

1. MUNICIPAL INFRASTRUCTURE

1.1 Drawing & Submission Requirements

1.1.1 General

This section discusses the requirements for the submission of engineering drawings and reports. All submitted records and digital files will become the property of the City of Vaughan.

1.1.2 Drawings

The following are typical drawings which are to be included, as applicable, for proposed (re)construction of municipal services.

- COVER SHEET – showing title of the project, any relevant application numbers, Owner’s information, consultant’s information, a key plan showing the project’s location relative to nearby arterial roads and a drawing index.
- GENERAL NOTES SHEET – showing the approved and unmodified general notes of the City of Vaughan, other text based information not included on any other drawing and a list of all design exceptions. The approved design exceptions shall be emphasized through the use of a box around the related text.
- GENERAL SERVICE PLAN – showing all existing and proposed underground and above ground infrastructure.
- GENERAL SANITARY PLAN – showing existing and proposed sanitary sewers and all areas tributary to each sanitary sewer inlet, including areas of future development. All external tributary areas will be spatially identified.
- GENERAL STORM PLAN – showing existing and proposed storm sewers and channels, overland flow routes and all areas tributary to each storm sewer inlet, channel or watercourse, including areas of future development. All external tributary areas will be spatially identified.
- SANITARY AND STORM DESIGN SHEETS – showing the standard sanitary and storm sewer design sheets which includes all sewer sections, populations, peaking factors, areas accumulated, infiltration, coefficients, expected flows, design sizes, slopes, full flow capacities, full flow velocities and actual velocities of design peak flows.
- GENERAL GRADING PLANS – showing existing contours and proposed road, lot and block grading and elevation details as well as identifying all engineered filled lots. The details shall extend at least 30 metres beyond the project boundaries. The size and base elevations of existing isolated trees to be retained shall also be included. In the event of a woodlot, only the trees along the woodlot edge shall be recorded on the grading plans.
- COMPOSITE UTILITY PLANS – showing all above ground utility locations, underground sanitary, storm and water pipes, maintenance holes, valves and connections, driveways, regulatory street and warning signs, pavement markings, streetlights, walkway lights, mailboxes, fences, retaining walls, rear lot catchbasins and sidewalks. Signature block for sign-off from all affected utility companies (e.g., Bell Canada, Rogers Cable, Alectra Utilities, Enbridge Gas, Canada Post, etc.) is required on these plans.
- STORMWATER MANAGEMENT PLANS – showing grading, cross-sections, details of inlets and outlets, structures, spillways, flooding extents, etc.
- PLAN AND PROFILE DRAWINGS – showing detailed alignment and profiles of the roads, sewers and water mains.
- STANDARD DETAIL PLANS – showing applicable City of Vaughan or Ontario Provincial Standard Drawings standard details used in the project.

- OTHER PLANS – as required (section details, fence details, stormwater management details, siltation and sediment control details etc.). All fence details shall appear solely in the landscape architecture drawings.
- LANDSCAPE AND STREETSCAPE PLANS – showing location and species of all plant material used for streetscaping, rehabilitation and restoration, as well as fencing, tree preservation details and entry or other decorative features as required by the Urban Design Department. All fence details shall appear solely in the landscape architecture drawings.
- STREETLIGHTING PLANS – showing the underground duct routing, streetlight schematic, photometric data as well as streetlighting standard details.
- EROSION AND SEDIMENT CONTROL PLANS – shall be prepared in accordance with Section 4.2.
- PARK AND OPEN SPACE CONCEPT PLAN - Prepare preliminary layout plan and conceptual grading plan of the approved park and open space facilities, showing, but not limited to, boundaries of proposed block, total size of individual blocks, existing conditions, topography, slopes, drainage, vegetation, storm water run-off, surface drainage patterns, sub-surface storm water servicing, restoration works, Edge Management Plan (for blocks abutting open space), associated buffer and preliminary construction cost estimate.

1.1.3 Supporting Information

Shall include where required:

- STORMWATER MANAGEMENT REPORT – showing, but not limited to, proposed stormwater management practices, calculations for pre-development flows, post-development flows, required storage volumes, erosion and sedimentation control measures, water quantity and quality control measures, design capacity of the receiving watercourse and overall grading of the subdivision. More detailed information can be found in the Stormwater Management System of this document.
- STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE MANUAL - A separate operation and maintenance manual for all proposed stormwater management facilities shall be submitted which includes but is not limited to the following information; the method and procedure for draining the forebay during maintenance, the techniques in removing the sediment from the facility and procedures for on-site drying, the procedure in diverting the storm flow away from the forebay during maintenance, the annual loading rate and the estimated sediment accumulation in the facility, the frequency when the facility must be cleaned, the inspection procedures and frequency of inspections, a description of the pond features and how the pond operates under the various storm events.
- FUNCTIONAL SERVICING REPORT – with plans showing current, interim and ultimate service areas and the necessary supply and distribution infrastructure or capacity required to supply water or convey storm and sanitary sewage. The report shall include calculations of watermain and sewer capacities, interim and ultimate flows as well as required infrastructure improvements including but not limited to, pumping station upgrades, reservoirs, wells, forcemains, twinning, etc. to support the project.
- HYDROGEOLOGICAL IMPACT STUDY – establishing a qualitative and quantitative baseline for local wells within a one kilometre radius of the development boundary and detailing the anticipated impact the development will have on the existing wells. Mitigating measures shall also be proposed in the event the development creates a negative impact on existing wells. A follow up report shall be prepared upon the completion of the construction to document the impacts on the local wells. Details of any monitoring program as may be required by the City to be included.
- GEOTECHNICAL REPORT – showing calculations and recommendations for pavement design, slope stability, methods of tunnelling, beddings, foundations, retaining walls and soil corrosivity, including mitigating measures in the event non-ideal conditions are encountered during road construction.
- NOISE AND VIBRATION REPORT – showing design calculations, assumptions and recommendations for noise and vibration attenuation features (e.g., barriers, berms, air conditioning, etc.). The report shall also reflect current City of Vaughan policies pertaining to mandatory air conditioning or fencing as

- the policies may be more stringent. Only the latest version of STAMSON computer program is acceptable for noise prediction.
- TRANSPORTATION MANAGEMENT PLAN – Traffic Management Plans shall generally include expected traffic volumes on all collector and local roads to precisely define the requirements for items such as traffic signals, stop signs, turn lands and transit stop locations, traffic calming measures, and transportation demand management.
 - TRAFFIC IMPACT STUDY – showing the interim and ultimate traffic volumes and levels of service at all affected intersections, including Level of Service (LOS), delays and V/C ratios. Wherever poor levels of service are anticipated, mitigative measures are to be recommended.
 - PHASE ONE ENVIRONMENTAL SITE ASSESSMENT (ESA) – in general, provides an opinion as to the environmental condition of the property and its suitability for the proposed uses based on a detailed records review. A Phase One ESA report must be accepted by the City when land is to be conveyed to the City or as otherwise required through City of Vaughan policies. To be completed in accordance with applicable legislation at the time of preparation.
 - PHASE TWO ENVIRONMENTAL SITE ASSESSMENT (ESA) – in general, provides quantitative results pertaining to the environmental condition of a property through intrusive investigations. A Phase Two must be accepted by the City if a Phase One ESA indicates that the land is potentially contaminated, if there is a park block to be conveyed to the City or as otherwise required through City of Vaughan policies. To be completed in accordance with applicable legislation at the time of preparation.
 - TREE INVENTORY, ASSESSMENT AND PRESERVATION PLANS AND DETAILS - The Tree Inventory and Preservation Study, and the Arborist Report/Tree Preservation Report must be prepared by a certified Arborist or qualified professional, identifying all existing trees, their type, size and condition, those trees proposed to be removed and retained, and the methods to be used to ensure preservation of those trees to be retained. The Tree Inventory and Preservation Study is typically submitted in conjunction with an Arborist/Tree Preservation Report. If there are no trees present, a certified letter from an ISA Certified Arborist will be required, confirming that no trees are present on or near the property. The report shall have regard for the Regional and City Tree By laws.
 - OTHER INFORMATION – as appropriate and required (foundation drain calculations, pipe strength, etc.) for the specific project, or as required by the City.

1.1.4 External Authority Approvals

Submissions shall include drawings, design sheets, contract specifications, design reports and other materials and information required for approvals from authorities external to the City, as applicable, such as:

- Ontario Ministry of Environment, Conservation & Parks (MECP)
- Ontario Ministry of Transportation (MTO)
- Ontario Ministry of Natural Resources and Forestry (MNRF)
- Toronto and Region Conservation Authority (TRCA)
- Region of York
- Other pertinent authorities (e.g.: Alectra Utilities, Fisheries and Oceans Canada, etc.)

1.1.5 Digital Files

Shall include and not necessarily be limited to Drawings, design sheets, contract specifications, Supporting Information reports and other relevant materials and information consisting of:

- Digital copies of all record(s) approved by the City of Vaughan. Digital file(s) shall conform to the specifications outlined in Appendix F.
- CADD file(s) of all record(s) approved by the City of Vaughan. The CADD files shall conform to the specifications outlined in Appendix F.

- CADD or GIS file(s), which will be referred to as a master infrastructure file, containing a compilation of all infrastructure relevant to the subdivision as noted in the Drawings section. This file shall be devoid of any Drawing Sheet Border information. TABULAR data related to the infrastructure shall be linked to the appropriate SPATIAL counterpart and conform to the specifications outlined in Appendix F.
- Digital format of Design Calculations.

1.1.6 Submission Procedure

1.1.6.1 [Perfect Engineering Submission](#)

The use of the Perfect Submission process is intended to streamline and expedite the engineering approvals process and relies on the consulting team to prepare and certify designs in accordance with the criteria and standards of the City. The following is the general procedure:

- In advance of scheduling a Perfect Submission meeting one rolled set and one digital set of Drawings including a complete list of design exceptions shall be submitted to the City of Vaughan for review.
- The Perfect Submission meeting shall be attended by the Owner or his designate, the civil consultant, the landscape architect, the electrical consultant and where required the soils, noise, environmental and transportation consultants as well as representation from the appropriate City of Vaughan departments.
- The Perfect Submission shall contain 5 (five) rolled sets of full size Drawings, 2 (two) sets of reduced half size Drawings, 2 (two) bound copies of all Supporting Information and a letter from each consultant certifying that their design is either in accordance with the City's Design Criteria or contains specific exceptions to the Design Criteria. Additional sets of Drawings or copies of Supporting Information may be required. All drawings and reports are to bear the seal, date and signature of the licensed Professional Engineer, Landscape Architect or other professional, as the case may be, under whose direction they were prepared.
- Upon completion of the Perfect Submission meeting, the design exceptions will either be approved or rejected, the drawings shall be red-lined and the City will be in a position to assess whether or not to recommend the MECP applications as required.
- The City reserves the right to conduct a subsequent review of the Drawings and all further red-lined changes shall be incorporated in the Drawings.

1.1.6.2 [Approved Drawings and Supporting Information](#)

- Refer to Appendix F (Section F4) for requirements.

1.1.7 Drafting Requirements

1.1.7.1 [Quality](#)

- ORIGINALS – All drawings shall be neat, legible and shall be corrected for As-Built information in the same manner. All information shall be neat, legible and reproducible in a white-printing or photocopy machine.
- PRINTS – All prints of drawings and information shall be neat and legible. Copies not considered legible shall be replaced by legible copies.
- APPROVED DRAWINGS – Approved drawings shall be neat, legible and suitable for reproducing on a white-printing machine. Copies of information shall be neat, legible and suitable for reproducing in a white-printing or photocopy machine.
- AS-BUILT DRAWINGS – Copies of information shall be neat, legible and suitable for reproducing in a white-printing or photocopying machine.

1.1.7.2 [Dimensions](#)

- DRAWING SHEET SIZES – Drawings shall generally have a paper size of 610 mm by 914 mm (24 inches by 36 inches) with borders set at a minimum of 13 mm (0.5 inches). Other paper sizes may be considered for use at the discretion of the City of Vaughan.
- SCALE – Standard scales to be used are 1:100, 1:500 and their factors of 10.
 - COVER SHEET – appropriate scales shall be used for site key plan.
 - GENERAL PLANS – shall generally use 1:1000 although other scales may be used where appropriate for larger or smaller plans. General plans should be all on one drawing wherever possible.
 - GRADING PLANS – shall use 1:500 or 1:200.
 - PLAN AND PROFILE – shall use 1:500 horizontal and 1:100 vertical. Detail profiles can use 1:50 horizontal and 1:10 vertical or as required.
 - DETAIL PLANS – shall use an appropriate scale for design.
 - OTHER PLANS – shall use an appropriate scale for design.
- DIMENSIONS – S.I. units shall be used for all projects.
- REDUCTIONS – Plans reduced to 215 mm by 350 mm (8.5 inches by 11 inches) may be required for inclusion in the subdivision agreement.

1.1.7.3 [Title Blocks](#)

All drawings shall include: a City Standard Title Block, Revisions Block and Signing Endorsement as per the City's Standards.

1.1.7.4 [Key Plan](#)

A Key plan shall be provided to clearly identify focus area on each drawing.

1.1.7.5 [Basic Information](#)

- NORTH ORIENTATION – All plans shall include a north arrow in the upper right hand quadrant. All general plans and east west streets shall generally be drawn with the north arrow pointing to the top, all north south streets with the north arrow generally pointing to the right, and all culs-de-sac or other roads where this does not apply, shall be drawn with the stations numbered from left to right.
- FEATURES – All existing utilities, structures and vegetation are to be shown and identified. Existing utilities shall be shown by a broken fine line as per City Standard Drawings G-102 and G-103.
- DIMENSIONS – The plan shall dimension the locations of all proposed utilities in the manner shown on City Standard Drawings.
- STATIONS – Zero station shall start at a production of an intersection centre line generally at the south or west end of through streets and lower numbered intersections for crescents and cul-de-sac.
- VERTICAL CONTROL – All elevation data shall be referred to a metric geodetic benchmark. The City of Vaughan Benchmarks are based on York Region datum and Ministry of Transportation information. All plan layouts shall be referred to official survey bars.
- HORIZONTAL CONTROL – Horizontal controls shall be survey bars set by an Ontario Land Surveyor.

1.1.7.6 [Sewer Details](#)

The standard abbreviations, sewer diameter, length, grade, maintenance holes, inlets and connections to the sewer shall be shown on appropriate General Plans. This information plus sewer bedding, type and class of sewer pipe, maintenance hole inverts, rim elevations and drop structures shall be shown on Plan and Profile Drawings as per City Standard Drawings G-102 and G-103.

1.1.7.7 [Watermain Details](#)

The standard abbreviations, watermain diameter, length, type and class of pipe, and the valves, hydrants and connections to the watermain shall be shown on appropriate General Plans and on Plan and Profile Drawings as per City Standard Drawings G-102 and G-103.

1.1.7.8 [Road Details](#)

Horizontal control data (beginning and end of curve, radius, curve length, delta, tangent and chord length) shall be shown on appropriate General Plans and on Plan and Profile drawings. Limit of precision shall be to 3 decimal places.

Vertical control data (beginning and end of curve, radius, curve length, delta and tangent length, K value and vertical D distance between the tangent intersection and the curve) shall be shown on Lot Grading Plans and on Plan and Profile drawings. Existing and proposed center line road grades shall be shown every 20 metres with stations shown measured in metres with kilometers separated by a + sign on long runs (e.g., STA 0+000, STA 0+020, STA 0+040 ... STA 1+020). Stations of interest (curve stations, intersections, end stations, etc.) shall also be shown. Limit of precision shall be to 3 decimal places.

1.1.7.9 [Other Details](#)

Other details shall be according to the City Standard Drawings and Ontario Provincial Standard Drawings (OPSD) where applicable and appear on the Standard Details drawings. City and OPSD Standard Drawings may be printed on these sheets directly. Details and sections specific to the project are to be provided on additional drawing sheets.

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