



Town of LaSalle | Development Manual
Volume II: Engineering, Specifications
and Standard Drawings

Revisions

The following table summarizes the revisions to the manual since its adoption on [Insert date] 2026. Please ensure the manual you are referencing is up-to-date and includes all revisions. If you are uncertain, check the Town of LaSalle’s website.

Revisions (Date/Number)	Description	Page Number Reference



Abbreviations

CA	Conservation Authority
CBO	Chief Building Official
CLI-ECA	Consolidated Linear Infrastructure Environmental Compliance Approval
CZBL	Comprehensive Zoning By-law 8600
DFO	Department of Fisheries Ontario
EPL	Essex Powerlines
MECP	Ministry of Environmental, Conservation and Parks
MMAH	Ministry of Municipal Affairs and Housing
MTCG	Ministry of Tourism, Culture, and Gaming
MNRF	Ministry of National Resource and Forestry
MTO	Ministry of Transportation Ontario
OBC	Ontario Building Code
OTM	Ontario Traffic Manual
OPSD	Ontario Provincial Standards Drawings
OPSS	Ontario Provincial Standards Specifications
PDC	Private Drain Connection
PEO	Professional Engineers of Ontario
R.O.W.	Right-of-Way
TAC	Transportation Association of Canada
WERSM	Windsor Essex Region Stormwater Manual



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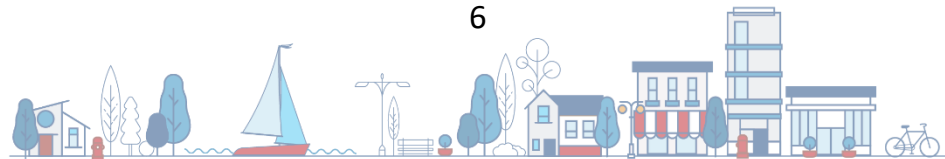
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1 Engineering Requirements

1.1 Engineering Fee Schedule

Fees shall be paid as part of the User Fees and Charges By-Law, as amended. It is the Owner's responsibility to ensure they pay fees associated with the development. Fees are collected as part of the development application. Typical engineering fees that may be part of a development include but are not limited to:

- MECP Consolidated Linear Infrastructure - ECA Applications;
- Watermain Approval Fees; and,
- Engineering Review Fees.

1.2 Consulting Engineer

All Owners shall retain a Consulting Engineer who shall design all services to be assumed as Municipal infrastructure, provide full-time on-site inspection during the installation of the services, maintain the services through the maintenance period, and verify its completion.

The Consulting Engineer shall be so designated by the Association of Professional Engineers of Ontario and have land development experience. All reports, drawings and specifications shall be signed, sealed and dated by a Professional Engineer licensed in the Province of Ontario and employed by the Consulting Engineering firm or personally designated as a Consulting Engineer. All submissions shall be submitted in a manner that allows for ease of review. Drawings shall be made legible, and PDF documents shall be submitted in a format to reduce file size to ensure the documents can be opened and readable. Any AutoCAD .shp file text should be eliminated from the PDFs. Where reports or documents are too large, appendices should be submitted as separate PDF files.

The Consulting Engineer shall be responsible to carry out and or oversee the design of all services including the:

- a) Preparation of design drawings, 3D CAD line work and 3D surfaces when applicable;
- b) Preparation of specifications and contract documents;
- c) Preparation of engineering studies and reports;
- d) Assistance in obtaining approvals;
- e) Assurance that the final drawings are approved by the Town prior to the pre-construction meeting;

- f) Preparation of field records;
- g) Chairing and preparation of minutes of pre-construction meetings, regular project meetings, and inspection walkthrough meetings;
- h) Coordination of the installation of other utilities (gas, telephone, cable, hydro and Canada Post Services);
- i) Preparation of record drawings;
- j) Preparation of lot grading sheets;
- k) Management of ongoing deficiency list for outstanding works and their associated values;
- l) Presentation of formal requests for reduction in security amounts; and,
- m) Attendance at the final inspection meeting.

1.3 Drawings

All developments shall include design and servicing drawings. Drawings shall be prepared in accordance with the guidelines entitled [“Guidelines, Professional Engineers Providing Land Development/ Redevelopment Engineering Services, 1994”](#).

1.3.1 Preliminary Drawings

The Consulting Engineer shall prepare a set of preliminary engineering drawings to the Town for review. A PDF set must be sent via email. The drawings shall include (at minimum):

- a) General storm, sanitary, and watermain layout with connection locations to existing infrastructure;
- b) Location of all other existing and proposed underground utilities;
- c) General sanitary and storm depths to ensure proper cover in all areas of the development;
- d) Storm and sanitary drainage areas with corresponding runoff coefficients and populations;
- e) Stormwater management facility location and configuration; as well as overland flow routing;
- f) Pump station location (if applicable);
- g) Road widths, sidewalk and path locations; and,
- h) Grading information at existing/adjacent properties.

In the case of phased developments, the above information must be presented for each phase. Temporary works such as temporary overland flow drainage or a temporary cul-de-sac must be shown in phased developments. Preliminary drawings must be based off of the Functional Servicing Report (FSR) and be at a 60% completion before submission. Upon review, the Town will respond with comments to the engineer. If required by the Town, the engineer may have to

re-submit a set of preliminary drawings. Once this set of drawings is deemed satisfactory, the engineer will continue with preparing the detailed engineering drawings.

1.3.2 Detailed and Final Engineering Drawings

The consulting engineer shall prepare a set of detailed engineering drawings to the Town for review. A PDF set is to be sent via email. All drawings shall be prepared in metric units. The drawings shall include:

- a) Cover sheet with project title, revision dates, key plan, north arrow, location and description of the benchmark, legend including all symbols and elevation formats, and drawing index;
- b) Pavement and grading plan including; road grading and layout, sidewalk and path layout, lot grading, driveway locations, all above ground utility structures, street lights, and street trees;
- c) Composite Plan highlighting above ground infrastructure in conjunction with underground utilities to avoid conflicts;
- d) Plan and profile of existing and proposed roads, sewers, hydraulic grade lines, watermain, individual connections and services;
- e) Storm and sanitary sewer design sheets;
- f) Storm and sanitary drainage areas with corresponding runoff coefficients and populations;
- g) Power distribution and road lighting;
- h) Right-of-way cross sections;
- i) Geotechnical borehole details and location plan including excess soil testing location/results;
- j) Stormwater Management Plan including overland flow routing;
- k) Signs and Markings Plan including all required regulatory signs, parking signs, and all pavement markings; and,
- l) Other infrastructure such as traffic signals, pedestrian crossings, etc.

Final and detailed Engineering Drawings should be submitted at no less than 90% completion for Town comments and approval. Comments will be sent via email from the Town to the engineer. When all comments have been addressed, the engineer will provide a “Final” set of engineering drawings that will be marked “Approved” by the Town. The final drawings will be referenced in the development agreement as well as used for tendering. An “Issued for Construction” set may be required prior to construction.

1.3.3 General Grading Plans

The Consulting Engineer will be required to submit a General Grading Plan for all areas within the subdivision. This includes the right-of-way grading as well as grading for all lots. The approved Grading Plan would then be the basis for development of all lots or blocks within that subdivision. The Plan will be reviewed, and comments will be provided by the Town.

Approval of the plan will be issued to the Consulting Engineer once all comments have been satisfactorily addressed. [Section 4.2](#) of the Manual provides requirements for individual Lot Grading Sheets/PDC Sheets.

1.3.4 Third-Party Engineer Review

For engineering review or construction inspection, the Town may require a third-party engineer. This will be determined during the early stages of the application and will be determined on a case-by-case basis. The Owner must provide a retainer in the form of a certified cheque, and the Town will hire a third-party engineer on behalf of the Owner.

1.3.5 On-Site Inspection

The Town will carry out its own independent inspection as deemed necessary. As a minimum, The Town will inspect the subgrade excavation, granular base prior to placing curbs and asphalt paving for roadways, trails, and sidewalks, and witness testing of watermain and sewers. The Consulting Engineer will give The Town 48 hours' notice prior to these inspections. Should sufficient notice not be given, and the Contractor proceeds with the work, The Town will not accept the services without further testing, which may include total or partial removal of pavement or curbs, etc. All this additional testing will be at the Contractor's expense. It is therefore imperative that the Contractor's schedule be made available to The Town at the job meetings, and The Town be promptly advised of any changes to this schedule.

1.3.6 As-Built/Record Drawings

The Consulting Engineer shall make necessary corrections to the detailed engineering drawings as required by the Town in order to accurately reflect "as-built" conditions. Each sheet shall be verified by the Consultant and indicate all "as-built" details. The location and elevation of all private drain connections shall be indicated on the Lot Grading Sheets/Private Drain Connection (PDC) sheets. The Consultant shall be responsible for making all field measurements required to complete the as-built drawings and PDC sheets.

The final drawings must indicate the:

- a) Location and elevations of all new private drain connections;
- b) Correct locations of all new maintenance holes in both plan and profile;
- c) Invert and top of maintenance hole elevations as constructed with cross outs of the proposed elevations that have changed;
- d) Adjustments to stationing values for sewer segment lengths;
- e) The storm sewer design sheets shall be revised as required to verify adequate design capacity;
- f) Oil and grit separator operational/maintenance manuals are to be submitted; and,
- g) Record drawings shall be in metric units and shall be coordinated using the Universal Traverse Mercator (UTM) coordinate system.

One drawing set in each AutoCAD and PDF format shall be provided in electronic format. Record drawings must be submitted within 60 days from the date the Town has accepted the services for the development.

Where developments are phased, a set of as-built drawings shall be submitted at the completion of each phase. A title, and index pages shall be adjusted to clearly indicate the location of work and any portion of the drawing not related to the current construction shall be indicated in a light line-weight and clearly identified as:

"NOT IN CONTRACT".



2 Right-of-Way Permit Application

2.1 General

If the proposed development is planned to be within a public right-of-way, or if new services are proposed to connect to existing sewers or watermain within a public right-of-way, the Owner is required to submit a right-of-way application to obtain a permit prior to the commencing of any construction work. Detailed design drawings must be submitted with the application, in relation to the type of work proposed. The right-of-way permit application can be found on the [Town's Website](#).

2.2 Servicing Requirements

2.2.1 All Servicing Present and Available

In the case where all existing trunk services are present and available for use, the proponents will be required to provide or confirm individual services for storm, sanitary and water for each building lot. The services must be provided along the frontage of the lot, and shall be designed in accordance with specification in this manual. The Owner must also provide a lot grading sheet for the entire area under construction in accordance with the standards and specifications in this manual. The Owner is required to obtain approval from the Town, prior to obtaining the necessary approval building permit, by:

- Submitting the proposed Lot Grading Plan;
- Submitting a fully completed Right-of-Way permit application and the necessary securities;
- Undertaking and completing the servicing work as part of the Lot Grading Plan that does preclude the development of other lands; and,
- Necessary inspections of the final work by Public Works department.

2.2.2 Servicing Infrastructure Not Present

Where existing trunk services are not present or available for use, this will be addressed on a case-by-case basis by the Planning and Engineering staff at the Town, where the Owner is required to follow the advice and guidance attained by Town staff. If trunk infrastructure is proposed and permitted, a Professional Engineer is required to complete the design, and verify and submit the as-built drawing of the works prior to issuance of a building permit. CLI-ECA or MECP approval will be required for the trunk infrastructure.

3 Roads, Pathways, and Traffic

3.1 General

All design and construction of roads, boulevards and driveway approaches, shall be carried out in conformity to the standards as specified in this manual and Town Standard Drawings, as well as the OPSS and OPSD. The use of Supplementary Plans and Specifications prepared by the Consultant shall be permitted, but such Plans and Specifications must be approved by the Town.

3.2 Shared Infrastructure

Any infrastructure, parkland, or land requirements shared between multiple owners shall be completed by way of private development servicing agreements and cost sharing to be completed prior to the signing of the Development Agreement.

3.3 Transportation Impact Study

3.3.1 Scope of Study

The level of detail and required components of the Traffic Impact Study (TIS) will be a function of the location, size and operation of the development proposal. The full scope and technical details will be addressed during pre-consultation with the Town.

TIS generally requires:

- a) Arterial and collector roadway requirements and operations;
- b) Transportation infrastructure improvement and phasing plan;
- c) Development design review based on the Transportation Association of Canada (TAC) recommendations;
- d) Site specific impacts on adjacent road network, such as new or changed driveway locations or closure of additional roadways;
- e) Consideration for other developments that may need to use the new roads for outlets; and,
- f) Critical movement analysis or Level of Service (LOS).

A Traffic Impact Assessment (TIA) generally requires:

- a) Access location and operations; and,
- b) Site-specific impacts on road network including adjacent site operations.

3.3.2 Description of the Development or Redevelopment Proposal

The following components of the project shall be summarized at the beginning of the TIS document, as applicable:

- a) Existing land uses, or R.O.W. provisions in the Official Plan and Zoning By-law etc.;
- b) Planned staging of the development;
- c) Boundary roadways, near-by intersections and accesses to adjacent land uses or developments;
- d) Proposed access points and types; and,
- e) Nearby transit facilities.

For site-specific TIS's, the following shall be provided, as applicable:

- a) Municipal address;
- b) Total building size and building locations;
- c) Floor space including a summary of each type of use;
- d) Number of parking spaces along with location and access arrangements; and,
- e) Number and type of loading areas along with the location and access arrangements.

As applicable, the proponent shall provide area road network, subdivision drawings or a preliminary site plan, of a suitable scale, for consideration in the evaluation of the transportation impact study.

3.3.3 Description of Study Area

The area of study shall encompass all Municipal, County and Provincial roads, intersections, interchange ramp terminals and transit facilities, which could be affected by the travel generated by the proposed development.

Typically, this will include area that may be impacted as follows:

- Increase by 5% or more of traffic volumes or transit usage on adjacent facilities;
- Volume/capacity (V/C) ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above; or,
- V/C ratios for exclusive movements increased to 0.95 or above.

The exact limit of the area of study will be discussed during the pre-application meeting.

A description and an illustration of the existing transportation system within the study area shall be provided in the existing conditions section of the TIS and shall include, but not limited to, the following:

- a) Roads indicating the number of lanes, jurisdiction, and posted speed;
- b) Signalized/un-signalized intersections and interchange ramp terminals indicating, as relevant:
 - Lane configurations, widths, and storage lengths;
 - Available and permitted movements,
 - Type and modes of control/detection; and,
 - Turning restrictions, by time of day/day of week, as applicable.
- c) Location of sidewalks, bicycle paths/routes, and pedestrian control measures such as crossovers, intersection pedestrian signals (IPS), and school crossing guard locations;
- d) Location of on-street parking, parking/stopping restrictions adjacent to the development and those which would affect the operation of the roadways and intersections in the study area;
- e) Existing transit facilities and routes, which may serve the development site; and,
- f) Truck routes/heavy vehicle restrictions including times they are in effect.

3.3.4 Horizon Year(s)

Generally, the horizon year will be taken as five (5) years from the build-out of the site/area or 20 years (whichever is more applicable) for TIA and TIS studies.

Other considerations to be taken into account are as follows:

- Area plan/secondary planning horizons;
- Other area development proposals;
- Future roadway infrastructure and transit initiatives; and,
- Occupancy date.

Interim horizon years may need to be evaluated to account for:

- Phasing of developments;
- Interim site access arrangements; and/or,
- Planned transportation system improvements.

3.3.5 Analysis Period

Identification of the time periods for analysis should take into consideration the following:

- Type and size of development;
- Trip generation potential during AM and PM peaks of the adjacent road network;
- Hours of operations;
- Reoccurring special events; and,
- Seasonal fluctuations.

Typically, the weekday AM and PM peak traffic periods will constitute the "worst case" combination of site related and background traffic; however, in the case of retail, entertainment, religious, institutional, sports facility uses, weekend or site peak analysis may be required.

3.4 Existing Transportation Conditions

3.4.1 Traffic Conditions

To provide a representative picture of the existing traffic conditions, the following shall be included in the TIS, as applicable:

- a) Exhibit(s) showing the existing traffic volumes for the roadways and intersections in the study area including pedestrian volumes and heavy vehicle percentages. Traffic volumes may be acquired from the Town, traffic operation or transportation impact studies undertaken in the vicinity of the proposed development (if approved by the Town). In general, traffic counts more than three (3) years old, or counts that do not appear to reflect current conditions, shall be updated by the proponent (as determined by the Town);
- b) Intersection analysis of the existing conditions for all peak periods. Calibration of the analysis to actual conditions must be undertaken; and,
- c) Summary of level-of-service including volume to capacity (v/c) ratios and critical queue lengths for all intersections and critical movements. Full documentation of the results of all level of service analyses shall be provided in an appendix.

3.4.1.1 Transit Operations (Where Provided)

To provide a representative picture of the existing transit conditions within the study area, the following shall be included in the TIS, as applicable:

- a) Commentary/exhibit(s) summarizing the existing transit routes, stops and facility locations;
- b) Approximate walking distance to the transit services from the proposed development; and/or,
- c) Transit vehicle headways/frequency for routes that service or may be anticipated to service the development proposal.

3.4.2 Future Background Conditions

Future background traffic consists of two components:

Background Growth	Background Development
A growth through travel demands resulting from overall growth in the Town.	Travel demands associated with adjacent developments in the study area.

Future transportation network considerations may also include, but are not limited to the following:

- a) Future transit facilities and routes, which may serve the development site;
- b) Planned roadway, transit, and pedestrian improvements which will have a noticeable impact on the transportation operations within the study area; and,
- c) Other developments in the study area, which are under construction, approved or for which an application has been submitted. Briefly describe the size and nature of these developments in general terms.

3.4.3 Site Travel Demands

3.4.3.1 Estimation of Traffic Demand

Available trip generation methods may include one or more of the following, and will be a function of the proposed development and its intended operations:

- Trip generation surveys from similar developments in the Town, which have similar operating characteristics as the proposed development;
- ITE (Institute of Transportation Engineers) Trip Generation rates provided that differences in the site operations and size are accounted for;
- "First principles" calculations of anticipated trips to/from the site;

- Any modal split adjustments should be justified (since the ITE Trip Generation Manual has a degree of non-auto modal split accounted for); and,
- Market studies and other similar materials are generally encouraged.

3.4.3.2 Trip Distribution and Assignment

The trip distribution assumptions should be supported by one or more of the following, in the order of preference:

1. Comprehensive origin-destination or travel surveys;
2. Employment and population data;
3. Existing/anticipated travel patterns; and/or,
4. Market studies.

Engineering judgement shall be used to determine the most applicable of the above methodologies for each particular application.

Trip assignment assumptions shall reflect the most "probable" travel patterns considering the planned site access. Traffic assignments may be estimated using a transportation planning model or "hand assignment" based on knowledge of the proposed road network in the study area. The assumptions shall take into account projected "pass by" trips, "diverted" trips, and "internal" trips.

3.4.3.3 Summary of Traffic Demand Estimates

A summary of the existing and future traffic demands shall be provided in a series of graphics that summarize the following:

1. Existing traffic;
2. Future background - existing plus background traffic growth;
3. Site generated traffic; and,
4. Future total traffic - future background and site generated traffic.

Summary exhibits must be provided for each peak period and analysis horizon. In some cases, interim traffic conditions may need to be assessed to reflect phasing of developments, interim site access arrangements or planned transportation system improvements.

3.4.4 Evaluation of Impacts of Site Generated Travel Demands

The following are the steps that shall be undertaken to evaluate the impacts of the site-generated traffic on the area road network:

1. Calculate the travel demand generated by the development proposal and assign it to the area road network;
2. Undertake intersection analysis for all intersections and accesses within the study area. The intersection analysis shall be conducted with the industry-accepted assumptions and methods outlined above;
3. Provide a summary of level-of-service for all analysis periods and time horizons. Full documentation of the results of all level of service analyses shall be provided in an appendix;
4. Identify signalized intersections where:
 - a. Volume/capacity (V/C) ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above;
 - b. V/C ratios for dedicated turning movements increased to 0.95 or above; or
 - c. Queues for an individual movement are projected to exceed available turning lane storage;
5. Identify un-signalized intersections where the level of service is "E" or above;
6. Identify potential safety or operational issues associated with the following:
 - a. Weaving/merging;
 - b. Corner clearances;
 - c. Sight distances;
 - d. Vehicle-pedestrian conflicts;
 - e. Access conflicts;
 - f. Traffic infiltration;
 - g. Bus stops and blockages;
 - h. Cyclist operations; and,
 - i. Heavy truck movement conflict.

All of the above considerations may not be applicable to the development site/area. It should also be recognized that the above list is not exhaustive and there may be other operational or safety concerns that need to be addressed in the TIS. Also, it is necessary to provide supplementary analysis required to address vehicle queue lengths/blocking, merging, weaving, gap availability/acceptance, sight distance available and so forth.

3.4.5 Transportation System Improvements

The physical and operational road network improvement requirements identified in the TIS must address and ensure that:

1. Site generated traffic does not create conditions in which the capacity criteria summarized above are exceeded;
2. Vehicular, pedestrian, and cyclist operations and safety are maintained or improved;
3. Motorist, pedestrian, and cyclist needs and safety are accommodated; and,
4. Site generated traffic will not have a noticeable adverse impact on existing or proposed residential communities.

3.5 Design Criteria

3.5.1 Road Classification and Geometrics

The road classification shall be determined by the Official Plan, relevant Environmental Study Reports, and the Town. The following R.O.W. widths shall be based on the specific road classification as follows:

Road Classification	R.O.W. Width (m)	Minimum Curvature (m)	Minimum Corner Radius (m)	Minimum Longitudinal Grade (%)
Local	20	83	7.6	0.3*
Collector	26	117	9.2	0.3*
Arterial	33	159	15	0.3*

Notes:

1. For all Road Classifications: Local, Collector and Arterial; the cross fall should be 3%. A 2% cross fall may be permitted for concrete roads.
2. *Minimum Longitudinal Grades at curves and cul-de-sacs should be 0.5%.

The Owner shall be required to bear the total cost of the pavements on Local or Collector roads that are directly attributable to the individual development. Arterial roads that provide a community benefit shall be considered under a cost sharing model. Transition treatments (i.e. lane widening or narrowing to introduce turning lanes) shall be specified in the [TAC Geometric Design Guide for Canadian Roads](#). All Town roads shall be designed to accommodate routine plowing and winter maintenance.

All components of the roadway are to follow the drawing specifications contained within.

Applicable Standard Drawings: Local, Collector, and Arterial: L-CS-01, L-CS-02, and L-CS-03, respectively.

3.5.2 Pavement Markings and Traffic Signs

The Owner is responsible for the installation and placement of all pavement markings, including temporary markings, as per the [OTM Book 11](#). The specification for painting of all 100 mm wide linear line paint is yellow and white solvent based acrylic traffic marking paint. All stop bars, crosswalks, and symbols shall be Durables. The Town shall install street name signs and stop signs at the cost of the Owner on stanchions installed by the Owner. The Owner shall produce a drawing with proposed stop sign locations for the Town to approve. The Owner is also responsible for the installation and placement of all other traffic signs in compliance with the [OTM Book 5](#) and [OTM Book 6](#). All pavement and traffic signage plans are to be reviewed by the Town prior to installation.

3.5.2.1 Parking Signs

The owner must install/reimburse the Town for the installation of any no parking and alternate signs throughout development, as required by the [Town's No Parking By-law](#), as amended.

3.5.2.2 Subdivision Development Sign

The Owners shall install a development sign of a minimum size of 2.0 m x 4.0 m, upon which sign will be shown a plan of this development and the location of all of the required sidewalks, trails, community mailboxes if applicable, street trees and parkland within this development. The said sign shall be installed in a location in this development as approved by the Corporation and shall be permanently fixed to the ground. The sign shall be installed prior to the commencement of servicing and must remain in this location until such time as the last dwelling unit in this development has been completed, or until such time as the sidewalks, trails, street trees, parkland and all driveway approaches have been completed in accordance with the provisions of the Agreement, whichever is later. The Owners acknowledge and agree that no refund of any security deposit paid to the Corporation will be paid to the Owners herein or to any other person in the event this development sign has been removed or is no longer in the location as required by the Corporation pursuant to the provisions of this Agreement. The Owners herein acknowledge that until such time as this development sign has been installed, no building permits for this development shall be issued.

The Owners shall be required to provide the draft development sign to the Corporation for approval. Until such time as the sign is removed, it shall be maintained in a good state of repair and in a clearly readable condition.

3.5.2.3 Subdivision Not Assumed by Town Sign

After the placement of base asphalt, the owner shall install signage at each entrance to the subdivision to notify vehicular traffic that the rights-of-way have not yet been assumed by the Town. The signs shall read:

"SUBDIVISION NOT ASSUMED BY TOWN – USE AT OWN RISK"

3.5.3 Roundabout Control

Roundabouts shall be designed in accordance with appropriate geometric design principles, including development of appropriate speed control and accommodation of a design vehicle. Design guidance shall be in accordance with the [TAC Canadian Roundabout Design Guide](#). Buses and Emergency vehicles shall be accommodated without using the central island on collector and arterial road roundabouts.

3.5.4 Active Transportation Facilities

Through the framework of the Town's Official Plan, Transportation Master Plan, and Active Transportation Master Plan, the Town is looking to develop town streets as urban, multi-modal transportation corridors that safely accommodate pedestrians, cyclists, transit and vehicular movement for people of all ages and abilities.

Traffic calming strategies are employed to improve the safety characteristics for pedestrians and cyclists. Boulevard spaces with enhanced streetscapes and amenities foster an urban character, supporting local business activity and accommodating the safe movement of people. In residential areas, sidewalks are integrated linkages to maximize connections for residents, creating safe and natural passages through neighbourhoods to local amenities including parks, commercial areas, recreation centers and schools.

Active transportation planning and design should be undertaken in close collaboration with land-use, transit and road planning. In existing developments, active transportation projects should be tied in with road and urbanization projects in order to accelerate the implementation of these measures and reduce capital costs. Smaller local services, meeting places and civic areas within neighbourhoods should be located near schools and be accessible without requiring the use of an automobile.

3.5.4.1 Concrete Sidewalk

Sidewalks are to be 1.5 m wide on both sides of the road unless adjacent to the roadway, then they must be 1.8 m. All new sidewalk ramps at intersections shall include cast iron tactile warning surface indicators (TWSI's) as approved by the Town. Sidewalk ramps that are reconstructed for any reason should be retrofitted with cast iron TWSI's. TWSI's shall conform to OPSD 310.039. Sidewalks shall meet the minimum requirements of Ontario Regulation 413/12, [Accessibility for Ontarians with Disabilities Act, 2005](#). Curbs and sidewalk ramps are to be poured flush with the edge of the road. Curb cutting is not permitted at these locations.

Sidewalks will be required to extend outside the development limits to obtain connectivity with existing sidewalks/walkways at the Owner's cost. All above ground appurtenances are to be a minimum of 0.45 m away from the edge of the sidewalk, where possible. Sidewalk layout shall be designed as per Standard Drawing L-CP-01.

3.5.5 Two-Way Cycle Track

Two-way cycle tracks are as per standard drawing L-CS-02, and L-CS-03. Appropriate paint markings and markings at intersection as per [OTM Book 18](#) and as approved by the Town.

3.5.5.1 Multi-Use Pathways

Installation of multi-use paths/trails are to be designed as per the Town's Standard Drawings: L-CS-02 and L-CS-03.

Pathway Locations	Width (m) Minimum
Along Collector Roadways	3.0
Along Arterial Roadways	4.0
Parks and Green Spaces	4.0

Notes:

1. For boulevard pathway design at intersections, refer to [OTM Book 18](#).
2. Side slopes or tapers adjacent to boulevard pathways shall be no steeper than 3:1. Base materials shall conform to OPSS criteria. Where multi-use paths are directly adjacent to stormwater ponds, the pathway may be left as a granular base to allow for settlement prior to asphalt paving.

3.5.6 Traffic Calming

Traffic calming is the implementation of physical measures to alter motorist behaviour on a street or street network. Traffic calming also includes traffic managements, which involves changing traffic routes or flows within a neighbourhood. It is intended to improve the quality of life for residents on traffic calmed streets, achieve slower speeds for motor vehicles, and increase the safety and the perception of safety for non-motorized users of the street.

Permanent traffic calming measures are to be implemented in accordance with the [Town of LaSalle Traffic Calming Policy](#). The TAC Canadian Guide to Neighbourhood Traffic Calming should be utilized to provide design guidelines in selecting the appropriate traffic calming measures. Designers should consider various constraints including local climate conditions, environmental impacts, emergency response times and design vehicles that operate in subdivisions.

3.5.7 Daylighting Requirements

A daylight triangle is the area of a corner lot formed by measuring from the projected point of intersection between the two R.O.W. lines from a specific distance back along each R.O.W. line. This daylight triangle shall be dedicated to the Town.

Intersection Type	Dimension of Triangle Sides (m x m)
Local to Local	3.0 x 3.0
Local to Collector	3.0 x 3.0
Collector to Collector	4.6 x 4.6
Collector to Arterial	4.6 x 4.6
Arterial to Arterial	6.1 x 6.1

3.5.8 Cul-de-Sacs and Turning Bulb

In instances where a temporary turning bulb or cul-de-sac is required, the minimum radius is to be 12 m. The temporary bulb is to be completed with temporary asphalt curb.

Permanent cul-de-sacs are not permitted in the Town, unless extenuating circumstances exist, and where the Town is willing to consider it. In these situations, the maximum length of a cul-de-sac is 120 m, with a 12 m turning bulb radius.

3.5.9 Emergency Access

Each phase of a development is required to have two (2) ingress/egress locations but may be reduced to one ingress/egress location where a cul-de-sac or a “P-Loop” street design is approved by the Town. If a permanent road is not part of a particular phase, the Owner shall be responsible

to construct a temporary emergency access. The design of said temporary access is to be approved by the Town and shall consist of a minimum of 2 lanes of pavement, a pedestrian facility, street lighting, and drainage.

3.5.10 Concrete Curb and Gutter

Concrete barrier curbs and mountable curbs shall be constructed in accordance with OPSD 600.040 and 600.100 or as per the Town's standard drawing L-CP-04. Barrier curb and gutter should be constructed unless otherwise noted.

3.5.11 Boulevards

Boulevards are defined as the area between the property line and the back of curb. They shall be grassed as approved by the Town. Topsoil and grass must conform to Town standards as set by [Section 3.6](#) and should be constructed with positive drainage towards the road. In cases where edge of pavement is higher than the boulevard, the boulevard will require catchbasins for drainage.

3.5.12 Driveway Approaches

Driveways and entrances shall be designed in accordance with Standard Drawing L-CP-02 and L-CP-03 found in [Appendix E | Standard Drawings](#).

Driveways shall not have reverse slopes. A driveway within the right-of-way may not interfere with the radii of an intersection and must have one (1) m separation from all above ground utilities, municipal functions and street trees. Driveway approaches are to be plain white concrete and as per Town standard drawing.

- The minimum width of a driveway must be 3.7 m (12 feet);
- The maximum width of a driveway must not exceed 50% of the frontage width to a maximum of 9.1 m (30 feet);
- All driveway approaches must maintain a minimum of 1 m (3 foot) separation from all municipal functions;
- A driveway approach must be straight, flares are not permitted;
- A driveway must be a minimum of 15 m (50 feet) away from the end of the radius of an intersection;
- Driveways for homes on a corner lot shall be constructed on the side of the house furthest from or opposite the intersection and must be located on the lowest classified road;

- A second driveway access from a side street may be permitted only at the rear of the house and where a 5.5 m (18 foot) minimum clearance from property line on to private property is available, subject to the approval of the Town;
- A driveway shall not protrude beyond the projected side yard property lines; and,
- A maximum 1.2 m (4 foot) wide concrete leadwalk may be permitted in addition to a driveway, provided the curb is not cut for the leadwalk and the total width of the driveway and leadwalk does not exceed 50% of the frontage width.

No coloured, stamped or exposed aggregate concrete shall be permitted within Town Right-of-Way. Max width of driveway approach is the total curb cut for the property.

Sidewalks are to be continuous through driveways and when possible, driveway approaches to be poured integral with sidewalk at appropriate slopes. Driveways should only have access onto one fronting street. Driveway contributions will be required as part of the Development Agreement.

The Owner is ultimately responsible to ensure all driveway approaches are completed to Town standards for each lot prior to the Town assuming the subdivision.

3.5.13 Road Subdrains

Road subdrains shall be constructed along both sides of all roads with curb and gutter. Subdrains shall conform to OPSD 207.0440. Road subdrains are to be a 150 mm diameter heavy-duty perforated Big 'O' in filter socks for all roads. Road subdrains are constructed continuously along the back of curbs at a gradient that is equal to the longitudinal pavement slope (or minimum 0.30%) and connected to roadway catchbasins or other appropriate outlets.

3.5.14 Bus Stops and Peripheral Furniture

Bus stop location, placement and concrete furniture shall be provided at the direction of the Town and shall be designed and constructed in accordance with the Town's Transit provider.

Other peripheral or street furniture, such as bollards, mailboxes, benches, and trash cans, are only to be placed within the boulevard subject to approval from the Town.

3.6 Restoration and Seeding

3.6.1 Topsoil

Prior to the placement of sod or hydroseed, there is to be a minimum of 100 mm of screened, friable topsoil, free of stones, sticks and other debris. The topsoil is to be fine graded prior to the placement of sod or hydroseed.

The topsoil must be tested at time of placement.

Topsoil must meet or exceed the Current OPSS 802 and in accordance with the Town's topsoil requirements below, onsite soil sampling may be required:

Parameter	Unit of Measure	Requirements
pH		5.5 - 7.9
Organic Matter	%	4 - 15
Total Salts	mmhos/cm	< 1.5
Nitrogen	ppm	As identified in the soil test report
Phosphorous	ppm	10 - 60
Potassium	ppm	80 - 500
Calcium	ppm	1000 - 7000
Magnesium	ppm	100 - 600
Chloride	ppm	< 100
Sodium	ppm	< 200
Sodium Absorption	Ratio	< 15
Sandy Loam	%	10 - 15
Silty Loam	%	15 - 19
Silty Clay Loam	%	20 - 24
Atrazine	Ppm	< 0.05

3.6.2 Grass

The Owner shall be responsible for the placement of topsoil and seed on all Town owned lands, or private lands to be assumed by the Town. The Town may require sod in certain situations and the Owner will be responsible to provide this at their own cost. The Owner will be responsible for watering and cutting the grass until final acceptance of each phase of the Development or until the grass is established and accepted by the Town at an earlier date.

All seed and cover specifications must comply with OPSS 804 and the seed must be to Federal and Provincial seed laws and have a minimum germination of 80% and a minimum purity of 97%. Fertilizer is to comply with the provisions of the Canada Fertilizer Act and Regulation.

The restoration of all Town own lands, including boulevards, parklands, SWM facilities, ditches, and drains shall be completed with seed mixes as listed below or approved equal. Boulevards and parks shall be seeded with the Standard Mix, whereas any areas such as SWM facilities or ditches may be seeded with the Rough-Cut Mix as approved by the Town.

Standard Seed Mix	
40%	Blue Grass (minimum percentage)
30%	Perennial Rye Grass (minimum percentage)
15%	Creeping Fescue
15%	Chewings Fescue
Rough-Cut Seed Mix	
20%	Annual Rye Grass
20%	Kentucky Bluegrass
30%	Fine Fescue
30%	Perennial Rye Grass

[Section 8.8.7](#) of the Manual includes additional SWM Facility Landscaping requirements. For naturalized restoration areas, Native seed mixes shall be specified in the Environmental Mitigation Report.

3.6.3 Fencing

A 1.5 m black chain link fence with black appurtenances is required on municipal lands when rear and side yards back or abut onto Municipal property that are not open R.O.W.'s, including natural environment areas.

Fences are to be installed as part of the civil construction contract, at the designed locations and grades, except where fences are adjacent to a side yard. Side yard fences can be installed after completion of the building foundations. Fences are to be shown on the grading plan.

Alternatively, if the Owner wishes to install vinyl or wooden privacy fence in lieu of the chain-link fence, they must submit a request for the Town to review on a case-by-case basis. The fence shall be installed on private property and be continuous in construction material and colour. Privacy fence maintenance will be the responsibility of the individual homeowners. If over time, the privacy fence is removed, the Town will install chain-link fence on Town property.

Any and all fences installed should never block sightlines of vehicles or pedestrians.

3.7 Community Mail Box

The Owner is required to contact Canada Post early in the design process to establish the preferred locations for mailboxes. The Owner is responsible for construction of the pad to the satisfaction of Canada Post and the Town, in accordance with Canada Post's standard drawings. The locations selected are subject to approval by the Town in order to verify they will not interfere with other municipal services. Community Mail Box sidewalk connections are to be poured in place. Curb cuts are not permitted.

3.8 Street Trees

Street trees are required every 9 m along both sides of all roadways.

The Contractor employed by the Owner must follow the standards set below for condition of the street trees and topsoil requirements, location of street trees, the maintenance requirements and the types of street trees allowed. Underground service connections are to be designed in a way to allow for the placement and growth of street trees. The Typical Street Tree Planting Detail can be found in the Standard Drawing L-LA-02.

Where several trees are to be planted, each subdivision is required to have six (6) different families of trees from [Table 3-1 Tree Species](#). Each subdivision or phase of each subdivision cannot have multiple species of the same family. In the case of overhanging utilities, approval of use of specialty trees must be obtained from the Town before planting.

3.8.1 Condition and Topsoil Requirements

1. The minimum acceptable size is 62.5 mm caliper for street trees (measured via the Canadian Industry Standard: 6 inches from above the root ball);
2. Trees must be free of insects, diseases and any trunk/branch breakage or scars. All trees shall have only one unpruned and undamaged leader;
3. Trees must have a strong fibrous root system sufficient to support tree life and all root balls must be wrapped in natural fiber; and,
4. Trees which adapt only to spring planting will not be accepted for fall plantings.

3.8.2 Location Notes

When choosing a tree's location, consider the tree's ultimate size. **Prior to planting, a meeting will be scheduled with the Town to confirm tree locations.** Location of trees on the right-of-way are not universal, however, they should be as described in Standard Drawing L-LA-01.

3.8.3 Maintenance Requirements

The Town requires the Owner to maintain the street trees for a two (2) year period from the date of planting.

The minimum maintenance requirements are as follows:

1. Trees must be pruned and fertilized, yearly;
2. During particularly dry summer months, the trees must be watered;
3. In the case of tree death, tree must be replaced within the year during planting season (fall or spring) with the same type of tree;
4. Trees must be staked upon planting, and the stakes must be removed prior to the Town taking possession of the trees; and,
5. Trees must be properly supported and plumb during the maintenance period.



3.8.4 Acceptance of Trees

Six (6) months prior to the end of the two (2) year maintenance of the trees, the Owners shall review and inspect the trees as well as summarize for the Town's review. Any trees that are either dead or in poor health must be replaced in the next available planting season, at the Owner's expense.

A final walkthrough with a Town representative and the Owner's arborist is required prior to the Town's acceptance of any trees.

Table 3-1 Tree Species

Common Name	Scientific Name	Cultivar
Shade Trees		
European Beach	<i>Fagus sylvatica</i>	
American Sycamore	<i>Platanus occidentalis</i>	
London Plain Tree	<i>Platanus x acerfolia</i>	Bloodgood
Ginkgo	<i>Ginkgo Biloba</i>	
Common Hackberry	<i>Celtis occidentalis</i>	
Littleleaf Linden	<i>Tilia cordata</i>	Greenspire, and Glenleven
Largeleaf Linden	<i>Tilia platyphyllos</i>	
American Linden	<i>Tilia americana</i>	Redmond
Honey-Locust	<i>Gleditsia triacanthos</i>	Shade Master, Skyline, and Sunburst
Hybrid Red Maples	<i>Acer x. freemanii</i>	Autumn Blaze, Autumn Fantasy, and Marmos
Red Maple	<i>Acer rubrum</i>	Common, Armstrong*, and Red Sunset
Sugar Maple	<i>Acer saccharum</i>	
Red Oak	<i>Quercus rubra</i>	
Pin Oak	<i>Quercus palustris</i>	
Ornamental/Flowering Trees		
Flowering Pear	<i>Pyrus calleryana</i>	Common, Chanticleer, and Capital
Ivory Silk Tree	<i>Syringa reticulata</i>	
Green Vase Zelkova	<i>Zelkova serrata</i>	
Cherry Tree**	<i>Prunus serrulata</i>	Kwanzen*

Common Name	Scientific Name	Cultivar
Specialty Trees		
Common Beech	<i>Fagus sylvatica</i>	Dawyck Purple*, Red Obelisk*, and Tri-colour
Tulip Tree	<i>Liriodendron tulipifera</i>	
Katsura Tree	<i>Cercidiphyllum japonicum</i>	
Sweet Gum	<i>Liquidambar styraciflua</i>	
Serviceberry**	<i>Amelanchier Canadensis</i>	Glenform
Catalpa	<i>Catalpa speciosa</i>	Heartland
River Birch	<i>Betula nigra</i>	
Black Birch	<i>Betula lenta</i>	
Japanese Maple**	<i>Acer palmatum</i>	Bloodgood
Redbud**	<i>Cercis Canadensis</i>	
Swamp White Oak***	<i>Quercus bicolor</i>	

Notes:

* Designates columnar tree cultivars.

** Designates trees with the Town's permission that are appropriate to plant under utility wires.

*** Designates trees to be planted in high groundwater conditions only.



4 Lot Grading

The Consulting Engineer is to reference the applicable standard drawings L-LG-01 and L-LG-02 in [Appendix E | Standard Drawings](#), as well as the design criteria referenced below.

4.1 Design Criteria

The Town's objective is to ensure that the property owner (i.e. the resident) will have maximum use of their property while still providing effective drainage within the development.

The following criteria should be used in the preparation of all lot grading plans:

- Grading design should avoid maximum grades unless there is no alternative;
- Proposed grading of any site will not interfere with, or significantly alter existing drainage patterns, and shall retain all surface water to avoid runoff onto abutting lands, including those with surface water features or other environmentally sensitive areas;
- Grades are required to match the adjacent properties and/or approved lot grading;
- Drainage shall be managed by use of swales, and provide positive drainage away from buildings;
- Proposed elevations that define the grading of the property must be shown on the Lot Grading Plan; and,
- Existing elevations on all abutting lands.

4.1.1 Rear Yard Catchbasins

Each residential lot is to have its own rear yard catchbasin (RYCB), which shall be tied into the lot's storm connection in front of the building.

Rear yard catchbasins shall have: a minimum of 300 mm diameter; a minimum 100 mm perforated Big 'O' outlet up to 3 m from rear of dwelling; and a solid polyvinyl chloride (PVC) pipe from 3 m of rear of dwelling to the connection.

In the case where a lot abuts an existing residence or serviced lot from a previous phase of a subdivision, the servicing contractor shall install the rear yard catch basin at the time of servicing. This includes installation of PVC pipe from the storm connection to within 7.5m of the rear lot line, perforated pipe from the PVC pipe to the RYCB, grading to promote drainage to the RYCB, and erosion control measures such as silt fence around the RYCB. It is to be understood that the installed pipe may be damaged or removed at the time of footing excavation and must be replaced to satisfy the [Ontario Building Code](#).

4.1.2 Swales

Drainage flows from one lot shall not enter onto another lot unless the outlet is established on title in the form of a drainage agreement or easement to the satisfaction of the Town. Swales are to be designed so that the flow is to be directed towards the rear yard catchbasin or toward the curb.

4.1.3 Retaining Walls

Every effort should be made during the design process to allow for site grading that does not require the use of retaining walls, however, should site constraints within a new development require the utilization of retaining walls, the Town will evaluate the retaining wall design on a lot by lot basis.

Design Criteria if retaining walls are necessary:

- a) All retaining walls that support municipal infrastructure shall be constructed on municipal property; walls that support private land must be constructed on private property;
- b) When retaining walls are deemed necessary, they must be clearly identified (in all dimensions) on the proposed lot development plan;
- c) Grades for the top and the bottom of the wall shall be clearly marked at regular intervals or at any elevation changes;
- d) Retaining walls are to have an architectural or smooth finish;
- e) If the grade difference is over 1000 mm, or as determined by the Town, the wall must be designed by a Professional Engineer and approved by the Town;
- f) Any retaining wall along the rear lot line is to be constructed as part of servicing with the appropriate grading on each side of the wall; and,
- g) Walls along the side yard (which will be in close proximity to a house foundation) are to be constructed after completion of the house footing but are still the responsibility of the Owner to ensure it is completed.

4.1.4 Rainwater Leaders and Sump Pumps

Sump pumps and Rainwater Leaders are to discharge directly onto pervious areas or into storm connections as per the Engineer's SWM plan. A maximum of 50% of rainwater leaders may be tied into the storm connection. The lot grading sheets are to show the method of discharge. Leaders shall not discharge onto impervious areas directly connected to the storm sewer (i.e. driveways) and shall not discharge towards neighboring properties.

4.2 Lot Grading Sheets/PDC Sheets

The Consulting Engineer will be required to submit individual Lot Grading Sheets/PDC sheets for each of the lots within the subdivision. Each sheet must include the following:

- a) All applicable streets, lot numbers, plan numbers and municipal addresses;
- b) All existing and proposed easements;
- c) Locations of catchbasins, maintenance holes, hydrants, valves, streetlights, transformers, utility pedestals, sidewalk, pathways, curbs, fences, utility poles, mailboxes and trees;
- d) Location of driveway if specific side of the lot is required;
- e) GPS coordinates of all the cleanouts and water service valves; as well as invert elevations;
- f) Typical cross-section of the lot (plan view, section through side yards and section through front);
- g) Sanitary hydraulic grade line elevation and indication on need of sewage ejector pumps;
- h) Any underground drainage must be identified;
- i) Catchbasin and storm details (bedding conditions, etc.);
- j) Location of existing and proposed buildings;
- k) Proposed and existing elevations at lot corners and lot lines;
- l) Proposed grade(s) at dwelling;
- m) Intermediate grade change points;
- n) Direction of flow on lot lines;
- o) Direction of existing and proposed surface runoff;
- p) Rear yard drainage system including catchbasin elevation must be identified;
- q) Identify all lots where engineered fill will be placed or has been placed;
- r) Water courses and drainage ditches;
- s) Retaining walls (if applicable), top and bottom elevations and locations;
- t) Septic system locations, footprint and landscaping grade (outside Urban Area Boundary as defined in the [Town of LaSalle Official Plan](#));
- u) Grades at neighbouring houses or structures;
- v) Sump pumps and rain water leads discharge details; and,
- w) Conservation Authority minimum open elevation (where applicable).

In order to minimize the flow rate from foundation drains/weeping tile, piezometer measurements shall be collected as part of the Development's Geotechnical report, prior to design and construction to determine the seasonal high groundwater level.

Low impact development facilities shall be considered where appropriate.

The underside of the floor slab should be set 0.5 m higher than the seasonal high groundwater level.

4.3 Elevation Certificates

A lot grading elevation certificate will be required from a registered Ontario Land Surveyor (OLS) or Professional Engineer for all residential development lots in order to obtain a building permit. The registered Ontario Land Surveyor is required to record, verify, and sign-off on an elevation certificate to confirm elevations of the main building opening, grades at the front, rear and side yards, property corner elevations, and rear yard catch basin rim elevation. This should be completed for all lots within a plan of subdivision. Failure to submit a verified lot grading elevation certificate will result in denial of occupancy permit.



5 Watermains and Services

5.1 General

Watermains and Appurtenances shall be designed and constructed in accordance with the information specified herein. All chemicals and materials used in the drinking water system that comes into contact with water within the system shall meet all applicable standards set by MECP, the Ontario Water Works Association (OWWA) and the American National Standards Institute (ANSI) safety criteria standards NSF/60 and NSF/61. Any deviation from the specifications contained herein and/or proposed alternatives require approval in writings from the Town.

5.2 Design Considerations

In order to establish watermain sizes, the Consulting Engineer is required to design potable water distribution using current Town standards and the [Design Guidelines for Drinking-Water Systems](#) as detailed by the MECP. In addition to these written guidelines, reference should also be made to the approved manufacturer's most up-to-date model's products for linear water systems.

Any work occurring on live watermains within the Town shall be either performed by a licensed operator employed at the Town or in the presence of a representative of the Water Department.

5.3 Watermain Standards and Requirements

All watermain work shall be completed in accordance with the Applicable Town's Standard Drawings in [Appendix E | Standard Drawings](#). Please refer to the Watermain Materials Specification Table in [Appendix F | Watermain Material Requirements](#) for approved materials.

5.3.1 Minimum Size

Sizing and looping of watermains will be discussed at the preliminary stage of the project. All watermains must be looped unless permission is granted from the Town. A minimum pipe diameter of 200 mm is required. Watermains may be required to be oversized due to flow demands external to the development. Cost recovery efforts to the Owner will be considered by the Town. Proposed developments shall consult with the Town to ensure current design is within Town's current water model and standards. Unless required, all watermains within the right-of-way shall be designed for 1,035 kPa (150 psi) test pressure.

5.3.2 Locations

Pipes shall be laid in an evenly graded trench to provide a minimum of 1.5 m cover below future or existing road grades, whichever is lower. Care must be exercised to prevent deformed sections

in the pipe caused by excessive bending. All deformed sections shall be removed and replaced at the Owner's expense. A separation of 2.5 m paralleling storm and sanitary sewer trunks is required.

5.3.3 Fittings

All PVC fittings shall be restrained in accordance with Standard Drawing L-WD-01. Tie in and Thrust Blocking shall be as per Applicable Standard Drawing L-WD-02.

5.3.4 Backflow Protection for Watermain Construction in the Right-of-Way

Contractors will be required to follow backflow prevention procedures as required by the MECP. Backflow devices are to be supplied by the contractor and up to date certification.

Applicable Standard Drawing: L-WD-17, L-WD-18, L-WD-19 (same as [Section 5.7 | Backflow Prevention in Buildings](#)).

5.3.5 Dead-End Mains

Dead-end mains are to be avoided wherever possible. Where dead-ends cannot be avoided, dead-ends on new mains shall be closed with cast iron plugs or caps; such dead ends shall be equipped with suitable blow-off facilities. Auto flushers may also be required as a temporary measure where developments are phased and required by the Town.

5.3.6 Abandonments and Service Disconnections

Watermains to be abandoned shall be capped or removed as decided by the Town. All service disconnects are to be completed by the Owner and inspected by the Town.

5.3.7 Easements

The Engineer shall also consider the soil conditions, constructability and future maintenance when selecting the easement width. In addition, if more than one utility is installed in the easement, the easement width should be increased by the separation distance of the utilities.

The minimum easement width shall be 6.1 m for all watermains.

5.3.8 Trench Requirements

The trench shall be excavated sufficiently as specified in [Part III of The Occupational Health and Safety Act, 1980 and Regulations for Construction Projects](#), and the proper laying and jointing of the pipe. Trench walls shall be vertical to 300 mm (12 in.) above the top of the pipe and the width at this location shall not exceed the maximum. Trench width for a single pipe shall be as per Standard Drawing L-WD-03.

5.3.9 Replacement or Installation of Service from Main to Property Line

A new service shall be installed from the new main to property line as per Standard Drawings L-WD-08 and L-WD-13.

The new curb stop shall be installed as close as possible to the R.O.W. property line.

5.3.10 Tracer Wire

A tracer wire shall be used with all PVC pipes and hydrants. The wire shall be installed along the side or top of the pipe as close to the pipe as possible. The tracer wire shall be brought to the surface at all fire hydrants and valve locations. Refer to the Watermain Materials Specification Table in [Appendix F | Watermain Material Specifications](#) for approved materials.

Applicable Standard Drawing: L-WD-04 (WUC 50.12.01).

5.3.11 Mainline Valves

Mainline valves shall be the same size as the watermain. A valve box shall be provided for every valve.

5.3.12 Gate Valves

The Town prefers the use of gate valves for pipes 100 mm to 600 mm. Any pipes above 600 mm requires the Contractor to consult with the Town.

5.3.13 Tapping Valves

Tapping valves are allowed if they are a stainless steel type as approved by the Town.

5.3.14 Quantity and Location

Two valves are required to isolate a tee intersection, and three valves are required to isolate a cross intersection. These valves are to be located close to the intersecting pipes if possible. Valves are required on each side of a railway crossing or at each end where the watermain is installed in a casing or under a drain crossing.

Valves are to be placed at intersections and spaced at a maximum of 250 m.

5.3.15 Valve Boxes and Valve Box Protection

All valves shall be equipped with valve boxes and restrained, unless installed in a chamber. Valve boxes shall be two-piece screw type to suit the size of valves. Valve boxes shall not rest on the valve.

All main line valve boxes are to be protected during construction and during the maintenance period.

5.3.16 Hydrants

Hydrants are to adhere to the specifications as described in the Town's list of approved products.

All hydrants shall stand plumb and shall have their nozzles parallel with, or at right angles to the curb (road) with the pumper nozzle facing the road.

In order to prevent confusion of availability of water for firefighting purposes, immediately after installation, all hydrants shall be covered with neutral coloured plastic covers, secured to prevent removal. This cover shall be removed only after the watermain has been completely installed, tested and approved for use by the Owner.

Applicable Standard Drawing: L-WD-05 and L-WD-06.

5.3.17 Spacing

Hydrants are to be installed on 150 mm diameter and larger watermains. Hydrants are to be placed near property lines at intersections (where possible), while maintaining a maximum spacing of 150 m and meeting minimum spacing requirements for all proposed dwellings. The maximum spacing may be altered at the Fire Chief's request.

When replacing existing hydrants use the same location if possible. If a new location is required, notify the homeowner in writing prior to engineering approval and provide proof of notification to the Town. Where an existing hydrant does not meet current spacing standards, the current standard shall apply.

5.3.18 Locations

The location of the hydrants in relation to the street line shall be in accordance with the Town of LaSalle approved relevant cross-sections. Any non-standard locations will require individual approval. Hydrants are to be located at intersections.

Hydrants near driveways shall be located at a minimum of 1.2 m clear from the projected garage (or edge of driveway, whichever is greater) in residential applications and 2.5 m separations in ICI areas. Where boulevard grass is limited, hydrant leads may require an additional 90° lead turn T and valve. Hydrants shall be 5 m from street trees.

If subsequent changes are made to the property or design during construction (i.e. driveway widening, entrance feature, etc.), all costs associated with the relocation shall be borne by the Owner, Builder or property owner.

5.3.19 Depth of Bury

The depth of bury for the hydrant shall be 1.65 m unless otherwise stated by the Town. The hydrant safety breakaway flange must be located between 50 mm and 100 mm above finished grade and field adjusted if required. Hydrant extension to adjust the length of a hydrant barrel, if necessary, shall be obtained from the manufacturer supplying the hydrant and installed as per manufacturer's direction.

5.3.20 Private Hydrant Maintenance

The Owner, for private hydrants on private property, must perform annual maintenance on hydrants.

5.4 Servicing Standards and Requirements

All water services shall be single service connections and be supplied as described:

All unutilized water services shall be abandoned at the watermain with valve or curb box removed. Services being utilized for future re-development can be abandoned at the curb box or valve box at the property line.

Private Service connections to the watermain will not be permitted until the watermain has been tested, chlorinated and accepted for service. Dry taps will not be permitted.

5.4.1 Service Sizing

The minimum nominal service size shall be 19 mm from the watermain to the property line. The maximum nominal service size shall be 25 mm from the watermain to the property line.

For pressure testing of a fire service line systems, must be tested to 1035 kPa (150 psi) for 2 hours.

The service shall not exceed the diameter of the watermain.

5.4.2 Service Location

Water services must be installed perpendicular to the road and/or the watermain. Wherever practical the service shall be installed in the center of the lot frontage. All water services shall have a 2.5 m horizontal separation from all sewers and 1.2 m vertical clearance from structures.

In cases where a fire and domestic service are required one connection from the watermain is made and branched off into two services before the property line. In situations where a fire service is required and a public hydrant is not at a sufficient location to the Siamese connection a private hydrant must be installed. This hydrant must be maintained annually.

5.4.3 Service Transfer

Under certain conditions if the existing service is of copper, the Town may decide to transfer the existing service to the new main.

The following procedures must be strictly adhered to:

1. Expose and clean surface of main pipe in preparation for tapping;
2. Install stainless steel tapping saddle on all watermains;
3. Install corporation main stop. Proceed to tap using an approved tapping machine;
4. Locate, expose, and clean old water service at the old water main to allow old main stop to be shut and old water service replaced;
5. A minimum of 1.0m clearance is recommended at the sides of both water mains to allow proper service pipe installation. Prior to cutting away old metallic water service; and,
6. Contractor must install a temporary jumper connection. Install ground plate. Notify homeowner of water disruption (give ample notice prior to shut off).

Service transfer in R.O.W. shall be as per Standard Drawings L-WD-12.

5.4.4 Service Abandonments

Water services are to be abandoned based on future usage of said service. If the service is to be used again in the near future, it is to be abandoned at the valve at the property line. If the service is not to be re-used, then it shall be abandoned at the watermain. Abandonment of watermains is to be completed by the Owner and must be approved by the Town.

5.4.5 Pipe Crossing and Clearance

All water services to be minimum 1.5 m in depth. Where the above mentioned requirements cannot be satisfied, the Owner's Contractor must get approval from the Town.

Sanitary sewers and watermains located parallel to each other shall be constructed in separate trenches, maintaining a minimum clear horizontal separation distance of 2.5 m from outside edge to outside edge of the pipe. When it is not possible to maintain a separate trench and the minimum horizontal separation distance, the crown of the sewer should be at least 0.5 m below the invert of the watermain and separated by in situ material or compacted backfill.

Where a crossing of a sanitary sewer and watermain is required, the watermain should cross above the sewer whenever possible. Whether the watermain crosses above or below the sewer, a minimum vertical distance of 0.5 m between the outside edge of the watermain and the outside edge of the sewer should be provided to allow for proper bedding and structural support of the watermain and sewer pipes.

Applicable Standard Drawing: L-WD-07 (WUC 50.01.03).

5.4.6 Main Stops and Curb Stops

All water services shall have the same size main stop as the service pipe. Main stops are not required on water services greater than 50 mm in diameter.

Service Saddles are required for all services connected to concrete pressure pipe manufactured to the latest edition of AWWA C301 and AWWA C303 specifications for all tap sizes.

Main stops or corporation curb stops shall be copper compression type conforming to AWWA C800. All services shall have curbs stops and boxes installed at the property line, be flush with grade and accessible at all times. Non-Draining curb stops are to be used. Curb stops shall be supported with concrete blocks or bricks.

For residential applications, all water service curb stops and boxes are to be installed in grass areas with a minimum distance of 1 m from the edge of the driveway if possible.

5.4.7 Metering

All water services shall be metered. All meters shall be accessible at all times. Meters shall not be installed until flushing and testing is complete.

Applicable Standard Drawings: L-WD-08 and L-WD-09.

5.4.7.1 Meter Chambers and Pits

Meters in chambers or in pits shall be as per the Towns Standard Drawings. Meters shall not be installed until flushing and testing is complete.

5.4.8 Servicing Vacant Lots

All materials shall be as per the Town of LaSalle specifications as described herein. The Owner must pay a construction rate from when connection to curb box is made until the meter is installed. Only **one** (1) water service and **one** (1) meter will be provided per municipal address.

5.4.8.1 Existing Water Service at the Property Line

Water service request is created through the building permit process. Inspection is scheduled and completed by the building department. The Owner is to call the Public Works Department a minimum of 48 hours in advance for meter installation. The meter must be installed prior to occupancy being granted.

5.4.8.2 No Water Service at the Property Line

Water service request is created through the building permit process. The fee of a 19 mm (3/4") service is collected at this time. This fee covers meter supply and installation.

The Owner must specify that a service and tap to the watermain is also required. This should be communicated verbally as well as noted on the building permit application.

The Owner retains a Contractor that is licensed and bonded with the Town of LaSalle to carry out the work; the Owner is required to obtain the list from the Public Works Department. Water Service Tap fee will be as per the Town's fee by-law. The Town must perform the tap at the watermain. All other works such as excavation, traffic control, backfilling, restoration, and materials are to be carried out by Owner. The fee will be billed to the Contractor upon completion of the work. All restoration within the Right-of-Way is to be done as per the Town standards.

5.5 Cathodic Protection

All metallic underground appurtenances are to have a non-woven synthetic fabric tape fully impregnated with a special blend of adhesive compound based on petrolatum polymers applied. Installers of this tape are to be properly trained as per manufacturer's standards. All mechanical parts that are not PVC must be corrosion protected with Denso Paste; it is applied prior to the tape application (Denso Petrolatum Tapes or Denso Bituminous Tapes). Denso Profiling Mastic will be used to provide a smooth profile on irregular shaped fittings such as flanged and mechanical joints and valves.

Anodes are to be used when connecting new watermain to an existing watermain that is not PVC.

5.6 Testing Procedure

5.6.1 Pressure Testing

Prior to pressure testing and disinfection, the Engineer and a licensed water operator from the Town shall inspect the installation. During this inspection, each and every valve will be checked using the proper valve operating key. Each valve must fully open or close as required.

Pressure tests shall be witnessed by the licensed water operator for the Town and the Owner.

The Contractor shall notify the Water Department and the Owner at least 48 hours in advance of the intended testing time. The Owner shall be charged for the Town's time and any sampling costs.

The Contractor is responsible for:	The Town is responsible for:
1. Supplying pressure tester; 2. Chlorination; 3. Backflow prevention; and, 4. De-chlorination.	1. Witnessing the procedure; and, 2. Attaining chlorine and microbial samples.

The test pressure shall be 1035 kPa (150 psi) for a period not less than two (2) hours. Maximum permissible leakage shall be 2.22 litres per day per mm diameter per km of pipe. Work to be done as per the most current Ontario Watermain Disinfection Procedure.

After the pressure test passes, the new system is filled with highly chlorinated water using continuous feed method with chlorine concentration >25mg/L.

5.6.2 Hydrant Flow Testing

Fire hydrant flow testing is required for all new developments at the time of installation. The developer is required to use a licensed company to undertake the flow tests and provide a report to the Town.

5.6.3 Flushing and Disinfecting Watermains

Flushing, swabbing and disinfecting operations shall be carried out in accordance with the MECP (Watermain Disinfection Procedure) and the requirements of the Town. The Town shall be notified at least 48 hours in advance of the proposed date on which commissioning operations are to commence.

Watermains shall be swabbed and flushed in a sequence and in accordance with the procedure set out by the Engineer and the Town. The Engineer may permit or require the flushing to be carried out in stages as sections of the system are completed. No unsuitable matter shall be allowed to enter the sections which have been flushed. A soft foam swab is to be inserted into the main at the filling end.

Once swabbing is complete, water from the existing distribution system shall be allowed to flow at a controlled rate into the new pipeline until flushed and full then the control valve shall be

closed immediately. The system shall be tested for residual, documented and left charged with the chlorine solution for 24 hours. All valves and hydrants shall NOT be operated during the 24 hour period.

The chlorine residual will be re-tested in the section after 24 hours. The maximum allowable decrease in chlorine concentration is 40% of the initial chlorine concentration to a maximum decrease of 50 mg/L.

Once acceptable, the section shall be flushed completely and recharged with water normal to the requirements. The chlorination procedure shall be repeated until satisfactory results are obtained. If chlorine residual tests are satisfactory, microbial testing (by an accredited facility) must be carried out on two consecutive days (maximum one every 24 hour period).

The system shall not be put into operation until approved by the Town.

Sample stations shall be installed where the Public Works Department deems necessary.

5.6.4 Tracer Wire Test

The Town is to perform a Tracer Wire Test, and the Contractor is responsible for repairing any disruptions found in the test.

5.7 Backflow Prevention in Buildings

Installation of backflow prevention devices and all other procedures related to potable drinking water and such are to be to the standard as described by the Cross Connection and Backflow Prevention By-Law, as amended. It applies to industrial, commercial, institutional and multi-residential buildings and structures except buildings of residential occupancies.

All new ICI buildings require backflow prevention devices to be installed right at the point of entry to the building. Such a device would be determined by the Town building inspector. Isolation and backflow prevention must be maintained when constructing new municipal watermains.



6 Sanitary Sewers

This section outlines the Town's guidelines regarding sanitary sewage collection system design, including: sanitary sewers, service connections, sewage pumping stations, and force mains. When constructing on private property, construction materials and practices must be in accordance with the OBC and the Town's standards.

All sanitary sewers shall be designed to accommodate sewage flows for the ultimate development expected in the drainage area.

6.1 Sanitary Allocation

The Town's overall sanitary capacity allocation is currently limited to 5 Million Imperial Gallons per Day (MIGD), with a future opportunity to increase to 6 MIGD. As such, the design guidelines set out within this manual have been established to coincide with the current allocation limit.

Sanitary allocation for a development is granted at the time of a Planning Act approval. Unallocated capacity is in the Town's ownership, until such time that an approval is received. Undeveloped lands within the urban boundary do not possess inherent rights to the unallocated capacity.

The Town has established a "Wastewater Plant Capacity Allocation Protocol" (WPCAP) to assess sanitary allocation for individual Planning Act applications. This protocol outlines the assumed baseline allocation provisions based on the Town's existing and planned sanitary infrastructure and overall treatment capacity.

The WPCAP is also used as a tool to consider and evaluate requests for increased allocation proposals, beyond the assumed baseline capacity. This review will occur once a Planning Act application is made to the Town, and the request for additional capacity will be assessed against the identified Merit-Based Criteria established within the WPCAP. The capacity allocation request, whether baseline or as part of an increased allocation proposal, will be formally assigned upon Planning Act approval.

6.2 Design Considerations

The careful determination of design flows is a crucial step in the design of an appropriate sanitary sewage collection system. The design flows for sanitary sewer must account for flows from all sources; residential connections, commercial and institutional connections, industrial connections and extraneous flows from groundwater infiltration and surface water inflow.

6.2.1 Drainage Areas

Drainage areas are as per the applicable Environmental Assessment or Functional Servicing Study. Ownership boundaries will not restrict the delineation of the drainage area limits. Areas outside the drainage area adjacent to the tributary limit, which could conceivably be simply re-graded to flow to the area in question or that could simply be serviced by extending the gravity sewers beyond the drainage area limit, must be included when considering the hydraulic design and design flows. The final design must be based on the drainage area which meet the approval of the Town. Sanitary drainage plans identifying the internal and external catchment areas will be required.

6.2.2 Average Daily Flow

Average daily domestic flow is 450 L/day/person (excluding extraneous flows).

Proper design flows are required for any development. Below are typical design flow criteria for residential, commercial and industrial areas. Due to the highly variable nature of peak and average flow rates for commercial and industrial establishments, actual flow records should be used from similar land uses whenever possible. When a study has not been already completed, the Consultant may refer to the most current Ministry of the Environment Guidelines. The Town must approve all rates used in the sewer design. The design flows shall be for present and future conditions.

For developments that are making use of the Wastewater Allocation Protocol, average daily flows may be considered to a low limit of 360 L/s/d. Consultation with the Town will be required under these circumstances.

6.2.3 Design Population

[Table 6-1 Equivalent Population Densities](#) provides a summary of the design population densities and average unit sewage flows. These values should be used for the design of all new developments within the Town.

The population in the table below may not exceed the population/Ha values that exist in the Town's overall sanitary system (Design MOE and Capacity Analysis 2025).

Table 6-1 Equivalent Population Densities

Land Use	Average Daily Flow (m ³ /ha/d)	Population Density (ppha)
Residential ⁽¹⁾	9.2 - 23	Malden Trunk = 48.7 Normandy N of 6 th Conc. = 51 Normandy S of 6 th Conc. = 20.4
Commercial ⁽¹⁾	28	62
Light Industrial (Employment) ⁽¹⁾	35	78
Mixed Use ⁽¹⁾	36	80
Neighbourhood Centre ⁽¹⁾	28	62
Park/Open Space ⁽¹⁾	1.4	3
Recreation Complex ⁽²⁾	4.2	9
Golf Course ⁽³⁾	0.38	4
Institutional Cemetery ⁽¹⁾ School ⁽⁴⁾	0.12	0.3 165 - 165 student/ha
SWM Facilities and Natural Areas	0	0

Notes:

* ppha = people per hectare | ppu = people per dwelling unit

(1) Average Sewage Flow per area and equivalent population density with 450 L/cap/d

(2) Recreation Complex Average Sewage Flow = 100 L/person/d (2,500 people over 58.9 ha)

(3) Golf Average Sewage Flow = 95 L/person/d (300 people over 74.7 ha)

(4) School Average Sewage Flow = 140 L/student/d (500 students/grade school, 1500 students/high school)

Residential population densities shall be calculated using the persons per dwelling unit below:

Single Family Detached Dwelling	3.5 ppu
Semi-Detached Dwelling	2.5 ppu
Townhouses and Apartments	2.0 ppu



6.2.4 Peak Flow

Peak domestic flow is to be calculated using the following formula:

$$Q_P = \frac{P * q * M}{86.4} + (I * A)$$

Where

Q_P	= Peak residential sanitary sewage flow, including peak extraneous flows (L/s)
P	= Design population (in thousands) Design Population
q	= Average Daily domestic flow per capita (L/day/person) Average Daily Flow
M	= Peaking Factor (from Harmon Formula or Babbitt Formula) Peaking Factor
I	= Peak extraneous flow (L/s/ha) Extraneous Flows
A	= Drainage area (ha) Drainage Areas

6.2.4.1 Peaking Factor

As per MECP Design Guideline for Sewage Works, 2008 (MOE Guidelines), the peaking factor, M, can be calculated using the Harmon Formula or the Babbitt Formula.

Harmon Formula

The Harmon Formula gives peaking factors that are more representative of peak hour.

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

Babbitt Formula

The Babbitt Formula gives peaking factors that are more representative of instantaneous peaks. It shall only be used to assess the upstream reaches of the sewershed where minimum scour is a concern for partial flow conditions where depth of flow is less than 30% of the pipe diameter.

$$M = \frac{5}{P^{0.2}}$$

Where

P	= Design population in thousands
-----	----------------------------------

The minimum permissible peaking factor M is 2.0 as per the MECP Guidelines.

6.2.5 Extraneous Flows

When designing a sanitary sewer system, an allowance should be made for the infiltration of groundwater into the sewers and sanitary service connections and for other extraneous water entering the sewers from sources such as maintenance hole covers (inflow).

The amount of groundwater leakage into the sewer system will vary with the quality of construction, type of joints, ground conditions, and level of groundwater in relation to pipe.

Although such infiltration can be reduced by proper design, construction, and maintenance, it cannot be completely eliminated, and an allowance should be made in the design sewage flows to incorporate this flow component.

An extraneous flow rate of 0.12 L/s/ha shall be used for sanitary sewer design if other data is unavailable.

The above rate assumes strict adherence to construction standards in the installations of sanitary sewers and building connections, and does not account for any other extraneous flows such as foundation drain connections, excessive flooding through maintenance hole covers, significant ground water problems, etc.

Where collection system infrastructure is being designed to convey flows from existing developed areas, the extraneous flow allowance used may be increased based on flow monitoring data and/or system modelling, as directed by the Town.

Where a sewer is located within the floodplain of a watercourse, maintenance hole covers are to be raised above the maximum flood elevations, or watertight maintenance hole cover with associated air vents may be required as directed by the Town.

6.2.6 Hydraulic Design Sheets

The design of sanitary sewers shall be completed using the Engineer's Sanitary Sewer Design Sheets and provided in the engineering drawings. The sewer design sheets shall be updated with the as-built drawings.

6.2.7 Pipe Diameter and Slopes

The minimum pipe diameter for sanitary sewers located within the Town shall be no less than 250 mm in diameter. The downstream sanitary sewer diameter shall be no less than the upstream sanitary sewer diameter. The minimum slopes for each sewer size shall be calculated to ensure that the minimum velocity is obtained.

Sanitary sewers must be increased in size when the capacity reaches 85%. The intent for the increase in size is to account for any future I/I as well as any potential blockages within the system.

A 200 mm sanitary sewer run at the upstream ends of the system may be allowed to ensure the velocity and wetted perimeter are maintained.

Minimum and Maximum Velocities

Sanitary sewers shall be designed such that:

Minimum Velocity	Maximum Velocity
0.76 m/s	3.0 m/s

The actual velocity at peak flow conditions should be calculated and the slope should be increased to ensure adequate flushing velocities are maintained. Minimum calculated velocities shall not exceed full flow velocities.

6.2.8 Hydraulic Grade Line

The Town sewage collection system is set up on a series of gravity pipes, lift stations, pump stations, and force mains. A select number of pump and lift stations have backup power as well as a gravity emergency overflow. These overflows outlet into adjacent drains and are based off of the normal water levels that existed at the time of the original design. The Hydraulic Grade Line (HGL) for the system is calculated based on these gravity overflows, assuming pump and/or power failure. The majority of the existing homes with basements at the time of original design have basement elevations above the HGL.

New sanitary systems that are designed and installed are to make all efforts to maintain a pipe elevation and system design such that the HGL is below proposed basement elevations. In these cases, the sanitary connection pipe elevation is to be set such that the springline of the connection at the property line is at or above the HGL. In cases where the HGL is above the basement elevation minus 0.15m, a sewage ejector pump will be required. Sewage ejector pumps are recommended in all other instances for redundancy. Owners and builders are to follow all other requirements of the Ontario Building Code with regards to private property construction.

The calculated HGL for development shall be identified on the plan and profile drawings, as well as on the individual Lot Grading Sheets with a note stating the conditions in which a sewage ejector pump would be required. During construction, it is the responsibility of the Owner and their Engineer to confirm that the elevation of the sanitary connection at the property line for each lot is at the appropriate grade (i.e. above the HGL).

6.2.9 Pipe Capacity Formula

Pipe capacity is to be calculated using Chézy-Manning's formula.

Chézy-Manning Formula

$$Q_{FULL} = \frac{A * R^{\frac{2}{3}} * S^{\frac{1}{2}}}{n}$$

Where

Q_{FULL}	= Flow capacity of sewer (m ³ /s)
A	= Cross sectional area of the pipe (m ²)
R	= Hydraulic radius of the pipe (m)
S	= Sewer slope (m/m)
n	= Manning's roughness coefficient (n = 0.013)

6.2.10 Changes in Pipe Size

Where an increase in pipe size occurs at the downstream side of the maintenance hole, maintain obverts of incoming and outgoing pipes at the same elevation if possible. This practice is effective in minimizing hydraulic losses across maintenance holes and reduces the probability of sanitary sewage backup in the collection system.

6.2.11 Hydraulic Losses at Maintenance Holes, and Junction Chambers

Maintenance Hole Type	Hydraulic Losses
Straight Run	Grade of Sewer
45 degrees turn or less	0.03 m
45 degree turn to 90 degree turn	0.06 m

6.2.12 Pipe Crossing and Clearance

Sanitary sewers and watermains located parallel to each other shall be constructed in separate trenches, maintaining a minimum clear horizontal separation distance of 2.5 m from outside edge to outside edge of the pipe. When it is not possible to maintain a separate trench and the minimum horizontal separation distance, the crown of the sewer should be at least 0.5m below the invert of the watermain and separated by in situ material or compacted backfill.

Where a crossing of a sanitary sewer and watermain is required, the watermain should cross above the sewer whenever possible. Whether the watermain crosses above or below the sewer, a minimum vertical distance of 0.5 m between the outside edge of the watermain and the outside edge of the sewer should be provided to allow for proper bedding and structural support of the watermain and sewer pipes.

Sufficient structural support for the sewer pipes should be provided to prevent excessive deflection of the joints and settling. The length of water pipe should be centered at the point of crossing so that joints in the watermain will be equidistant, and as far as possible from the sewer. The crossing should be perpendicular if possible. When it is impossible to obtain proper horizontal and vertical separation as stipulated above, one of the following methods should be satisfied:

- The sewer should be designed and constructed equal to the water pipe and should be pressure tested at 320 kPa (46 psi) to assure water-tightness; and/or,
- Either the watermain or the sewer line should be encased in a watertight carrier pipe which extends 3 m (10 feet) on both sides of the crossing, measured perpendicular to the watermain.

6.2.13 Separation Between Sanitary Sewers and Storm Sewers

A minimum clearance of 0.5 m between the obvert of the sanitary sewer and the invert of the storm sewer shall be provided if the sanitary sewer connections are required to go under the storm sewer. The minimum horizontal clearance between the outside walls of the adjacent sewer pipes shall be 0.8 m.

6.2.14 Sanitary Sewer Minimum Cover

The minimum depth of cover over sanitary sewers shall be 2.4 m, measured from the sewer obvert to the finished road or ground surface elevation. The sanitary sewer main should be installed at a depth to prevent frost damage and also allow for gravity drainage of at least 2% from basements. Generally, sewers placed between 0.9 to 1.5 m below basement floor elevation

will allow for sufficient drainage and cover; however, it is the responsibility of the Consultant to determine the nature of each development to ensure depths are sufficient for servicing. In special cases where the minimum cover is not feasible, approval may be given for a lesser depth of cover subject to the provision of frost protection, as deemed necessary by the Town.

6.2.15 Trench Requirements

Trench and backfill requirements are to follow Applicable Standard L-CP-03 or L-CP-04. If these details are not applicable, then OPSD Division 800 will govern.

6.2.16 Dedications or Easements

The minimum width of easements for sanitary sewers shall be in accordance with the following guidelines:

Depth of Invert	Minimum Width of Easement
Less than 5.0 m	6.1 m
Greater than 5.0 m	6.1 m + depth greater than 5.0 m

6.2.17 Sanitary Maintenance Holes

6.2.17.1 General Requirements

Maintenance Holes shall be a minimum diameter of 1200 mm. Applicable Standard Drawing OPSD 701.010, 401.02 and 401.01.

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 shall not be permitted.

Watertight maintenance holes and sealed maintenance hole lids are required. A high-performance waterproofing barrier is required at every joint within the maintenance hole as well as the rings.

6.2.17.2 Location and Spacing

Maintenance holes shall be provided at the beginning of each sewer line, at a change in alignment, grade, and material and at all junctions (except in curvilinear installations).

Maintenance holes shall generally be located between wheel tracks to avoid undue impact loads, as per Town standards. Maintenance holes shall be located, wherever possible, at least 1.5 m clear of any other service. The maximum distance between maintenance holes for 250 mm diameter sewers shall be 110 m.

6.2.17.3 Drop Inlet Structures

Internal Bowl Drop structures are to be used where the invert levels of the inlet and outlet sewers differ by greater than 600 mm. Drop maintenance holes shall be used in accordance with Standard Drawing L-CU-05.

Drop structure connections must not interfere with access, ladders or safety grates in any way.

When drop structures are required, the maintenance hole shall not be less than 1500mm.

6.2.17.4 Rain Catchers

All sanitary maintenance hole are to include the installation of rain catchers (also known as turtle shells) in the frame cover. Rain catchers cannot be installed with maintenance hole cover riser rings.

6.2.17.5 Raising Maintenance Hole Frame and Covers

The Town requires that maintenance hole frame and covers are raised at the time of surface asphalt paving. This involves circular core hole cutting in the base asphalt around the frame and cover, and the use of concrete rings and parging to raise the entire frame and cover. Material to be approved by the Town.

6.2.17.6 Back Flow Preventors

When installing any type of back flow preventers, installations must follow the manufactures specifications. 1500mm diameter is the minimum size permitted for maintenance holes with any type of back flow preventer. Depending on the scenario, discussions should be made with the Town regarding a possible twin maintenance hole opening.

6.2.18 Pipe Material and Specifications

The following pipe materials are permitted to be used for sanitary sewers:

- Polyvinylchloride;
- Reinforced concrete; and,
- High Density Polyethylene (450mm and larger).

Pipe specifications shall conform to the current OPSS.

The designer shall ensure that appropriate pipe material is used for industrial sewers where maximum resistance to corrosion is desirable. Bedding and trench materials and installation details shall conform to current Town specifications.

6.2.19 Sanitary Service Connections

One sanitary service connection must be provided per development lot.

Sanitary lateral connections for pre-serviced lots are to be located at the centerline of the lot, temporarily capped and marked with a 2" x 4" extending to the pipe, and painted purple. Service connection pipes shall be colour coded green to avoid cross connections. Colour coding method includes pipe colour, wrapping, demarcation tape, or stenciling.

Also, a detailed sanitary service connection as-built record, as part of the lot grading sheets, shall be submitted to the Town with GPS coordinate and invert elevations.

All connections to new sanitary mains shall be approved factory made tees. Connections to existing sanitary sewer shall be made with approved factory made tees or saddles in strict accordance to manufactures guidelines.

A sanitary inspection (sampling) maintenance hole as per OPSS is to be provided for all commercial, institutional and industrial developments. The maintenance holes are to be located in an accessible location within the project's boundaries. All sanitary services shall be installed with traceable appurtenances to the satisfaction of the Town.

6.2.20 Minimum Service Pipe Diameter, Grade and Depth of Cover

The minimum diameter of service connections shall be as follows:

Residential Unit	Commercial/Industrial/Institutional
125 mm	150 mm

The minimum requirements for cover:

- Elevation of spring line at the property line is to be at or above the hydraulic grade line;
- Cover at the property line is to be no less than 1.2 m; and,
- In situations where the hydraulic grade line is below 2.4 m, the elevation of the connection at the property line is to be between 2.4 m and 2.7 m deep.

All service connections shall be constructed at a minimum grade of 2% and a maximum grade of 8%. If grades less than 2% are proposed, approval from the Town is required. Risers shall be utilized when the invert depth of the sewer main exceeds 4.25 m deep and will not exceed 3 m in height. Risers shall be installed at the time of construction of the sewer mains and in accordance with the standard drawings. Risers shall be firmly supported and anchored to the

trench wall in a manner that will minimize the possibility of damage to the riser by the backfilling operations or by settlement. Supports and anchors are to be the satisfaction of the Town. A tee or wye connection may be allowed to service two lots if permitted by the Town, however one (1) service per lot is preferred. Direct connections to maintenance holes will not be permitted.

6.2.21 Pipe Materials for Service Connections

The following pipe materials are permitted to be used for service connections:

- Polyvinylchloride;
- Tee fittings only at cleanout (no Tee-Wyes or Wyes are permitted).

Pipe specifications shall conform to current OPSS and the Town Approved product list. Steel caps are required on the cleanouts at the final grade in both driveways and grass areas for each lot.

6.3 Forcemains

6.3.1 Minimum Diameter

The minimum diameter of forcemains shall not be less than 100 mm in diameter unless otherwise approved by the Town. The forcemain is to be designed in conjunction with the long range capacity of the pumping station. Forcemains that outlet within close proximity to the pump station shall make all efforts to minimize road crossings.

6.3.2 Velocity and Transient Analysis

Forcemain velocities shall range from 0.8 m/s to 2.5 m/s. These velocities are sufficient to re-suspend the solids in the forcemains which have settled out when the pumps are not operating. Forcemains shall be designed to the design pressure and must withstand sudden surges in pressure. A transient analysis for all forcemains over 150 mm diameter will be required and must be attached to the design brief. The use of surge tanks and valves with adjustable rate of closure or other suitable means shall be evaluated.

6.3.3 Materials

In the case of directional drilling: only black or purple fused SDR 28 polyvinylchloride or fused high density polyethylene are permitted to be used for forcemains. In the case of open cut, only purple fused SDR 28 polyvinylchloride bell and spigot shall be used, with all necessary restrainers.

All forcemain integrity is to be evaluated and confirmed with both a pressure and leakage test as per the Design Engineer. Isolation valves shall be installed on long forcemains and be placed in conjunction with air or vacuum valves in the same chamber. The Town requires the use of a

temporary riser to conduct the pressure test; the temporary riser is to be removed after the test is complete. The Engineer is to sign off on satisfactory installation and testing of forcemains.

6.3.4 Air Release Valves

Low pressure double acting air release valves, or approved equal, shall be installed at high points in the forcemain to prevent air locking. Vacuum relief valves may be necessary to relieve negative pressures on forcemains. The designer shall evaluate the forcemain configuration and head conditions to determine areas where negative pressures will be anticipated, and design for pressure relief.

6.3.5 Bedding and Installation

Bedding materials and installation details for forcemains shall conform to current Town Approved Drawing L-CU-03 or L-CU-04.

6.3.6 Tracer Wire

Tracer wire shall be installed on all forcemains for “locate” purposes. Tracer wire shall be brought to the surface using 50 mm diameter valve boxes spaced at 300 m intervals along the forcemain for locating purposes. Tracer Wire shall be #12 AWG high-strength copper clad steel insulated with a 30 mil, high density polyethylene insulation, blue in colour and installed in such a manner that allows for proper access for connecting of line tracing equipment, proper locating of wire without loss or deterioration of low frequency signal, and without distortion of signal caused by multiple wires being installed in close proximity.

A continuous length of wire must be used. If the wire must be joined, only the approved connectors shall be used and installed per manufacturer’s instructions. To ensure there is no damage to the tracer wire during or after construction, the Town’s Representative shall perform a continuity test on the wire. If the Town’s Representative finds a problem with continuity or installation of the tracer wire, the Contractor/Owner shall be responsible for the repair, at no cost of the Town.

6.3.7 Emerging Technologies

The use of emerging technologies in sanitary sewage collection system design may be considered by the Town on a case-by-case basis. Due to the nature of emerging technologies, there is typically a lack of available monitoring data or design guidelines. As such, it is incumbent upon the proponent or Consulting Engineer to provide complete supporting calculations when submitting sanitary system designs utilizing emerging technologies. A pre-consultation meeting with the Town is used to discuss emerging technologies (as applicable) and to review the

proposed design, and to establish any specific requirements. All submissions employing sanitary collection system design with emerging technologies will be reviewed by the Town and other regulating agencies on a site-by-site basis.

6.4 Cross Connections

No stormwater from any source, including sump pumps, roof drains and foundation drains, shall be connected to the sanitary sewer. Every effort should be made to have such connections redirected to overland flow or the storm drainage system.

Charges will be incurred to the offender in events of improper connection to the sanitary system as follows:

During Servicing	During Home Construction
Storm connection to sanitary system resulting in above-average flows downstream will be deducted from the performance securities.	Storm connecting to sanitary connections will result in a deduction from the Bond Return through the building permit process and user fee by-law.

6.5 Flow Monitoring

Flow monitoring may be required for a development to ensure that no I/I is present in the system, during the construction of services, as well as the buildout of the project. The costs to monitor any flow within the sanitary sewer as a result of I/I will be borne by the Owner as described in the Agreement.

6.6 Testing Requirements for Sanitary Sewers

Below are the minimum sewer testing requirements:

1. Conform to the current OPSS material specifications;
2. All PVC and HDPE mainline pipes of any size shall be tested by pulling mandrill as per OPSD;
3. Air pressure tests will be performed on all mainline and lateral connections;
4. The mainline and all the connections shall be inspected through Closed Caption Television (CCTV) Sewer Inspection:
 - Where practical, the CCTV inspection shall be conducted in a manner that provided unobstructed view of the entire pipe. The pipe should be free of debris, obstruction, and water filled sags that impede visibility. Sewer runs and laterals that were cleaned but still have debris/obstructions should be re-cleaned and re-inspected;

- All camera inspections shall be provided to the Town for review and acceptance; and,
 - No sag, deflection dip, or reverse grade of any magnitude is permitted. All deficiencies identified shall be remediated and re-inspected to confirm the repair has been completed to the satisfaction of the Town;
5. Depending on the site characteristics the Owner may be required to perform:
- Infiltration tests, or,
 - Exfiltration tests.

6.7 Septic Systems

Development of private sewage treatment systems are not permitted within Urban Areas as defined by the [Town of LaSalle Official Plan](#).



7 Storm Sewers

7.1 General

The purpose of this section is to provide a guide for storm drainage, to establish uniform design guidelines of the minimum standards, and to improve processing of site plan and plan of subdivision applications for approval in the Town.

Technological or economical deviations which improve or maintain the quality of the design will be considered and must be approved by the Town. Changes and revisions may be made to these policies and guidelines from time to time and it is the responsibility of the Owner or the Owner's Consulting Engineer to obtain and make use of the latest version available at the time of engineering design.

This document does not provide guidance on the selection of storm drainage or management technologies required to meet specific drainage or environmental objectives.

7.1.1 Subwatershed Plan

The existing environmental conditions within the subwatershed are identified and defined through a series of technical studies. Alternative subwatershed management strategies are developed and evaluated to determine the preferred strategy to implement in terms of achieving the established goals and objectives. Based on the preferred alternative, recommendations are prepared that will specify areas for protection, restoration and/or enhancement.

Finally, a plan is proposed that will ensure that the recommendations are implemented. Environmentally sound land use designations and development policies are ensured as the information from the subwatershed plan is incorporated into the planning documents. The Consultant Engineer is to confirm the drainage area at the time of the functional servicing report by way of current survey data, and not based solely on previous and possibly outdated reports.

7.2 Design Considerations

This section discusses the considerations and design guidelines to the storm drainage system including foundation drains, the minor system (storm sewers), major system (roads and swales), bridges and culverts, watercourses, and easements and buffers. When contracting on private property, construction materials and practices must be in accordance with the [Ontario Building Code \(OBC\)](#), the Town's standards and [Section 4 | Lot Grading](#) of this manual.

Storm sewers shall be provided on all roads with curb and gutter. It is the Engineer's responsibility to ensure that the design of storm drainage systems conforms to the current Windsor/Essex Region SWM Manual, beyond what is addressed in this section.

In all cases, the Engineer is to confirm that the downstream outlet is considered sufficient to accept the proposal flows without causing any negative impact downstream of the outlet or upstream of the outlet.



7.2.1 Design Flow

Storm sewer systems shall be designed to convey the 1:5 year (minimum) design storm using the Rational Formula for stormwater runoff, IDF regression and curves, as well as all necessary runoff coefficients for rainfall intensity as stated in the Windsor/Essex Region SWM Standards Manual (WERSM), unless otherwise approved or directed by the Town.

Under no circumstances shall the storm system be designed in a surcharged condition under the post development 1:5 year storm event. Hydraulic sizing must be found using Manning's Equation ($n = 0.013$) as described in the WERSM. The storm sewer capacity shall be calculated as described in WERSM.

Table 7-1 Runoff Coefficients

Proposed Land Use	Runoff Coefficients
Chrysler Canada Greenway Extension/Hydro Corridor	0.30
Employment	0.80
Golf Course	0.20
Highway Commercial	0.90
Institutional Heavenly Rest Cemetery (29.8 Ha)	0.20
Institutional Other (4.9 Ha) (assumed school)	0.60
Neighbourhood Centre	0.90
Park/Open Space	0.20
Recreation Complex ⁽¹⁾	0.60
Residential Single Family	0.60
Residential Semi-Detached	0.70
Residential Townhouse/Row Housing	0.80
School	0.60
Stormwater Management Pond	--
Town Centre (Mixed Use)	0.90
Woodlot/Natural Corridors	0.15

Notes:

(1) Assumed combined runoff coefficient - confirm once more details are available.

These runoff coefficients are general and can vary based on development, thus the runoff will need to be determined based on actual or proposed conditions. For individual runoff coefficients associated with specific surface types, please refer to the WERSM.

7.2.2 Service Areas

The drainage system shall be designed to accommodate all upstream drainage areas plus any external area tributary to the system for the existing, interim and ultimate development conditions, as determined by the delineation of appropriate topographic mapping and the preparation of drainage plans.

7.2.3 Flow Velocity

Sewers should be designed such that:

Minimum Velocity	Maximum Velocity
0.80 m/s	3.66 m/s

7.2.4 Storm Sewers Minimum Cover

A minimum 1.2 m cover below grade to top of pipe shall be provided for storm sewers. Under certain conditions where sufficient cover is not feasible, shallow insulated pipes may be permitted subject to review by the Town.

7.2.5 Pipe Crossing and Clearance

A minimum clearance of 500 mm between the obvert of the sanitary sewer and the invert of the storm sewer shall be provided if the sanitary sewer connections are required to go under the storm sewer.

The minimum horizontal clearance between the outside walls of the adjacent sewer pipes shall be 0.8 m. On crescent roads or roads with numerous bends, the sewer position may generally follow the same relative side of the road allowance.

The minimum clearance from a sewer to a watermain shall be 2.5 m horizontally and 0.5 m vertically.

7.2.6 Trench Requirements

Trench and backfill requirements are to follow Applicable Standard L-CU-03 or L-CU-04. If these details are not applicable, then OPSD Division 800 will govern, and approved by the Town.

7.2.7 Storm Maintenance Holes

7.2.7.1 General Requirements

Maintenance holes shall be a minimum diameter of 1200 mm or 1200 mm x 1200 mm precast or poured in place concrete with precast or poured bases in accordance with the OPSD drawings 701.01, 401.02 and 401.01.

Watertight maintenance holes and sealed maintenance hole lids are required where structures are below the expected groundwater table and in areas prone to ponding and/or flooding.

7.2.7.2 Location and Spacing

Maintenance holes shall be provided at the beginning of each sewer line, at a change in alignment, grade, and material and at all junctions (except in curvilinear installations).

Maintenance hole frame and covers shall be located away from the normal wheel track to avoid undue impact loads.

Maintenance holes shall be located, wherever possible at least 1.5 m clear of any other service and/or the face of the curb. The maximum distance between maintenance holes shall be 120 m for a pipe diameter less than 1200 mm, and 150 m for pipe diameter 1200 mm or larger.

The maximum change in direction is 90 degrees for pipes 900 mm and smaller, and 45 degrees for pipes over 900 mm.

The minimum allowances for hydraulic losses incurred at maintenance holes shall be as follows:

Maintenance Hole Type	Hydraulic Losses
Straight Run	0 mm
45 degrees turn or less	50 mm
45 degree turn to 90 degree turn	100 mm

7.2.8 Catchbasins

Catchbasins (CB) shall be located upstream of pedestrian crossings, at street intersections such as to avoid driveways, sidewalks, and walkways and, where possible to outlet into maintenance holes. The Consultant is to specify and show the OPSD (400.020, 400.081, 400.082, 400.100 and 401.080 as applicable) specifications for catchbasins and catchbasin frame and cover, as part of the engineering drawings.

Curb inlet catchbasins are required for all new developments unless approved otherwise by the Town. Standard catchbasins may be specified by the Town in certain circumstances depending on existing conditions, active use facilities, and other utilities.

All CB styles shall be designed based on the applicable OPSD. Any proposed special CB and inlet structures must be approved by the Town. Due to maintenance issues, sump pit/rear yard CBs are typically not permitted by the Town within the R.O.W. limits except when other options are not feasible. Wherever possible, site grading should be designed in such a way that sump pit CBs are not required. Curb Inlet CBs (CICBs) are to be used on active transportation facilities.

Catchbasins shall not be more than 90 m apart (each side of the road is considered separately) or not more than 90 m distant from any high point, provided that no further drainage other than the high point to the catchbasin is directed to the catchbasin. Catchbasin locations shall not conflict with existing or future driveways. Double inlet CBs (DICBs) may be spaced no more than 180 meters apart.

The maximum drainage area for any CB shall be 380 m² of paved area or 1500 m² of grassed area. Additional CB may be required at road intersections, elbows, and cul-de-sacs to facilitate satisfactory drainage.

7.2.8.1 Leads

The lead size for CB shall be as follows:

- 250 mm diameter with a 0.44 % minimum slope for single CBs;
- 300 mm diameter with a 0.34 % minimum slope for DICBs; and,
- 200 diameter with a 0.1 % minimum slope for rear yard CBs.

7.2.8.2 Inlet Control Devices

Inlet control devices (ICD's) shall be installed where the inlet capacity must be regulated. ICD's such as orifice plates or other flow control devices are to be permanently attached to the storm structure in parking lots. The minimum orifice diameter shall be 75 mm.

7.2.8.3 Temporary Catchbasin Sediment Control

Temporary catchbasin filter socks or bags may be required to be installed at the time of base asphalt and be maintained until surface asphalt is placed. The purpose is to provide sediment control during the house construction period. Material to be approved by the Town.

7.2.9 Pipe Material and Specifications

The following pipe materials are permitted to be used for storm sewers:

- Concrete;
- Polyvinylchloride (PVC); and,
- High Density Polyethylene (HDPE) (320 kPa).

The designer shall ensure that appropriate pipe material is used for industrial sewers where maximum resistance to corrosion is desirable.

7.2.10 Private Storm Sewer Connections

The connection of sanitary sewers and drains to the storm sewer is **strictly prohibited**.

When designing private storm connections in the Town, several factors must be accounted for, including:

- The pipes for private storm sewer connections must have a minimum diameter of 150 mm;
- Steel cleanout caps are to be used (at all times);
- A minimum cover of 1.2 m from the grade line to the top of the pipe;
- A minimum grade of 2.0 % must be maintained; and,
- Service Connection pipes shall be colour coded white to avoid cross connections. Colour coding method includes pipe colour, wrapping, demarcation tape, or stenciling.

7.2.11 Joints

All concrete and PVC pipes shall have rubber gasket joints.

7.2.12 Flap Gates

Flap gates must be installed where applicable or when directed by the Town. The material and specifications will be selected by the Town at the time of design or implementation, typically bronze seated is preferred, however, this may change.

7.2.13 Testing Requirements for Storm Sewers

Below are the minimum sewer testing requirements:

1. Conform to the current OPSS material specifications;
2. All PVC and HDPE mainline pipes of any size shall be tested by pulling a mandrill as per OPSS;
3. Air pressure tests will be performed on all mainline and lateral connections as per the applicable OPSS;
4. The mainline and all the connections shall be inspected through Closed Caption Television (CCTV) Sewer Inspection;
 - a. Where practical, the CCTV inspection shall be conducted in a manner that provided unobstructed view of the entire pipe. The pipe should be free of debris, obstruction, and water filled sags that impede visibility. Sewer runs and laterals that were cleaned but still have debris/obstructions should be re-cleaned and re-inspected;
 - b. All camera inspections shall be provided to the Town for review and acceptance;
 - c. No sag, deflection dip, or reverse grade of any magnitude is permitted. All deficiencies identified shall be remediated and re-inspected to confirm the repair has been completed to the satisfaction of the Town;
5. Depending on the site characteristics the Owner may be required to perform;
 - a. Infiltration tests, or,
 - b. Exfiltration tests.

7.3 Overland Flow

7.3.1 Overland Flow on Roads

Road grading must direct flows from the right-of-way to a safe outlet at specified low points. Outlets can be walkways or open sections of road leading to open spaces, river valleys, or SWM facilities. Roads that are to be used for major overland flow conveyance during the 100-year storm event are subject to the following depth constraints:

Location	Maximum Ponding Depth
Local Roads	0.3 m above the lowest catchbasin
Collector Road	Single lane to remain dry
Arterial Road	Two lanes to remain dry

7.3.2 Overland Flow in Channels

Overland flow channels shall be designed to convey the regulatory storm peak flow without flooding adjacent private properties. Appropriate stabilization shall be provided to protect against velocity conditions experienced during the Regulatory storm and calculations shall be provided to the Town for review and approval.

The maximum velocities during the 1:5 year and regulatory storms shall be 1.5 m/s and 2.5 m/s, respectively for grass lined channels. Channels expected to experience higher flow velocities shall be stabilized using other measures approved by the Town, such as soil reinforcement or stone lining. Calculations, using the Maximum Permissible Tractive Force method ([MTO Drainage Management Manual](#), Section 5), shall be provided to the Town and the Conservation Authority for review.

7.3.3 Conveyance of Flow from Road to SWM Facility or Channel

The Consultant must demonstrate that overland flows during the regulatory storm can be safely conveyed from the road allowance to a SWM facility or open channel without flooding adjacent private properties.

Overland flows may be routed as follows:

- a) Overland flow may be routed over the curb and boulevard. The Consultant must demonstrate that sufficient hydraulic capacity exists using the broad-crested weir equation. The flow route from the boulevard into the SWM facility or open channel must be stabilized to prevent slope erosion;
- b) Overland flow must be contained within publicly owned lands;
- c) Overland flow must be captured and piped at the major system low point(s) on the roadway unless the Consultant can demonstrate that the flow can be conveyed by other means to the satisfaction of the Town; and,
- d) The Consultant must demonstrate that the inlet grates required to capture the major system flow have sufficient hydraulic capacity assuming 50% bar area and blockage of opening.

7.3.4 Outfall Channels

7.3.4.1 General

The following general principles are to be applied when designing storm sewer or foundation drainage collection (FDC) outfalls to a natural watercourse:

- a) Headwall designs shall conform to the applicable OPSD. Pipes 900 mm in diameter or greater shall be complemented by armour stone wing walls. Headwall grates, as per OPSD, shall be specified for all headwalls;
- b) Headwalls shall be protected by a 1200 mm height black vinyl chain link fence, and the posts shall be cored into the concrete headwall and/or armour stone wing walls;
- c) All exposed concrete faces and surface treatment shall conform with Town Standards; and,
- d) All outfalls to a watercourse require a permit from the Conservation Authority.

7.3.4.2 Hydraulics

The following hydraulic considerations are to be incorporated to all outfall channel designs:

- a) To minimize erosion, outfall channels shall be extended from the headwall to the natural watercourse. The outfall channel shall be designed, where possible, such that flow in the outlet channel is tangential to the flow in the natural watercourse at the confluence. The outfall channel shall tie into the natural watercourse at or above the normal water level in the watercourse (where possible);
- b) Discharge onto steep slopes (above 8%) is not permitted;
- c) Outfall channels shall be designed to withstand the erosive forces experienced under the design storm event. Calculations, using the Maximum Permissible Tractive Force method ([MTO Drainage Management Manual](#), Section 5), shall be provided to the Town and the Conservation Authority for review; and,
- d) Tailwater impacts of the natural watercourse shall be accounted for in the design of the outfall channel, control structures and upstream storm sewer/FDC systems.

7.4 Bridges and Culverts

Culverts and bridges crossing arterial roads must be designed to prevent overtopping during the 100-year storm. Under certain circumstances the Town may request protection from overtopping for the regional storm. In addition, bridges and culverts shall be designed so there is no increase in the Regulatory flood conditions of the watercourse. All culverts shall be supplied with headwall end protection constructed of interlocking wall systems, concrete, and armor stone or other material approved by the Town.

The following design flood frequency shall apply to road crossings unless otherwise directed by the Town. Culverts and road elevations shall be designed accordingly to meet the flood design guidelines:

Road Classification	Design Flood Frequency
Arterial	1:100 Year
Collector	1:50 Year
Local	1:25 Year
Temporary Detour	1:10 Year
Driveway	1:10 Year

7.4.1 Roadside Ditches and Culverts

When designing a rural road cross section, the design of roadside ditches shall consider the following:

- Ditch inverts shall be located a minimum of 0.15 m and a maximum of 0.50 m below the roadway subgrade elevation. Where the minimum of 0.15 m cannot be met, a ditch subdrain will be required and shall outlet to the ditch once the minimum depth criterion is met;
- The minimum longitudinal ditch gradient shall be 0.4% (wherever possible);
- Boulevard catchbasins are to be installed between each driveway approach;
- Ditch protection shall consist of 200 mm topsoil and staked sod or hydro seed with erosion protection on the side slopes and bottom of the ditch. In the event that the 1:5 year storm velocity in the ditch exceeds 1.5 m/s, or the regulatory storm velocity exceeds 2.5 m/s, the ditches shall be stabilized using other measures approved by the Town such as soil reinforcement or stone lining; and,
- All roadside ditches shall transport runoff to a safe outlet, such as a stormwater management facility or natural watercourse, approved by the Town.

The design of culverts shall consider the following:

- a) Entrance or driveway culverts must have a minimum size of 375 mm (320 kPa HDPE) with appropriate end treatment and be sized to convey the 10-year event (minimum) without overtopping unless otherwise directed by the Town;
- b) A minimum of 300 mm cover shall be provided at the edge of the shoulders; and,
- c) End protection shall be provided on all driveway culverts, including metal aprons, concrete, pressure treated timbers, concrete headwalls or precast stones.

The Owner is required to retain an Engineer in order to design, prepare and sign off on all drawings associated with the roadside ditch and culvert.

The Engineer is required to include the following information in the engineering drawings:

- a) Side view of the infill, and cross-section of the ditch and culvert;
- b) Number and placement of catchbasins;
- c) Location of driveway, and house;
- d) Pipe size and slope;
- e) Slope of the ditch and direction of drainage; and,
- f) All the information as described above.

Roadside ditch on a municipal drain must be completed through the Drainage Act.

7.4.2 Endwalls Treatment

Endwall treatment shall be as per Town Standards and be included on the engineering drawings. The details provided shall include the existing topography, proposed grading and the works necessary to protect against erosion. Headwalls are to be architectural finished blocks with approved shop drawings.

7.4.3 Erosion Protection

Armour stone, Gabion stone and/or concrete shall be provided at all inlets and outlets to protect against erosion of the watercourse and provide embankment stability. The maximum allowable target channel velocity shall be in accordance with the [MTO Drainage Management Manual](#) (Section 5).

7.5 Watercourses

Watercourses and associated floodplains shall be capable of handling the Regulatory flood run-off as determined by the Conservation Authority.

7.6 Dedications and Easements

The minimum width of dedications or easements for storm sewers shall be in accordance with the following guidelines:

Size of Pipe	Depth of Invert	Minimum Width of Easement
375 to 1500 mm	3.0 m Maximum	6.1 m
1650 mm and larger	4.0 m Maximum	4.0 m plus 3 times O.D. of pipe
Open Channel	N/A	6.1 m on each side of top of bank

Dedications or Easement plans shall be reviewed and approved by the Town on a case-by-case basis.

7.6.1 Municipal Drain Setbacks

In addition to satisfying any requirements of the Conservation Authority, no building or structure, other than a permeable fence, may be constructed within a setback of 8 m plus the depth of an open municipal drain, to a maximum of 15 m, measured horizontally and perpendicular from the top of bank. In the case where a municipal drain is covered, the minimum setback distance shall be 6 m from the centerline of the drain.

Notwithstanding the foregoing, a reduced setback may be permitted if approved by the Town Engineer.



8 Stormwater Management Plan

This section describes the Stormwater Management (SWM) policies and design guidelines regarding environmental protection, flood and erosion control. This section provides guidance on the design of SWM facilities as they may be applied to traditional urban design concepts as well as employing principles of low impact development and redevelopment. The SWM guidelines to be applied to proposed site plans are dependent upon the drainage area associated with the proposed development. It is also the Engineer's responsibility to ensure that the SWM design conforms to the current [Windsor/Essex Region Stormwater Manual \(WERSM\)](#).

For large scale development proposals, the Stormwater Management Plan may be done in two stages to avoid significant revisions to technical reports as detailed design evolves. The stages are outlined in [Section 8.1](#) and [Section 8.2](#) below.

8.1 Preliminary/Conceptual Design

The SWM Plan prepared at the preliminary or conceptual design stage is typically completed as a Functional Servicing Report or Preliminary SWM report or Functional SWM Report.

A Functional or Preliminary SWM Report focuses on the storm drainage system and its existing external/internal drainage, and the proposed stormwater quality and control facilities. The SWM Plan at the preliminary stage provides guidelines for the Draft Plan Approval Process and lays the groundwork for the detailed design stage. Thus, it must be circulated and accepted by the Conservation Authority and the Town.

8.2 Detailed Design

The SWM Plan prepared at the detailed design stage is referred to as the Stormwater Management Report. Its purpose is to provide details and supporting calculations associated with the detailed design of the minor and major drainage system and the required source, conveyance and end-of-pipe controls (i.e. SWM facilities) to achieve the criteria established. The SWM report is typically prepared following the issuance of the Draft Plan Conditions and is required for Plan of Subdivision Approval and Registration. Thus, it must be circulated and approved by the Conservation Authority and the Town.

8.3 Windsor/Essex Region Stormwater Manual (WERSM)

The [Windsor/Essex Region Stormwater Manual](#) was created in consultation with the Essex Region Conservation Authority (ERCA), and the local municipalities in this region. The manual provides

a minimum standard and consistent level of service and protection of the environment throughout the region.

The manual provides a clear, concise and consistent approach to stormwater design within the Windsor/Essex region, including the Town of LaSalle. In designing any developments in the Town, Consultants must conform to the standards outlined in this manual.

8.4 Howard/Bouffard Drainage Area

Development within the Howard/Bouffard Development Area is subject to review by the Town and the Conservation Authority with respect to SWM, for the purpose of ensuring conformity to the Howard Bouffard Master Drainage Study. At the time of this publication, the ultimate solution identified through the Study is not yet constructed and in place. As such, developments that rely on the ultimate solution that wish to develop in advance of its construction shall adhere to the policies established in the [Howard Bouffard Secondary Plan](#) that contemplate Multiple Approaches to Stormwater Management.

8.5 Turkey Creek Drainage Area

Developments or areas with direct drainage to Turkey Creek, the Cahill Drain, the Detroit River and west of Malden Road, require only quality control measures as discussed in the [Windsor/Essex Stormwater Management Manual](#), if conveyance to the drain is obtainable. Conveyance to these outlets will be designed to the same standard as discussed by the WERSM: for a 1:5 year event and 1:100 year overland flow.

8.6 Source and Conveyance Controls

With the exception of the municipal-specific guidelines identified in the sections below, the guidelines for the design of source and conveyance controls shall be in accordance with the governing guidelines which are currently documented in the [Stormwater Management Planning and Design Manual \(SWMPD\)](#) (MOE, 2003) and the [Windsor/Essex Stormwater Management Standards Manual](#) as a minimum.

8.6.1 Roof Leaders

Roof leaders should be directed to front or rear yard grassed areas wherever possible to promote infiltration and shall not discharge to impervious areas directly connected to the storm sewer (e.g. driveways, parking areas) unless there is no other feasible option. Roof leaders shall discharge to the ground surface via splash pads or extension pipes and flows shall be directed a minimum of 600 mm away from buildings such as to prevent ponding or seepage into the

weeping tile. Roof leader outlet locations shall be identified on the lot grading plan. Leaders connected directly to the storm system are to be as outlined in the Stormwater Management Plan. Details on connections to storm or splash block are to be clearly shown on the individual lot grading sheets. The impervious calculations for lots should not receive a reduction in impervious percentage due to disconnected roof leaders. All stormwater calculations shall be based on impervious percentages outlined in the WERSM.

8.6.2 Underground Storage

The use of underground storage is permitted. Underground storage may be used where surface SWM storage is not feasible, desired or the volume is not adequate (subject to acceptable geotechnical and hydrogeological investigations in support of the approach).

If the underground storage facility is designed for infiltration of road or parking lot runoff, a pretreatment structure shall be provided. The outlet structure shall be designed to meet the SWM control requirements. Any such facilities shall be readily accessible for any required maintenance activities. Operation and maintenance requirements for underground storage facilities shall be identified in the SWM report for the site and shall be implemented by the owner to ensure that the continued performance of the facility as designed is achieved.

The Consultant shall confirm ground water level through the geotechnical investigation to ensure infiltration methods are possible and confirm the system will not be accepting groundwater.

8.6.3 Rear Lot Ponding Areas

Rear lot ponding or other areas of extended ponding on residential lots is not permitted.

Rear yard ponding on commercial and institutional lots is permitted on the basis that these areas are usable green spaces during dry times and are intended on being regularly maintained.

8.6.4 Roadside Ditches (Industrial Areas Only)

Similar to natural channels, roadside ditches may be used as a flow filter and storm runoff detention area subject to flow conveyance design requirements and a minimum slope of 0.4%.

8.7 End-of-Pipe Controls

End-of-pipe control facilities shall provide the required quantity and quality control in accordance with the governing guidelines which are currently documented in the [Stormwater Management Planning and Design Manual](#) (MOE, 2003) and the [Windsor/Essex Stormwater Management Standards Manual](#), unless otherwise specified below by the Town.

8.8 Stormwater Management Facilities

Stormwater Management Facilities must be designed and implemented as per the [Windsor/Essex Stormwater Management Standards Manual](#). The Town prioritizes having regional SWM facilities that are built in accordance with master drainage studies, planning area functional servicing plans, and environmental assessments. Where these studies do not exist, the requirement will be for the owners of the developable lands to undertake the necessary studies to provide regional SWM solutions for the area. Subsequently, the owners of lands are required to enter into the necessary private cost sharing agreements for the construction of the facility. Best Efforts Clauses through development agreements with the Town will not occur. The Town does not allow small-scale individual SWM facilities in the form of traditional wet ponds. If regional SWM facilities are not a viable option as deemed by the Town, then alternative SWM solutions can be contemplated with the support of the Town.

An Operation and Maintenance Manual for the SWM facility shall be submitted to the Town for the site and shall be implemented by the owner to ensure that the continued performance of the facility as designed is achieved.

Stormwater Facilities are to be located in parks and greenspaces. Only one side of the pond may have rear lots backing onto them.

8.8.1 Wet and Dry Pond with Extended Detention

Wet ponds are typically the preferred end-of-pipe control facility for large drainage areas. Ponds shall be designed in accordance with the governing guidelines including the [Windsor/Essex Stormwater Management Standards Manual](#) and [Stormwater Management Planning and Design Manual](#) (MOE, 2003) unless otherwise specified in the Town's guidelines.

As part of the Town's guidelines, ponds are to:

- Act as an aesthetic feature;
- Be located within or adjacent to parks or on municipally owned lands;
- Have public pedestrian access with a pathway incorporated into the design;
- Include a pedestrian access pathway that also doubles as a maintenance path, and thus be designed to handle heavy loads from maintenance equipment; and,
- Dry ponds will be allowed in parks or green areas as a secondary means of storage.

8.8.2 Maintenance Access Roadway

Maintenance access roads are required to all inlets, outlet structures, sediment forebays, and sediment drying areas (if applicable) within the SWM facilities. Where feasible, two access points shall be provided from the municipal road allowance such that the access road is looped to key hydraulic features. In situations where this is not practical, dead end access roads shall be designed with a hammerhead turning area consisting of a minimum hammerhead width of 17.0 m and a 12.0 m centerline turning radius.

The maintenance access road shall consist of a minimum 300 mm of compacted granular "A" + 90 mm asphalt placed in two lifts at 4 m wide (or greater if recommended by a geotechnical engineer and approved by the Town). The access roads shall provide for all-weather ingress and egress. The access road shall double as a pedestrian path.

8.8.3 Fencing

A 1.5 m black fence shall be installed where the SWM facilities abut private lots and where required, fencing shall be installed as per Town's Standards.

8.8.4 Inlet Structures

Inlet structures shall be installed submerged so that the obvert of the pipe lies below the maximum anticipated thickness of ice. Inlet structures installed with the invert set to the normal water level (NWL) or higher shall have an architectural headwall. Suitable erosion control and energy dissipation treatment shall be provided at all inlets to the pond. Headwalls and safety grating shall be installed at all inlets as per the applicable OPSD. SWM pond inlet elevations are to be designed such that the 1:5 year storm design sewer is maintained and not reduced due to tailwater conditions. Rodent grates shall be installed on all inlet or outlet pipes that are not fully submerged.

8.8.5 Major System Overland Flow Routes

The major system overland flow route shall be designed to safely convey the regulatory 100-year storm to the SWM facility. Should the overland flow route to the SWM facility consist of the access road and path, then the flow depth shall not exceed 0.3 m or a velocity of 0.65 m/s. Where feasible, the overland flow should not be directed into the forebay to avoid the re-suspension of settled sediments. It shall accommodate future and existing overland flow routes.

8.8.6 Site Grading

The maximum side slope permitted shall be 5:1 for all SWM facilities. A 6 m offset is required from the top of bank to the property line or obstructions to provide an adequate maintenance corridor.

8.8.7 Stormwater Management Facility Landscape Guidelines

The Town requires contractors to provide a landscape plan utilizing the tree species list and specifications as described in section [3.8 | Street Trees](#) of this manual. The contractor shall submit landscape drawing for Town approval. Landscaping shall include meadow grasses on banks, and asphalt pathways and trees around the pond.

The establishment of dense woody vegetation around the perimeter of a pond is required where possible to provide effective means of geese and undesirable waterfowl species from colonizing and contaminating facilities which have a permanent pool.

All SWM facilities must be fine graded and hydroseeded. A minimum 75% consistent germination is required, as determined by the Town prior to the acceptance of maintenance.

8.9 Low Impact Development

The Town encourages the use of low impact development measures as part of the stormwater management plan where feasible and practical. Current industry standard practices and specific needs will be as required as discussed by the MECP, and the Conservation Authority in the following documents:

- [Stormwater Management Planning and Design Manual](#) (MECP, 2003);
- [Design Guidelines for Sewage Works](#) (MECP, 2008);
- [Low Impact Development Stormwater Management Guidance Manual](#) (MECP, 2022); and,
- [Windsor/Essex Stormwater Management Standards Manual](#).

Any and all LIDs must have a maintenance plan submitted and approved by the Town.

Each proposed low impact development implementation will be reviewed on a case-by-case basis through established processes. The Town is not in the practice of prescribing specific solutions on private property, and does not intend to monitor, inspect, maintain or otherwise enforce implementation or operation of low impact development facilities on private property, except where required to ensure compliance with by-laws and the [Town of LaSalle Official Plan](#). It may be required that LID facilities on private property or R.O.W. to be on title and the requirement of the homeowner to maintain.

8.9.1 Soakaway Pits

A soakaway pit is used to store runoff and promote infiltration (subject to acceptable geotechnical and hydrogeological investigations in support of the approach). Soakaway pits shall only be used where rear yard catchbasins cannot be connected to the storm sewer. The maximum draw down time should be less than 48 hours, soils permitting. Longer drawdown times may be permitted where soils exhibit lower percolation rates. Soakaway pits shall be located a minimum of 5.0 m from buildings with basements to avoid infiltration to drainage tiles and sump pumps. Operation and maintenance requirements for soakaway pits shall be identified in the SWM report for the site and shall be implemented by the owner to ensure that the continued performance of the unit as designed is achieved.

8.9.2 Pervious Pipe Systems (for treated runoff only)

Subject to the Town's review, pervious pipe systems may be used to store stormwater and promote infiltration for treated runoff only (subject to acceptable geotechnical and hydrogeological investigations in support of the approach). Operation and maintenance requirements for pervious pipe systems shall be identified in the SWM report for the site and shall be implemented by the owner to ensure that the continued performance of the system as designed is achieved.

8.9.3 Grassed Swales

The use of grassed swales for extended detention by impoundment of water on residential lots is not permitted by the Town. Grassed swales are permitted as a means to promote infiltration, but must be free flowing and designed primarily to convey runoff from the lot without any ponding.

8.9.4 Infiltration Trenches

Infiltration trenches may be used in the Town to promote infiltration of runoff (subject to acceptable geotechnical and hydrogeological investigations in support of the approach). The maximum draw down time should be less than 48 hours, soils permitting. Longer drawdown times may be permitted where soils exhibit lower percolation rates. Infiltration trenches shall be located a minimum of 5.0 m from buildings with basements to avoid infiltration to drainage tiles and sump pumps. Operation and maintenance requirements for infiltration trenches shall be identified in the SWM report for the site and shall be implemented by the owner to ensure that the continued performance of the facility as designed is achieved.

9 Functional Servicing Report

The intent of this technical report is to evaluate the effects of a proposed change in land use or development on the Town's servicing infrastructure. The report shall demonstrate that the design conforms to current Official Plans, Secondary Plans, and Master Plans.

The report is required to include:

1) **Introduction:**

- a) The location map and description of the subject property; and,
- b) Information on the magnitude of the proposed development, including preliminary site design, lots, and street layout.

2) **General:**

- a) Identify the routing of water, wastewater and stormwater services;
- b) Identify the sizing of services including accommodation for external service areas, as may be required;
- c) Identify the cost sharing responsibilities of developing the services;
- d) Identify the timing of services;
- e) Describe development phasing including any interim servicing measures and how those services shall be decommissioned or modified; and,
- f) Detail any implementation requirements, including how the disturbed areas will be rehabilitated.

3) **Water Supply and Distribution:**

- a) Water distribution concept plan and phasing of the development;
- b) Net impact due to the proposed change in land use or development and need for expansions and upgrades;
- c) Hydrant flow test to confirm boundary conditions and confirmation that it meets Town standards; and,
- d) Identify the requirements for fire-fighting capacity.

4) **Sanitary Collection:**

- a) Estimated discharge and current capacities of trunk systems;
- b) Sanitary drainage areas included in the design;
- c) Net impact due to the proposed change in land use or development and need for expansion and upgrades; and,
- d) Identify servicing capacity requirements with respect to the standards in this Development Manual, and the Wastewater Plant Capacity Allocation Protocol.

5) **Stormwater Drainage System:**

- a) Estimated discharge and current capacities of trunk systems and confirmation of a sufficient outlet;
- b) Storm system drainage area;
- c) Net impact due to the proposed change in land use or development and need for expansion and upgrades;
- d) Identify preliminary grading and overland flow routing; and,
- e) Demonstrate how the stormwater drainage conforms to the Windsor/Essex Region Stormwater Management Standards Manual and the design standards in this Development Manual.

6) **Road Network:**

- a) Confirmation that it is compliant with the Master Transportation plan;
- b) Demonstrates that all necessary connections to Collector Roads are present; and,
- c) If required, confirms that consultation with the County and Provincial levels are in progress.

7) **Existing Utility Coordination:**

- a) Describe existing utility infrastructure and preliminary utility servicing requirements for the development; and,
- b) Confirmation that sufficient supply and routing exists.

- 8) Any necessary supporting documentation and references to previous reports (for each component of the development).

9.1.1 Servicing Design Brief/Memo

Where an FSR was not required at the preliminary design stage, a Servicing Design Brief may be required at the time of detailed design. The Design Brief ensures the development has examined the opportunities and constraints of the site and provided design solutions that are context-sensitive and respond to urban design policy context. The level of detail in the design brief will reflect the scale and/or sensitivity of the development project.

The Servicing Design Brief should provide a description and analysis of the site and surrounding context, noting any attributes and considerations including existing natural features, existing structures, surrounding land uses, etc.

The Design Brief should demonstrate how the Town's design guidelines and policies have guided the design of the site through written descriptions, plans, elevations, and/or diagrams. All variables, constants, assumptions and formulas associated with each portion of the development must be covered, examined and explained. As part of the design brief, written explanations and

descriptions should be provided in addition to drawings, analysis, diagrams and/or illustrations to support the proposed development. To be submitted as part of the detailed drawings for Town Review.



10 Pump Stations

The Owner shall provide the Town with storm and sanitary pumping station design, as required, prepared by a licensed Professional Engineer in Ontario. In addition to the guidelines and standards included herein, all sewage pumping stations must be designed in accordance with current MECP guidelines.

10.1 Station Capacity

Pump Stations shall be designed with sufficient capacity to accommodate the maximum design peak instantaneous flow from the ultimate drainage area. Allowances shall be made in the design such that with minor modifications, the pumping station capacity may be upgraded (i.e. upgrade or addition of pumps, motors, forcemains, etc.) to handle future peak flows from the ultimate drainage area. In certain instances, it may be more economical to initially over-design the pumping station for future flows rather than upgrading at a later date. In these instances, pumping station operations should be evaluated at various flow rates anticipated during the design life. If pumps are to be removed and upsized at a later date, the old pumps are to be returned to the Town.

10.2 Site Considerations

The site for a pumping station shall be selected based off of the latest Functional Servicing Report, Environmental Assessment, or Master Plan. A detailed site selection shall be located to ensure that its drainage area is serviced with the minimum amount of cost.

The following shall also be reviewed when considering the site location of a sewage pumping station:

- Ability to maximize depth of pipes at far reaches of the drainage area;
- Type of station, the capacity, and the type and number of pumps to be used;
- Soil investigations (i.e. rock, or high water table resulting in increased construction cost);
- Flood protection shall be considered when designing sewage pumping stations. Sewage pumping stations shall be designed to be protected from damage during the 1:100 year storm and shall remain fully operational and accessible during the 1:100 year storm event + 0.3 m freeboard. Regulations/requirements of municipalities, provincial and federal agencies regarding floodplain obstructions must be considered;
- Proximity to the emergency gravity overflow channels;
- Structural, architectural and/or landscaping design of the station to ensure that it does not detract from the surrounding area;

- Availability of utilities such as electric power (i.e. voltage to operate electric motors), natural gas, potable water, fire protection and telephone service;
- A junction maintenance hole will be required to allow for one inlet into the well;
- Odour control and the location of sensitive receptors;
- Noise control and backup power considerations and the location of sensitive receptors; and,
- Vehicle access and parking must be provided for inspection and maintenance of the station. The pumping station shall be readily accessible by maintenance vehicles during all-weather conditions.

10.3 Site Works Requirements

After the selection of the site and implementation of the aforementioned specifications, the contractor is also required to implement the following site works requirements:

1. A landscape plan including trees;
2. 600 V, three (3) Ph. Power;
3. Asphalt access driveway with turn around;
4. Fencing where abutting private property; and,
5. Rear yard catchbasin.

10.4 Types of Pumping Station

The two (2) major types of sewage pumping stations that the designer may consider for site specific conditions, and as approved by the Town are:

Wet Well/Submersible	Screw Pump
The wet well or submersible pumping station has submersible pumps located in the same below grade chamber into which the wastewater flows.	Screw lift pumping stations use an Archimedean screw with the motor mounted above grade.

10.5 Pumps

To determine the appropriate pumps for installation in the sewage pumping station, the following data must be included with the design submission. Final equipment selection must meet the approval of the Town. The preferred Submersible pump supplier is ITT Flygt (Xylem Canada).

Multiple pumps shall be provided. Where only two units are provided, they shall be of the same size, to provide a firm capacity with one unit out of service. The designer should ensure that all pumps will be subjected to hydrostatic and operating tests performed by the manufacturer.

Submersible Pumps (Flygt N-Type) handling raw sewage should be capable of passing spheres of at least 75 mm in diameter. Pump suction and discharge openings shall be at least 100 mm in diameter.

The pump shall be so placed that, under normal operating conditions, it will operate under a positive suction head.

Each pump shall be equipped with a time totalizer and provision for automatic or manual alteration of the lead pump.

Each pump shall have an individual intake. Wet well and intake design shall be such as to avoid turbulence near the intake and to prevent vortex formation.

Pumping station designs shall be based on system-head calculations and curves for three conditions using appropriate Hazen-Williams factor “C” as follows:

1 Low sewage level in the wet well | **C = 120**

2 Median sewage level over the normal operating range in the wet well | **C = 130**

3 Overflow sewage level in the wet well | **C = 140**

System-head curve (2) should be used to select the pump and motor since this will reflect the normal operating condition. The extreme operating ranges will be given by the intersections of curves (1) and (3) with the selected pump curve. The pump motor shall be able to operate satisfactorily over this full range (i.e. between conditions (1) and (3)).

Although it is normal to size pumps and motors for design peak instantaneous flows, consideration shall be given to how the future and ultimate sewage flow requirements can be handled. Ultimate sewage flows would account for the build-out of the catchments area. These operating points shall also be shown on the system head curves.

10.6 Wet Wells

The design fill time and minimum pump-cycle time shall be considered in sizing the wet well. The effective volume of the wet well shall be based on design average daily flow, and a filling time not to exceed 30 minutes, unless the facility is designed to provide flow equalization. Other factors that shall be considered include volumes required for pump-cycling, dimensional requirements to avoid turbulence problems, vertical separation between pump and control points, sewer inlet elevation(s), capacity required between alarm levels and basement flooding and/or overflow elevations, and number of and horizontal spacing between pumps.

The minimum surface plan area of a wet well shall be 3 m diameter or 2.25 m square. Wet wells shall not provide excessive retention times, due to potential odour problems. The designer shall ensure that easy and efficient removal of pumps, motors, and other mechanical and electrical equipment is provided. A suitable and safe means of access for persons wearing self-contained breathing apparatus needs be provided to wet and dry wells and valve chambers. Equipment such as access hatches, ladders, service platforms, guards, grates, and handrails, shall be constructed of stainless steel when exposed to wet and/or corrosive conditions.

To achieve the minimum detention time in a two-pump station using constant speed pumps, the volume in cubic metres (m^3) between pump start and pump stop shall be 0.15 times the pump rate of one pump, expressed in L/s. For two-speed or variable speed pumps, or for other number of pumps, the required volume depends on the operating mode of the pumping units. The pump manufacturer's duty cycle recommendations shall be utilized in selecting the minimum cycle time. When the anticipated initial flow drainage to the pumping station is less than the design average daily flow, provisions shall be made so that the fill time indicated is not exceeded for initial flows.

Access to the wet well shall always be from the outside. An access ladder shall be provided from the top of the slab to the service platform, and a separated ladder from the platform to the bottom of the wall.

The opening to the wet well shall be no smaller than 750 by 900 mm. The cover shall be equipped with a non-recessed lock and pry lip. The opening edge shall be flush with the vertical wall of the wet well. The access opening(s) to the wet well shall have the access to float controls, without the necessity of entering the wet well.

Wet Well pump level control TXDR and alarm float control shall be located just below top elevation of access hatch(s). This is to allow safe access to TXDR and floats for maintenance and testing, without the necessity of entering the Wet Well.

All wet wells need to be provided with cross ventilation. Natural ventilation will usually suffice for small pumping stations where access is limited. This can be achieved through a 100 mm diameter vent pipe. Vents shall be equipped with a gooseneck at the top, extending 900 mm above the top of the slab of the wet well. The vents shall be equipped with an insect screen. Natural ventilation can be supplemented with portable ventilation units. Adequate provisions for fresh air entry of all wet wells shall be followed. In locations adjacent to sensitive receptors, such as schools or recreation sites, the need for supplemental odour control shall be evaluated and, if required, suitable equipment installed.

An adopted Standardized Pump Lifting equipment has been in practice, using fixed davit bases by Easily Moved Equipment (EME). The type of davit base used is determined on the weight (kg) of the Submersible pump used for the pump station and approved by the Town.

10.7 Pump Discharge Piping, Guide Rails, and Lift Chains

Pump discharge piping shall be designed with the following features:

1. Velocities for the 20-year or greater sewage flow pumping needs, preferably in the low end of 0.8 to 4 m/s range;
2. Flanged, concentric increaser;
3. Spacer 150 to 300 mm long with one flanged end and one grooved end for Victaulic coupling;
4. Elbows (as necessary);
5. Flanged Check valve (ValMatic Brand Swing Flex), preferably horizontally placed;
6. Knife valve (flanged);
7. Riser pipe;
8. All Wet Well Metals to be non-ferrous (SS) and/or Aluminum; and,
9. Full length SS Pump rolling/lifting Chains.

10.8 Standby Power

The objective of standby power at a pumping station is to allow for emergency operation of the pumping station in order to prevent the discharge of raw or partially sewage into any waters, and to protect public health by preventing back-up of sewage and potential discharge into basements, or onto streets and other public and private property.

All pumping stations must provide an automatic generator for standby power in case of power failure, to be housed in an appropriately sized building. The building's aesthetics are to match the surrounding neighbourhood.

Standby generators shall be sized to provide adequate power to start and continuously operate all connected loads including pumps, lighting, ventilation and other auxiliary equipment necessary for the safe and proper operation of the pumping station. The generating equipment shall be capable of operating all pumps necessary for adequate pumping station operation during emergency situations. The standby generator location should be installed to minimize impacts to nearby residential areas including noise levels and aesthetics. The Consultant Engineer shall be required to provide an Air Quality and Noise Assessment for all pump stations with standby generators.

10.9 Standard Town Outpost SCADA Panels

Supervisory Control and Data Acquisition (SCADA) shall consist of an integrated hardware and software system to provide full control and monitoring of the pumping station. The pumping station must be designed for operation in a manual configuration with a future optional automated controlling. Level control will be a combination of Wet Well alarm floats and a standardized Siemens pump level controller and Milltronics Level Sensor TXDR (ultrasonic level sensor) and wet well alarm floats.

Flow monitoring and data logging shall be accomplished with a magnetic flow meter.

The selection of all hardware for SCADA and Communications shall be approved by the Town and will be communicated at the pre-design phase. SCADA equipment to be installed by the Town and paid for by the Owner.

10.10 Pumping Station Alarm Monitoring

Standardized Alarm systems with a backup power source are required for all pumping stations. All alarm floats used need to be wired as "Normally Closed" and terminated at panel alarm relays and dry contacts with **no voltage**.

At a minimum, the following alarms are required:

1. Power failure (included with standardized alarm panel brand);
2. Wet Well high water level;
3. Pump failure (for each pump);
4. Unauthorized entry;

5. Diesel Gen Set Running;
6. Diesel Gen Set Fail; and,
7. Any other case of pump station malfunction.

A standardized Pumping Station alarm monitoring panel, Alarm monitoring cellular Communication Panel and battery Power Supply is in use at all existing pumping station sites by the Town.

10.11 Pumping Equipment Supplier Operator Training

There must be a scheduled equipment supplier training for operational staff during equipment supplier commissioning of the equipment.

10.12 Storm Pump Stations

Storm pump stations are to be designed with any applicable information as provided above as well as the below information:

1. Drawdown in pond of 1:5 year design storm in 24 hours;
2. Drawdown in pond of 1:100 year event in 48-72 hours;
3. 2 submersible pumps in wet well;
4. Ability to completely empty the Stormwater Management Facility for maintenance purposes;
5. Sluice gate provided to separate the Pump station and retention pond; and,
6. Onsite generator and building.



11 Consolidated Linear Infrastructure

| ECA Requirements

11.1 General

A Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) application is a modernized approach to low-risk municipal linear infrastructure permissions. This approach reduces the burden on municipalities, Owners and the Ministry, while imposing a consistent set of conditions intended to improve environmental protection. Pre-authorization will be granted from MECP to the Town for ECA applications related to minor storm, sanitary and watermain additions/modifications to existing municipal systems.

11.2 Key Components

There are three key components to the Consolidated Linear Infrastructure Permissions:

1

New ECA Templates

- Introduces a standard format and standard conditions; and,
- Includes new pre-authorization conditions.

2

New Design Criteria

- When followed, enables alteration to the works without a separate approval;
- For sanitary and some types of storm collection systems; and,
- Includes clear design specifications and new monitoring and reporting requirements for combined sewer overflows and bypasses.

3

Prescribed Persons Regulation O. Reg. 208/19

- Enables Owners to make alterations to a Town's sewage system without a separate approval; and,
- Requires municipalities to approve alterations prior to taking ownership.

11.3 Key Objectives

There are three key objectives to the Consolidated Linear Infrastructure Approach:

1	Reduce Burden Eliminate the need for multiple separate applications from municipalities and Owners, if specific conditions are met.
2	Improve Consistency Provide a holistic picture of sewage works to better inform municipal operations and ministry policies.
3	Enhanced Protection Use standard conditions that apply across Ontario for system design, construction and operation.

11.4 Operational and Maintenance Manuals

As part of the CLI-ECA requirements, an Operation and Maintenance (O&M) Manual shall be prepared and implemented for all infrastructure approved under the Town's stormwater and sewage works CLI-ECAs.

Pumping stations, stormwater management facilities, and portable equipment should be supplied with a complete set of operational instructions, including emergency procedures, maintenance schedules, tools and such spare parts as may be necessary. This includes both storm and sanitary pump stations, forcemains, LIDs, OGS units, flow control devices, dry ponds, wet ponds, etc. Documentation to be kept at the pumping station should confirm the level at which flooding, in particular basement flooding, may occur. This level should be provided as an elevation and also co-related to levels in the pumping station wet well.

The Town requires:

- 1) Detailed procedures of the routine operation of the works;
- 2) Inspection programs, including the frequency of inspection, and the methods or tests required to detect when maintenance is necessary;
- 3) Frequency of maintenance and repair works (i.e. specific month or time of year);
- 4) For stormwater management facilities, the inspection and maintenance should include:
 - a) Presence of algae and/or invasive species impairing the operation of the works (e.g. phragmites, goldfish)

- b) Measurement of sediment depth, manual water levels, and/or visual observation as deemed appropriate.
- c) SWM pond sediment cleanout and dewatering;
- 5) Source drinking water protection plans and polices where required;
- 6) Procedures for routine physical inspection and checks of controlling systems (i.e. SCADA) to ensure the mechanical integrity of the equipment and its accuracy on the controlling system;
- 7) Procedures to prevent odours and other environmental impacts;
- 8) Procedures for calibration of monitoring equipment;
- 9) Emergency response, spill reporting, and contingency plans and procedures including notification contact list;
- 10) Record drawings of the works;
- 11) All final utility suppliers and TSSA Regulatory Code inspection reports (if stationary Diesel Gen Set at Pumping Station); and,
- 12) Electronic Copies of all print and operations manuals.

11.4.1 Maintenance Period

The Owner shall be responsible to execute all requirements noted in the approved O&M Manual during the infrastructure's maintenance period. The Owner shall bear all costs for inspections and maintenance of the infrastructure during the maintenance period.

All inspections and maintenance logs recorded shall be submitted to the Town prior to the Town's assumption of the infrastructure. Failure to submit inspection logs may result in forfeit of securities being held by the Town.

Alternatively, a contribution to the Town may be provided through the subdivision agreement to provide the Town with control of the day-to-day operations of the pump station during the Maintenance Period.



12 Utilities

All proposed new utility installations within municipal R.O.W. require Municipal Consent from the Town. All utilities, with the exception of gas mains, shall be located in a common trench and duct bank. The location of at grade vaults or above grade pedestals shall be placed to line up with common lot lines. Any road crossings for utility ducts shall be confirmed with the utility company during the design process. The Owner will confirm that consideration has been given to all utilities and allow for future expansion within the proposed duct bank. Any duct crossings required after base asphalt is placed shall be directional bored.

12.1 Electric Power

The design, material and installation of underground electric power requirements shall be designed by a qualified Professional Engineer and as approved by Essex Powerlines. The Owner shall obtain the approval of the appropriate utility suppliers prior to construction.

The Consulting Engineer will be responsible to coordinate the efforts of the other public utilities as a result of conflicts with proposed services and/or upgrading to accommodate development.

The minimum design criteria for the design of power distribution system shall be in accordance with specifications of the operating authority:

a) Underground Primary	Concrete-encased rigid PVC conduits or direct buried
b) Underground Secondary	Direct buried
c) Transformers	Low profile, pad-mounted and to be placed as per Provincial standards

12.1.1 Trench Requirements

Trench and backfill requirements are to follow the applicable OPSD Standard. If these details are not applicable, then OPSD Division 800 will govern.

12.1.2 Transformers

Placement of transformers are to be placed at lot lines, as designed by the Engineer, and presented in the As-builts.

Applicable Standard Drawings: Local, Collector, and Arterial: L-CS-01, L-CS-02, and L-CS-03, respectively.

12.2 Lighting

A Lighting Study or Photometric Plan is often required for both subdivision designs of the public rights-of-way, and private developments.

Illumination levels shall be expressed in foot candles or lux values and in the form of isolux curves showing the predicted lighting levels at the property lines and throughout the development site or rights-of-way. The study shall include the location and height of all proposed luminaires, including wattage and lamp type. Lighting analysis shall be carried out with independent software (e.g. AGI 32 or equivalent).

The following guiding principles and techniques are to be adopted for the lighting of private and public lands, and applied consistently to obtain development approvals:

- Contribute to personal safety;
 - Locate lamps so as to avoid glare;
 - Provide additional shielding of lamp fixtures to avoid glare;
 - Provide uniform lighting without sudden light to dark transitions;
 - Provide overlap of light distribution;
 - Provide illumination to articulate steps;
 - Coordinate spacing and height of lamps with landscaping to ensure lighting coverage is not interrupted;
- Support the supervision of secure areas;
 - Provide good colour rendering for identification purposes using acceptable street lighting standards;
 - Provide sufficient lighting coverage including building recesses or inside corners;
- Assist in way finding;
 - Provide illumination to improve legibility of notes, landmarks and circulation areas;
 - Align lamps in consistent, recognizable and unambiguous patterns;
 - Provide a uniform and modest brightness along paths of travel;
- Conserve energy;
 - Employ alternatives to best conserve energy;
 - Dim down lighting to minimum levels after normal operating hours (where required/ requested);
- Preserve the experience of the night sky;

- Light pollution is considered undesirable and many feel that it reduces the enjoyment of night sky;
- Provide full cut-off lighting (zero percent of peak intensity radiating above 90 degrees and 10 percent of peak intensity above 80 degrees) or employ low cut-off where full cut-off lighting alternatives are not feasible, as approved by the Town. As LED fixtures can't be fully evaluated in terms of full, semi-cutoff or non-cutoff terms, and as the movement towards anti-light pollution increases, a new system has been implemented jointly by Illuminating Engineering Society of North America (IESNA) and the International Dark-Sky Association (IDA) to evaluate luminaires. The MLO (Model Lighting Ordinance) uses the BUG (note 8) rating of the fixture shall follow TM-15, issued by IESNA and IDA;
- For all area lighting, luminaires should be equipped with devices for redirecting light such as shields, visors or hoods;
- Respect the privacy of residential space;
 - Locate lamps to direct light away from neighbouring properties;
 - Provide supplementary shielding of lamps to direct light away from neighbouring properties;
 - Provide lamp fixture mounting heights that avoid glare to the vantage point of neighbouring residential units;
 - Provide recessed light fixtures that avoid glare to the vantage point of neighbouring residential units;
- Respect animal habitat;
 - Direct illumination away from abutting Municipal Parks and naturalized areas on abutting private lands;
- Heighten the enjoyment of public space and nighttime activity;
 - Provide minimum illumination to encourage nighttime use;
 - Minimize glare using shielding of fully recessed light fixtures, as required; and,
 - Reveal the salient features of a site using a combination of diffused and spot lighting.

12.2.1 Streetlights

Streetlights shall be designed with the spacing and height design to meet provincial standards for roadways, lighting intensity and uniformity. The Town and Essex Powerlines will approve final design of streetlights. The drawings for electric power and streetlights shall be included in drawing packages and As-builts.

The Town has two following options for Streetlights:

Standard	Decorative
• Variable length concrete pole by StressCrete Limited; • LED Grey NXT fixture; and • Aluminum arm.	• Variable length black decorative poles by StressCrete Limited; • LED Black NXT fixture; • Black decorative arm (KA 10-S1 Brookville with Decorative Scroll) from King Led Technology; and, • Finial (King Luminaire Washington Highwayman, eclipse colour and etched finish (Cat. No. KWH28-G-E11 C/W 140-25/30 and BA and DR).

Town has approved the following NXT LED Street Light Types:

NXT Product Number	Wattage
NXT-24S-0-7-2ES-4-GY-1-UL-X-2H	35W
NXT-24S-0-7-2ES-4-BK-1-UL-X-2H	35W
NXT-36S-0-7-2ES-6-GY-1-UL-X-2H	46W
NXT-36S-0-7-2ES-3-GY-1-UL-X-2H	42W
NXT-36S-0-7-2ES-4-GY-1-UL-X-2H	52W
NXT-36S-0-7-2ES-5-GY-1-UL-X-2H	60W
NXT-36S-0-7-2ES-6-GY-1-UL-X-2H	69W
NXT-48M-0-7-2ES-3-GY-1-UL-X-2H	53W
NXT-48M-0-7-4AH-4-BK-1-UL-X-2H	68W
NXT-48M-0-7-2ES-5-GY-1-UL-X-2H	80W
NXT-48M-0-7-4AH-6-GY-1-UL-X-2H	92W
NXT-72M-0-7-4AH-4-GY-1-UL-S-2H Switchable Driver	118W
NXT-72M-0-7-4AH-7-GY-1-UL-X-2H	158W

12.3 Communication Utilities

The Owner's Consulting Engineer shall contact and consult all individual utility companies regarding their requirements in all areas. The Town requires all power electric and communications utilities to reside in a common trench within the R.O.W. on each side of the road.

12.4 Gas

The Owner's Consulting Engineer shall contact and consult appropriate gas agencies for specific design requirements and considerations.

Gas must be in place prior to occupancy permits being granted.

12.4.1 Plains Midstream

If the Plains Midstream Pipeline is in 30 m proximity to the development, the consultant is to coordinate and seek approval as part of design process.

If road or pathway crossings are proposed, agreements with Plains are to be in place with Owner prior to servicing.



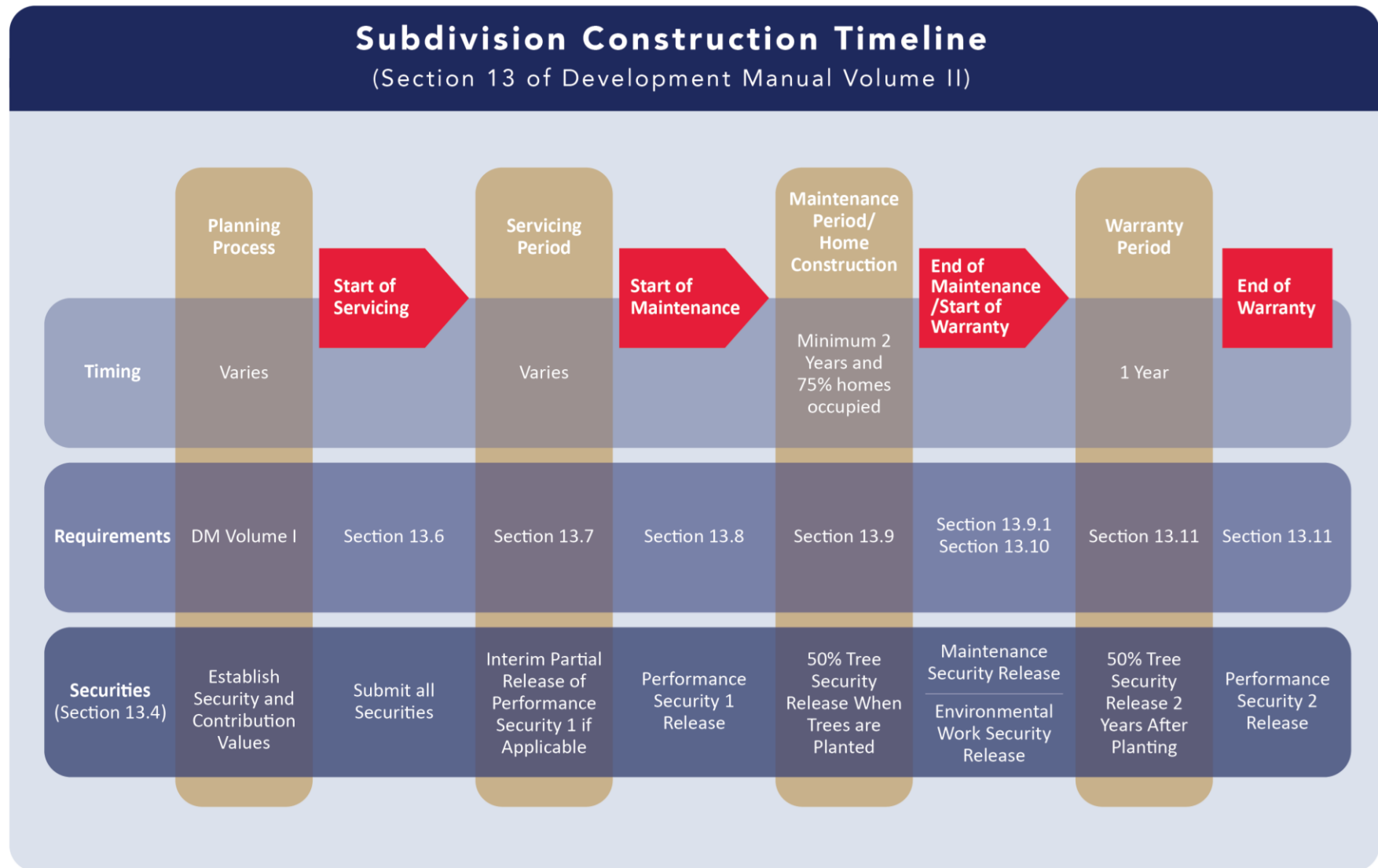
13 Development Construction Requirements

The Owner or Contractor is required to obtain all planning and engineering approvals prior to any construction work on the development property.

On the following page is the [Subdivision Construction Timeline Flowchart](#) to help navigate the step-by-step process for Owner's during the construction period.

The owner or contractor shall be required to construct all aspects of the development in accordance with this manual. Civil works shall include but are not limited to all works shown on civil drawings, sewers, watermain, curbs, roads, sidewalks, surface asphalt, line painting, stormwater management facilities, fencing, grading, and restoration. Other works may include street trees and environmental mitigation and monitoring.

13-1 Subdivision Construction Timeline Flowchart



13.1 Commencement of Construction Prior to Final Plan of Subdivision Approval

As detailed in the manual, there are several items that the Owner is required to complete and fulfill prior to advancing a subdivision to the construction stage. Should the Owner choose to begin construction **prior** to Final Approval of the Subdivision by the County of Essex and subsequent plan registration, it will be at their own risk, and the Town will not accept any responsibility for any consequences associated with this decision. In addition, should the Final Approval of the Subdivision by the County of Essex and the subsequent plan registration be secured prior to the Owner commencing servicing works, no lot will be sold until full municipal services to the lot, to the satisfaction of the Town, are in place.

13.2 Specifications and Tenders

All development documents shall include specifications and contract documents prepared in accordance with the [Guidelines, Professional Engineer Providing Land Development/Redevelopment Engineering Services, 1994](#).

In the event that the Owner shall call tenders for any of the services to be installed, such tenders shall be called on the basis of Standard Specifications and Requirements.

The specifications and contract documents shall include the following:

- a) Information to Tenderers;
- b) Form of Tender;
- c) Form of Agreement;
- d) Special Provisions;
- e) Technical Specifications; and,
- f) General Conditions.

The specifications and contract documents shall refer to the Ontario Provincial Standard Specifications where applicable, except as amended or extended by the Town's requirements. If requested by the Town, the Owner shall provide the specifications and contract documents to the Town.

13.3 Local Servicing of Other Lands

The Owner may be required to service other lands within the development area that are not owned by the Owner at the time of servicing.

Services to include:

1. Sanitary, storm, and water connections;
2. Appropriate sizing and availability for utility connections (i.e. Electrical, gas, communications);
3. Continuous Right-of-Way cross-section fronting other lands; and,
4. Lot grading sheets should be completed.

Please Note: for regional servicing or infrastructure, including oversizing of municipal infrastructure for external developments outside of the Development, please see [Appendix G | Local Servicing Policy](#).

13.4 Development Securities

All Securities are required to be submitted to the Town prior to the scheduling of a pre-construction meeting. The following identifies the required securities for the purpose of the servicing and maintenance of the development. The value of the performance securities is to be based off the tender prices that are awarded to the servicing contractor, plus any additional values based on other contracts outside of the servicing contract. The Town retains the right to review and comment on the values presented in the tender documents if they are not in keeping with current market conditions. See the table on the following page for Security Requirements.

Security may be provided by electronic funds transfer, certified cheque, bank draft, or unconditional irrevocable stand by letter of credit (referred to as a letter of credit or LOC). In addition, for development obligations under the [Planning Act](#) a surety bond is acceptable. If a surety bond is provided as security, it must be in compliance with the town's surety bond template and the requirements under the [Planning Act](#) and [Ontario Regulation 461/24](#) (hereinafter referred to as "the regulation"). If a letter of credit is provided as security it must be in compliance with the town's letter of credit template and acceptable financial institutions listing by the security administrator. For the purposes of this procedure, performance bonds and letters of guarantee are not considered acceptable forms of security. The LOC template can be found in [Appendix H | letter of Credit Template](#) and the Surety Bond template can be found in [Appendix I | Surety Bond Requirements](#).

The Town may draw upon such securities in whole or in part where the Owner has failed to perform any obligation under its Agreement or has failed to complete the works in accordance with approved plans and specifications. Without limiting the generality of the foregoing, the Town may draw upon the securities to:

- Complete or correct any deficient or incomplete works;
- Address any emergency condition affecting public health, safety or property;
- Restore or repair municipal infrastructure impacted by the works; and,
- Satisfy any costs, damages or expenses incurred by the Town arising from the Owner's default.

Except in the case of an emergency, the Town shall provide the Owner with written notice of the default and a reasonable opportunity to remedy the same prior to drawing upon the securities. In the event of an emergency, the Town may take such immediate action as it deems necessary, acting reasonably, without prior notice to the Owner.

The Town shall provide an accounting of any amounts drawn upon the securities upon written request by the Owner.

The Town's rights to draw upon the securities are in addition to, and not in substitution for, any other rights or remedies available to the Town at law or in equity.

13-1 Subdivision Security Requirements

Security	Required Security Format	Required Security Value	Timing of Release of Security
Performance Security 1 ⁽¹⁾	Letter of Credit, Certified Cheque, Bank Draft, Electronic Funds Transfer (EFT), Surety Bond	75% of the value of servicing work. Includes but not limited to; all civil works. Excludes only street trees and environmental mitigation and monitoring work.	At the beginning of the maintenance period and when building permits are made available. Interim security releases may occur at 30-day intervals as deemed appropriate by the Town and will require a certified letter from the consulting engineer. See Section 13.4.1.
Performance Security 2 ⁽²⁾	Letter of Credit, Certified Cheque, Bank Draft, EFT	25% of the value of the servicing work.	Upon completion of the warranty period – 1 year after assumption by Town.
Maintenance Security	Certified Cheque, Bank Draft, EFT	Minimum of \$20,000 or \$1000/unit , whichever is greater.	At the time of assumption of the subdivision by the Town. A reduction in the Maintenance Security can occur annually, based on the number of Occupancy Permits granted in the subdivision, to a minimum of \$20,000, which will be held until final assumption.
As-Built Drawings	Certified Cheque, Bank Draft, EFT	Value determined at time of Agreement writing.	Once PDF and CAD versions of the As-Built Drawings have been submitted to and approved by the Town.
Sewers – Camera and Flushing	Certified Cheque, Bank Draft, EFT	Value determined at time of Agreement writing.	Once sewer videos have been submitted and any deficiencies noted by the Town have been addressed.

Security	Required Security Format	Required Security Value	Timing of Release of Security
Landscaping and Street Tree Security ⁽³⁾	Letter of Credit, Certified Cheque, Bank Draft, EFT	100% of the value of the street tree work.	50% returned at time of installation, 50% returned at the end of the 2-year warranty period from the date of planting.
Environmental Mitigation Security	Letter of Credit, Certified Cheque, Bank Draft, EFT	100% of the value of any environmental litigation/compensation works as identified in the EIA.	This security will be released upon receipt of written confirmation from the Owner's Environmental Consultant stating that all Mitigation Works and Monitoring have been completed as outlined in the approved EIA.

Notes:

- (1) If surface asphalt is not included in the servicing contract, an additional security (either LOC or cash) will be required and released as per the timing of release of Performance Security 2.
- (2) No Surety Bond will be accepted for Performance Security 2.
- (3) A value per tree will be established by the Town for each development.

13.4.1 Partial Return of Performance Security 1

Based off the information provided by the Consulting Engineer, a partial amount of the Performance Security 1 shall be returned to the Owner as deemed appropriate by the Town. Any outstanding work, deficiencies and allowances shall be considered in determining this amount.

A letter from the Consulting Engineer shall include:

1. Items that can go onto maintenance;
2. Outstanding work, and respective value of that work;
3. Updated deficiencies list with respective values to rectify those deficiencies; and,
4. Proposed security to be released.

The Town will review the information and provide the released securities as deemed appropriate. Request for release can occur at 30-day intervals throughout the servicing period.

13.4.2 Maintenance Security Use

The Maintenance Security is to be held for the duration of the servicing and the duration of the maintenance period through to the assumption of the development by the Town. The purpose of this security is to be used by the Town generally for the cleaning of the roads, sewers, sidewalks, and attending to any emergency that is undertaken by the Town if the Owner has not attended to the items as per this manual. The intention is that the Owner monitor the development and rectify any deficiencies prior to the Town needing to take action. The Owners are not to rely on the Town for notification of the deficiencies.

13.5 Insurance Requirements

The Owner shall, at its own expense, obtain and maintain in full force and effect during the performance of the Works and for a period of not less than one (1) year following the issuance of Final Acceptance, Comprehensive/Commercial General Liability insurance in an amount of not less than Five Million Dollars (\$5,000,000.00) per occurrence.

Such policy shall:

- a) Name the Town as an additional insured;
- b) Be primary and non-contributing with respect to any insurance maintained by the Town;
- c) Contain a cross-liability/severability of interests clause;
- d) Include a waiver of subrogation in favour of the Town;
- e) Provide coverage for bodily injury, personal injury, property damage, contractual liability, and products and completed operations; and,
- f) Name the Town's consultants as an additional insured where required.

The Owner shall ensure that their Consulting Engineer, sub-consultants, and general contractors also carry liability insurance.

The Owner shall provide the Town with certificates of insurance evidencing the required coverage prior to commencement of the Works and, upon request, shall provide certified copies of the policies or endorsements. Such insurance shall not be cancelled, permitted to lapse, or materially altered without at least thirty days' prior written notice to the Town.

Notwithstanding the limits of the insurance, the Owner shall indemnify the Town against all or any claims or losses arising out of this Development.

The Owner's consulting engineer shall carry and maintain professional liability (errors and omissions) insurance in an amount not less than Two Million Dollars (\$2,000,000.00) per claim, and shall provide confirmation of such coverage to the Town upon request.

The maintenance of insurance as required herein shall not be construed to limit the liability of the Owner under this Agreement or otherwise at law. The Town reserves the right to modify the above-noted requirements as needed to suit specific project needs.

13.6 Pre-Construction Meeting

No later than seven (7) days before construction is to commence, the Owner's Consulting Engineer shall call and chair a pre-construction meeting. The Consulting Engineer, Owner, site inspector, general Contractor, Town representatives, and utility company representatives must attend.

Prior to the Pre-Construction Meeting being scheduled, the following items must be completed:

- a) Development Agreement signed and adopted by the Council;
- b) All securities and contributions submitted to the Town;
- c) Insurance documents submitted to the Town;
- d) Agency Approvals (such as the Conservation Authority, etc.);
- e) All drawings approved by the Town;
- f) Confirmation from each utility that their respective designs are complete and incorporated into the engineering drawings;
- g) Any Land Transfers, if required must be shown on a Reference Plan;
- h) Construction Management Plan submitted to the Town if applicable;
- i) Compliance with any pre-construction provisions outlined in an Environmental Report;
- j) Excess Soils Requirements specific to the development;
- k) County Planning Clearance letter (Subdivisions);

- l) Consolidated Linear Infrastructure Environmental Clearance Approval from the Town for Municipal Services;
- m) Development sign installed; and,
- n) All other special requirements as per the Development Agreement.

The topics of discussion for the meeting shall include but are not limited to:

- a) Verification of the submission of the securities and contributions;
- b) Verification of the registration of the Agreement;
- c) Agency approvals;
- d) Plan and schedule for any and all environmental mitigation measures required prior to, during, and post construction that are required as part of an environmental permit or letter of advice;
- e) Contact names and emergency telephone numbers for issues during servicing;
- f) Contact names and emergency telephone numbers for issues during the maintenance period (after general contractor is off-site, and builders are on site);
- g) Construction access routes;
- h) Supervisory staff and who to notify of deficiencies;
- i) Considerations for utility companies;
- j) Subcontractors, suppliers and sub-consultants;
- k) Documents (i.e. Tender Issue Contract Drawings, Form 1000, Notice of Project, etc.);
- l) Schedules;
- m) Material and Control Testing;
- n) Lay Down Areas;
- o) Pre-Construction Survey/Photos;
- p) Traffic Control and Detouring;
- q) Emergency Service Notification;
- r) Excess Soils Requirements and Tracking;
- s) Noise and Dust Control;
- t) Work Procedure;
- u) Public Relations;
- v) Public Notification Letters;
- w) Payment Certificates;
- x) Insurance; Owners and Contractors;
- y) Construction Health and Safety;
- z) Schedule of site meetings and access to construction sites; and,

- aa) Environmental permits, work plan and requirements prior to and during construction;
- bb) Any additional concerns as noted by attendees.

The Consulting Engineer will provide minutes of meeting within one week from the meeting date.

13.6.1 Public and Agency Notification

Prior to the start of construction the Consulting Engineer shall arrange to notify all public agencies, emergency response agencies and residents in abutting neighborhoods of the impending start date and the estimated completion date of the project.

The following information shall be included in the notification:

1. A brief description of the project;
2. Construction start date;
3. Scheduled completion date;
4. Temporary road closures (as applicable); and,
5. Contact information for the Consulting Engineer and the Contractor.

13.6.2 Construction Management Plan

The construction management plan should be a short report that includes the following:

- a) How the site and adjacent properties will be kept clean of debris and garbage;
- b) Location of fencing (construction, silt, snake, etc.);
- c) Truck routes;
- d) Detour routes (if required);
- e) Confirmation on stucco, and if there is any how that will be kept on site (enclosures);
- f) Dust control measures;
- g) Details of an on-site concrete plant if proposed;
- h) Proper wash out details for concrete trucks;
- i) Any phasing plans if required;
- j) Schedule of construction;
- k) Parking for contractors; and,
- l) Confirmation that no site work will take place on Town property, or a proposed plan for the R.O.W. works with the acknowledgment that any damage to municipal property will be repaired following construction.

13.7 Responsibilities During Servicing

The Town requires the following considerations at the Owner's own expense, during the servicing period of the development:

- a) Maintain all new streets within the development. Any affected external streets are to be clear of dirt and debris;
- b) Maintain grading to eliminate all standing water on the development and surrounding properties;
- c) Maintain separation of storm sewers and surface runoff from sanitary sewers;
- d) Maintain any silt fence or erosion control measures implemented including around stormwater ponds to prevent sediment and construction debris from entering the pond or stormwater system; and,
- e) Install, maintain, and remove necessary traffic control devices as needed.

13.7.1 Site Meetings

The Consulting Engineer shall chair and prepare minutes of construction site meetings. Meetings are to be held as required by the Town. A meeting within two days of road cut is mandatory. The Consulting Engineer's project manager or project engineer and the site inspector along with the contractor's project manager and job superintendent (or foreman) shall attend the job meetings. Minutes shall be distributed no later than seven (7) days of the meeting date.

13.7.2 Sidewalk and Active Transportation Construction

Sidewalks and multi-use trails are to be installed as part of the servicing work and will be required prior to the beginning of the maintenance period. Where multi-use trails are to be installed around a stormwater management pond, and there is likelihood for settlement that could cause cracking in the asphalt trail, the trail may be installed as a granular pathway for the first year, and then regraded and paved in the second year of the maintenance period. The responsibility lies with the Owner for the maintenance and replacement of the sidewalks until the Town assumes the subdivision.

13.7.3 Installation of All Rear-Yard Catchbasins and Drainage Systems

Rear yard drainage shall be provided for each building lot in the locations and according to the specifications prescribed by the approved engineering drawings and as approved by the Corporation. Rear yard drainage shall be installed simultaneously at the time of servicing. A separate rear-yard drainage system, with a catch basin, shall be provided for each building lot.

The Owners shall install a solid pipe not less than 100 mm in diameter running from the clean out at the front of each property line to a point 7.6 m from the rear yard property line to ensure drainage from the rear yard to the front, as per drawing L-LG-01.

Where deemed necessary by the Town, the Owners shall install rear yard catch basins at the time of servicing to eliminate ponding water or overland flow onto neighbouring properties. with locations and grades as shown on the approved lot grading plan. At the time of servicing, the Owners shall grade all lots to eliminate ponding water until such time that a Building Permit has been approved for each lot.

The Owner may be responsible to install a temporary construction fence 3 m offset from the property line, thus delineating a construction zone and the rear yard line. The fence shall remain in place until the end of maintenance.

13.7.4 Inspections and Quality Control Testing

The Consulting Engineer shall provide full-time on-site inspection services during the construction activity. The Inspector's skills shall be suitable for the inspection tasks to be undertaken. The Town reserves the right to request a change to the consultant's inspector if the Town believe the inspector is not qualified.

The Consulting Engineer's site inspector shall ensure that the work is constructed in accordance with the contract documents and shall keep adequate records of work.

Inspections shall be completed for all underground infrastructure before the sidewalk is installed.

As a minimum, the following documents are to be prepared by the site inspector:

- a) Diary indicating daily progress of work, labour and equipment on site;
- b) Measurement of pay items;
- c) Discussions with general public and agency representatives;
- d) Accidents (if applicable); and,
- e) As-built records.

The Consulting Engineer shall arrange for quality assurance testing by an independent firm or by their own forces. The tests shall include:

- a) Granular material sieve analysis;
- b) Engineered fill;
- c) Asphalt extraction;

- d) Compaction tests, granular and asphalt;
- e) Concrete compressive strength, air content and slump tests;
- f) Storm and sanitary sewer air tests;
- g) CCTV video for all sewers and services to be reviewed prior to final inspection as well as prior to acceptance onto maintenance period;
- h) Watermain testing as specified in this manual;
- i) Deflection testing (plastic sewer pipe); and,
- j) Any other tests as called in agreement documents or as needed by the Town.

The Consulting Engineer is to review and certify that all testing is complete as per above requirements. The Consulting Engineer is to prepare a Deficiency List which should be updated continuously throughout the construction period.

13.7.5 Street Cleaning

The Owner is required, at their own expense, to monitor and facilitate cleaning of all streets as needed within the development, and any streets abutting the development being used during the servicing and maintenance period. Responsibilities may include, but are not limited to the following:

- a) Owner responsible to clean streets minimum every two (2) weeks;
- b) Catch basin filters, and Straw Check Dams may be required to prevent debris from penetrating the sewer systems or natural watercourses; and,
- c) The Town will regularly inspect the development for cleanliness. If the development is not to the satisfaction of the Town, the Owner will be notified and be provided 24 hours to address the deficiencies (weather permitting). If not resolved, the Town will take action to address the deficiencies and extract the necessary funds from the appropriate securities.

13.7.6 Property Maintenance

The Owner is required to keep all weeds cut and ensure all lands associated with the development are properly draining. If the development is not to the satisfaction of the Town, then the Town will notify the Owner. The Owner will be given five (5) business days to address the deficiencies (weather permitting), otherwise the Town will address the deficiencies and extract the necessary funds from the appropriate securities.

13.8 Acceptance onto Maintenance/ Building Permit Issuance

Prior to acceptance of the servicing work, commencement of the maintenance period, and issuance of building permits, the following items must be complete:

- a) Final approval from the County of Essex for the Plan of Subdivision, including registration of the requisite 12M Plan;
- b) All underground mainlines and connections must be completed, tested (including cleaning, infiltration/exfiltration, test gauge and CCTV) and approved by the Town;
- c) All stormwater management facilities and pump stations if required must be operational;
- d) All surface work, with the exception of surface asphalt, must be completed;
- e) Sidewalks and Active Transportation facilities are installed;
- f) Grade, topsoil, and seed any Town owned lands, or land abutting new streets that do not have lots fronting the street as part of this development;
- g) Electrical power and streetlights are installed and energized;
- h) All retaining walls and fences are to be installed. Walls or fences along side yards that will be affected by a basement excavation may be delayed until completion of that foundation if approved by the Town;
- i) All infrastructure associated with a Plains Midstream crossing has been completed (if applicable);
- j) A walkthrough to identify any outstanding work and deficiencies;
- k) For the Town to accept each item, the Consulting Engineer must provide a letter to the Town confirming which services are installed, that they are constructed properly and recommend that the item go onto maintenance; the Town will confirm (in writing) that the development has been constructed to Town standards;
- l) Lot grading sheets have been submitted and approved in format as specified by the Town;
- m) All regulatory signs erected as required by the Town;
- n) Development sign as per the development agreement must be installed on the site;
- o) “Subdivision Not Assumed By Town – Use at Your Own Risk” sign installed;
- p) Site to be clean of debris/garbage and all roads (new and existing) clean and safe for access; and,
- q) Any additional requirements identified in the applicable development agreement on a site-by-site basis, at the Town’s discretion.

In accordance with the requirements of the Ontario Building Code, construction cannot commence on any buildings until a building permit is issued. This is Provincial legislation administered by the Chief Building Official. The Town does not have the authority to waive this

Provincial legislative requirement. Building permits will not be issued until all requirements have been fulfilled.

Sufficient information shall be submitted with each application for a permit to enable the CBO to determine whether or not the proposed construction, demolition or change of use will conform to the Ontario Building Code Act, the Ontario Building Code and any applicable law. Each application must be accompanied by two complete sets of plans and specifications required under law, unless otherwise specified by the CBO.

13.8.1 Model Home Permits

The CBO may issue building permits in advance of the completion of all required works for ten percent of the total dwelling units, or as appropriately determined by the Town in any particular phase of a development provided:

- a) The base coat of asphalt has been installed, to the satisfaction of the Town;
- b) It is determined from a review of the approved plans by the Town that there is no conflict between the activity that would result from the building permit being issued and the installation of various underground utilities (such as storm, sanitary, watermains, hydro, gas, street lighting and applicable pumping stations);
- c) A surveyor's certificate has been received by the Town pertaining to the lot for which the building permit is being sought;
- d) Lot Servicing/Grading sheets for the Model Home lots must be completed as described in [Section 4.2](#) of this manual and approved by the Town;
- e) A letter is received from the Owner confirming support for the building permit issuance; and,
- f) It is clearly noted on the building permit that occupancy of the dwelling unit will not be permitted until the Owner has completed all required works, except surface layer of asphalt, to the satisfaction of the Town and all Agreements to Purchase affecting the subject property will provide a notice regarding the restriction pertaining to occupancy. Such notice shall be required on all Agreements to Purchase until the completion of the required works, excluding surface layer asphalt, are completed to the satisfaction of the Town.

13.9 Responsibilities During Maintenance Period

The maintenance period shall be a minimum of two (2) years from the date that the Town has accepted the development onto maintenance. The maintenance security and liability insurance must remain in full effect for the duration of the maintenance period.

The Owner shall be responsible for the maintenance and repair of all works for the prescribed maintenance period and shall promptly address any deficiencies identified by the Town. Where the Owner fails to carry out required maintenance or repairs within a reasonable period of time following written notice from the Town, the Town may, but is not obligated to, undertake such work. If there are deficiencies that arise, the Owner shall:

- a) Rectify the problem at the earliest availability (pending weather);
- b) Notwithstanding the foregoing, where the Town determines that an emergency exists affecting public health, safety or property, the Town may enter upon the lands and carry out such work as it deems necessary, without prior notice to the Owner;
- c) All costs incurred by the Town in carrying out such work, including administrative and overhead costs, acting reasonably, shall be recoverable from the Owner and may be deducted from any securities held by the Town;
- d) The Town shall, upon request, provide the Owner with a summary of costs incurred;
- e) The Owner acknowledges and agrees that the Town is under no obligation to monitor the works or notify the Owner of deficiencies, and that any inspections carried out by the Town are for its own purposes only and shall not be relied upon by the Owner as confirmation of compliance with the approved plans and specifications; and,
- f) In determining whether to undertake such work, the Town shall act reasonably having regard to the nature and urgency of the deficiency.

The following measures must be followed by the Owner during the maintenance period:

- a) All road maintenance on all new roads within the development, including grading and dust control, as needed until the roads have their final surface;
- b) Repairs that may be required as a direct result of the construction activity in the development until the maintenance period for the construction of services expires;
- c) All sanitary storm sewer cleaning required as a result of debris/blockages caused by servicing or home construction outside of this development;
- d) Cleaning and flushing of sewers and drains throughout the development until the maintenance period for construction has expired;

- e) Catchbasins and manholes to be set at base asphalt grade and not raised until surface is scheduled;
- f) Any requirements outlined in the O&M Manual that are not listed above; and,
- g) Snow clearing can be carried out by Town, if Owner makes written request to the Town.

13.9.1 Requirements at the End of Maintenance Period

Prior to the final acceptance by the Town, the Owners and consulting engineer shall be required to schedule a final walkthrough with the Town to:

- a) Identify any required sidewalk and curb repairs;
- b) Identify any required road base repairs; and,
- c) Mark out locations of street tree planting with the Town.

Prior to the walkthrough, the following items must be completed:

- a) The sewer mainline and connections must be flushed and inspected by CCTV, and the report must be reviewed by the Consulting Engineer;
- b) The streets within the development must be thoroughly cleaned for inspection;
- c) Ensure all necessary contractors and consultants are informed of the pending inspection and all necessary parties are in attendance; and,
- d) Compose and send the Minutes of the Final Walkthrough to the Town.

After the walkthrough, the Owner is to address deficiencies identified during walkthrough, as well as:

- a) Base repairs and complete surface asphalt;
- b) Raise catch basins and pour concrete box outs;
- c) Raising manhole frame and cover; with concrete riser rings, circular hole saw, re-parging and base patch. MH riser rings may be approved by the Town if requested;
- d) Landscape, address any weeds and plant street trees;
- e) Grade, topsoil, and seed any Town owned lands, or land abutting new streets that do not have lots fronting the street as part of this development; and/or,
- f) Lands that have been disturbed by the construction of this development.

13.9.1.1 SWM Pond Acceptance Protocol

Prior to assumption of any SWM facilities by the Town, the following steps shall be taken:

- a) Complete a pond performance evaluation;
- b) Complete inspection of facilities;
- c) Bathymetry, including removal, testing, and safely disposing of any accumulated sediments at a suitable offsite location, if required;
- d) As-constructed survey of SWM pond block and all key pond elements and hydraulic structures; and,
- e) Written clearance from a Landscape Architect that all pond plantings are as approved on the design drawings and are established. Pond plantings must be shown to be healthy and complete. Any dead, diseased or missing material must be replaced prior to assumption inspection.

13.10 Final Acceptance by the Town

The services installed shall be further inspected prior to the expiry of the maintenance period for each item. If any further deficiencies exist, the Owner shall be required to carry out the necessary remedial work. Once all outstanding work and deficiencies are resolved, and the Consulting Engineer composes and sends a letter to the Town, then the remainder of the Performance and Maintenance Securities will be released to the Owner. The Town will not assume the subdivision for a minimum period of two (2) years from the start of maintenance, until all of the requirements of the development have been satisfied, and until a minimum of 75% of the units within the subdivision are occupied.

Surface asphalt is typically placed at the end of the maintenance period, subject to approval by the Town. However, where the maintenance period extends beyond five (5) years due to the minimum occupancy requirements not being met, the Town may require or permit the Owner to place the surface asphalt at any time after the fifth anniversary of the base asphalt installation. Placement of the surface asphalt under these circumstances does not relieve the Owner of any remaining maintenance period obligations, which shall continue until the maintenance period has been satisfactorily completed.

Town administration has delegated authority from Council to assume the subdivision from the Owner.

13.11 Responsibilities During Warranty Period

The Owner is responsible for the service and maintenance of the surface asphalt for a minimum of one (1) year after installation of these services. Street trees must be maintained and replaced within the Warranty Period in accordance with the guidelines as described in [Section 3.8](#) of this manual. All deficiencies are to be rectified prior to the end of the Warranty Period.



14 Site Plan Design Requirements

Site plan control is a planning tool that a Town uses to evaluate certain site elements, such as walkways, parking areas, or new structures on a parcel of land where development is proposed. The following are requirements that should be considered during the design of a new development that triggers Site Plan Approval.

14.1 Site Servicing

The servicing for all Site Plans shall follow the guidelines provided in this Manual, as well as any other documents referenced including the WERSM, and the MECP Design Guidelines for Sewage Works.

Only one set of services (i.e. a storm service, sanitary service, and a water service), shall be provided to each Site Plan Development. Duplicate services shall not be installed, and multiple buildings within a site shall be serviced internally.

14.1.1 Underground Stormwater Storage

Underground storage for stormwater may be permitted for Site Plans. Downstream receiver water levels and the groundwater table should be reviewed during the design of the underground storage. Emphasis on this requirement will be recognized specifically for the Waterfront Zones along Front Road, where the Detroit River water level and groundwater table may affect the efficiency of underground storage.

14.1.2 Water Servicing

For private water main installations greater than 100mm diameter, the Consultant Engineer shall provide full-time inspection of the installation. Periodic inspection will be provided by the Town. Please refer to [Section 5.3.16](#) for Hydrant requirements and to [Section 5.4.7](#) Water Meter requirements.

14.2 Site Layout and Design

14.2.1 Curbs, Walkways and Pavements

When designing Site Plans in accordance with Ontario's AODA (Accessibility for Ontarians with Disabilities Act), designers must integrate barrier-free principles throughout the built environment. This includes ensuring accessible exterior paths of travel—such as ramps, curb cuts, and tactile walking surface indicators—to connect parking, building entrances, and public amenities.

Site Plans should be designed to provide adequate pedestrian movements from the right-of-way, and from the parking areas to the building entrances.

14.2.2 Lighting

As specified in [Section 12.2](#) of the Manual, various lighting principles and techniques shall be adopted to provide safe lighting, and to minimize the impacts to neighbouring properties.

The Owner shall orient, shield, install, and maintain all outdoor lighting, installed on buildings and on light standards, in such a manner so as to direct all lighting away and eliminate direct light penetration from abutting municipal road allowances and all other properties. The owner shall further use only full cut-off fixtures for any outdoor lighting purposes. The design should strive to achieve '0' foot candles illumination levels at all property lines.

14.2.3 Earth Bin Requirements/Refuse Enclosure for Commercial and Mixed-Use Developments

Earth Bins shall be installed in a manner to minimize visual and odor impacts to neighbouring properties. Conventional garbage bins (dumpsters) will not be permitted. Roll-out bins and internal garbage storage may be permitted for buildings containing less than 11 residential units, and for commercial developments after consultation with the Town. Bins shall be installed to provide easy access and turn around for garbage trucks to safely enter and exit the site. Where garbage is stored inside the building, the refuse room shall be located to provide convenient access, allowing bins to be easily rolled to a suitable pickup point for collection by garbage trucks.

14.2.4 Snow Storage

Adequate snow storage space shall be provided, which does not cause sight obstructions or damage to landscaping. Snow storage areas are not to encompass any Low Impact Development (LID) features or storm drainage features (e.g., catchbasins, area drains, swales, ditches, etc.).

Snow storage space should not reduce the parking spaces below the minimum required number for a site.

14.2.5 Landscaping

Landscaping designs should strive to:

- Improve the Town's aesthetic image, as an attractive, clean, and prosperous urban environment;
- Help conserve energy, assist in snow removal, and offset air pollution;
- Define public and private spaces and give form and enclosure to a site;

- Reduce the negative visual and environmental impacts associated with parking lots; and,
- Ensure compatibility with adjacent landscaping or buffer the site from adjacent conflicting land uses.

14.2.6 Fencing

For fencing requirements, refer to the Council adopted By-law: [“Fence, Decks, Pools and Hydro-Massage Pools on Private Property”](#), as amended.

When any new development which includes a parking lot that abuts a residential zone or a natural environment area, a fence encompassing the subject land shall be included. The construction of said fencing shall be approved by the Town.

Where deemed necessary by the Town, the fencing shall be constructed to provide noise attenuation to reduce impacts to the residential zones.

Any proposed fencing shall be shown on the design drawings including height, type, and construction details.

14.3 Traffic

Traffic designs should strive to meet best engineering practices, encompassing a range of principles and techniques aimed at maintaining/improving the efficiency, safety, and sustainability of the surrounding transportation systems. The Town identifies certain key practices that can play an integral role in facilitating the above, including traffic calming measures (at the Town’s discretion), access management, intersection design, parking management, and an overall sustainable multimodal/complete streets approach to traffic design.

Through the design process, site plans should also consider the following:

- Site circulation;
- Parking design;
- Pedestrian and cycling facilities;
- Wayfinding and signage;
- Accessibility;
- Emergency vehicle access;
- Sustainable transportation; and,
- Developments should include analysis of traffic from reciprocal accesses to neighbouring properties.

The Town utilizes [OTM Books](#) and [TAC Guidelines](#), but additional design requirements may be required. As such the Town should be contacted directly for any additional information regarding the Traffic network.

14.3.1 Parking Lot Design and Site Access

Through the design process, site plans should consider the following when developing parking lot layout:

- Drive Aisle Widths;
- Fire Route;
- Parking Stall Dimensions;
- Accessible Parking;
- Signage;
- Safe pedestrian movements to allow access from parking areas to store fronts; and,
- Reciprocal access to neighbouring properties:
 - Temporary parking spots located in future reciprocal access areas will not be included in minimum parking space calculations.



14.4 Utilities

Telecommunications, Hydro, Gas, etc., should be constructed below ground and in accordance with applicable utility provider requirements. The Owner is responsible for all design coordination with utility providers and must receive and provide acceptance/approval from each utility provider.



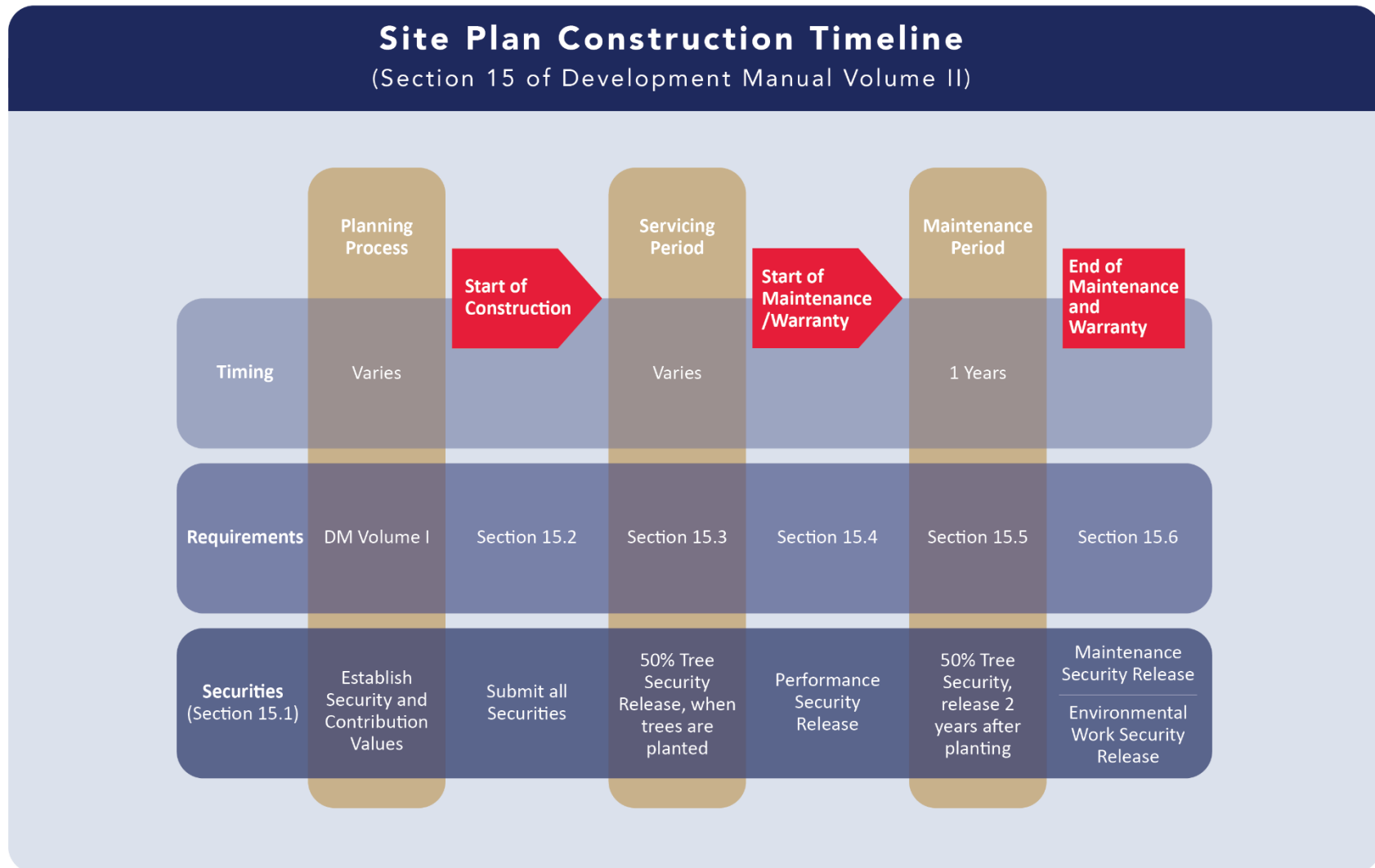
15 Site Plan Construction Requirements

The Owner or Contractor is required to obtain all planning and engineering approvals prior to any construction work on the development property.

On the following page is the [Site Plan Construction Timeline Flowchart](#) to help navigate the step-by-step process for Owner's during the construction period.

The owner or contractor shall be required to construct all aspects of the development in accordance with this manual. Civil works shall include but are not limited to all works shown on civil drawings, sewers, watermain, curbs, roads, sidewalks, surface asphalt, line painting, stormwater management facilities, fencing, grading, and restoration. Other works may include street trees and environmental mitigation and monitoring.

15-1 Site Plan Construction Timeline Flowchart



15.1 Site Plan Securities

All Securities are required to be submitted to the Town prior to the scheduling of a pre-construction meeting. The following identifies the required securities for the purpose of the servicing and maintenance of the site. The Town retains the right to review and comment on the values presented in the tender documents if they are not in keeping with current market conditions. Security requirements can be found in the table on the following page.

15-1 Site Plan Security Requirements

Security	Required Security Format	Required Security Value	Timing of Release of Security
Performance Security 1	Letter of Credit, Certified Cheque, Bank Draft, Electronic Funds Transfer (EFT)	100% of the value of the works in the Town right-of-way. Includes all civil and restoration works. Excludes only street trees and environmental mitigation and monitoring work.	At the completion of all R.O.W. servicing and restoration, and once sewer videos have been reviewed and all deficiencies have been addressed.
Performance Security 2	Letter of Credit, Certified Cheque, Bank Draft, Electronic Funds Transfer (EFT)	25% of the value of the site works on private property. Including but not limited to; civil works, refuse enclosures, lighting, and restoration.	After the completion of all site works.
Maintenance Security	Certified Cheque, Bank Draft, EFT	Minimum of \$5,000 . Determined by the Town based on the magnitude and scope of work.	At the end of the Maintenance/Warranty Period.
As-Built Drawings	Certified Cheque, Bank Draft, EFT	Value determined at time of Agreement writing.	Once PDF and CAD versions of the As-Built Drawings have been submitted to and approved by the Town.
Sewers – Camera and Flushing	Certified Cheque, Bank Draft, EFT	Value determined at time of Agreement writing.	Once sewer videos have been submitted and any deficiencies noted by the Town have been addressed.
Landscaping and Street Tree Security⁽¹⁾	Letter of Credit, Certified Cheque, Bank Draft, EFT	100% of the value of the street tree work.	50% returned at time of installation, 50% returned at the end of the 2-year warranty period from the date of planting.

Security	Required Security Format	Required Security Value	Timing of Release of Security
Environmental Mitigation Security	Letter of Credit, Certified Cheque, Bank Draft, EFT	100% of the value of any environmental mitigation/compensation works as identified in the EIA.	This security will be released upon receipt of written confirmation from the Owner's Environmental Consultant stating that all Mitigation Works and Monitoring have been completed as outlined in the approved EIA.

Notes:

(1) A value per tree will be established by the Town for each development.

15.2 Pre-Construction Meeting

No later than seven (7) days before construction is to commence, the Owner's Consulting Engineer shall call and chair a pre-construction meeting. The Consulting Engineer, Owner, site inspector, general Contractor, Town representatives, and utility company representatives must attend.

Prior to the Pre-Construction Meeting being scheduled, the following items must be completed:

- a) Site Plan Agreement signed and adopted by the Council;
- b) All securities and contributions submitted to the Town;
- c) Insurance documents submitted to the Town;
- d) Agency Approvals (such as the Conservation Authority, etc.);
- e) All drawings approved by the Town;
- f) Any Land Transfers, if required must be shown on a Reference Plan;
- g) Construction Management Plan submitted to the Town if applicable;
- h) Compliance with any pre-construction provisions outlined in an Environmental Report;
- i) Excess Soils Requirements specific to the development;
- j) Consolidated Linear Infrastructure Environmental Clearance Approval from the Town for Municipal Services;
- k) Development sign installed; and,
- l) All other special requirements as per the Development Agreement.

The topics of discussion for the meeting shall include but are not limited to:

- a) Verification of the submission of the securities and contributions;
- b) Verification of the registration of the Agreement;
- c) Agency approvals;
- d) Plan and schedule for any and all environmental mitigation measures required prior to, during, and post construction that are required as part of an environmental permit or letter of advice;
- e) Contact names and emergency telephone numbers for issues during servicing;
- f) Construction access routes;
- g) Supervisory staff and who to notify of deficiencies;
- h) Subcontractors, suppliers and sub-consultants;
- i) Documents (i.e. Tender Issue Contract Drawings, Form 1000, Notice of Project, etc.);
- j) Schedules;
- k) Material and Control Testing;

- l) Lay Down Areas;
- m) Pre-Construction Survey/Photos;
- n) Traffic Control and Detouring;
- o) Emergency Service Notification;
- p) Excess Soils Requirements and Tracking;
- q) Noise and Dust Control;
- r) Work Procedure;
- s) Public Relations;
- t) Public Notification Letters;
- u) Payment Certificates;
- v) Insurance; Owners and Contractors;
- w) Construction Health and Safety;
- x) Schedule of site meetings and access to construction sites;
- y) Environmental permits, work plan and requirements prior to and during construction;
and,
- z) Any additional concerns as noted by attendees.

The Consulting Engineer will provide minutes of meeting within one week from the meeting date.

15.2.1 Construction Management Plan

The construction management plan should be a short report that includes the following:

- a) How the site and adjacent properties will be kept clean of debris and garbage;
- b) Location of fencing (construction, silt, snake, etc.);
- c) Truck routes;
- d) Detour routes (if required);
- e) Confirmation on stucco, and if there is any how that will be kept on site (enclosures);
- f) Dust control measures;
- g) Details of an on-site concrete plant if proposed;
- h) Proper wash out details for concrete trucks;
- i) Any phasing plans if required;
- j) Schedule of Construction;
- k) Parking for contractors; and,
- l) Confirmation that no site work will take place on Town property, or a proposed plan for the R.O.W. works with the acknowledgment that any damage to municipal property will be repaired following construction.

15.3 Responsibilities During Construction

The Town requires the following considerations at the Owner's own expense, during the servicing period of the development:

- a) Any affected external streets are to be clear of dirt and debris;
- b) Maintain grading to eliminate all standing water on the development and surrounding properties;
- c) Maintain separation of storm sewers and surface runoff from sanitary sewers;
- d) Maintain any silt fence or erosion control measures implemented including around stormwater ponds to prevent sediment and construction debris from entering the pond or stormwater system; and,
- e) Install, maintain, and remove necessary traffic control devices as needed.

15.3.1 Sidewalk and Active Transportation Facilities

Sidewalks and multi-use trails that must be removed during construction must be approved by the Town. If the Owner must obstruct, remove, or damages any portion of the existing sidewalk, the sidewalk must be reinstated within seven (7) days and made accessible as per the AODA requirements.

15.3.2 Inspections and Quality Control Testing

Although full-time inspection is not required during construction of site plan developments, it is recommended by the Town that the Consultant Engineer provide full-time inspection services for the civil works required to be constructed.

The Consultant Engineer is responsible to provide the Town with a letter of conformance once the project is completed identifying that all the works have been constructed according to the approved plans. This letter will need to be sealed and signed by a Professional Engineer licensed to practise in Ontario.

The Town will carry out its own independent inspection as deemed necessary.

The Consulting Engineer shall arrange for quality assurance testing by an independent firm or by their own forces. The tests shall include:

- a) Granular material sieve analysis;
- b) Engineered fill;
- c) Asphalt extraction;
- d) Compaction tests, granular and asphalt;

- e) Concrete compressive strength, air content and slump tests;
- f) Storm and sanitary sewer air tests;
- g) CCTV video for all sewers and services to be reviewed prior to final inspection as well as prior to acceptance onto maintenance period;
- h) Watermain testing as specified in this manual;
- i) Deflection testing (plastic sewer pipe); and,
- j) Any other tests as called in agreement documents or as needed by the Town.

The Consulting Engineer is to prepare a Deficiency List which should be updated continuously throughout the construction period.

A final walkthrough with the Consultant Engineer and The Town will be required to be completed to ensure any deficiencies in the construction have been resolved.

15.3.3 Property Maintenance

The Owner is required to keep all weeds cut and ensure all lands associated with the development are properly draining. If the development is not to the satisfaction of the Town, then the Town will notify the Owner.

15.4 Acceptance onto Maintenance

Prior to acceptance of the right-of-way servicing work and commencement of the maintenance/warranty period, the following items must be complete:

- a) All underground servicing must be completed;
- b) All stormwater management facilities must be operational;
- c) All surface work must be completed;
- d) The right-of-way has been restored to the existing condition or better, including sidewalks, multi-use trails, topsoil and seeding;
- e) Street Trees have been installed where applicable;
- f) All retaining walls and fences are to be installed;
- g) A walkthrough to identify any outstanding work, and deficiencies;
- h) Conformance Letter provided to the Town;
- i) Record Drawings submitted to the Town;
- j) CCTV videos submitted and approved by the Town;
- k) Site to be clean of debris/garbage and all roads clean and safe for access; and,
- l) Any additional requirements identified in the applicable Site Plan Agreement on a site-by-site basis, at the Town's discretion.

15.5 Maintenance/Warranty Period

The maintenance/warranty period shall be a minimum of one (1) year from the date the Town has accepted the site servicing work. The maintenance security and liability insurance must remain in full effect for the duration of the maintenance period.

The Owner shall be responsible for the maintenance and repair of all works for the prescribed maintenance period and shall promptly address any deficiencies identified by the Town. Where the Owner fails to carry out required maintenance or repairs within a reasonable period of time following written notice from the Town, the Town may, but is not obligated to, undertake such work. If there are deficiencies that arise the Owner shall:

- a) Notwithstanding the foregoing, where the Town determines that an emergency exists affecting public health, safety or property, the Town may enter upon the lands and carry out such work as it deems necessary, without prior notice to the Owner;
- b) All costs incurred by the Town in carrying out such work, including administrative and overhead costs, acting reasonably, shall be recoverable from the Owner and may be deducted from any securities held by the Town;
- c) The Town shall, upon request, provide the Owner with a summary of costs incurred;
- d) The Owner acknowledges and agrees that the Town is under no obligation to monitor the works or notify the Owner of deficiencies, and that any inspections carried out by the Town are for its own purposes only and shall not be relied upon by the Owner as confirmation of compliance with the approved plans and specifications; and,
- e) In determining whether to undertake such work, the Town shall act reasonably having regard to the nature and urgency of the deficiency.

As specified in [Section 3.9](#), Street Trees shall be maintained for a two (2) year period from the date of planting. A final walkthrough with a Town representative and arborist is required prior to the Town acceptance of any trees.

15.6 Final Acceptance by the Town

Prior to the final acceptance by the Town and release of the maintenance security, the Owners and Consulting Engineer shall be required to schedule a final walkthrough with the Town to identify any deficiencies that have not been addressed.

