

TOWN OF HANOVER
**Municipal Development and
Engineering Guidelines**

Version 1

TABLE OF CONTENTS

SECTION 1 INTRODUCTION.....	8
1.1 DEFINITIONS	8
1.2 PURPOSE.....	9
1.3 PLANNING APPLICATION PROCESS.....	12
1.4 ENGINEERING PROCESS.....	13
1.5 DEVELOPMENT APPROVALS.....	15
1.6 AGREEMENTS.....	15
1.7 DEVELOPER’S ENGINEER	15
1.8 UTILITIES	16
1.9 DESIGN STANDARDS	17
1.10 BARRIER FREE REQUIREMENTS	17
1.11 CAPITAL PROJECTS	17
 SECTION 2 SUBMISSION OF PLANS, REPORTS, AND STUDIES	 19
2.1 SUBMISSION PROCEDURE.....	19
2.2 PLANS AND DRAWING REQUIREMENTS	19
2.3 PLANS-PROFILE DRAWINGS	20
2.4 GENERAL SERVICING PLAN	22

2.5	APPROVALS	23
2.6	SERVICES FOR INDIVIDUAL RESIDENTIAL LOTS	23
2.7	EASEMENTS	24
2.8	DEVELOPMENT AGREEMENT	24
2.9	REQUIREMENTS PRIOR TO COMMENCEMENT OF CONSTRUCTION	25
2.10	AS-RECORDED (AS-BUILT) DRAWINGS AND RECORD FIELD SURVEY	25

SECTION 3 | ROADS 27

3.1	ROADS GENERAL	27
3.2	CLEARING AND GRUBBING	28
3.3	GRADING	28
3.4	ROAD CONSTRUCTION	28
3.5	ROADWAY SURFACE ASPHALT	29
3.6	CURBS	29
3.7	SIDEWALKS	29
3.8	ACCESSIBILITY	30
3.9	TURNING CIRCLES OR HAMMERHEADS	30
3.10	ADJACENT ROADS	30
3.11	DAYLIGHTING REQUIREMENTS AT INTERSECTIONS	31
3.12	LOCATION OF UTILITIES	31
3.13	COMMUNITY MAILBOX REQUIREMENTS	31
3.14	SNOW CLEARING	32
3.15	DRIVEWAY ENTRANCES	32

3.16	OTHER REQUIREMENTS	32
------	--------------------------	----

SECTION 4 | SANITARY SEWERS 34

4.1	APPROVAL OF PLANS	34
4.2	CONFIRMATION OF CAPACITY	34
4.3	DESIGN STANDARDS	35
4.4	LOCATION	35
4.5	MATERIAL.....	35
4.6	SANITARY SEWER CONSTRUCTION	35
4.7	HOUSE CONNECTIONS	36
4.8	GRINDER PUMPS	36
4.9	MAINTENANCE HOLES	36
4.10	TESTING AND FLUSHING OF SEWERS	37
4.11	COMPLETION AND ACCEPTANCE.....	37

SECTION 5 | WATERMAINS 38

5.1	APPROVAL OF PLANS	38
5.2	CONFIRMATION OF AVAILABLE CAPACITY.....	38
5.3	WATERMAIN DESIGN	38
5.3.1	Location in ROW	38
5.3.2	Location Outside the ROW.....	38
5.3.3	Material Specifications	39

5.3.4	Bedding.....	39
5.3.5	Depth of Cover	39
5.3.6	Material and Size	40
5.4	Watermain Construction.....	43
5.5	Flushing, Testing and Disinfection.....	43
5.6	Completion and Acceptance	44

SECTION 6 | STORM MAINS AND STORMWATER MANAGEMENT..... 45

6.1	APPROVAL OF DESIGN AND PLANS.....	45
6.2	STORMWATER MANAGEMENT REPORT	46
6.3	CONNECTION TO MUNICIPAL SYSTEM.....	47
6.4	DESIGN CRITERIA.....	47
6.5	LOCATION	48
6.6	SEWER PIPE MATERIAL	48
6.7	STORM SEWER CONSTRUCTION	49
6.8	MAINTENANCE HOLES AND CATCH BASINS.....	49
6.9	OPERATIONS AND MAINTENANCE MANUAL (O&M)	50
6.10	REPORT FORMAT	51
6.11	OPERATIONS AND MAINTENANCE FEATURES	51

SECTION 7 | UTILITIES AND STREET LIGHTING..... 54

7.1	TELECOMMUNICATIONS	54
-----	--------------------------	----

7.2	ELECTRICAL	54
7.3	GAS SERVICING.....	54
7.4	STREETLIGHTING	54
 SECTION 8 LOT GRADING AND DRAINAGE.....		56
8.1	GENERAL.....	56
8.2	LOT GRADING PLANS	56
8.3	LOT GRADING DESIGN	56
8.4	INDIVIDUAL LOT GRADING PLAN	57
8.5	CERTIFICATION	58
 SECTION 9 PARKLAND AND LANDSCAPING		59
9.1	PARKLAND	59
9.2	LANDSCAPING	59
9.3	WALKWAYS.....	60
9.4	TRAILS/PATHWAYS.....	60
 SECTION 10 TRAFFIC AND STREET SIGNS		61
 SECTION 11 ASSET MANAGEMENT		62
 SECTION 12 PAYMENT TO DEVELOPERS		63

LIST OF APPENDICES

Appendix "A" – Typical Urban Cross Section

Appendix "B" – Typical Collector Cross Section

Appendix "C" – Typical Industrial Cross Section

Appendix "D" – Typical Rural Road Cross Section

Appendix "E" – Stormwater Management Standard for Site Plans or Small Developments

SECTION 1 | INTRODUCTION

The purpose of this manual is to provide guidance to Developers, Consultants and the general public through the Town of Hanover's development approval process.

The design information contained in this manual is intended to provide direction beyond legislative and standard design practices for use in the Town of Hanover (the Town). There will be site specific situations where the design will depart from these practices as it is not possible nor is it the intention of the Town to anticipate every situation.

The appropriate Town Department Head (hereon is referred to as the Director) must approve technological or economical changes that improve or maintain the quality of the design.

These standards are to be read in conjunction with Ontario Provincial Standards (OPS) and Drawings (O.P.S.D.), Grey County standards/manuals and any other applicable regulations. However, in the case of a discrepancy the Town Standards shall prevail. The Town of Hanover maintains its right to accept or refuse any design submissions and requires an acceptable design for any given circumstance.

The design of all Town services is to be based upon the specifications and standards in effect at the time of design. All drawings are to be accepted by the Town before they are used for the construction of services; however, such approval in no way relieves the Developer's consulting engineer from providing an adequate and safe design.

The Town reserves the right to require a review and request possible revisions of previously accepted drawings if five years or more have passed between approval and construction. It is understood that these standards may be referred to as a schedule in a subdivision agreement and that the current revision of the standards are then considered part of the agreement.

These engineering standards form the basis of road reconstruction for Town driven projects.

1.1 DEFINITIONS

In this specification the following definitions shall apply:

"AODA" shall mean Accessibility for Ontarians with Disabilities Act.

"AFC" shall mean Accepted for Construction.

"AWWA" shall mean the American Water Works Association.

"CHBDC" shall mean the Canadian Highway Bridge Design Code.

"CLI-ECA" shall mean Consolidated Linear Infrastructure Environmental Compliance Approval

"Engineer" shall mean professional engineers licensed to practice in Ontario and shall be responsible for the preparation of drawings and specifications to the satisfaction of the Town.

"Contractor(s)" shall mean the firm of Contractors, the company or individual acting as the Contractor and having entered into a contract with the Developer/Owner to install the services.

"Developer(s)/Owner(s)" shall mean the person(s) causing the Works to be undertaken.

"DFO" shall mean the Department of Fisheries and Oceans, Canada.

"SVCA" shall mean the Saugeen Valley Conservation Authority.

"Landscape Architect" shall mean a professional landscape architect who is a full member of the Ontario Association of Landscape Architects with a Seal and Certificate and shall be responsible for the preparation of drawings and specifications to the satisfaction of the Town.

"Major Pumping Station" shall mean a water pumping station greater than 30 L/s and a sanitary pumping station greater than 15 L/s.

"MNRF" shall mean the Ontario Ministry of Natural Resources and Forestry.

"MECP" shall mean the Ontario Ministry of the Environment, Conservation and Parks.

"MTO" shall mean the Ontario Ministry of Transportation.

"NEC" shall mean the Niagara Escarpment Commission.

"NVCA" shall mean the Nottawasaga Valley Conservation Authority.

"OBC" shall mean the Ontario Building Code.

"OPSD" shall mean the Ontario Provincial Standard Drawings.

"OPSS" shall mean the Ontario Provincial Standard Specifications.

"TAC" shall mean the Transportation Association of Canada.

"Town" shall mean The Corporation of The Town of Hanover

"Town Representative" shall mean any person assigned to a project by the Town to carry out work on their behalf.

1.2 PURPOSE

This document is to provide the reader with a description of the process undertaken to get Town approval for Site Plan and Subdivision Developments. Draft Plan and other Planning applications that are processed by the Grey County (County) are described herein. The intention of this document is that these steps, if followed will lead to a quick and simple approval that enables construction.

Applicable Law

Development applications are reviewed and processed in accordance with relevant legislation and regulations, including but are not limited to:

- Municipal Act

- Planning Act
- Building Code Act
- Environmental Protection Act
- Safe Drinking Water Act
- Ontario Water Resources Act
- Conservation Authorities Act
- Accessibility for Ontarians with Disabilities Act
- Aggregate Resources Act
- Town of Hanover By-laws
- Grey County By-laws
- Town of Hanover Official Plan
- Town of Hanover Comprehensive Zoning Bylaw

Applicants must ensure compliance with these pieces of legislation and their enacting regulations as part of the development approval process.

Pre-consultation

Prospective applicants are encouraged to contact Hanover Development Department staff to schedule a preliminary discussion with the Town. This discussion helps clarify key requirements and expectations early in the process. Depending on the scale and complexity of the proposal, a pre-consultation meeting with relevant staff and agencies may be scheduled before submitting a formal application.

Town staff and/or the Planner will coordinate this meeting, and applicants are encouraged to bring their consultants (e.g., planners, engineers) if needed. Pre-consultation helps identify key planning considerations and any required technical studies—such as traffic, noise, or servicing assessments (e.g., hydrogeology/nitrate studies).

Applicants should submit preliminary materials to the Town at least one week before the pre-consultation meeting to allow for staff review and preliminary comments.

Helpful materials include:

- Concept plans
- A detailed description of the proposed development
- Specific technical or procedural questions related to the proposal

Depending on the project's complexity, the Town may require its engineer or other consultants to attend, at the applicant's expense.

Key Discussion Points

At the pre-consultation meeting, the following topics will typically be reviewed:

- Official Plan & Zoning By-law Compliance – If amendments or relief from policies are required, additional applications may be necessary.
- Application Requirements – This includes fees, supporting documents (e.g., contour plan, servicing plans, stormwater management, etc..) and any required agreements.
- Timelines & Scheduling – Key milestones, including next steps for the Developer and their team as well as for staff will be outlined.

Application Processing & Public Review

Once an application is submitted with all required materials, it will be reviewed by Town staff, and where applicable, relevant agencies (Saugeen Valley Conservation Authority, County staff, etc.) If applicable, technical studies may be subject to peer review at the applicant's cost.

Once the submission is deemed complete, a Public Meeting will be scheduled, and notice of the Public Meeting will be circulated to the applicable agencies, municipal departments, community organizations, and neighbouring property owners in accordance with the *Planning Act R.S.O. 1990, c. P.13*. The circulation provides an opportunity to review the application, provide comments, and identify any issues or concerns to be considered as part of the planning review process.

Staff will work with the applicant to review and, where appropriate, address any concerns or recommendations received through the circulation process. A comprehensive staff report—including draft plan conditions based on agency and public input will be prepared by staff and presented to Town of Hanover Council for review and for recommendation. The Town recommendation will then be passed on to the County for their review and final decision.

Final Approval & Development Agreements

Following draft plan approval, several conditions must be met before final approval can be granted. For subdivisions, site plans, and condominiums, applicants may be required to enter into a development agreement with the Town.

This agreement addresses infrastructure requirements, such as road construction, servicing, and will require the submission of engineered drawings that meet Town standards.

Plans of Subdivision require Subdivision Agreements as well as Development Agreements. Development Agreements are released; Subdivision Agreements are registered on title for perpetuity.

For further details or to begin the development application process, please contact the Hanover Development Department staff to schedule an initial consultation with the Town.

1.3 PLANNING APPLICATION PROCESS

1.30 Planning Application Process

1.30.1 Draft Plan Approval Application

Pre-consultation shall include discussion with:

- Required Town staff,
- County Planning staff,
- Saugeen Valley Conservation Authority (SVCA) if applicable,

1.30.2 Site Plan Application

Pre-consultation for Site Plan Approval includes discussions with:

- Town staff, as identified by Hanover Development staff,
- If needed County staff, and
- SVCA staff, if the property is within a regulated area

1.30.3 Subdivision Agreement/Pre-servicing Agreement/Site Plan Agreement

If a significant amount of time has passed since the original Draft Plan Approval, or if a new phase of the development requires special consideration, the Town may request an additional pre-consultation meeting before plans and reports are submitted.

Developers may also request this meeting at their discretion.

Re-consultation meetings typically include discussions with:

- County Planning staff,
- Town/County Public Works and Development staff, and
- SVCA staff, if applicable.

1.30.4 Draft Plan of Subdivision/Condominium Approval

A Draft Plan of Subdivision is generally required for developments that:

- Create five (5) or more lots.
- Establish new Town roads with lots.

The County is the approval authority for Draft Plans of Subdivision. The Town provides input on Town matters such as servicing, infrastructure and parkland dedication.

Throughout the process, the Hanover Development Department generally serves as the primary point of contact for developers.

1.30.5 Application Fees

Fees for planning applications are established in the Town's Fees and Charges By-law. Staff will calculate the required fees and communicate the amount to the applicant. All fees must be paid before the application review process begins.

For a detailed fee schedule and payment instructions, visit the link:

<https://www.hanover.ca/building-planning/planning-development>

1.4 ENGINEERING PROCESS

Following acceptance and approval of the draft plan, the developer shall proceed to the engineering phase of the development process which will include a number of submissions including preliminary and follow-up submissions as required. Prior to the commencement of the Engineering Design, the Developer's Engineer shall obtain copies of the Town's Development and Servicing Guidelines to familiarize themselves with the requirements of the development design in the Town.

The initial submission of engineering drawings shall be delivered to the Town and should include copies of the preliminary drawings and servicing (functional design) report(s).

The initial submission of engineering drawings shall also contain a declaration from the Developer's Engineer showing that they have been retained to design and supervise the construction of the development according to the terms of the Development Agreement. The purpose of the initial submission is to review the general design concept prior to the Developer proceeding to detailed engineering.

In some cases, this information may have been provided in conjunction with the Draft Plan process. The preliminary drawing and report should consider items such as existing conditions, road alignments, cross section details, parkland dedication, watermains, trunk storm and sanitary sewers, storm water management and drainage, lot grading, etc. This document becomes particularly important when servicing is to be phased in conjunction with the development plan.

When a development is being phased the servicing report is to include details of how the phasing will occur and how infrastructure may be impacted by such phasing.

A Functional Servicing Report (FSR) must be submitted to the Town for review and acceptance. This report must be presented in a clear, comprehensive, and professional manner. The Developer shall retain a qualified professional engineer to prepare the FSR, which shall, at a minimum, address the proposed and current servicing of the development, with regard to water supply and distribution, sanitary sewage collection, storm drainage and stormwater management (SWM), and roads, including a review of the existing infrastructure to confirm whether they are sufficiently sized to accommodate the proposed development. Reference to the Ministry of the Environment, Conservation and Parks' (MECP) Design guidelines

and the Ontario Building Code (OBC).

It shall include the provision of utilities such as telecommunications, natural gas, and hydro distribution, etc. This report shall identify any improvements to existing infrastructure which may be required to service the proposed development.

The report shall include calculations for water demand, fire flow (per Fire Underwriters Survey (FUS) method) and sewage generation rates, along with the sizing of watermains, sewers, SWM facilities, pumping / booster stations, forcemains, etc., as applicable.

A calculation shall be provided that equates the water demand in the distribution system will be designed in accordance with MOECP guidelines which state the system should be designed to satisfy the greater of the following demands:

- Maximum day demand plus fire flow; or,
- Peak hour demand

In addition, to the above noted report, the Developer may be required to submit:

- Hydrogeological, hydrology;
- Traffic;
- Acoustical;
- Geotechnical;
- Archaeological;
- Phase 1 – Environmental Site Assessment;
- Tree Inventory and Preservation Plan; and
- Environmental, biological or other studies.

Appropriate engineering or other consultants shall be retained to complete these reports as part of the applications and submissions required. The Developer's Planner and/or Engineer shall consider future adjacent land uses, and all design and layout of services shall incorporate considerations with respect to future servicing, grading and drainage issues on the adjacent lands. Upon completion of designs and submissions, sufficient copies of preliminary design briefs, agency approval submissions and all final drawings and reports shall be submitted for review by the Town and their Engineer.

In the event that the proposed development requires a new water treatment and/or wastewater treatment system(s) to proceed, the Developer and the Developer's Engineer shall start early discussions with the Town and the Town's Engineer, before the preliminary drawings and servicing (functional design) reports are submitted to determine design criteria and requirements.

Submissions are to be made until the Engineering Drawings, design and reports, are acceptable to the Town

Additional details related to drawing requirements and approvals are provided in later sections of this document.

1.5 DEVELOPMENT APPROVALS

Depending on the nature and location of the development proposal within the Town, the Developer may be required to obtain additional approvals from a number of agencies including, but not limited to the following:

- The Town of Hanover;
- The Ministry of the Environment, Conservation and Parks (MECP);
- The Ministry of Natural Resources and Forestry (MNRF);
- Fisheries and Oceans Canada (DFO);
- Grey County;
- Grey Bruce Public Health; and
- Saugeen Valley Conservation Authority (SVCA).

It is the responsibility of the Developer to provide the Town with written documentation detailing its application to the various authorities and copies of approval documents from these regulatory agencies.

1.6 AGREEMENTS

As noted above, the Developer shall be required to enter into a Subdivision or Development Agreement with the Town. A standard form of that agreement is available from the Town for a Developer's review. Certain fees, deposits, and charges will apply and are outlined within that document.

Example agreements can be found on Hanover's website - Planning and Development:

<https://www.hanover.ca/building-planning/planning-development>

Information regarding the preparation of the Development Agreement is provided in Section 2.10 of this document.

1.7 DEVELOPER'S ENGINEER

The Developer shall employ Engineers registered with Professional Engineers' Ontario (PEO) to design all of the services, prepare plans and specifications, and provide construction review and inspection of all works.

The services shall include the following:

- Preparation of functional reports as may be required through the draft plan approval process.
- Preparation of designs.
- Preparation of drawings for approval purposes and construction.
- Preparation of necessary contracts and specification documents.
- Preparation of necessary approval documents in conjunction with the regulatory agencies.
- Provision of contract administration, and full-time construction review of all Town facilities.
- Maintenance of records of construction and upon completion, the provision of As-Recorded/As-built drawings in suitable digital format to the Town.
- Provision of certification to the Town the works have been constructed in general conformance with the approved plans and specifications.
- To act as a representative of the Developer in all matters pertaining to the construction.
- To provide coordination of the scheduling to comply with timing provisions for inspections and testing of the works.
- To provide certification of the installation of services was in conformance to said plans and specifications, such certification should be in a form acceptable to the Town's solicitor and the Town's Engineer.

The Developer's Engineer shall provide evidence of professional liability insurance from their insurer in the amount of not less than five million dollars per occurrence prior to the review of any reports or briefs by the Town. Insurance requirements shall be as detailed in the Town's Standard Development Agreement.

1.8 UTILITIES

The Developer shall coordinate the design and installation of all utilities including electrical, telecommunications (telephone, internet, TV) and gas. These utilities shall be installed within the road allowance in accordance with the typical cross section attached as Appendix "A" and "B" to this document.

The Developer shall provide documentation to the Town that they have contacted all telecommunications providers and advised them they will have access to servicing in the Development.

The Developer will be asked at times in the development process to provide

confirmation from the utility companies that the appropriate arrangements have been made for installation and upon completion of said installation of the utilities, provide to the Town a notice of completion by said companies.

1.9 DESIGN STANDARDS

The standards that follow should be adhered to wherever possible. It is acknowledged that on occasion unique and special circumstances occur and minor deviations may be required from the standard. These deviations shall only be made through consultation with Development and Public Works.

Further, the Town reserves the right to require compliance to a higher standard on occasions where warranted (dependent upon the specific details of any development). Further, the Town may require higher standards in areas of higher density developments, arterial or collector roads, or heavy industrial traffic.

These guidelines should be read in conjunction with the standard engineering practice as established by the MECP and Ministry of Transportation (MTO) together with regulations, the current drinking water license, current municipal sewage collection Environmental Compliance Approvals (ECA) current municipal stormwater management system ECA, design manuals and guidelines of the Municipal Engineers' Association.

Unless superseded by the Town's Development and Servicing Guidelines specific standard drawings and specifications from the Ontario Provincial Standards Specifications and Ontario Provincial Standard Drawings shall be used as reference for individual details (OPSS, OPSD).

1.10 BARRIER FREE REQUIREMENTS

All design projects throughout the Town must adhere to the requirements of the Accessibility for Ontarians with Disabilities Act (AODA) and shall incorporate ways to remove barriers for the public.

On Town reconstruction projects where the requirements of AODA are not practical or financially feasible, exceptions may be accepted, upon review by the Town, providing there is sufficient justification that the existing conditions prohibit proper application of AODA standards.

1.11 CAPITAL PROJECTS

The Town may appoint a qualified consulting engineer registered with the PEO, to design, supervise, and certify the construction and installation of the Capital Works, including but not limited to external works to subdivisions, road construction, intersection improvements, and Town underground infrastructure.

Where external works are required related to a Development, depending on the

scope and magnitude of the works, the Town may choose to manage the design, tendering, and inspection of works on the public right-of-way (ROW), at the Developer's cost. If the Town chooses not to manage the works themselves, the Developer shall appoint a competent, qualified, professional engineer, acceptable to the Town, to design, administer, and provide full-time inspection for the external works

SECTION 2 | SUBMISSION OF PLANS, REPORTS, AND STUDIES

2.1 SUBMISSION PROCEDURE

All submissions for approval shall be forwarded to the attention of the Development and Infrastructure Department for the Town in sufficient quantities as may be required for distribution. Town staff will distribute said plans to public works, building, Town's Engineer, fire department, etc.

Drawing submissions shall include but not be limited to:

- Plan and profile.
- General Servicing Plan.
- Typical cross section(s).
- Typical lot grading sections.
- Lot grading drawings.
- Typical swale details.
- Geotechnical report information.
- Specific structure and erosion protection and control details.
- Details with respect to stormwater management and associated facilities.
- Any other special facility required for the type of development proposed.
- Details of all installations not covered and noted by standard OPSD drawings.
- Such other environmental reports as may have been prepared as part of the application process.

2.2 PLANS AND DRAWING REQUIREMENTS

Drawings must be prepared in digital format, which is compatible with the current version of AutoCAD, for all new development within the Town. The digital files and drawings, including those digital plans showing details of special structures, details, etc., shall be prepared by the Developer's Engineer and provided to the Town as a permanent record prior to the Final Acceptance of services required to be provided by the Developer.

All digital files are to be geographically referenced in a format suitable for insertion into a geographic information system.

The following standards shall be adhered to in preparation of these drawings:

- Existing services shall be shown as dotted or dashed lines while proposed services shall be shown as solid lines.
- All elevations shown on the drawings are to be of geodetic origin.
- Drawings shall be of a consistent size – A2 (594 mm x 841 mm).
- Scales shall be as follows for drawings:
 - General Servicing Plan, Scale Ratio – 1:500
 - Plan-Profile Drawings, Horizontal – 1:250
 - Plan-Profile Drawings, Vertical – 1:50

Ratios shall be shown on all drawings.

- A standard title block placed in the lower right corner of all drawings shall be used in which revisions are clearly dated and displayed, and in which the Town is named. A title sheet containing a drawing index shall be provided for each drawing set. A key plan at a suitable scale shall be displayed on all plan and profile drawings as well as the General Servicing Plan. The area covered by each specific drawing shall be identified in the key plan.
- All engineering drawings shall be stamped and dated by the Developer's Engineer prior to issuance for tender.
- Upon completion of the works, As-Recorded drawings, as outlined elsewhere in these specifications, shall be submitted prior to acceptance of the services. These drawings shall be comprised of the original drawings that were issued for construction, amended to incorporate any changes implemented during construction.

2.3 PLANS-PROFILE DRAWINGS

Plan-Profile drawings are required for all roads, blocks and easements where services are proposed, for all outfalls, and for all boundary roadways abutting the development. The following standards shall be adhered to in the preparation of Plan-Profile drawings:

- All profiles must be drawn with reference to the geodetic datum (NAD83) noted on each drawing. All drawings must contain a complete legend.

-
- Drawings are to be prepared so that each street can be filed separately. The street numbers/names must be identified on the plan portion of the drawings.
- In general, east-west streets shall have zero chainage at their westerly limits and north-south streets shall have zero chainage at their southerly limits. Chainages shall increase from left to right. On the plan portion of each drawing the centerline of construction shall be noted with chainage in 20 metre increments. Chainage for the centerline of construction as well as the chainages for vertical curves (i.e. beginning, end, and apex points) shall be noted on the profile portion of each drawing.
- When the plan must be broken because of curvature, etc., the profile shall be broken as well, so that, insofar as possible, chainage points in plan and profile will coincide vertically. When a street must be displayed on more than one drawing due to its length, match lines shall be used with no overlapping of information.
- The beginnings and ends of curves must be shown on the plan and profile with the radius of curvature shown on the plan. Chainages of points of curvature shall be calculated.
- The chainage and names of intersecting streets shall be shown in plan and profile, and the reference drawing numbers for these streets and for any match lines shall be shown on all applicable drawings.
- The drawings shall show clearly the proposed profiles, road widths and cross-sections, ditches, ditch gradients, curb gradients if different from the proposed services, north arrow and limits of the proposed work. The plan shall show any required off-street drainage, and separate profiles shall be prepared for drainage easements. All details for intersecting streets including grades must be shown for a distance of 50 metres from the intersection of the intersecting street. All street lines, for drainage or services, shall be shown and all easements.
- Plan-Profile drawings shall identify road allowances, lot and block frontages, easements, and reserves. The curb, gutter, and sidewalk are to be shown and dimensioned on the plan portion of the drawings.
- Storm and sanitary sewer shall be drawn in both plan and profile. In profile, the diameter of the sewer shall be drawn to scale. On the plan portion, sewers shall be described by size, type, and direction of flow. On the profile portion, the length, grade, pipe material and class, usage (storm or sanitary) and bedding type shall be identified.

- Structures associated with sewers (i.e. maintenance holes, catch basins) shall be numbered and drawn on both the plan and profile portions. On the profile portion, the number, offset, size, invert elevations, and applicable OPSD shall be identified for each structure. Safety platforms or drop connections shall be noted on the profile portion where applicable. Top of grate elevations shall be specified for rear lot catch basins.
- Ditch profiles and grades shall be shown.
- Watermains, hydrants, and valves shall be drawn on the plan portion of the drawing. On the profile portion, the diameter of the watermain shall be drawn to scale.
- Water and sanitary service connections shall be shown in the plan portion of each drawing.
- The original and proposed ground profiles shall be plotted. Proposed vertical curves shall be defined by all relevant data (K value, grade, etc.). Proposed roadway profiles shall be displayed sufficiently beyond the limits of construction to confirm the feasibility of future extensions.
- Details of gutter grades for cul-de-sacs and crescents shall be provided on the plan portion as a separate detail at a scale of 1:100.
- Existing utilities and services shall be shown in plan.
- The following additional information shall be shown in plan:
 - Curb radii at all intersections;
 - Location of luminaire poles and transformers;
 - Location and type for all street name and traffic control signs
 - Any special notes related to construction procedures or requirements.

2.4 GENERAL SERVICING PLAN

A copy of the General Servicing Plan shall be submitted to the Town identifying the proposed locations of telecommunications, electrical servicing, and gas mains, as well as watermains, storm sewers and sanitary sewers. All locations must be established and resolved by the Developer's Engineer in conjunction with the utility companies and following the locations shown on the Town's Typical Cross Section. The drawing should also display lot and street boundaries and dimensions in accordance with the Registered Plan for the area. Geodetic (with reference to the NAD83 vertical datum) and site benchmarks should also be identified. If applicable, flood lines specified by Saugeen Valley Conservation Authority (or SVCA) should be displayed.

2.5 APPROVALS

Ministry of Environment, Conservation and Parks (MECP) and Conservation Authority Approvals

The Consulting Engineer shall obtain a Certificate of Approval from the Ministry of the Environment (MOEP) and if applicable, approval from the Saugeen Valley Conservation Authority prior to commencing construction.

Other Acceptances

The Developer's Engineer is required to make all submissions and representations necessary to obtain acceptances from all other authorities affected (Ministry of Natural Resources and Forestry, Ministry of Transportation, Conservation Authorities, Source Water Protection Authority, Canada Post Corporation, Fire Marshall, Medical Officer of Health, etc.).

The Town shall be kept informed of the progress of these submissions by way of copies of all correspondence.

Final Approval of Submission

After the Town is satisfied that they have completed their review of the submission drawings and have documentation from the Developer or their Engineer that all other regulatory agencies have been satisfied with their approval submissions, the Developer shall submit to the Town final copies of drawings and specifications in quantities the Town may determine sufficient, which shall include all details required by the Town and the approval agencies.

Any changes after this submission which may be proposed by the Developer or their engineer must be resubmitted to the Town for review and for their approval prior to such changes being made in the installation of services. If one year has passed since the date of the acceptance of the drawings by the Town and the Developer has not yet entered into Development Agreement with the Town, the Town reserves the right to revoke any or all acceptances related to the engineering drawings.

2.6 SERVICES FOR INDIVIDUAL RESIDENTIAL LOTS

Services for individual residential lots or units shall generally be as follows:

- Telecommunications (Telephone, cable TV and internet) and electrical services shall be installed in a common trench.
- Driveways shall be located on the opposite side of the lot from pad mount transformers, streetlights, or perpendicular intersecting roads.
- Enbridge/Union Gas.

2.7 EASEMENTS

Where buried services, utilities, channels, overland flow routes, etc., are placed outside the road allowance, permanent easements will be required.

The widths of the easements shall be determined through consultation with the Town. In general, the buried infrastructure shall be placed in the centre of the easement.

2.8 DEVELOPMENT AGREEMENT

The draft of the Development Agreement will be prepared by the Town. The Developer's Engineer shall prepare a servicing cost estimate for review and inclusion in the agreement related to securities. The Town must be in a position to clear all conditions of the Draft Plan Acceptance prior to the preparation of the draft Development Agreement Schedules. The following information must be provided by the Developer's Engineer to the Town prior to the preparation of the draft Development Agreement Schedules:

- MECP certificates of acceptance for all the services to be constructed if available.
- The name of the person and/or company with whom the Development Agreement will be executed.
- The name, address and telephone number of the developer's lawyer.
- **One hard copy** and an electronic copy of the Reference Plan
- **One hard copy** of any easements, road widening plan(s)
- **One hard copy** and an electronic copy of the Legal Description based on the Reference Plan, including but not limited to, easements, reserves and daylighting.
- **One hard copy** and an electronic copy of the proposed final plan for future registration complete with all the pertinent information as required by the registry office. The plan shall show all required lots, blocks, and easements.
- **One hard copy** and an electronic copy of the accepted engineering drawings.
- A detailed cost estimate of all services to be constructed. This estimate will form the basis for calculation of security to be posted for this development. It shall include:
 - Detailed cost of services;
 - Cost of underground electrical distribution and street lighting (where not part of a separate agreement with the utility);

- All miscellaneous expenditures;
- Allowances for contingencies, engineering, and HST.
- Proposed timetable for construction of services reflecting phasing.
- Proposed landscaping plans where necessary or required.

2.9 REQUIREMENTS PRIOR TO COMMENCEMENT OF CONSTRUCTION

Following signing of the agreement, receipt of the insurance certificate, receipt of security deposit (i.e., Letter of Credit), and at least two weeks prior to the commencement of construction, the Developer's Engineer shall submit the following information to the Town for acceptance:

- One set of construction specifications;
- A list containing the Contractor, subcontractors and the Contractor's material suppliers;
- A copy of the signed contract tender complete with prices;
- Proposed disposal sites;
- Insurance documents;
- Project schedules;
- Spills Action plan;
- Any other information as required by the Town staff or as specified in the Development Agreement.

In addition to the above items, the Developer's Engineer must provide confirmation that all recommendations of the Erosion Control plan are implemented. The Developer's Engineer must schedule a pre-construction meeting and provide sufficient notice of this meeting to the Town.

2.10 AS-RECORDED (AS-BUILT) DRAWINGS AND RECORD FIELD SURVEY

The Developer's Engineer shall retain a record of all revisions to the design that were implemented during construction. These "record revisions" shall be based on a final survey of the development. The final survey shall include a check of the following items:

- Location and invert elevations of all sewer maintenance holes.
- Distances between all sewer maintenance holes.
- Location of all roadway catch basins.
- Location, rim and invert elevations for all year yard and lot catch basins.

- Road centreline elevations.
- Site benchmarks.

The original drawings shall be revised to incorporate all changes and variances found during the final survey and to provide ties and additional information to readily locate all underground services.

These new amended drawings shall constitute the As-Recorded drawing set.

The As-Recorded drawings shall display all sewer and road grades recalculated to two decimal places. All street names, lot numbering and block identification shall be checked against the Registered Plan and corrected if necessary. An As-Recorded revision note shall be placed on all drawings in the revision block.

At any time up to two years after Final Acceptance of the development, the Town may return the As-Recorded drawings to the Developer's Engineer for rechecking and further revision if discrepancies are found. The Developer's Engineer shall be required to explain in writing any major difference between the design and the As-Recorded data to provide verification that the alteration does not adversely affect the function of the development services.

A paper and electronic copy of the As-Recorded drawings must be submitted to the Town for review before "Final Acceptance" of the development will be given.

The Development Agreement shall be referred to for the definition of "Final Acceptance".

SECTION 3 | ROADS

3.1 ROADS GENERAL

All local roadways for residential development shall be designed and constructed to the urban standard and the typical cross section shown in Appendix “A” to this document.

All roadway design shall meet the minimum requirements of all applicable current industry standards and specifications set out by the Transportation Association of Canada (TAC), OPS, Ontario Traffic Manual (OTM), CSA, and the ESA regulations and shall apply together with the following Town Standards.

Road allowances shall be a minimum of 20 metres wide. The edge of the roadway paved surface shall have a minimum radius of 9 metres at intersections. Access roads not owned by the Town, leading to the area of the development, shall be constructed and maintained to a standard equal to the standards for roadways within the development. On all streets, horizontal and vertical sight distances and vertical curves shall meet MTO Geometric Design Standard and engineering shall conform to 50km/hour allowed speed limits within the settlement area. Any deviation from this speed will be requested from the Town.

Road allowances on cul-de-sacs are to have a minimum radius of 20 metres. Edge of pavement radius on cul-de-sacs are to be a minimum of 15 metres.

For urban cross sections, the minimum road asphalt width shall be 8.5 metres. The finished roadways shall have a crossfall of 2% from the centerline to each curb line.

Should the development require the construction of arterial or collector roads, the Town will establish design widths for that section of road if required.

All roadways for new industrial development shall be designed and constructed to the urban standard as shown in Appendix “A” to this document. Road allowances for industrial development shall be a minimum of 26 metres wide.

A qualified geotechnical firm shall be engaged by the Developer’s Engineer to confirm the suitability of the minimum pavement designs contained in these standard for use in the Development, or to recommend a higher standard if required. The same geotechnical firm shall be retained by the Developer’s Engineer to carry out field testing during construction to verify the design.

Copies of all test results and proposed road designs shall be submitted with the engineering drawings. Testing and acceptance of all granular materials at the designated pits prior to placement and subsequent in-situ verification tests shall also be performed by the Developer’s geotechnical firm.

Prior to the placement of asphalt pavement, the Developer’s Engineer must submit to the Town for acceptance, the asphalt pavement mix designs.

3.2 CLEARING AND GRUBBING

Trees shall be removed so that the specifications for sight distances, grading, ditching, etc., may be met. All stumps, logs, brush, boulders, debris, etc. shall be removed from the street allowance. Unless noted otherwise, all healthy trees not obstructing visibility or installation of services shall be preserved. The Town may give permission to leave trees on the street allowance (boulevard).

3.3 GRADING

A 1.5-metre boulevard area behind the curbs and/or sidewalk (as applicable) shall be graded at a minimum of 2% and maximum of 5% towards the curbs. Where the proposed road extends through areas of cut and fill, the area from the edge of the road boulevard to the street line shall be graded with a side slope not exceeding a slope of 3 metres horizontal to 1 metre vertical to meet the original ground. All side sloped ditches and boulevards to the street line shall be protected with nursery sod over a minimum depth of 150 mm of topsoil.

In all cases, topsoil shall be stripped for the complete width of the road allowance and stockpiled at locations accepted by the Town. Rough grading shall be done to bring the travelled portion of the road to the necessary grade and in conformity with the cross-section shown on the drawings. All subgrade material shall be compacted to 95 percent Standard Proctor Density prior to any application of granular base course materials.

Rough grading of all lots and easements must be properly shaped to ensure suitable drainage.

3.4 ROAD CONSTRUCTION

All road construction shall conform to applicable standards of the Ontario Provincial Standard Specifications (OPSS) and the Ontario Provincial Standard Drawings (OPSD). The granular road base shall consist of a bottom course of 450 mm minimum depth consolidated Granular “B” full width across the roadway and a top course of 150 mm of Granular “A” full width between concrete curbs. The granular materials shall be spread in layers of 150 mm maximum compacted depths, and each layer shall be thoroughly compacted. During and between construction seasons, the granular base shall be maintained suitable for vehicle and pedestrian traffic, including dust control by calcium chloride and renewed if required to the satisfaction of the Town.

Road subdrains shall be provided as required in accordance with OPSS 405.05 and amended to accept only polyethylene Big “O” Boss 2000 or equivalent. The subdrain shall include filter wrap (non-woven type) in accordance with OPSS 1860. The Town reserves the right to require video inspection of subdrains prior to acceptance.

3.5 ROADWAY SURFACE ASPHALT

As soon as the granular base has been completed, it shall be thoroughly compacted and shaped, and the base course of asphalt. The base course shall consist of 50 mm minimum thickness of HL-4 Base Course Asphalt.

Following at least one year from the date of placement of the base asphalt, the Developer shall arrange an inspection with the Town to discuss any remedial work that may be required prior to placing the surface coat of asphalt. Not sooner than one year following the completion of any remedial works and as dictated by the Development Agreement shall the surface coat of asphalt be placed consisting of 40 mm minimum thickness of HL-3 Surface Course Asphalt.

Asphalt work shall conform in all respects to OPSS 310.

3.6 CURBS

Concrete curb and gutter, of cross-section approved by the Town, shall be provided along all edges of paved roadway surface. Terminations at the limits of the subdivision shall be either joined to existing concrete curbs or rounded to reduce hazard to traffic.

Construction shall conform to OPSS 353.

If a driveway location cannot be determined at the time of pouring, a full section of curb and gutter shall be poured continuously. When the driveway location is determined, a driveway depression can be cut with a curb cutting machine providing the section to be cut, is free from cracks and other defects. The Town reserves the right to request semi-mountable curb and gutter where they deem appropriate. All curbs and gutter are to be protected from damage by heavy equipment and vehicles.

Two stage curb is not permitted.

3.7 SIDEWALKS

A 1.5 metre sidewalk shall be constructed on one side (minimum) of each street within the development. Links where possible shall be provided to access neighbourhood parks or schools via walkways. Sidewalks shall have a minimum depth of 125 mm and shall be bedded in granular material in accordance with the current OPS standard details.

Sidewalks shall be increased in thickness from 125mm to 150mm at all driveway locations, and 200mm for commercial or industrial driveways. Granular depth shall be 150mm minimum or increased to the same depth as the sidewalk or driveway installed thicker.

Sidewalks shall be placed prior to construction of asphalt, concrete or brick driveways.

Sidewalk locations and installation will depend on the type of roadway and allowable infrastructure within the right-of-way. Refer to typical cross-sections in the appendix and below are the types of roads that are within municipal boundaries:

1.0 Arterial Roads

Arterial roads shall be provided with sidewalks adjacent to residential areas with direct access to schools, hospitals and retail outlets. Main through fares to be provided with sidewalks on both sides of the roadway if possible.

2.0 Collector Roads

Collector roads shall be provided with sidewalks on both sides if room is available where only one side gets the sidewalk it will be on the side of the adjacent side to residential areas with direct access to schools, hospitals, and retail outlets

3.0 Local Roads

Local roads that provide connectivity and access to schools, hospitals and retail outlets or access between neighbourhood communities shall be provided with sidewalks on one side of the roadway.

Cul-de-Sacs and Crescents

Cul-de-Sacs and Crescents within a neighbourhood community will receive a sidewalk depending on compatibility and infrastructure required.

3.8 ACCESSIBILITY

As part of construction of any concrete curb and gutter, sidewalks or other surface structures, the Developer will be responsible for construction of all Works in accordance with the Town's and the Province of Ontario's current accessibility standards and regulations to provide full access where possible, to all individuals in the community.

3.9 TURNING CIRCLES OR HAMMERHEADS

Where construction is phased, the Town may require the installation of temporary turning circles. These turning circles will be constructed in accordance with the requirements for cul-de- sacs in Section 3.1 of this Schedule. Temporary cul-de- sacs shall be paved, and curb and gutter shall be provided when needed to contain surface water and direct it to the storm sewers.

3.10 ADJACENT ROADS

Whenever a development abuts adjacent roads, improvements to those roads and the installation of all municipal services shall extend to the limit of the property owned by the Developer.

3.11 DAYLIGHTING REQUIREMENTS AT INTERSECTIONS

Where deemed necessary by the Town, daylighting at intersection quadrants shall be included in the road allowances to provide for uniform boulevard widths. When required, daylighting details (location, and size) shall be included on the proposed plan for Registration and on all engineering drawings.

3.12 LOCATION OF UTILITIES

The location of utilities within the road allowance shall be as detailed in the Town's standard drawings. Utility drawings shall be submitted to the Town for acceptance of the proposed utility locations. All utility wiring is to be housed underground or directly buried.

Hydro transformers are to be housed in suitable enclosures and mounted on transformer pads installed at the final elevation of the adjacent ground. The location of transformer pads shall be as detailed on the Town's standard drawing and are typically to be in the opposite boulevard of the sidewalk. Telecommunications and cable T.V. junction boxes may be mounted at the surface in accepted standard enclosures.

3.13 COMMUNITY MAILBOX REQUIREMENTS

Community mail centres and/or site individual super mailboxes shall be placed in locations accepted by the Town. Community mail centres shall be constructed centrally and suitably located in consultation with the Canada Post Corporation. The design of the community mail centre must incorporate such criteria as pedestrian safety, traffic flow and aesthetics.

The Town may require the developer to furnish the following amenities within the community mail centre:

- Park benches
- Fencing
- Litter containers
- Landscaping
- Pedestrian lighting
- Concrete pad or interlocking stone surface
- Architectural controlled kiosks
- Adjacent car bays parallel to the travelled portion of the roadway.

All details associated with the community mail centres or super mailboxes shall be identified in the Engineering Drawings and will be subject to review by the Town. The Developer shall be responsible for constructing community mailboxes within residential developments, prior to the issuance of the first building permit.

The acceptance of Canada Post Corporation with respect to location of community mail centres and/or site individual super mailboxes will be required prior to the acceptance of the Engineering Drawings by the Town.

3.14 SNOW CLEARING

Snow clearing operations prior to “Final Acceptance” may be carried out by the Town if so, requested in writing by the Developer; the associated costs will be charged back to the Developer.

3.15 DRIVEWAY ENTRANCES

The standards for driveways and entrances shall be reviewed in conjunction with the Town’s Zoning By-law. Driveway entrances shall be constructed to the property or to the edge of sidewalk. Entrances shall have a consolidated base constructed of 300 mm minimum depth of Granular “B” and 150 mm minimum depth of Granular “A”.

All entrances shall be hard surface (asphalt, concrete, or similar material). Exception for hard surface will only be given in a rural residential setting.

All entrances shall be completed in accordance with the current OPS standard details.

Allowable Town Entrance widths and curb depressions shall be formed in the curb according to OPSD 351.010.

The maximum width for driveway depressions shall be:

Table 1: Permitted Drive Width

Type of Driveway	Total Width (m)
Urban Residential	6.0 meters
Rural Residential	8.0 meters with 9.0 meter Culvert
Commercial / Industrial	9.0 meters

Additional driveway width may be permitted with permission from CBO.

Any entrances required off a County of Grey highway will be applied for and approved by the Grey County Transportation Department.

3.16 OTHER REQUIREMENTS

Whenever it is necessary to cut through an existing municipal road, the Contractor will be responsible for obtaining a Road Occupancy permit from the Town. The placement and compaction of the backfill material and the restoration of the surface pavement shall be done in accordance with the standard and specifications in effect at that time.

Before making detours, permission is required from the Towns public works department. Where the road is not part of the municipal road system, acceptance

from the appropriate road authority will also be necessary.

In all cases, the fire, police departments, school bus companies and ambulance service must be notified by the Developer or their Contractor.

All work will be done in accordance with the ordinances and by-laws.

Road Occupancy Permit

A Road Occupancy Permit is required from the Town whenever it is necessary to perform excavations or any construction works on an existing Town ROW, unless the work is covered under a Subdivision or Site Plan Agreement. All Work shall be done in accordance with the instruction and direction provided in the Road Occupancy Approval from the Town.

Inspection and Testing

Full-time inspection is required while the construction of roads is occurring. Materials testing reports and other reports as applicable shall be provided to the Town to ensure compliance with the recommendations of the geotechnical report. The following minimum testing shall be completed for new roads:

- Air test.
- Slump test.
- Concrete Cylinders.
- Compaction test.
- Material samples.
- Proof roll of subgrade (under supervision of the geotechnical engineer, with Town staff in attendance, if requested).
- Geotechnical engineer is to submit a final report including all test results and sign off that the subgrade meets requirements.

SECTION 4 | SANITARY SEWERS

4.1 APPROVAL OF PLANS

The Town is now a municipal partner in the MECP CLI-ECA Program. Projects falling within the scope of the CLI shall be submitted to the Town for approval. Projects that do not fall under the scope of the CLI shall be submitted to the MECP for approval. Projects submitted under the CLI program must be designed, constructed, and tested per the most current version of the Town Engineering Standards.

The CLI-ECA covers several works that are of a non-complex or less environmentally sensitive in nature. These projects must also fulfill the requirements of the Ministry's Design Criteria Manual. In general, the CLI-ECA includes the following types of Works:

- Sanitary sewers.
- Sewage pumping stations.
- Force mains.

Or the most up-to-date version of the above, or any new documents issued by these agencies.

A CLI-ECA does not apply to the following types of works:

Town Sewage Treatment Plants.

Privately Owned Industrial and Commercial Sewage Collection Systems.

Approval for the above will require direct submission to the Ministry. As part of the second engineering submission, the Developer is to submit a digital copy of the completed Application for ECA and all required documents to the Town for review.

If the Town has comments related to the approval process, they will be sent to the Developer's engineer, as the Town will not recommend approval until all comments are addressed.

4.2 CONFIRMATION OF CAPACITY

Prior to commencement of any design for sanitary sewage works within the Town, the Developer shall contact the Town to ensure that adequate external trunk sewer and treatment plant capacity is available for the proposed development. If the Town does not have a confirmed capacity within the downstream system, the Developer's engineer shall undertake an assessment of the nearest downstream trunk sewer, or a different location at the discretion of the Town.

In the event that the Town does not have sufficient system records or an understanding of the available reserve capacity, then the Town and the Developer will agree to a scope of work for determining available capacity.

The costs associated with undertaking a comprehensive reserve study will be determined through the pre-consultation process, prior to commencing any design work.

The system shall be designed to service all areas within the subdivision to their maximum future development potential and must take into consideration external flows within the drainage area, in accordance with the Town's Official Plan. Allowance shall be made for inflows from the appropriate adjacent subdivisions or areas and shall meet with the approval of the Town's Public Works department. Discharges of the system are to be connected into appropriate sewers and are to be approved by the Town's Public Works Department. The exact location for connecting sewers in adjacent subdivisions or areas shall be approved by the Town's Public Works Department.

In accordance with MECP guidelines and Town policy, all urban developments are to be serviced by municipal wastewater systems. Individual septic systems are NOT permitted in new developments.

4.3 DESIGN STANDARDS

Sanitary service shall be designed in accordance with current MECP design guidelines. The minimum size for main sewers shall be 200 mm diameter. House connections shall be a minimum of 100 mm in diameter. For multiple dwelling, industrial or commercial buildings, the service connections shall be sized to accommodate the flow. Unless otherwise specified, the average daily per capita flow for sanitary sewer design shall be 450 L/cap/day.

4.4 LOCATION

The main sewers shall be located along the centre of the street allowance. House connections shall terminate at the property line for each lot.

4.5 MATERIAL

Main sewers shall be P.V.C. (SDR35) or approved alternate. House connections shall be P.V.C. (SDR28) or approved alternate. All joints shall be of the rubber gasket type as approved by the Town. Approved caps shall be provided for service lateral terminations.

4.6 SANITARY SEWER CONSTRUCTION

Sewer construction and pipe bedding shall conform to the requirements of OPSS 410 for sewer construction. A minimum 2.5-metre depth of cover shall be provided over all sanitary sewers and service laterals.

4.7 HOUSE CONNECTIONS

Plan locations and invert elevations, for all house connections at the street line, shall be shown on the drawings. Minimum fall on house connections shall be 2% and maximum 8%. Where the depth of sewer is excessive, a riser may be used over the main sewers.

Shop manufactured “Tee” connections shall be used for house connections to the main sewer. Each service lateral shall be complete with a manufactured “Wye” connection and 100 mm diameter cleanout that shall extend to the ground surface level.

The top of the cleanout shall be installed flush with the ground surface 100mm PVC SDR28 with cleanouts at property line to include a sanitary tee-wye to inspect service from cleanout. Cleanouts to include cast iron cover DF44 cast iron cleanout cover clearly marked “Sewer”. Flexible couplings should not be used to connect the bolted cap to the cleanout. A cast iron cap shall be installed on each service lateral termination at the street line and made watertight.

During the development stage, the ends of all services shall be marked by a 50 mm x 100 mm wood post extending from the service to 300 mm above the surface of the ground and the top section painted fluorescent green. Connections to maintenance holes shall enter the structure no higher than 0.5 m above the lowest invert, except as otherwise approved by the Town.

All sanitary service pipe material shall be coloured green to avoid cross connection. This includes pipe colour, wrapping, demarcation tape or stenciling.

4.8 GRINDER PUMPS

Should the development require the use of Grinder Pumps, they shall be E-One sewer systems curb stop c/w integral stainless steel check valve equivalent. Service box to have stainless steel stem. Isolation valves to be located at the property line of each service. Valve box covers to be stamped “SEWER”.

Service pipe to be 32 mm (minimum), Polyethylene (PE) DR-11 tubing, compression joint connections for PE service pipe requires a stainless-steel tube liner with a fluted end as supplied by the corporation stop manufacturer. Should grinder pumps be required, more detailed design, material and installation specifications will be provided by the Town.

Grinder pumps shall remain in the ownership of the private property owner. The property owner shall be responsible for all operating, maintenance, repair and replacement costs.

4.9 MAINTENANCE HOLES

Concrete maintenance holes shall be provided at all changes in direction of the sewer and at all street intersections, but no further apart than note:

Table 2: Sanitary Sewer Spacing

Sewer Diameter (mm)	Maximum Spacing (m)
Up to 400	120
450 to 750	150

Maintenance holes shall be 1200 mm dia. conforming to OPSD 701.010 or as required for larger trunk sewer sizes. Benching shall be provided in all structures. Joints shall be watertight.

4.10 TESTING AND FLUSHING OF SEWERS

The complete sewer system, including house connections, shall be tested: infiltration, exfiltration, deflection and flushed in accordance with OPSS 410, including video inspection.

The Developer or consulting engineer shall arrange the tests for sections of sewer between maintenance holes and shall provide all information and video to the Town of Hanover. Sewers shall be video inspected at least twice by the developer, once immediately prior to base asphalt and once immediately prior to surface asphalt placement. Any sections of sewer which fail to meet the requirements of this section shall be repaired and retested until results are satisfactory to the Town. All repairs and retests will be at the Developer's expense.

Testing and flushing also applied to the storm sewer pipe installed as part of the development. A sanitary sewer, storm sewer and forcemain commissioning plan will be submitted to the Town for review and comment, at least 2 weeks in advance of the proposed start date of the flushing and testing. Notice of test start date shall be received at least 5 days prior to the start day. Upon completion of the sanitary and storm construction, a commissioning report from the Developer's Engineer will be submitted to the Town.

4.11 COMPLETION AND ACCEPTANCE

The complete sewage collection system installation must be approved by the Town prior to the issuance of building permits for the subdivision.

SECTION 5 | WATERMAINS

5.1 APPROVAL OF PLANS

Plans for the entire system shall be submitted to the Town for approval and prepared in accordance with the Ministry of Environment, Conservation and Parks (or MECP) Guidelines and the Municipal Drinking Water Licensing Program (as applicable). The developer shall provide a complete MECP Form 1 – Record of Watermains (and any supporting information) for any addition to, or alteration of Hanover owned water distribution systems.

The submission shall consist of an overall plan, a plan and profile of each watermain drawn to the same scale as the roads, together with typical details of house service connections, pipe bedding and other appurtenances. Approval for construction will not be given until all the requirements of the MECP and the Municipal Drinking Water Licensing Program are fulfilled and the necessary approvals received.

Or the most up-to-date version of the above, or any new documents issued by these agencies.

5.2 CONFIRMATION OF AVAILABLE CAPACITY

As part of the pre-consultation process and prior to the commencement of any design, the Developer and / or designer must contact the Town and confirm that there is adequate capacity in the system, as well as the water treatment facility, to accommodate the proposed project.

5.3 WATERMAIN DESIGN

5.3.1 Location in ROW

Watermains shall be located as shown on the Towns standard roadway cross-sections. This location shall normally be on the north and west sides of the street. The watermain shall not be located on the same side as the sidewalk, except where there are sidewalks on both sides of the street.

Placement of valves in the wheel track of a travel lane shall be avoided, whenever possible.

At intersections, the preference is to have valves located in the boulevards and out of the asphalt.

5.3.2 Location Outside the ROW

Any watermains which are situated outside of the ROW shall be contained within a

block. Where watermain are located in blocks, the block width shall be 3.0 m for watermain at a depth less than 2.0 m and 6.0 m for watermain greater than 2.0 m depth, unless depth or size of watermain dictates a larger width necessary for maintenance.

Watermain to be centered within block.

Additional depth of footings for houses adjacent to the watermain block shall be considered in the design.

5.3.3 Material Specifications

Watermain pipe shall be C900 Class 235 rated PVC pipe with rubber gasket joint fittings. Push-on PVC rubber gasket joint fittings are not to be used on any hydrant lead, elbow, or tee. All materials that come into contact with potable water shall conform to NSF 61 and the latest American Water Works Association (AWWA) Standards. All fittings are to be ductile iron AWWA C110. The type and material classification of all watermain and bedding types shall be clearly identified on all profile drawings. PVC is acceptable for use in all development projects (residential and IC&I).

5.3.4 Bedding

Watermain bedding shall be constructed with bedding as per OPSS 802.010 Granular "A" embedment material) or high-performance bedding for flexible pipes and OPSS 802.030 or 02.031 Class "B" (Granular "A" bedding material, Granular "A" or select native cover material) for rigid pipe unless otherwise approved by the Town.

Alternative embedment material shall be sand meeting gradation requirements of OPSS 004.05.05 compacted to 98% Standard Proctor Density. Geotechnical certification of alternative material must be provided every 150 m and approved by Town prior to installation. The compaction testing must include the entire envelope (haunches, bedding, and top of pipe).

5.3.5 Depth of Cover

- Curb and Gutter Roads – 1.80 m minimum cover.
- Open Ditch Roads – 2.2 m minimum cover.
- Unbuilt future Roads – 1.80 m minimum cover measured from ultimate design grade.
- Road crossings – 2.2 m minimum cover.
- Watercourse, Creeks – 2.0 m minimum cover.

In areas where the Town allows a watermain to be installed with less than a minimum cover, the contractor is to supply and install insulation as directed by the Town to protect watermain, hydrant leads, and appurtenances.

5.3.6 Material and Size

All materials for watermains, valves, valve boxes, etc. supplied for the development shall comply with the latest edition of the applicable AWWA standard. Oils and lubricants used in assembly shall be 'Food Grade' and shall comply with the latest edition of NSF/ANSI Standard 61.

No substitutions shall be considered without the Town's approval.

Watermain: Watermain material shall be Polyvinyl Chloride PVC DR18 – AWWA C900 Pipe joints shall be bell and spigot with rubber gaskets. Minimum watermain size shall be 150 mm. Minimum watermain depth of cover shall be 1.8 meters.

Fittings: All fittings shall be ductile iron cement mortar lined mechanical joint (MJ) type with adaptors to suit other materials, where necessary. All fittings shall be in accordance with AWWA C110 and the rubber-gasket joints for ductile iron fittings shall be in accordance with AWWA C111.

All fittings including hydrants must be suitably restrained with approved mechanical restraints and have a minimum pressure rating of 250 psi (1724 Kpa). Grip-ring joint restraint required on all mechanical joints. Pipe to pipe connections 6.0 meters or less from any valve, tee, elbow, cap, reducer or hydrant shall be restrained.

Gate Valves: Mueller mainline valves and in mechanical joint with standard operating nut, hydrant valves to MJ to MJ gate valves with standard operating nut.

All valves to be supplied with "O" ring packing for water use and open counterclockwise.

Tapping valves and sleeves must be approved by the Town.

Fire Hydrants – Installation: Hydrants shall be installed in accordance with OPSD 1105.010, as amended and shall generally be located as follows:

- Residential areas – Along the projection of lot lines.
- Industrial areas – Centrally along lot frontages.
- Maximum spacing for all areas is 150 m.
- Hydrants shall be mounted with break-away flange at a maximum height of 100 mm above finished grade.
- At the end of dead-end mains, either temporary or permanent.
- At high points along the watermain system, as an alternative to air release valves.
- All joints shall be mechanically restrained and braced with concrete thrust blocks.
- 100 mm Storz pumper port facing the street. Side ports to be 65 mm.
- Hydrant leads are to be 150 mm diameter and have shut-off valves placed 900 mm from the hydrant.

The spacing and location of hydrants on private property is governed by the OBC.

Markers: Hydrant markers shall be yellow, 1.2 m high, FH-800 Series Canadian, and connected to the side port(s).

Painting: Hydrants shall be painted with rust proof paint prior to final acceptance in accordance with National Fire Protection Association (NFPA) 291 as follows:

- All hydrant bodies or “barrels” are to be chrome **RED**.
- Side ports and top / bonnet to be painted to indicate capacity:
 - Light Blue for Class AA (= to or > than 5,680 L/min or 1,500 GPM). b) Green for Class A (3,785 to 5,675 L/min or 1,000 to 1,499 GPM).
 - Orange for Class B (1,900 to 3,789 L/min or 500 to 999 GPM).
 - Red for Class C (<1,900 L/min or 500 GPM)\
 - Private hydrant barrels to be painted **YELLOW**.

Dry barrel hydrants shall be in accordance with AWWA C502. All hydrant leads shall be 150mm diameter and shall be supplied from the watermain of not less than 150mm diameter.

Services: Residential services shall be 19mm, higher-density will be 50 mm Type “K” copper tubing (ASTM B88) or Municipex Cross-linked polyethylene (PEX) series 160 conforming to AWWA C904. If PEX tubing is used, installation of tracer wire as well stainless-steel inserts for all fittings.

Backflow Prevention:

Larger service diameters (50 mm or higher) shall install backflow preventers, these will be certified each year and submitted to the Development Department to show conformity. The Towns’ Chief Building Official will have the ability to request a backflow preventer of any size if there is risk to the water system.

Private connections to the water system including IC&I and agricultural properties, and condominium developments shall have a backflow device installed prior to any upstream connections, such as tees. Backflow preventer shall be selected, installed and tested in conformance with CSA B64.10 “Selection and installation of backflow prevention”. The type of backflow valve shall be determined based on the hazard level of the Site, as dictated by OBC and Town Staff.

The backflow device shall be in a heated mechanical room of a building. Backflow devices shall be as per CSA and OBC Standards. Backflow devices shall be installed downstream of the water meter. There shall be no connection to the watermain prior to the backflow valve. Reduced pressure backflow preventors must be certified annually by a qualified person, and a copy of the certification provided to the town.

Removal of backflow preventors without the Town’s written permission is prohibited.

Corporation stops: Ball style 19mm and 50mm Mueller B25008 or Cambridge Brass 301-A3H3

Curb stops shall be Ball style 19mm and 50mm Ball style Mueller B25209 or Cambridge Brass 202-H3H3. With 36" stainless steel rod Mueller 801 or Star D-1-8 50mm Mueller 802.

Service saddles: Model No. 2616 by Robar Industries Inc., stainless steel, double bolted, wide band. The service tubing shall be installed to a minimum depth of cover to the watermain. Underground service line valves shall be in accordance with AWWA C800.

Cathodic Protection: In accordance with OPSD 1109.011. For any installation of water pipe systems, an investigation of the soils conditions shall be undertaken to determine the corrodibility of the native soils and to provide recommendations with regard to corrosion protection. Sacrificial caps are to be provided on every bolt of all mechanical joints and restrainers. The bolt lengths shall be sufficient to accommodate the caps. Zinc anodes or other corrosion protection measures may also be required as directed by the Town. Cathodic protection shall be provided for all tracer wires on PVC watermains. As a minimum, 175 gram zinc caps or approved equivalent shall be installed on each bolt of any mechanical connection.

Additionally, a 5.4 kg (2 lb.) packaged zinc anode shall be installed on each hydrant and all valves.

Anode Installation: For all mechanical joint fittings and couplings used with either ductile iron or PVC pipe, a sacrificial zinc nut shall be installed on each bolt. For buried anodes, connect anode copper lead wire to pipe, valve, fitting, hydrant, etc., with "double nut" type connection. Connect to main stops or curb stops with the electrical ground connections supplied. Place anode in trench a minimum of 500 mm from pipe, valve, fitting, etc. Complete installation shall conform to anode manufacturer's recommendations.

Tracer Wire: All PVC watermain to be provided with a No. 12/7 strand copper cable having TWH insulation rated for underground use and strapped to the top of the pipe every 5.0 metres with a brass or galvanized clamp.

Thrust Restraints: OPSS 441.07.23 is amended as follows: All thrust restraint shall be designed to adequately provide the minimum amount of pipe/joint restraint required by mechanical joint restraint device alone. Concrete thrust blocks are not an accepted method of thrust restraint in the Town of Hanover except for connections to an existing main as directed by the Town or their designate.

Design of the pipe joint restraining systems shall consider the pressures that the system will be subjected to as well as any expansion and contraction due to temperature changes during and following construction of the various pipe materials selected. Restrain lengths for watermain 100 mm to 300 mm shall be in accordance with the requirements outlined below. Restrained length calculations for watermains 400 mm and greater shall be supplied by the pipe manufacturer using the design criteria set out below.

Thrust restraint shall be provided at all fittings, bends, tees, valves, hydrants, crosses, reducers, and plugged or capped dead ends. For Ductile Iron pipe refer to AWWA C600 – Section 3.8. For PVC pipes refer to UNI-BELL and AWWA M-23.

Hydrants shall be restrained with mechanical thrust restraints.

5.4 Watermain Construction

All watermain and appurtenances are to be installed, bedded and backfilled in accordance with current Ontario Provincial Standard Specifications, Safe Drinking Water Act, Drinking Water Works Permit, The Municipal Drinking Water License, and the most current recent version of ANSI/AWWA C651, the MECP “Watermain Disinfection Procedure”, and to the satisfaction of the Town.

Minimum 1.8 metre depth of cover over all mains and services. Main valves and hydrant sets shall, generally, be located at a maximum spacing of 200 metres and 120 metres, respectively. Hydrant spacing for commercial areas may require reduced spacing. At main intersections, a main valve shall be provided at each direction from the intersection.

5.5 Flushing, Testing and Disinfection

All watermain shall be tested, flushed, swabbed and disinfected. Such procedures shall be in accordance with OPSS 441 for pressure testing and the most recent version of AWWA C651 and the MECP “Watermain Disinfection Procedure” for disinfection and connection to the waterworks system. The Developer or their consulting engineer shall inform the Town when the watermain is to be tested and disinfected.

The pressure testing shall be in accordance with OPSS 441.07.24 Hydrostatic Testing and under the supervision of the municipal Town. All hydrant leads, services, stubs, blow-offs etc. shall be subject to the hydrostatic pressure testing. Hydrant valves shall be in the open position to subject the hydrant to the test as well.

Bacteriological testing will be completed by Town waterworks employees.

The Developer will be billed for any testing or retesting required. Any failure of the testing and disinfecting shall require the Developer to re-flush, retest and/or re-disinfect the watermain until the watermain has met the requirements of the Ontario Provincial Standard Specifications and the MECP, to the satisfaction of the Town. Minimum requirements for bacteriological testing are:

- Escherichia coli – not detectable
- Total coliforms – not detectable

All chemicals and materials used in the disinfection of the drinking water system shall conform to the following standards:

- AWWA B300 for Hypochlorites
- AWWA B301 for Liquid Chlorine
- NSF/ANSI 60, Drinking Water Treatment Chemicals – Health Effects
- NSF/ANSI 61, Drinking Water System Components – Health Effects.

A watermain commissioning plan(s) will be submitted to the Town for review and

comment, 2 weeks in advance of the proposed start date of the flushing, testing and disinfection. Upon completion of the watermain construction, a watermain commissioning report from the Developer's Engineer will be submitted to the Town.

5.6 Completion and Acceptance

The complete water distribution system will be installed and must be approved by the Town prior to the issuance of building permits for the subdivision.

SECTION 6 | STORM MAINS AND STORMWATER MANAGEMENT

6.1 APPROVAL OF DESIGN AND PLANS

The Town operates under a Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) for the approval of qualifying Storm Water Management (SWM) projects and is therefore the approval authority. For all projects that do not fall under the CLI-ECA, the Ministry of the Environment, Conservation and Parks (MECP) continues to be the approval authority. The Developer shall design stormwater infrastructure in accordance with the most current version of the Town's CLI-ECA and associated design requirements.

If the design does not fulfill these requirements, application to the MECP for a Schedule 'C' amendment to the CLI-ECA will be required. The Developer is responsible for obtaining and reviewing the CLI-ECA documents and design requirements from the Town to ensure adherence.

The most current version of the following MECP, Saugeen Valley Conservation Authority (SVCA) guidelines, policies, and standards apply to the design of storm drainage facilities in the Town.

Reference material can be found within the MECP (i.e., Stormwater Management Planning and Design Manual, March 2003). In addition, Design Criteria for Sanitary Sewers, Storm Sewer, and Force mains for Alterations Authorized under Environmental Compliance Approval.

Or the most up-to-date version of the above, or any new documents issued by these agencies.

Development proponents are also required to confirm design criteria and obtain approvals from any other relevant ministries or agencies (i.e., MTO, MNRF, DFO, etc.). The most current version of OPSD shall also apply to design and construction of storm drainage facilities as determined by the Town.

The consulting engineer responsible for the design of Storm Water Management Facilities (SWMF) shall consult with the Town and the SVCA early in the process to confirm / clarify issues, policies and design requirements, and shall focus on minimizing the number of pond facilities.

Water quality and quantity control in new development areas are to be provided in Town-owned Town blocks. Low Impact Development (LID) techniques in lieu of and / or in combination with end-of-pipe designs where feasible will be considered by the Town in consultation with the SVCA on a case-by-case basis.

Redundancy to protect for blockage or plugging of LIDs and sequential runoff events is to be provided.

The design of each SWMF shall also focus on opportunities to integrate the SWMF

with the surrounding topography and land uses.

SWMFs are to be created as public amenity features and are to be, when possible, visible to the general public. Opportunities for linkages through the use of trails to larger open space, parkland areas, or other SWMFs are to be maximized.

The design of SWM works is to have full regard for riparian rights of both upstream and downstream landowners. Any change in flow rates, or water levels, that would occur as a result of the development, SWM drainage areas, and / or in-stream works to neighboring private properties must be adequately addressed. Written permission from affected landowners must be sought prior to final design submissions, in cases where acknowledged impacts are proposed, and any governing legislation, in this regard, must be adhered to.

In the case of infilling proposals, on-site SWM concepts may be considered by the Town in conjunction with any potential off-site storm drainage improvements.

Drawings shall consist of an overall plan, a plan and profile of each storm sewer, drawn to the same scale as the roads, pipe bedding, maintenance holes, and other appurtenances. Design (including all drawings and calculations) of the proposed works must be submitted to the Town and applicable government agencies for approval.

6.2 STORMWATER MANAGEMENT REPORT

A Stormwater Management Report (SWM Report) setting out the existing and proposed drainage pattern shall be submitted to and approved by the Town, the Saugeen Valley Conservation Authority and the Ministry of the Environment, Conservation and Parks (if required). Should the development be of a size or location that the Conservation Authority has no requirement to regulate the stormwater management criteria, or in the event that specific design details are not provided by the Conservation Authority, the standard in Appendix “C” shall apply.

The stormwater management requirements within the Town shall be those of SVCA or as listed below in the general requirements:

Table 3: Levels of Service for Major and Minor Systems

Item	Level of Service	Comments
Storm Sewers	1:5 Year Storm	Use CB inlet controls (as required), to meet hydraulic grade line (HGL) elevation criteria. Storm sewers shall be required in all new developments.
Hydraulic Grade Line (HGL)	1:100 Year Storm	Subject to pre-design confirmation with Town staff, HGL analysis is

		required (for both 5-year and 100-year storms). Confirm there is no surcharging under the 5-year storm event.
Major System	1:100 Year Storm	Overland flow cannot exceed width or flow capacity of ROW or 0.3 m depth.
Major System	Regional Storm Level of Control	Safe conveyance of the Regional Storm through to the SWMF, or a positive outlet via overland flow routes including drainage blocks and / or municipal ROWs, unless otherwise directed by the SVCA or Towns Public Works department.
Culverts	Per Highway Drainage Design Standards (March, 2024)	Refer to current MTO standards.
Bridges	Per Highway Drainage Design Standards (March, 2024)	Refer to current MTO standards.

6.3 CONNECTION TO MUNICIPAL SYSTEM

The storm sewers shall be connected to the municipal storm sewer system (where feasible) or discharged to a natural watercourse as approved by the Town, SVCA and the Ministry of the Environment, Conservation and Parks (or MECP).

6.4 DESIGN CRITERIA

The stormwater management system shall be designed by using MIDUSS (acronym long form?) (current version) or an alternate approved hydrologic model. The Developer's Engineer shall consult SVCA as to the appropriate storm distribution and duration to be used. The Developer's Engineer shall advise the Town in writing as to the Authority's requirements. The Developer shall ensure that the Town is aware of any requirements that SVCA may have so that they can be

reviewed, discussed, and revised should the Town deem it necessary. The design of the stormwater management system shall be in accordance with the following:

- Appendix Stormwater Management Standard for Site Plans or Small Developments.
- Latest version of the “Stormwater Management Practices, Planning and Design Manual” and “Design Criteria for Sanitary Sewers, Storm Sewers and Force mains for Alternations Authorized under Environmental Compliance Approval”, as prepared by MECP.

6.5 LOCATION

The storm sewer shall be located under the gutter line, with lateral connections to catch basins located within the curbing.

Development in the Town may provide for a storm sewer service. Where a storm sewer service is proposed, the service connection will be done in accordance with Municipal Standards. All other sump pump discharges shall be located on dwellings to ensure discharge is not directed to adjacent property. Grading and splash pads shall be used to direct sump pump discharge to the front or rear yard via swales. Sump pump discharge pipe locations shall be noted on the residential lot grading and drainage plan.

The Consulting Engineer shall confirm the availability and location of an appropriate outlet with the Town and shall complete the final design and obtain a Certificate of Approval from the MECP prior to construction. Work on private property shall conform to the Ontario Building Code (OBC).

All pipes shall be laid and maintained in straight alignment and grade. At no point shall the pipe deviate by more than 0.05% horizontally or vertically from the straight alignment. All structures are to be placed within 75mm horizontally of the design location. Should it deviate by more than these amounts it shall be removed and reinstalled.

Blind connections are not preferred.

Adjustment and final setting of catch basin frames shall be completed by pouring concrete, or using concrete riser units, immediately prior to the placement of the top lift of asphalt. Riser units shall be placed on the outside of the catch basins only. Catch basins shall be initially set to base asphalt elevation. Temporary asphalt curb shall be placed at catch basins between the preliminary acceptance and final acceptance stages of the development.

6.6 SEWER PIPE MATERIAL

Sewer pipe material shall be:

Concrete Sewer Pipe (Rigid)

- 300 mm non-reinforced Class 3 – CSA certified to A257.1
- 300 mm or greater reinforced as specified in the tender form – CSA certified to A257.2
- Polyvinyl Chloride (PVC) Pipe (Flexible)
- Class SDR 35 or Class V (320 kPa)
- Annular ribbed profile for ripped pipe
- Polyethylene Sewer Pipe (Flexible) – CSA certified Sewer Class to B 182.6
- 300 mm to 750 mm smooth inner wall, annular corrugated profile (320 kPa)
- 15 PSI bell and spigot joints shall have elastomeric gaskets (CSA certified to B 182.6)

The minimum size, including catch basin leads, shall be 300 mm. The Town may require a larger storm sewer size on parts of the subdivision than required for the subdivision alone.

6.7 STORM SEWER CONSTRUCTION

Storm sewer construction and pipe bedding shall conform to the requirements of the Ontario Provincial Standard Specifications for sewer construction. Pipes shall be bedded in approved granular materials.

Catch basin leads shall be connected to the main sewer with a maintenance hole except where the main sewer size exceeds 450 mm diameter, in which case the lead can be connected directly to the main sewer using a factory manufactured “Tee”.

6.8 MAINTENANCE HOLES AND CATCH BASINS

Concrete maintenance holes shall be provided at all changes in direction of the sewer and at all street intersections, with maximum spacing on straight runs as noted:

Table 4: MH Storm Sewer Spacing

Sewer Diameter (mm)	Maximum Spacing (m)
300 to 975	110
1050 to 1350	130
1500 to 1650	160
1800 and above	305

Maintenance holes shall be 1200 mm diameter or larger, conforming to OPSD Series 700. Benching shall be provided in all maintenance holes. Catch basin maintenance holes shall contain a sump or minimum depth of 300 mm below lowest

invert on sewers up to and including 600 mm diameter.

Frames and covers shall be OPSD 401.01 Type A, or approved equal, set on not less than three

(3) layers nor more than six (6) layers modoloc pre-cast units, which shall be parged on the outside face. Adjustment units shall conform to OPSD 701.010.

Catch basins shall be provided on both sides of the street at all low areas with the maximum spacing as noted.

Table 5: CB Storm Spacing

Road Gradient (%)	Maximum Spacing (m)
0 to 3	110
3.1 to 4.5	90
Over 4.5	75

Catch basins for depth up to 2 m from ground level to invert shall be 600 mm square concrete conforming to OPSD 705.01. For greater depths, catch basins-maintenance holes shall be used conforming to OPSD 701.03.

Frame and grates shall be OPSD 400.110.

6.9 OPERATIONS AND MAINTENANCE MANUAL (O&M)

A Storm Water Management Facility (SWMF) O&M Manual is to be prepared for the Town by proponents of new SWMFs. O&M activities to be in accordance with the Town's CLI-ECA.

The manual is to describe how each facility operates, and the short-term and long-term inspection and maintenance requirements of the facilities. Any collection system SWM components, such as OGS (Oil Grit Separator), infiltration galleries, or infiltration trenches, etc. are to be included in the manual.

The manual is to focus on the expected frequency and method of maintenance that will be required in the following specific areas:

- Facility inspection / monitoring program (outline seasonal and annual tasks based on Master / Functional Studies or Draft Plan Approval Conditions).
- Grass cutting.
- Weed control.
- Plantings.
- Trash removal.
- Sediment testing, removal, and disposal.

The SWMF O&M Manual is also to include cost estimates (including labour, equipment, and materials) for the operations and activities described above.

6.10 REPORT FORMAT

Once the reports have been reviewed and accepted by the Town, separate digital and hard copies of the report shall be provided. The SWM Design Report and the O&M Manual shall be separate documents, bound with front / back covers, the Development / Subdivision name shall be included on the front covers.

ARCH D size drawings included within the reports shall be folded and included in the back of the report in appropriate sleeves.

6.11 OPERATIONS AND MAINTENANCE FEATURES

O&M of SWM ponds is to be in accordance with the Town's most current CLI-ECA requirements. The SWM pond designs are to incorporate features that allow the Town to operate and maintain the facility. It is strongly recommended that the design engineer arrange a pre-consultation meeting with the Town once a preliminary pond design has been prepared in order to discuss maintenance operations and features, specifically clean-out procedures, and sediment management and removal.

These features include:

- a) Provide a primary maintenance access to the facility (minimum 4 m in width of access road, and an additional minimum 3.0 m buffer where adjacent to residential properties) suitable for municipal equipment. Maintenance access to be asphalt with a composition of 50 mm HL4, 150 mm Granular A, and 250 mm Granular B.
- b) Maintenance vehicle access roads and turn-around areas at sediment forebays, outlet pools, and control structures having a maximum gradient of 10%, minimum width of 4 m, a minimum inside turning radius of 14 m, and including a 10 m long loading platform at the forebay and outlet pool locations. Maintenance roads may be required to other locations within the pond block as determined by the Town. Maintenance roads should have maximum crossfall of 2%. Provide a minimum of 3 m offset of clear space between the maintenance road and any property lines.
- c) All maintenance vehicle access roads construction shall be structurally designed to support municipal equipment.
- d) Provision of a drain down pipe leading from the permanent pool to an MH with dewatering sump, if a gravity outlet is not available.
- e) In order to facilitate sediment removal operations, either of the following may be proposed, and are subject to review and approval of the overall approach to sediment management and removal:

A sediment drying space, suitable to contain the volume of sediment and water remaining (after completing pond drain down procedures) shall be provided. Calculations to be provided with assumptions for the volume of

sediment removal and area calculations for appropriate drying area sizing.

OR

Provision of a pond by-pass sewer (sized based on the minor system design criteria) between the inlet and the outlet in order to divert incoming flows around the pond for the duration of clean-out operations (allows for sediment drying in situ).

The sediment drying area should be sized to provide sufficient storage space for the volume of sediment accumulated over a 10-year period. This can be calculated using the MOE Stormwater Management Planning and Design Manual – Table 6.3. The sediment drying area is to be provided above the extended detention level in the facility. Drainage from the sediment drying area should return to the pond. Area to be sloped towards the pond at 2% to 5% grade. The drying space is to be designed based on a maximum sediment depth of 0.5m.

- A minimum 3 m wide platform at a maximum cross slope of 4% is to be provided around the property boundary of the stormwater block for the purposes of grass cutting.
- Use of a reverse sloped control pipe, which reduces thermal impacts (wet pond application).
- Provision of flow control devices in maintenance hole structures located in a berm for easy access, maintenance, and cleaning as opposed to a vertical pipe structure located in the pond.
- Minimum orifice size of 75 mm diameter. Orifice plates to be stainless steel. Use of a screened orifice plate or weir plate fixed to a permanent structure to achieve extended detention.
- A gate valve and valve box to enable the normal pond outlet to be closed in case of chemical spills where applicable.
- Provide the following table in the SWM Report, as required in the CLI-ECA

Table 6: Sample Table for SWM Report

Location	Latitude and Longitude or Physical Address (UTM Coordinates can be Provided in Addition)
Watershed / Subwatershed	E.g., Mad River
Receiver of Discharge	E.g., Surface discharge to “Mad River”
Outlet Location	E.g., Latitude and longitude (UTM coordinates can be provided in addition)
Catchment Area	E.g., 10 ha
Level of Treatment for Suspended Solids	E.g., Level 1 or 2 (80 or 70%) Long-term suspended solids removal or specify if other treatment level
Treatment for Other Contaminants, As Required	E.g. Phosphorus, water temperature

Level of Volume Control	E.g., Local 90th percentile rainfall event or local water balance (X mm)
Design Storm	E.g., Quantity: X-year storm; Quality: X-year storm
Brief Description	Include model number if equipment is used (E.g., OGS/filters)
Receive Emergency Sanitary Overflows	Y/N; briefly describe
Notes / Additional Information	Provide any additional information relevant to this facility not captured above

SECTION 7 | UTILITIES AND STREET LIGHTING

7.1 TELECOMMUNICATIONS

Telecommunication services, which include telephone, internet, and television, shall be provided and installed in a corridor at the location provided in the typical cross section. The Developer must bear the cost of any surcharges for underground installation made by the provider(s) and must grant them any easements for their services. Where requested by the Town, spare conduit(s) for future services will be provided as part of the telecommunication installation.

Telecommunication Companies

There are several telecommunication companies that may have interest in providing installations. The developer shall ensure that all can be installed and shall provide service. The developer shall provide to the Town documentation, satisfactory to the Town that all such companies have been contacted and offered the opportunity for installation.

7.2 ELECTRICAL

Underground electrical installation shall be completed to the satisfaction of the local power supplier based on their most current specification.

7.3 GAS SERVICING

Developers shall ensure that a corridor is provided for the future installation of gas distribution mains and services throughout the subdivision. Should, within the time that the development is being serviced, gas supply is available, then the developer shall arrange for its installation.

7.4 STREETLIGHTING

All developments shall be provided with adequate street lighting in accordance with current utility or Town standards. The materials and suppliers will be reviewed with the Town prior to design, approval of materials, installation, and where appropriate, shall be sourced from suppliers for which the Town currently has luminaires in service.

For decorative lights and poles, an arrangement shall be made with the Town to provide for stocking of spare poles, lights and accessories to the satisfaction of the Town for the initial operation and repair of the street lighting system.

The minimum street lighting requirements are as follows:

- Fixtures will be LED. All fixtures shall have individual photocell

control, and photocells shall have proven 25-year life expectancy and a warranty satisfactory to the Town (20 year unless agreed to otherwise).

- Poles shall be one piece concrete or aluminum. Concrete poles shall be direct burial. Aluminum poles shall be installed on an adjustable frangible base. Poles shall be of sufficient height to ensure a minimum vertical separation from the road surface to the luminaire, of 6 metres.
- The tenon size on pole and fixture must match. Power feed shall be completely underground. The lights shall generally be placed to the outside of curved roads.
- The maximum allowable spacing along the street, between the lights, shall be 35 metres. Increased pole spacing may be considered if photometric modelling is performed and the RP-8 standards are achieved. In all cases, the lighting design shall meet IESNA RP-8 standards for Type III distribution. The poles must be installed at the location as shown on the Town's Typical Cross-Section. Particular care shall be taken to adequately illuminate the intersections and cul-de-sacs. Preference to have poles located along lot lines if possible.

Amendments to this standard are at the Town's discretion/direction and the developer and their engineer are to review the materials specifications with the Town in advance of proceeding to the design stage for the lighting.

Street lighting requirements for collector and arterial roads shall be reviewed with the Town prior to design.

SECTION 8 | LOT GRADING AND DRAINAGE

8.1 GENERAL

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

8.2 LOT GRADING PLANS

All Lot Grading Plans for new development in the Town shall be prepared in accordance with the criteria contained in this section and shall contain the following information and detail:

- Scale 1:250 (unless otherwise approved).
- All existing and proposed lot numbers and blocks.
- All proposed rear lot catch basins, leads, top elevations and inverts.
- Location of service connections.
- Existing contours at maximum 0.5 m intervals.
- Existing and proposed elevations at lot corners.
- Specified house grades.
- Proposed road grades, length and elevations on all streets.
- Proposed elevations along the boundary of all blocks abutting single family and semi-detached lots in the subdivision.
- Direction of the surface run-off by means of arrows.
- All proposed easements required for registration.

8.3 LOT GRADING DESIGN

Lot Grading Design for new development in the Town shall be prepared in accordance with the criteria contained in this section and shall contain the following information and detail:

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

- All boulevards are to be graded with a constant slope from the curb to the street limit. (Minimum slope to be 2.0 percent and the maximum slope to be 8.0 percent).
- All rear yard drainage is to be directed away from the houses in defined swales which outlet at the curb or a catch basin.
- All lot surfaces shall be constructed to a minimum grade of 2.0 percent and a maximum grade of 12.0 percent.
- The maximum slope on all embankments and terraces shall be 3:1 (4:1 preferred).
- The maximum flow allowable to any side yard swale shall be that from two lots plus that from two adjacent lots.
- The maximum number of rear lots contributing to a rear yard swale shall be that of four rear yards.
- The maximum length of a rear yard swale between outlets shall be 90 metres. Where rear yard swales provide drainage for more than one lot, the swale must be located within a 4.0 metre drainage easement over the total length. Rear yard swales shall have a minimum slope of 1.5 percent.
- Swales providing internal drainage from each lot shall have a minimum slope of 2.0 percent.
- Minimum depth of any swale to be 150 mm.
- Maximum depth of rear yard swales to be 500 mm.
- Maximum depth of side yard swales to be 300 mm.
- Maximum side slopes on any swale to be 3:1.
- All drainage swales shall be located on the common lot line between adjacent lots.
- Rear yard catch basins and outlet pipes are to be located entirely on the same lot and shall be located 1.0 metres from the lot line.
- The minimum driveway grade shall be 1.0 percent and the maximum grade permissible shall be 8.0 percent.

8.4 INDIVIDUAL LOT GRADING PLAN

Prior to application for a building permit, individual lot grading plans for each lot (inclusive of infill lots) shall be prepared and shall be submitted to the Town's Building Department for approval. These lot grading plans shall include the following:

- Lot description including Registered Plan Number.

- Dimensioned property limits and house location.
- House type; normal, side split, back split, etc.
- Finished floor elevation.
- Finished garage floor elevation.
- Finished and original grades over septic tile beds.
- Finished basement floor elevation.
- Top of foundation wall elevations (all locations).
- Existing and proposed lot elevations.
- Existing trees to be maintained.
- Driveway location, width and proposed grades.
- All sidewalk locations, width and proposed grades.
- Arrows indicating the direction of all surface drainage and swales.
- Location and elevation of swales.
- Location of decks, porches and patios.
- Location of terraces and retaining walls.
- Location and type of any private sewage disposal systems, reserve areas and private wells.
- Location of engineered fill (where required).
- Lot grading certificate by Developer's Engineer in accordance with the subdivision agreement requirements.
- In the case where the lot falls within SVCA's regulatory limit, the SVCA shall be consulted regarding any additional information provided on the plan.

8.5 CERTIFICATION

Prior to the release of any lot from the subdivision agreement, the Developer's Engineer shall provide certification to the Town of Hanover that the grading and drainage of the lot is in accordance with the approved lot grading and drainage plans.

SECTION 9 | PARKLAND AND LANDSCAPING

9.1 PARKLAND

Parks are an essential component of the urban area. They provide opportunities for both residents and visitors to explore other aspects of daily life and to have social, educational, and recreational experiences in a designated outdoor setting. Parkland that provides maximum benefit to the public, integrates existing natural features (such as streams and creeks) and cultural heritage resources (such as woodlots and hedge rows) in a functional manner and are a vital component of a well-planned community. The ideal park will have a wide range of features and facilities from open meadow to shady groves of trees and will accommodate use by residents with a variety of interests and capabilities.

Prior to the initiation of any design work, the Town requires pre-consultation with the Developer and their agents to address the design features for park and open space facilities.

Where park areas are dedicated to the Town as part of the development, the Developer shall grade and hydroseed the parklands so that they are suitable for recreational use. Hydroseeding will be guaranteed for two (2) growing seasons. Grading shall be to a minimum slope of 2% and appropriate drainage swales and outlets shall be provided for the municipal storm system or too an appropriate outlet. The Town may also ask for a water and sanitary service to be installed for future park amenities.

The requirement for fencing, parking or further landscaping of a park area will be reviewed with the Developer at the time of Draft Plan submission along with the location and geometry of a proposed park.

Stormwater management facilities and environmentally sensitive areas are not to be considered appropriate for parkland dedication.

All trees that die or fail to grow (as per the discretion of the Town) prior to “Final Acceptance” shall be replaced by the Developer.

Developments will incorporate the Town’s Parks, Recreations and Culture Master Plan.

<https://www.hanover.ca/our-community/strategic-plans-initiatives/parks-recreation-culture-master-plan>

9.2 LANDSCAPING

Boulevards shall be finished with a minimum of 150 mm of topsoil and shall be sodded or seeded.

At least one tree shall be planted in the boulevard in front of each lot (single family

or semi- detached) generally within one year of the completion of the curb and gutter and paving in that section of subdivision. On corner lots, a second tree will be required on the flankage. Trees are to be planted so as not to interfere with other street functions or services when the tree matures. Trees shall be planted in the boulevard, generally opposite the driveway on any lot and not interfering with municipal services.

Trees shall at a minimum be 60-70 mm dia. measured 300 mm above the ground and shall be No. 1 nursery stock. The Town maintains a list of current species of trees acceptable for use in new development and the Town shall be consulted to designate species at the time of planting.

Tree planting and care procedure is recommended to follow the “Ontario Landscape Tree Planting Guide” from the Landscape Ontario Horticultural Trades Association.

All trees that die or fail to grow (as per the discretion of the Town) prior to “Final Acceptance” shall be replaced by the Developer.

9.3 WALKWAYS

Walkways shown on the Plan of Subdivision shall be constructed between parkland and adjacent streets or from street to street. They shall consist of a concrete sidewalk of minimum width of 1.8 m.

The walkway boulevard shall be landscaped, topsoiled and hydroseeded. A standard 1.5 m high chain link may be required and shall be placed along both sides of the walkway “right-of-way” with bollards placed at each end of prevent vehicular traffic from using the walkway.

9.4 TRAILS/PATHWAYS

Walking Trails or Pathways are a mechanism to provide conductivity within newly created subdivisions and existing sections of the urban settlement or existing parks and trails. The Developer will look as to how to bring accessible pedestrian connectivity to the neighborhood.

The developer may be asked to install benches, bicycle racks, signage and other park features and furniture as discussed with the Town.

SECTION 10 | TRAFFIC AND STREET SIGNS

The Developer shall be responsible for erecting all traffic and street name/number signs within the development. These signs may be provided by the Town at the Developer's expense. The Developer shall further be responsible for providing lot identification signs on each lot outlining the appropriate municipal address (911 address) for said lot.

Proposed street names shall be subject to the approval of the Town. Street name signs shall be double-sided and shall be installed at every intersection.

Temporary road name signs and posts, approved by the Town, or permanent signs mounted on temporary posts, must be erected at intersections upon completion of the base course asphalt and prior to the first occupancy.

These signs must be maintained in good condition by the Developer. Permanent signs and posts must be maintained in good condition prior to the start of the maintenance period and until assumption by the Town.

Unassumed Subdivision Signage

Unassumed road signs shall be installed at all entrances to new subdivisions, in a location satisfactory to the Town, and as per the Standard Details. This signage shall be maintained in good condition by the Developer, until assumption of the subdivision, or specific phase of the subdivision by the Town.

SECTION 11| ASSET MANAGEMENT

Prior to Final Acceptance of the services as defined in the Subdivision or Development agreement, the developer shall engage their Engineer to provide the Town with a detailed list of the cost of all of the assets for the purpose of the Town's asset management system.

This list will be split into the required asset categories as directed by the Town of Hanover.

SECTION 12| PAYMENT TO DEVELOPERS

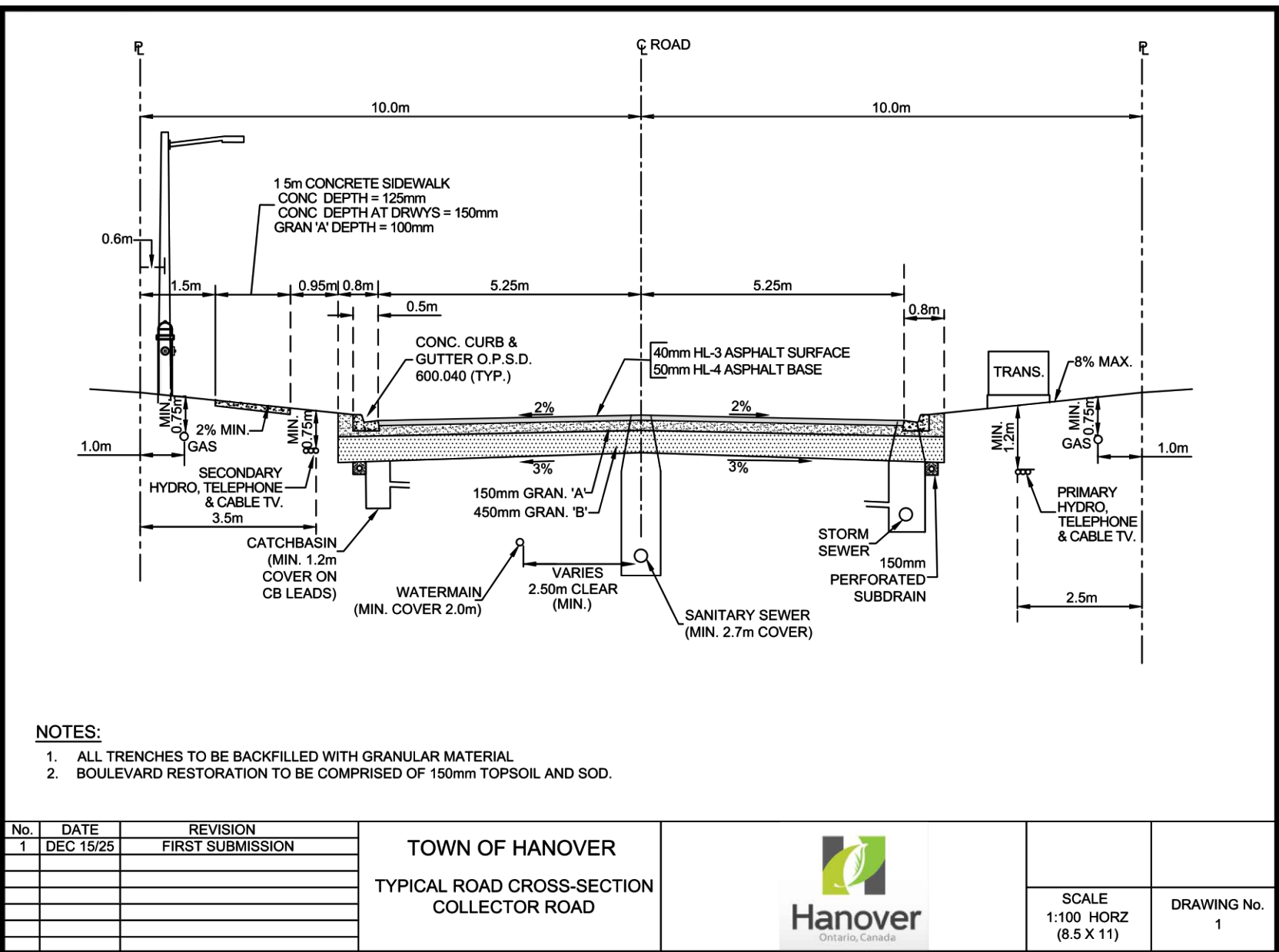
The Town shall not be liable for any costs arising out of the construction of services except potentially the oversizing of the works are required for future development. The Town may pay the marginal cost of any requested oversizing of stormwater collection works and appurtenances beyond an increase in one nominal pipe size above that which might be needed for the development.

For example, where a sanitary sewer (or a watermain) designed solely for the development might require the developer to install a 250 mm dia. pipe, a request for oversizing beyond one pipe size or 300 mm could result in the Town paying the marginal cost.

Where a storm sewer is requested that is larger than that required for the development and any offsite flows (based on their current developed state), the Town may pay the difference in cost for supplying the larger size pipe and appurtenances beyond one incremental pipe size of that needed.

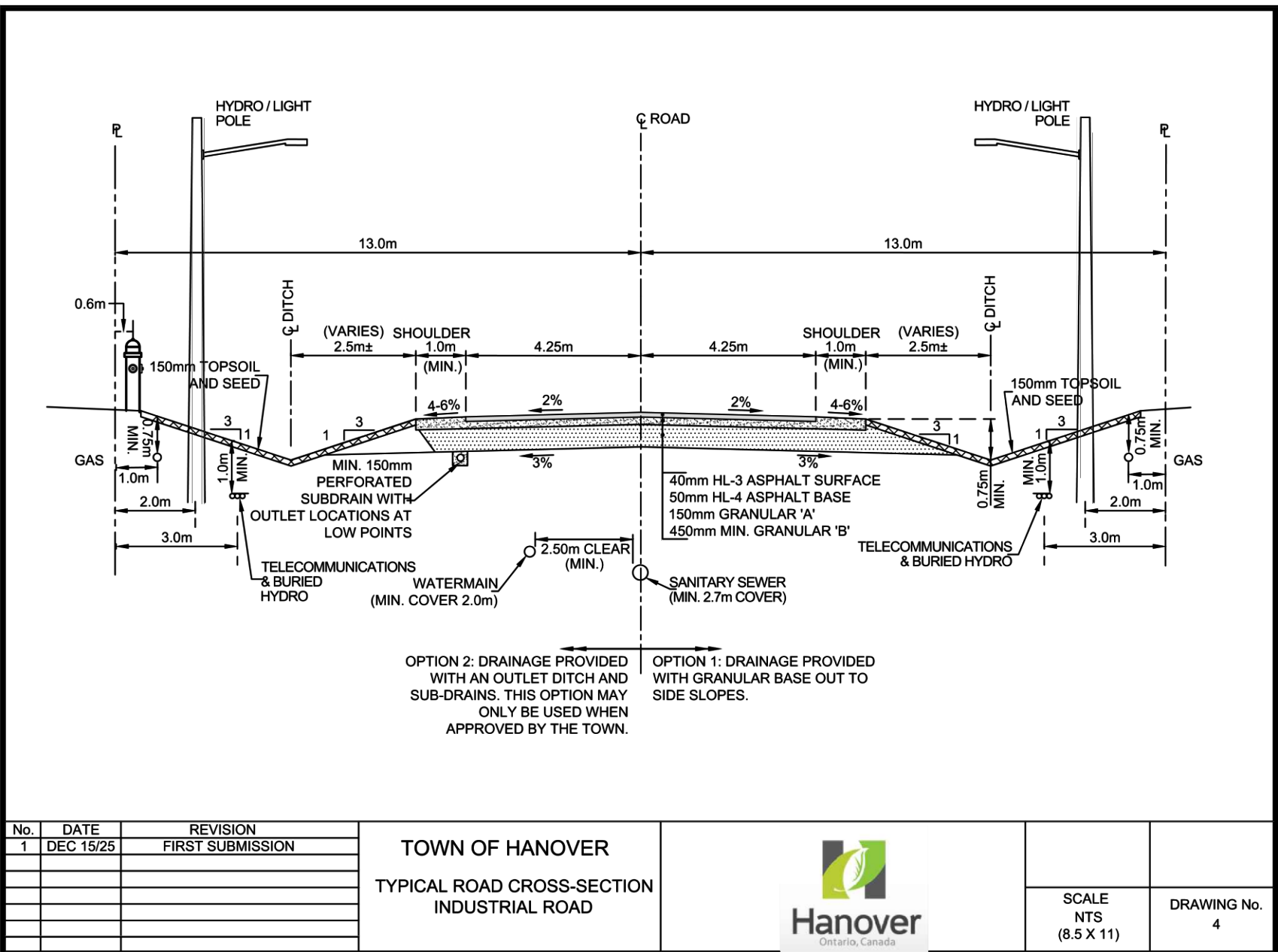
APPENDIX “A”

Typical Urban Cross Section



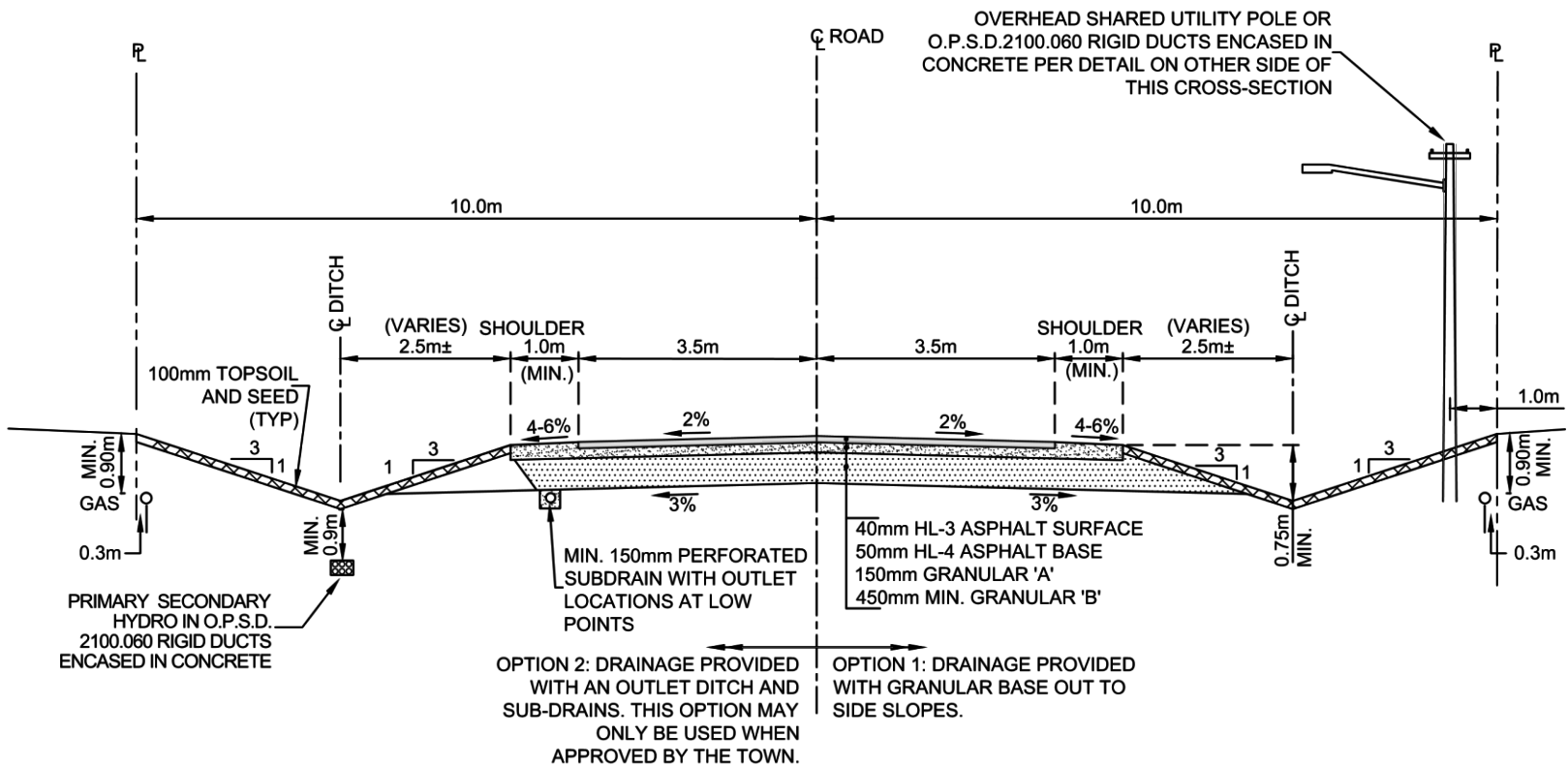
APPENDIX “B”

Typical Collector Cross Section



APPENDIX “C”

Typical Industrial Cross Section



No.	DATE	REVISION
1	DEC 15/25	FIRST SUBMISSION

TOWN OF HANOVER
TYPICAL ROAD CROSS-SECTION
RURAL ROAD

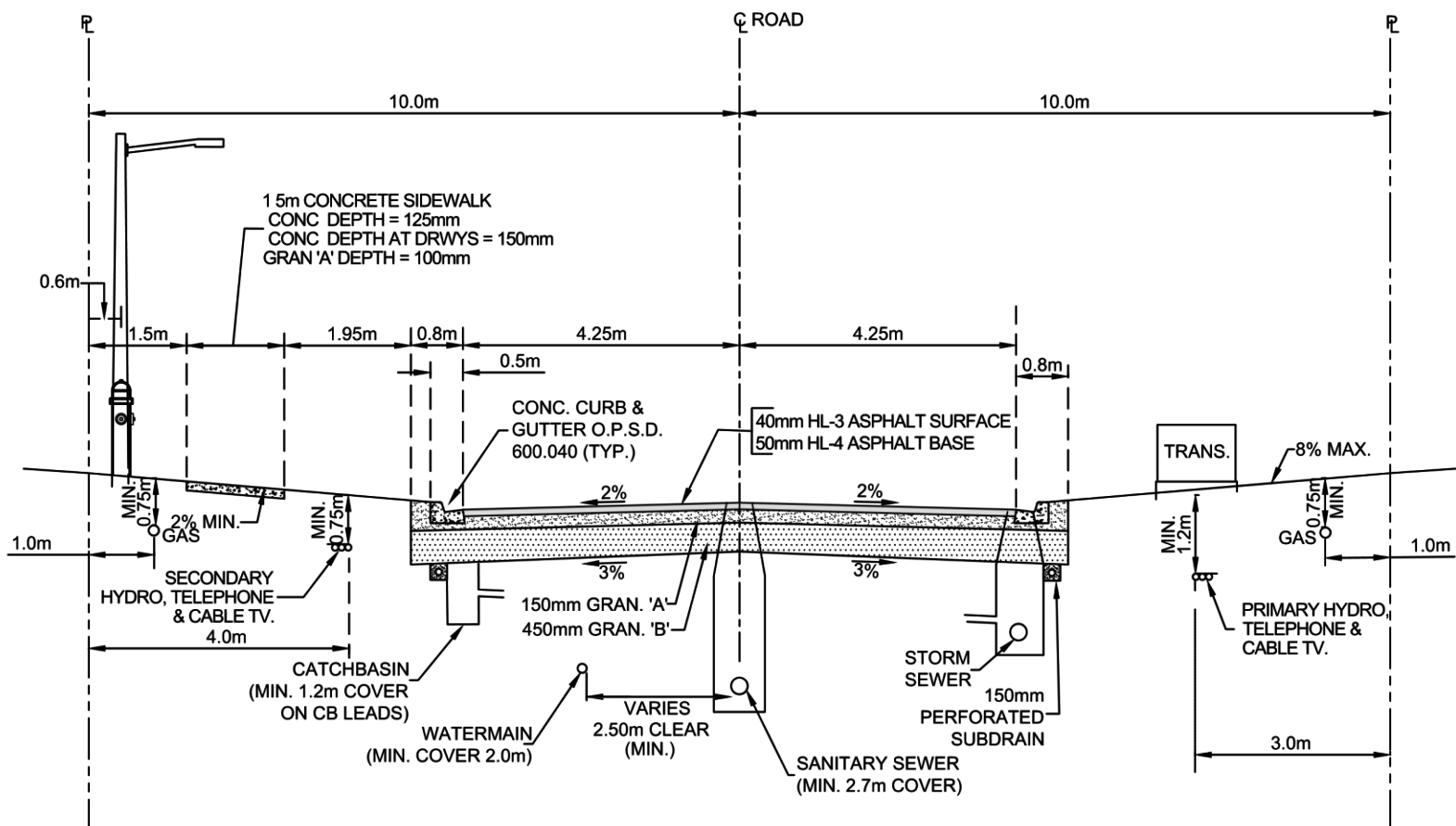


SCALE
1:100 HORZ
(8.5 X 11)

DRAWING No.
3

APPENDIX “D”

Typical Rural Road Cross Section



NOTES:

1. ALL TRENCHES TO BE BACKFILLED WITH GRANULAR MATERIAL
2. BOULEVARD RESTORATION TO BE COMPRISED OF 150mm TOPSOIL AND SOD.

No.	DATE	REVISION
1	DEC 15/25	FIRST SUBMISSION

TOWN OF HANOVER
TYPICAL ROAD CROSS-SECTION
URBAN ROAD



SCALE
1:100 HORZ
(8.5 X 11)

DRAWING No.
2

APPENDIX “E”

STORMWATER MANAGEMENT STANDARD FOR SITE PLANS OR SMALL DEVELOPMENTS

SECTION E1 | DRAINAGE POLICIES

1. APPLICATIONS

These drainage policies will apply to all development or redevelopment requiring site plans or other planning approvals. Where the local Conservation Authority determines the development is in their regulated area or they have an interest in the development, their standard and policies shall apply.

2. DRAINAGE OBJECTIVES

The Town of Hanover has set the following objectives for the management of storm drainage within its boundaries:

- Reduce to acceptable levels, the potential risk of health hazards, loss of life and property damage from flooding.
- Reduce to acceptable levels, the incidence of inconvenience caused by surface ponding and flooding.
- Ensure that any development or redevelopment minimizes
- the impact of change to the groundwater regime; increased pollution; increased erosion or increased sediment transport, especially during construction; and impact to surrounding lands and areas of existing development.
- Maintain, where applicable, any natural stream channel geometry insofar as it is feasible while achieving the above objectives.

3. ATTAINMENT OF DRAINAGE OBJECTIVES

3.1 Major and Minor Systems

In general, the Town of Hanover supports the concept of drainage having two separate and distinct components – the minor drainage system and the major drainage system. The minor system comprises swales, street gutters, ditches, catch basins and storm sewers. The major system comprises the natural streams and valleys and man-made channels, roads, or other overland conveyance systems.

3.2 Run-off Quality Control

The Town requires developers, contractors and builders to plan and execute their operations so as to minimize sediment and debris pickup and transport to water bodies. The degree of control and methods used must meet the regulations and standard of the MECP, MNRF, MTO, and local conservation authorities.

The Town will expect all erosion control works to be properly maintained throughout the duration of the project.

3.3 Conservation Authority Criteria

In the design of new drainage systems within areas regulated by the local Conservation Authority, the Developer's Engineer will be required to follow the most recent edition of the Authority's Stormwater Management Policies and Technical Standard.

MAJOR SYSTEM

a) Hazard Lands and Flood lines

The Town of Hanover requires that Hazard Lands be clearly defined on all watersheds and that no development other than necessary access or services be located herein. The Town also requires that the floodplains that would result from the 1:100 and Regional storms be defined for predevelopment and post development conditions.

Consultation with the local Conservation Authority will be necessary when dealing with Hazard Lands.

b) Detention Ponds

Detention Ponds shall be design so as to minimize any adverse effects to the environment as well as ensuring the safety of local residents. Unless noted otherwise, detention ponds are to be designed in accordance with the Ministry of the Environment, Conservation and Parks Stormwater Management Planning and Design Manual (March 2003), or the latest edition.

MINOR SYSTEM

a) Watershed Area

The watershed area shall be determined from the contour plans and shall include all areas that naturally drain into the system. Fringe areas not accommodated in adjacent drainage systems, and any areas which may become tributary by reason of re-grading.

b) Storm Drainage Plans

External Areas

A plan shall be prepared to a scale dependent on the size of the watershed area, to show the nature of the drainage of the lands surrounding the development site. The area to be developed and all existing contours used to justify the design shall be clearly shown. This plan shall be prepared and submitted to the Town's Engineer at the functional report stage.

Internal Drainage Plan

All internal drainage plans shall be prepared and shall include all streets, blocks, lots and easements. The proposed storm sewer system shall be shown on this plan with all maintenance holes and the area contributing to each structure shall be clearly outlined on the plan. The area in hectares and the run-off coefficient shall be shown within the contributing area.

In determining the contributing area to each storm sewer structure, the proposed lot grading must be considered to maintain consistency in the design.

The length, size, and grade of each section of the minor system shall also be shown on the storm drainage plan. Arrows should depict the overland flow route and the extent of flooding from the major storm.

Rain water leaders shall not be connected directly to the storm sewer system. Leaders on all single family and semi-detached residential units shall be constructed in a manner so as to not interfere with adjacent properties. Sump pump discharge should discharge to the side yard swale.

4. HYDRAULIC DESIGN

4.1 Design Levels

The system of street gutters, catch basins, storm sewers or open ditches, where permitted, shall be designed for the 1:5 year storm. Culverts or sewers crossing major County roads or Provincial highways shall be designed and approved in accordance with the requirements of the County of Grey Highways Department or the Ministry of Transportation, respectively.

4.2 Rational Method

In general, the Rational Method shall be used for the sizing of the minor sewer system at the final design stage. Calculations based on a hydrologic simulation model are required for systems serving large areas or involving treatment and/or storage systems.

4.3 Stormwater Management Report

Hydrologic studies should describe the model parameters and criteria for their selection as well as input and output data. The Consulting Engineer has the responsibility for the computations, and the Town's Engineer shall check the main assumptions and the input data.

All information required for this verification shall be submitted with the hydrologic computations. Copies of the report, where required, shall be provided to the local Conservation Authority and the MECP for approval purposes.

Each report shall include a section outlining the following:

- Run-off Quantity Control
 - Address the impact of the minor and major storm as required in these standard for both predevelopment and post development regimes.
- Run-off Quality Control
 - Address best management practices proposed to achieve desired treatment.
 - Refer to MECP Stormwater Management Planning and Design manual and Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains.
- Erosion and Sediment Control Plan
 - Provide comments and detail on a Site Plan or a separate plan as part of the submission.
- Major System/Overland Flow Routes
 - Provide extent of flood for the Major Storm or Site Plan
 - Show major storm route
 - Comment on a right to access of major storm routes based on land ownership on adjacent lands
- Maintenance Considerations
 - Address ownership and obligation for maintenance
 - A maintenance manual outlining maintenance tasks and frequency of maintenance activities shall be provided as part of the Stormwater Management Report process.
- Facility Access
 - Access to all areas of any proposed facility needs to be detailed and commented on in the report.

5. STORM SEWER DESIGN

The requirements for storm sewer design shall be in accordance with the latest edition of the Ministry of the Environment, Conservation and Parks Design Standard.

5.1 Location

Any storm sewers within road allowances shall be located as shown on the standard Town of Hanover, road cross section drawings (Appendix 'A').

5.2 Limits

All sewers shall be terminated at the development limits when external drainage areas are considered in the design. Suitable provision shall be provided to allow for the future extension of the sewer (i.e., maintenance hole knock-outs, sewer stubs, etc.).

5.3 Sewer Alignment

All storm sewers shall be laid in a straight line between maintenance holes.

5.4 Pipe Crossings

A minimum clearance of 0.20 metres shall be provided between the outside of all pipe barrels at all points of crossing. In the event of watermain crossing, Ministry of the Environment, Conservation and Parks separation distances shall apply.

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

5.5 Changes in Pipe Size

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

5.6 Sewer Pipe Materials

- Concrete Sewer Pipe (Rigid)
 - 150 mm to 375 mm Class 3
 - 375 mm or greater as specified in the tender form
- Polyvinyl Chloride (PVC) Pipe (Flexible)
 - Class SDR35 or Class V (320 kPa)
 - Annular ribbed profile for ribbed pipe
- Polyethylene Sewer Pipe (Flexible) – CSA certified Sewer Class to B 182.6
 - 150 mm to 600 mm
 - Smooth inner wall, annular corrugated profile (320 kPa), 15 PSI bell and spigot joints shall have elastomeric gaskets (CSA certified to B 182.6)

The Town shall be consulted for the material of any storm sewer > 900 mm or deeper than 5 metres

5.7 Pipe Bedding

The class of pipe and the type of bedding shall be selected to suit loading and proposed construction conditions. Details and types of bedding are illustrated in OPS Drawing 802.03.

5.8 Backfill for Sewers

Backfill for sewers shall be in accordance with OPSD 803.04.

6. MAINTENANCE HOLES

6.1 Location

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

6.2 Maximum Spacing of Maintenance Holes

Maintenance hole spacing shall be as per MECP Design Guidelines as follows:

Sewer Diameter (mm)	Maximum Spacing (m)
300 to 975	110
1050 to 1350	130
1500 to 1650	160
1800 and above	305

6.3 Maintenance Hole Types

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

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

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

6.4 Maintenance Hole Design

- Safety gratings shall be provided in all maintenance holes when the depth of the structure exceeds 5.0 m.

- When the difference in elevation between the obvert of the inlet and outlet pipes exceeds 0.9 m, a drop structure shall be placed on the inlet pipe.
- All storm sewer maintenance holes shall be benched in accordance with the OPS Drawings.

6.5 Grades for Maintenance Hole Frames and Covers

All maintenance holes located within the traveled portion of a roadway shall have the rim elevation set flush to the base course of asphalt.

Prior to the placement of the surface course asphalt the maintenance hole frame shall be adjusted to the finished grade of asphalt. Steel adjusting rings will not be permitted. The parging and setting of the frame and cover shall be in accordance with the details on the OPS Drawings. A maximum of 300 mm of modular rings shall be permitted on maintenance hole in new subdivisions.

6.6 Head Losses Through Maintenance Holes

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

The minimum drops across maintenance holes shall be as follows:

Change of Direction	Minimum Drop (mm)
1 to 45 degrees	30 mm
46 to 90 degrees	60 mm

7. CATCH BASINS

7.1 Location and Spacing

Catch basins shall be generally located upstream of sidewalk crossings at intersections.

Catch basins spacing will vary with street width, grade and cross fall, the location shall be provided on both sides of the street at all low areas with the maximum spacing as noted:

Road Gradient (%)	Maximum Spacing (m)
0 to 3	110
3.1 to 4.5	90
Over 4.5	75

Double catch basins shall normally be required when the catch basin intercepts flow from more than one direction. Single catch basins may be used in the case where the total length of drainage to the catch basin is subject to the analysis of the major – minor system.

Rear lot catch basins and connections shall be located as outlined in the lot grading criteria and in all cases shall discharge/connect to a structure.

7.2 Catch Basin Types

Catch basins must be precast with full depth sumps, as shown on the OPS Drawing 705.010.

Special catch basins and inlet structures shall be fully designed and detailed by the Consulting Engineer.

7.3 Catch Basin Connections

Type	Minimum Size of Connection	Minimum Grade of Connection
Single and Double Catch Basins	300 mm	1.0%
Rear Lot Catch Basin	250 mm	1.0%

7.4 Catch Basins Frame and Covers

The frame and cover for catch basins shall be as detailed in the OPS Drawing 400.110.

8. INLETS, OUTFALLS AND SPECIAL STRUCTURES

8.1 Inlets

Inlet structures must be fully designed and detailed on the Engineering Drawings. Gabions, rip rap or concrete shall be provided at all inlets to protect against erosion and to channelize flow to the inlet structure.

8.2 Outlets

The OPSD 804.030 standard headwall shall be used for all storm sewers up to 900 mm in diameter. For sewers over 900 mm in diameter, the OPSD 804.040 headwall shall be used. All headwalls shall be equipped with a grating over the outlet as per OPSD 804.050.

Suitable erosion protection, which may include gabions, rip rap, concrete or other erosion protection shall be provided to the satisfaction

of the regulatory agencies at all outlets to prevent erosion of the watercourse and the area adjacent to the headwall.

8.3 Open Channels

The proposed criteria for an open channel shall be submitted to the Town for their approval. The Consulting Engineer shall be responsible for obtaining approval from the MNRF, MECP, and the local Conservation Authority, if the open channel concept is favourably considered.

The Conservation Authority shall be consulted during initial project planning in regard to any potential watercourse alterations associated with the development proposal.

Watercourse alterations are subject to permitting requirements under the Authority's

- Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 147/06).

Planned watercourse alterations may, in addition, be subject to other Agency requirements:

- DFO;
- MNRF;
- Navigable Waters (Transport Canada); and
- Drainage Act.