Catch Basins

Catch Basins shall be located at a maximum interval of 90m between catch basins or 90m between a crest of a road to a catch basin.

All catch basins are to be set back off the roadway, as per OPSD's and shall be 1.5m clear of any driveway curb depression.

Curb inlet catch basins are to be used at all low points on a roadway, and curb inlet catch basins are to exclusively used on arterial roadways. Inlet grate capacity shall be designed by the consulting engineer to determine if catch basin spacing should be reduced. Catch basins shall be spaced so that no ponding occurs during minor storm events (1:5 year storm event).

6.5 Allowable Ponding

No surface ponding is allowed to develop under a 5 year storm event. Ponding on major overland flow routes allows for 300mm on street catch basins and 450mm on rear yard catch basins. Consultants are to map the ponding area on grading design drawings for all new developments.

Major overland flow routes are to be continuous along roads and easements without flooding onto lots during a 100 year storm.

6.6 Cover

A minimum of 1.5m is required to the top outside edge of the pipe for all storm sewers

6.7 Easements

A minimum sewer easement is to follow the Townships zoning by-law requirements. If not mentioned in the zoning by-law, the minimum easement for one service is 5.0m. These minimum easements widths will be increased depending on the depth and size of the sewer, and as dictated by the Township team.

6.8 Storm Private Drain Connections

All PDC's shall be installed to the property line for all new construction projects.

PDC's are not to be directly connected into a maintenance hole.

PDC's on private property of the town house complexes, row housing and apartments are to be connected to a maintenance hole located on the R.O.W. PDC's for industry and commercial property are also to be connected to a maintenance hole located on the R.O.W.

All locations and elevations of the storm PDC shall be recorded on a Building Services Report along with As-built Drawings for the project, whether part of a reconstruction project or new development. See Section 15 for a sample Building Services Report.

7. STORMWATER MANAGEMENT

Storm sewer systems shall include stormwater management facilities and measures to address quality and quantity, aligning with the “treatment train” approach within the Ministry of Environment, Conservation and Parks guidelines. For all new stormwater management facilities, the developer shall contact the Infrastructure and Development Services Department for further clarification and guidance on applicable requirements and standards that may affect the stormwater management (SWM) facility.

7.0 Stormwater Management Design

7.0.1. Peak Flow Control

The peak flows discharging from the site shall not increase as a result of the proposed development for the calculated 2 through 100-year storm events. All SWM measures shall provide an enhanced level of protection in accordance with MECP’s stormwater management and LID guidelines, to make sure the design accommodates climate change.

Extended detention and storage of SWM facilities should discharge over a 24–48 hour period to the 5 year storm even under pre developed conditions. Storm water volume calculations shall be broken out into the following durations (t = minutes): 0, 10, 15, 30, 45, 60, 75, 90, 100, 120, 180, 240, 360, 480, 720, 1080, 1440.

7.0.2. Green Infrastructure and Low Impact Development

The Township promotes green infrastructure and low impact development (LID) with developments for SWM measures. Both natural and man made devices to assist in providing the treatment train approach. This can include parklands, street trees with enhanced soil characteristics, natural channels and flood plains, LID facilities, and naturalized end of pipe stormwater management systems.

All LID facilities shall have a design capacity that exceeds the existing conditions recharge volume by 15% as a factor of safety to account for aging, compaction and clogging. LID locations shall be strategic to mitigate against operational constraints and clogging.

During construction buildout, LID’s shall be by-passed to avoid clogging.

Design of the LID system shall follow best municipal standards and MECP design guidelines for LID’s.



7.1. Stormwater Design Requirements for Development

The following is a summary of the Storm Water Management requirements for development submissions. There may be additional information required depending on the site locations and constraints.

- Provide all SWM calculations to show the pre-development and post development flows. These flows shall be calculated using the Township's design guides as well as MECP guidelines.
- Provide SWM calculation for SWM facility sizing, orifice sizing, and any other relevant calculations completed for the design of the facility.
- Forebays and other quality controls should be used to minimize the amount of sediment that reaches the main cell of the SWM facility.
- Landscaping and trees shall be included in the design of SWM facility to improve the quality of the storm water as well as aesthetics for the development.
- Identify the major overland flow routes and provide volume calculations for the routes at various cross sections to confirm that the major overland flow route will carry the major flow.
- Identify all levels of stormwater in the storage facility for the various rainfall events.
- Design storm sewer pipe system to 5 year storm return period for pipe flow conditions
- Keep development maximum outlet flows to pre-development values for the 2 through 100 year storm events.
- Detain the first 13mm or 24mm, as applicable of rainfall generated runoff from all development for a period of 24 to 48 hours for quality control.
- Oil grit separators are recommended for developments as a quality control measure as a quality control measure for sites less than 2 hectares. Site plans will typically require the installation of an oil grit separator as a quality control device
- Use of shallow grassy lined swales for storm water conveyance is recommended.
- Include all design detail, sizing calculations, sediment removal rate and floatable storage capacity for the unit, ensuring its design and installation will more than adequately suit the site plan development.
- SWM design will need to consider maintenance requirements for Township staff to maintain with ease.



8. SANITARY SEWERS

This document outlines the minimum requirements for the design of a sanitary sewer system within the Township of Southwold boundary.

All sanitary sewer design shall follow the Township sanitary sewer design sheet and a copy of this sheet is provided in this design guidelines manual.

8.0. General Requirements

Sanitary sewers are not permitted to accept foundation or weeping tile drainage or roof drainage. Storm water is not permitted to enter the sanitary sewer system.

Sanitary sewers shall be designed in accordance with the design principles recommended in the most current edition of the Ministry of Environment, Conservation and Parks (MECP) guidelines for the design of sanitary sewers.

Minimum sanitary sewer diameter is 200mm and the minimum private drain connections (PDC) is 150mm.

Minimum velocity for a sanitary sewer system is 0.6 m/s and the maximum allowable velocity is 4.5 m/s.

8.1. Peak Flow Calculation

The Manning Formula is to be used for calculating sewer capacity and selecting pipe sizes and the roughness coefficient (n) of not less than 0.013 is to be used for smooth-wall pipe materials. This formula is to be used for gravity sewers and open channels.

The Manning Formula is as follows:

$$Q = \frac{1}{n} \times A \times R^{2/3} \times S^{1/2}$$

Where:

Q = Flow capacity of sewer (m³/s)

A = cross sectional area of pipe (m²)

R = Hydraulic radius of pipe (D/4) (m)

S = Sewer Slope (m/m)

N = Mannings Roughness Coefficient (unitless)



Development Zoning	Population Density
Low density residential	44 units/ha
Medium density residential	65 units/ha
Institutional (schools, etc)	53 units/ha
Commercial	60 units/ha
Industrial	150 units/ha

Alternatively, population density can be calculated on a lot basis using the following criteria:

- Single family = 3 people/unit
- Semi-detached = 6 people/unit

8.2. Peak Sanitary Sewage Flows

Peak sewage flows shall be calculated using the following equation:

$$Q (d) = Pq M + IA$$

Where:

- Q(d) = peak flow (L/s)
- P = Design population in thousands
- Q = average daily per capita flow (L/capita.d)
- M = Peaking factor derived from Harmon Formula
- I = Unit peak extraneous flow (L/s/ha)
- A = Gross tributary area (ha)

Harmon Formula:

$$M = 1 + \frac{14}{4 + P^{1/2}}$$

Where:

- M = Ratio of peak flow to average flow
- P = Tributary population in thousands

All sewer 600mm in diameter and larger shall be shown with two lines in the plan view.

All sewers shown within the road allowance should be 3m apart unless otherwise directed by Township Engineer.



Minimum elevation of new basements must be shown whenever the sanitary sewer in the street has less than 2.7m cover.

Bolt down covers are required where maintenance holes are in flood plains or overland flow routes.

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

No sewer pipe greater than 375mm may be turned at 90 degree.

8.3. Maintenance Hole Design

Changes of direction of flow greater than 90 degrees shall not be permitted in one maintenance hole. In sewers 750mm diameter and greater, changes in direction of flow greater than 45 degrees shall not be permitted in one maintenance hole. The locations of all maintenance holes are to be designed to be outside of the vehicles wheel path.

Maintenance holes on sewers shall be located at every change of size, grade, or direction of flow but shall in no case exceed the maximum spacing specified below:

- Pipes 900mm diameter and smaller – 110 metre spacing
- Pipes greater than 900mm diameter – 150 metre spacing

Safety grates are required at the mid-point depth of maintenance holes, when the depth is between 5.0m and 10.0m. Additional safety grates are required at third-point depth when the maintenance hole is greater than 10.m in deep. All in coming pipes are to be below the safety gratings.

All sanitary maintenance holes in the vicinity of a low point (within 10 metres) shall be installed with a maintenance hole insert as specified within the Township's supplemental specifications.

All maintenance hole chamber openings shall be located on the side of the maintenance hole parallel to the flow for straight runs and on the upside side of the maintenance hole at all junctions.

The obvert of the inlet pipe shall not be lower than the obvert of the outlet pipe. The minimum drop across maintenance holes shall be as follows:



Change of Direction	Minimum Drop
0 degree	20mm
1 to 45 degree	40mm
46 to 90 degree	50mm

Where the difference in elevation between the invert of the inlet and overt of the outlet pipes exceeds 600mm in height, a drop structure shall be placed on the inlet pipe, with the design conforming to OPSD’s.

8.4. Pump Stations

All sanitary sewers for development should be by gravity unless they are constraints within the sewage system and only if approved by the Township. Township Staff shall be consulted on design criteria, operational preferences and other requirements during the pump station design. Stations shall have full backup power, SCADA connectivity, and flow monitoring. Any design of a pumping station shall take confined space entry into consideration. When a person needs to perform a confined space entry into the pumping station, there shall be no areas or points that a person shall have to unhook from the life line.

8.5. Sanitary Private Drain Connections (PDC’s)

Each property shall be provided a sanitary PDC of a minimum diameter of 150mm having a minimum slope of 2% and a clean out.

In Industrial and Commercial areas, an inspection maintenance hole shall be located at property line of the service. The minimum diameter of sanitary PDC for institutional blocks are 200mm diameter at 2%.

Sanitary PDC’s shall not be connected to sanitary maintenance holes.

8.6. Easements

All sewer easements must be a minimum of 5.0m wide for one service. These minimum values must be increased when the depth and diameter of services dictates a greater working area.

8.7. Sanitary Sewer Testing

The contractor shall supply, at his own expense, all labour, equipment and materials necessary to carry out infiltration / exfiltration tests, deflection testing and video inspection of all sanitary

sewer and appurtenances as specified under this section. All tests shall be carried out under the direction and supervision of the Township of Southwold Infrastructure and Development Services Department

8.7.1. Infiltration/Exfiltration Testing

Infiltration and exfiltration testing shall be conducted on new sanitary sewers as per the requirements in OPSS 410.07.16.03 and 410.07.16.04.

8.7.2. Deflection Testing

Deflection testing is to be complete as per the Townships Supplemental Specifications.

8.7.3. Video Testing

Video (CCTV) testing is to be complete as per the Townships Supplemental Specifications.

9. WATERMAINS

The specifications within this section apply to all water services and watermains including appurtenances which are located within the Township road allowance, or on property that will be transferred to the Township ownership. These specifications also apply to all water meter replacements.

The designer shall design to the Township specifications and also make reference to the Ministry of the Environment, Conservation and Parks "Design Guidelines for Drinking-Water Systems" and to MECP's "Water Design Criteria for Future Alteration Authorized Under a Drinking Water Works Permit". If there is a discrepancy between the Township specifications and the MECP guidelines, the Infrastructure and Development Services Department shall be contacted to resolve the issue.

Any deviations from these specifications must be submitted to the Township Engineer.

These specifications shall apply to all services and private watermain and to all watermains up to 450mm diameter including appurtenances. For watermains larger than 450mm diameter and for any other water system installation, special specifications must be prepared for and approved by the Township Engineer.

The water distribution system is for the purpose of supply and distributing water, but does not include plumbing or other works to which the Ontario Building Code applies.

A water distribution system may exist for the purpose of distributing potable or non-potable water; however, water distribution systems for potable and non-potable water may not be intermixed or cross-connected. Private supplies of potable water may not be cross-connected to the municipal or public water distribution system.

9.0. Watermain Design

9.0.1. Pressure, Flow and Velocity Design Requirements

Watermains shall be sized to maintain the greater of:

- Maximum day demand plus fire flow at a pressure not less than 140kPa at all points in distribution system



potential to re-enter the municipal water system, the Township reserves the right to require premise isolation. This shall consist of appropriate backflow protection to the risk posed and shall be installed at the property line and at the owners expense.

9.1. Watermain Layout

9.1.1. Location of Watermain in Road Allowance

Watermains shall be located in accordance with the Township of Southwold's Standard ROW Cross Sections. Deviation from the standard location must be approved by the Township Engineer.

The standard location must be used on straight streets. On bends, the main may deviate from the standard up to 1.0m closer to the street line but not closer to the curb and gutter as approved by the Infrastructure and Development Services Department. Maximum use may be made of pipe joint deflections so that a minimum number of bends are used on any curved laying line. PVC pipe will require more bends because the allowable joint deflection is smaller. Refer to AWWA C600 for Ductile Iron Pipe, AWWA M23 for PVC pipe and supplier specifications for allowable joint deflection and pipe bending.

Watermains shall be terminated opposite street lines or property lines.

9.1.2. Depth of Watermain

Watermains shall have no less than 1.7m nor more than 2.0m of cover from final surface grade above the watermain alignment. Variations from this cover may be made only if approved on plans or in writing by the Township Engineer. Depth of watermain shall be measured from installation location and not centreline of the road.

For unimproved roads with open ditches, watermains shall be laid 2.1m minimum below road grade or 1.2m below the bottom elevation of the ditch, whichever is greater. Consideration shall be taken by the designer for the vertical alignment of the road and its impacts with the watermain resulting from future road improvements.

9.1.3. Pipe Insulation

Where joint deflections, offsets, or other issues arise that require the watermain to be laid with less than 1.7m of cover from final surface grade at watermain alignment location, insulation shall be placed to prevent freezing.

Insulation is also required between a watermain and storm sewer/culvert where there is less than 1.5m minimum separation. Please refer to the Township's Supplemental Specifications.

Compaction of gravel material above insulation shall be inspected by contract administrator to verify that the integrity of the insulation isn't impacted during construction.

9.1.4. Blow-offs and Dead Ends

Dead end watermains shall not be permitted unless unavoidable. All dead end watermains are to have a 50mm blow off installed as per Township's Supplemental Specifications.

Where a watermain ends in a cul-de-sac, a 50mm watermain loop shall be installed from the minimum 150mm watermain to last fire hydrant around the cul-de-sac, where the loop reconnects back to the watermain. The designer can contact the Infrastructure and Development Services Department for further details of the cul-de-sac watermain loop.

A hydrant and valve shall be installed at the end of a watermain on a street that is to be extended in the future. A 50mm blow off or automatic flusher may be substituted at the discretion of the Township Engineer.

9.1.5. Separation between Watermain and Sewers/Utilities

Designers should refer to the Ontario Ministry of Environment, Conservation and Parks (MECP) Guidelines regarding the location of watermains relative to sewers and to the Public Utilities Act of Ontario regarding the location of watermains relative to other utilities.

Sewers and watermains located parallel to each other should be constructed in separate trenches maintaining the maximum practical horizontal separation. Under normal conditions, watermains shall be laid with minimum 2.5m clear horizontal separation from any sewer or sewer manhole; the distance shall be measured from the nearest edges.

9.1.6. Crossings

The designer shall refer to the Ministry of the Environment, Conservation and Parks Procedure F-6-1, Procedures to Govern the Separation of Sewers and Watermains.

Under normal conditions, watermains shall cross above sewers and Private Drain Connections (PDC) with a minimum vertical separation of 0.50m to allow for proper bedding and structural support of the watermain over the sewer or PDC.

Where it is not possible for the watermain to cross above the sewer or PDC, the watermain passing under a sewer or PDC shall be protected by providing:



- A vertical separation of at least 0.6m between the invert of the sewer or PDC and the crown of the watermain.
- That a minimum of 5.0m length of water pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer or PDC.
- Structural support is provided to prevent excessive joint deflection and settling.
- The crossing is not within 2.0m of a watermain joint (for watermains larger than 450mm diameter).

The same criteria shall be applied in new construction (i.e. subdivisions) and in conditions where an existing watermain is present. Also, the same criteria as noted above shall be applied if the watermain crosses above or below a sewer, PDC or other utility.

9.1.7. Watermain Looping

Water distribution systems shall be designed to exclude any dead-ended pipe. Water distribution systems shall be designed so that no more than sixty (60) units with individual water services and meters shall be serviced from a single source of supply. If the looped watermain is connected to a single watermain, a valve must be installed in the watermain to permit isolation of supplies.

A looped watermain connected to a public or private watermain(s) must be installed:

- when one water service will not supply the required flow for domestic use and fire protection or,
- for an apartment complex containing one or more structure and more than 300 dwelling units or,
- for a townhouse, condominium or similar complex having more than eighty (80) units with individual water services and meters.

The looped water servicing must be installed to service the private development from two sources. If the looped watermain is connected to one public watermain, an isolating splitter valve must be installed in the public watermain to permit isolation of supplies, at no cost to the Township.

9.2 Easements

Easements may be required to be assumed by the Township located outside a road allowance on private property.

Easement widths are determined by the depth of cover from the centreline of the road/round to the invert of the watermain or a minimum of 5.0m, assuming no other services are located within the easement. If additional services are located in the easement, adequate width of easement and separation of services for construction and future maintenance purposes shall be provided.

9.3. Location of Valves

9.3.1. Residential Developments

In residential developments, valves shall be located so that any section of watermain serving up to a maximum of 60 residential water services can be isolated by operating not more than four valves. Phasing of developments should be considered and valving should be logical (i.e., at intersections). In residential areas, valves shall be spaced no more than 250 m apart. Valves shall be located on at least 3 legs of watermain at an intersection. In high density residential, commercial, and industrial developments, valves shall be located no more than 150 m apart.

9.3.2. Looped Services/Private Watermains

Valves shall be installed on looped services or private watermains to isolate buildings or groups of buildings so that no more than eighty (80) individual water services or apartment complex containing 300 dwelling units or more are on any one valved section. The Owner shall install a valve on the street watermain between connections to a looped private watermain if there is not an existing valve, at no expense to the Township.

9.3.3. Locations of Valves at Intersections

For street intersections, water valves shall be located at the extension of street lines in grassed boulevard. For intersections with roundabouts, water valves may be placed in the raised portion of the roundabout island if possible. However, if conflicts occur with other features of the roundabout (i.e. curb and gutter of the island), the valves may alternatively be placed in the boulevard clear of curb and gutter from approaching streets to the roundabout.

9.4. Fire Hydrants and Fire Department Connections

All fire hydrants located within the road allowance shall only be maintained and operated by the Township of Southwold.

9.4.1. Location and Spacing of Hydrants on Road Allowance

Hydrants shall be spaced no greater than 150m in residential areas and 105m in commercial and industrial areas, measured along the centreline of the watermain. In rural areas where new watermain is to be installed, designers shall add hydrants at each intersection. Hydrants shall be 1.5m away from any driveway or physical obstruction that would limit the operation and maintenance. Hydrants are to also be installed at property line boundaries.

9.4.2. Hydrants on Dead-end Streets

Hydrants shall not be located on dead-end streets unless such streets exceed 90m in length. Where located on dead-end streets the hydrant shall be located at 90m from the end and a smaller sized watermain (minimum 50mm) shall be used beyond the hydrant so that the water quality is maintained.

9.5. Water Services, Fire Services, and Private Watermains

For the design and materials requirements all water service pipe and fire service mains on private property, the Ontario Building Code shall apply. It shall be noted that water quality requirements are not addressed in the Ontario Building Code. Where there is a concern that there may be a degradation of water quality in the private servicing that has the potential to enter the municipal water supply system, the Township reserves the right to require premise isolation. Premise isolation shall consist of appropriate backflow prevention measures to the risk posed, and shall be installed at the property line at the owners expense.

The following apply to the water services on public property up to the property line.

9.5.1. Size Required

The Developer will be responsible for private main and service sizing. The Township Engineer shall be consulted for available pressures and flows at the main under design conditions. If the results of hydrant flow tests are to be used, the Township Engineer shall be consulted for necessary adjustments since flow tests are not usually done at design conditions. Minimum size for services is 25mm diameter. Acceptable service sizes are 25mm, 40mm, 50mm, 100mm, 150mm, 200mm, 250mm, and 300mm diameter. 25mm diameter or larger services should be

installed for estate lots, larger homes, deep setbacks or where automatic lawn sprinkler systems or fire sprinkler systems are to be used.

9.5.2. General Requirements

Each dwelling unit, including detached and semi-detached units, townhouses, multi unit and row houses, must be serviced with a separate water meter and water service connected to a main or private main.

Each unit in a commercial or industrial mall must be serviced with a separate water meter and water service connected to a main or private main.

Swimming pool facilities and lawn sprinkler systems must be serviced by a connection to the metered side of a water service that is in use yearlong and is located in a frost free structure.

Unless otherwise approved by the Township Engineer, all structures not noted above shall have one water meter and one water service connected to a main or private main.

When there are two watermains on a road allowance, the water service shall be laid from the structure to the watermain which, in the opinion of the Township Engineer, provides adequate flow and/or pressure.

Services to semi-detached housing must front the unit they serve.

Electrical systems of all new developments shall not be grounded to the water system. Refer to Ontario Hydro Electrical Safety Code (Section 10) for grounding requirements.

9.5.3. Looped Private Main/Service

A looped private main connected to a main or mains must be installed:

- When one main will not supply the required flow for domestic use and fire protection.
- For an apartment complex containing more than one structure and more than 300 dwelling units.
- For a townhouse, condominium, single family dwellings or similar complex having more than 60 units with individual services and meters.
- For a subdivision servicing more than 60 units.
- At the discretion of the Township Engineer within new subdivision developments

9.5.4. Location

The service pipe must be installed at right angles to the main and in a straight line from the main to the meter. The standard single unit residential or subdivision service stub will be normally located as per the standard servicing locations.

A private main to a complex of structures shall be located to serve all structures in the complex with the least amount of bends possible.

Services off a private main are subject to the same requirements as services off a main.

The Developer should ensure that services and private mains are located so that "berm" or "mound" type landscaping will not cause excessive cover over pipes.

Any deviations to service stub locations must be approved by the Township Engineer.

All locations and elevations of the water services shall be recorded on an individual Building Services Report for each property and submitted to the Infrastructure and Development

Services Department along with As-built Drawings for the project, whether part of a reconstruction project or new development.

9.5.5. Non-Conforming Installation

If a service stub, a service or a private main is installed or extended that is not in accordance with these specifications or with the service drawing approved by the Township, such installation will be required to be removed and relocated to conform with the specifications or approved drawings.

All relocation work required shall be at the expense of the Developer or Contractor.

9.5.6. Fire Services

9.5.6.1. Fire Service Design

The determination of fire service requirements and the sizing of supply piping shall be the responsibility of the Designer. If a domestic service is combined with a fire supply service, the Designer is responsible to ensure that the supply pipe is large enough to carry the combined demand. Design and installation of sprinkler and standpipe systems and their supply services

shall conform to the requirements of the Ontario Building Code, the Township Design Guidelines Manual, and the Fire Code and must be approved by the Township.

The designer shall obtain information from the Township Engineer regarding flows and pressures available for fire systems. If the flows and pressures required are in excess of the minimum design standards given in this manual and in excess of the actual capacity of the system, the Developer shall install booster pumps and/or storage to satisfy the required demand.

9.5.6.2. Fire Service Layout

Layout and installation of fire services to the structure including required valves and hydrants must be approved by the Township Engineer and the Township Fire Department. This requires a submission of plans as specified in Section 3.

A domestic sprinkler or standpipe service may each be installed as a separate service from the main. Sprinkler and standpipe services may be combined or a domestic service may be combined with either or both but the Developer is advised to obtain the approval of his Insurance Underwriter before combining them.

If combined, the domestic service can be connected to the fire service inside the building provided the complete system is designed as specified in this Section. If not combined, the domestic service must be installed separately from the main or private main.

All fire protection systems must have a backflow prevention device conforming to the Ontario Building Code, as amended. They must be ULC approved alarm check valves or ULC approved resilient seat check valves installed immediately downstream from its connection with the domestic service or immediately inside the building if the fire service is not combined with the domestic service. Fire services are not metered with the exception of a sprinkler system in individually metered dwelling units.

9.5.7. Service to Blocks in Subdivisions

Where service stub size and/or location for any block cannot be determined prior to street construction, the Township Engineer will not approve installation of the service stub. The following policy administered by the Township Engineer will apply and the cost will be paid by the Developer of the block serviced. Where any water service connection is required to be made following construction of curb, gutter, concrete sidewalk and/or wearing surface coat of asphalt on any street in the new subdivision, such water service connection shall not be made



using open cut methods but shall be made using drilling or boring techniques and in such a manner as to eliminate the possibility of settlement of such curb, gutter, concrete sidewalk or wearing surface coat of asphalt; it being understood that this policy shall apply except where, in the opinion of the Township Engineer, ground conditions are such that the use of drilling and boring methods become unreasonable or uneconomical.

For all water servicing on blocks in a subdivision, quality control is required until the service is connected to the future use. Automatic flushers are the preferred use if the water service is planned to be connected and the developers engineer will need to submit water quality report detailing the time requirement for flushing this service.

9.5.8. Backflow Prevention on Commercial/ Industrial Services

New residential, commercial or industrial services must have a backflow prevention device conforming to the Ontario Building Code as amended.

9.5.9. Service and Private Main Valves

Services shall be located such that curb stops are not located in driveways. Main valves shall not be located in driveway entrances.

On services of 50mm diameter and smaller, a main or corporation stop shall be installed at the main and a curb stop shall be installed on the property line.

On services of 100mm diameter and larger where the main cannot be closed off for the service connection, a tapping sleeve and valve will be required at the main. Where the main can be closed off and a tee cut into it, or where a new main is being installed, an approved valve shall be installed on the property line.

Approved valves shall be installed on looped private mains to isolate buildings or groups of building so that no more than sixty (60) individual services are on any one valved section. The Developer shall install a valve on the street main between connections to a looped private main if there is no existing valve.

All service valves shall be installed with approved valve boxes. Curb stops shall be installed with approved valve boxes and operating rods. 38 mm or larger water services shall have a 50 mm square operating nut and 130 mm diameter screw type service box with "Bubba Base" and shall have a rod extension (as per Township supplemental specifications).



9.5.10. Meters

All domestic services must be metered. Fire services are not metered except sprinkler systems in individually metered dwelling units. The meter shall be installed immediately inside the first external wall (excluding cold storage rooms) at the point of service entry into the building. Any variation from this location must be approved in writing by the Township Engineer.

The Developer shall provide sufficient space for installation and maintenance of the meter. The Township's staff will supply and install the meter. The meter must be accessible for reading and maintenance and must be protected from freezing and other damage. The meter or piping shall not be installed above or below any electrical panel and no closer than one metre horizontal distance. Meter pits are required where the meter is required to be more than 40m from the road allowance.