

Engineering Submissions

Subdivision and Land Division Developments

All developments requiring City infrastructure to be constructed must go through the review and approval process of engineering drawings to confirm compliance with standards and criteria. The developer must retain a Professional Engineer to manage all aspects of the engineering design and construction of all City Services on behalf of the City. The engineer retained by the developer must have extensive experience and technical expertise to manage the development and will be subject to approval by the Director, Engineering Services.

1.0 First Submission Requirements

- 1.1 Three (3) sets of engineering drawings that typically includes the following plans as required:
 - 1.1.1 Cover Page
 - 1.1.2 Index Page
 - 1.1.3 General Notes
 - 1.1.4 General Plan of Services
 - 1.1.5 Lot Grading Plan(s)
 - 1.1.6 Storm Drainage Area Plan(s)
 - 1.1.7 Plan and Profile(s)
 - 1.1.8 Utility Coordination Plan(s)
 - 1.1.9 Traffic Signage and Pavement Marking Plan(s)
 - 1.1.10 Erosion and Sedimentation Control Plan(s)
 - 1.1.11 Construction Management Plan(s)
 - 1.1.12 Details and Standards Plan(s)
- 1.2 Three (3) sets of Landscape Plans.
- 1.3 Two (2) copies of a detailed Stormwater Management Report.
- 1.4 Two (2) copies of a Geotechnical Soils Report.

- 1.5 Two (2) copies of Streetlighting Design Plan(s) including underground wiring diagrams.
- 1.6 Two (2) copies of a Draft 40M-Plan.
- 1.7 Two (2) copies of a Hydrogeological Analysis (if required).
- 1.8 Two (2) copies of other studies or reports required as a Condition of Draft Plan Approval.
- 1.9 Digital copies of the entire submission package in pdf form.

2.0 Second and Subsequent Submission Requirements

- 2.1 Second and subsequent submissions must be accompanied by a cover letter from the engineer identifying how the previous comments were addressed. The letter shall restate the City's comment followed by the appropriate response. The letter should also outline any additional changes that affect the engineering design shown on the previous submission.
- 2.2 All marked-up plans must be returned with any subsequent submissions.
- 2.3 Two (2) copies of the Draft 40R-Plan, if required, are required to be submitted with the second submission.
- 2.4 A detailed cost estimate in the prescribed format in the Appendix must be provided to form the basis for the Engineering Review and Inspection Fee, Stormwater Maintenance Fee, and Securities.
- 2.5 As per the General User Fees & Charges By-law, 75% of the Engineering Review Fee will be payable prior to the release of the second submission comments.
- 2.6 The Statement of Municipality section of the Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) application forms will only be signed by the City when the stormwater and servicing design is deemed acceptable.
- 2.7 Digital copies of the entire submission package in pdf form.

3.0 All Engineering Plans

3.1 All plans are to be drawn in metric units.

3.2 Show the Title Block in the lower right-hand corner of the drawing. The Title Block must include the following information:

3.2.1 Revision block with column for the City to approve revisions.

3.2.2 Subdivision name and street or easement limits.

3.2.3 “Approved” – provide a line for signature and date. The following note must be placed under the signature; “Approval of works required by the City of Pickering and as defined in the Subdivision Agreement. The City is relying on the technical skills of the Professional Engineer signing and sealing this drawing”.

3.2.4 Consultant’s name and engineer’s stamp (signed and dated).

3.2.5 Scale.

3.2.6 Designed by, drawn by and checked by.

3.2.7 Date issued.

3.2.8 Draft Plan of Subdivision number SP- 20 __- __.

3.2.9 Registered Plan number 40M-____.

3.2.10 Drawing number.

3.3 Show a Key Plan in the upper right-hand corner of the drawing. The Key Plan should include a north arrow and scale.

3.4 If the plans are amended or altered after the Director, Engineering Services has approved them; the date of revision shall be noted in the Revision Block and resubmitted to the Director, Engineering Services for approval.

4.0 General Plan of Services

- 4.1 All general plans must be drawn at a scale of 1:1000 or 1:500.
- 4.2 Refer all datum to a City of Pickering Benchmark – Benchmark information may be obtained from the Engineering Services Department.
- 4.3 Show the following information:
 - 4.3.1 Existing contour lines at 0.5 metre intervals.
 - 4.3.2 Existing services, above ground utilities, sidewalks, curbs, etc. and abutting property limits in broken lines, indicating them as such.
 - 4.3.3 Proposed above ground services, sidewalks, curbs, road allowances, street names, etc.
 - 4.3.4 Existing and proposed lot numbers, blocks, easements and phases, if applicable.
 - 4.3.5 Existing and proposed maintenance holes and catchbasins, indicating them as such.
 - 4.3.6 Existing and proposed storm and sanitary sewer lengths, sizes, material, slopes and direction of flow. All sewers 750 millimetres in diameter, or larger must be shown with two lines. The slopes are to be shown to two decimal places.
 - 4.3.7 Rear yard catchbasins and easements.
 - 4.3.8 Existing and proposed watermain sizes and type, along with valves and hydrants.

5.0 Lot Grading Plans

- 5.1 All plans must be drawn at a scale of 1:500.
- 5.2 Include reference to a City of Pickering Benchmark used as datum for elevations. Benchmark information may be obtained from Engineering Services Department.
- 5.3 The City may require the developer to establish additional benchmarks within the subdivision limits as required.

- 5.4 The Standard Notes for all lot grading plans are to be shown on the right-hand side of the drawing above the Title Block and are as follows:
- 5.4.1 All rear yard catchbasins are to be fitted with a Beehive Catchbasin Cover (City Standard Drawing P-215) or a Birdcage Grate (OPSD 400.120).
 - 5.4.2 An undisturbed strip and/or flat area having a width of 0.6 metres shall be provided within the boundary limits adjacent to other properties, developed or undeveloped, in order to maintain the existing boundary elevations. No filling up to, or on private lands shall be tolerated unless the abutting owner furnishes written permission.
- 5.5 Show the following information:
- 5.5.1 Existing contour lines at 0.5 metre intervals to a point beyond the limits of the subdivision, sufficient to determine existing drainage patterns.
 - 5.5.2 Existing services, above ground utilities, sidewalks, curbs, etc., and abutting property limits in broken lines, indicating them as such.
 - 5.5.3 Proposed above ground services, sidewalks, curbs, road allowances, street names, etc.
 - 5.5.4 Existing and proposed lot numbers, blocks, easements and phases, if applicable.
 - 5.5.5 Existing and proposed maintenance holes and catchbasins, indicating them as such.
 - 5.5.6 Proposed rear yard catchbasins, inverts, top of grate elevations and easements.
 - 5.5.7 Proposed rear yard swales with regular centreline elevations.
 - 5.5.8 Existing and proposed elevations at the lot corners with the proposed elevation over the existing elevation.
 - 5.5.9 Grade at the front of the proposed house and/or garage. The grade at the rear of the proposed house must be shown if it differs from the elevations at the front, and the house type must be indicated.
 - 5.5.10 Minimum basement elevation (MBE) for each lot. The MBE must be a minimum of 300 millimetres above the hydraulic grade line (HGL).

- 5.5.11 Proposed road grades, lengths and elevations on all streets, with symbols at grade changes indicating direction of slope.
 - 5.5.12 Proposed elevations along the boundary of all blocks abutting single family and semi-detached lots in the subdivision.
 - 5.5.13 Grading slopes with a maximum slope of 3:1.
 - 5.5.14 Show all retaining wall details such as type, height, length, top and bottom of wall elevations. Please note that pressure treated timber is not an acceptable material.
- 5.6 All property lines for multiple unit lots to be indicated on the plan with a dashed line.
- 5.7 Rear yard catchbasins are to be constructed in a minimum 3.0 metre wide easement, unless otherwise approved by the Director, Engineering Services. Easement limits must be shown on the plan.
- 5.8 All vegetation to be preserved as per the approved Tree Preservation Plan must be shown on the plan, including tree protection fencing as per City Standard Drawing P-1100.

6.0 Storm Drainage Area Plan

6.1 Watershed Area

The watershed area for the site shall be determined from contour plans and shall include all lands that naturally drain into the system and any fringe areas not accommodated in adjacent storm drainage systems, as well as other areas which may become tributary due to regrading. The information shall be confirmed with the City prior to the start of the design of the internal servicing of the site.

6.2 External Drainage Area Plan

A plan shall be prepared to a scale of 1:1000 or 1:2000, depending on the size of the watershed area, to show the nature of the drainage of the lands surrounding the development site and to accurately delineate all external drainage areas that are contributory to the drainage system for the development. The external drainage areas shall be divided into smaller tributary areas and the area and the location to which the tributary area is considered in the design shall be clearly shown. The plan shall clearly show all existing contours used to justify the limits of the external drainage area.

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

6.3 Internal Drainage Area Plan

All internal storm drainage plans shall be prepared to a scale of 1:500 and shall include all streets, lots, blocks, right-of-ways, easements and other lands within the development or capital improvement project. The proposed storm sewer system shall be shown on this plan with all maintenance holes numbered consecutively from the outlet.

These maintenance holes shall be the tributary points in the design, and the area contributing to each maintenance hole shall be clearly outlined on this plan. The area, in hectares, of each contributing area (rounded up to two decimal points) and the runoff coefficient used shall be shown in a circle located within the contributing area indicated on a General Plan and called a Storm Drainage Plan. In cases where areas of different runoff coefficients may be tributary to the same maintenance hole, the areas and the coefficients shall be separately indicated on the plan.

In determining the tributary area to each maintenance hole, the proposed grading of the lots must be considered to maintain consistency in the design.

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

The length, size and grade of each section of storm sewer shall also be shown on the storm drainage plan.

Where the major and minor system drainage areas differ due to grading, separate major and minor system drainage plans shall be provided to the specification described above.

6.4 Show all overland flow routes.

7.0 Plan and Profiles

- 7.1 Plan and profile drawings must be drawn at scales of 1:500 horizontally and 1:100 vertically.
- 7.2 Refer all datum to a City of Pickering Benchmark.
- 7.3 The sewer profiles shall be separated such that each street and easement can be filed separately.
- 7.4 On all plan and profile, the type of bedding for the storm sewers must be shown along the bottom of the profile, and be referred to a City Standard Drawing.
- 7.5 The Development Services Design Standard Notes must be shown on the right-hand side, above the Title Block on the first plan and profile drawing, or on a separate drawing reserved for standard notes and symbols, which are as follows:
 - 7.5.1 All concrete sewer pipe up to and including 450 millimetre diameter shall be equal to CSA Specifications A257.2 (latest amendment) unless otherwise noted.
 - 7.5.2 All concrete sewer pipe 525 millimetre diameter and larger shall be equal to CSA Specifications A257.2 (latest amendment) unless otherwise noted.
 - 7.5.3 All polyvinyl chloride pipe (PVC) shall be equal to CSA Specifications B182.1 and B182.2 (latest amendment) unless otherwise noted.
 - 7.5.4 For dimensions and details not shown, see the City Standard Drawings referred to on the profile.
 - 7.5.5 All storm sewer mains, house connections and catchbasin leads shall be installed in accordance with the manufacturers' specifications.
 - 7.5.6 Storm sewer pipes larger than 450 millimetres are to be benched throughout to the crown of pipes on a vertical projection from spring line.
 - 7.5.7 Storm sewer pipes 450 millimetres and smaller are to be benched to spring line.
 - 7.5.8 All restoration, reconstruction and relocation is to be performed to the satisfaction of the Director, Engineering Services.

- 7.6 Plan and profiles are to show the following information:
- 7.6.1 Existing services, above ground utilities, sidewalks, curbs, etc., and abutting property limits in broken lines indicating them as such.
 - 7.6.2 Existing and proposed services, curbs, sidewalks and roads, dimensioned to the street line.
 - 7.6.3 Existing municipal addresses of adjacent properties.
 - 7.6.4 Existing and proposed lot numbers, blocks and easements and phases, if applicable.
 - 7.6.5 Proposed driveway aprons.
 - 7.6.6 Existing ground profile.
 - 7.6.7 Proposed road grade elevations at 25 metre intervals. Vertical curve information, if required, is to be provided.
 - 7.6.8 Proposed slope of the road.
 - 7.6.9 Existing and proposed watermain sizes and type, along with valves and hydrants.
 - 7.6.10 100-year hydraulic grade line (HGL).
 - 7.6.11 Minimum basement elevation (MBE) for each lot. The MBE must be a minimum of 300 millimetres above the HGL.
 - 7.6.12 Top elevations of all proposed structures.
 - 7.6.13 Existing and proposed maintenance hole locations shown projected perpendicular to the centre line chainage and indicate the particular chainage in the profile view. Maintenance holes shown in the profile view must refer to a City Standard which is to be shown above the centre line of the road profile at each maintenance hole.
 - 7.6.14 Existing and proposed storm and sanitary sewer lengths, sizes, material, slopes, inverts and direction of flow. All pipe classifications are to be shown on the profile view. The slopes are to be shown to two decimal places.
 - 7.6.15 Sewers 750 millimetres in diameter, or larger, with two lines in the plan view.

- 7.6.16 Existing and proposed catchbasins, and indicate them as such. All proposed street catchbasins are to be placed on a projection of the property line (i.e. not placed within the limits of the driveway) whenever possible.
- 7.6.17 Rear yard catchbasins and easements.
- 7.6.18 House storm service connections; provide a single connection for detached lots, two single connections for semi-detached lots and a single connection for each unit on a block. (Refer to Durham Region Standard Drawing S-230.010).
- 7.6.19 All cross-sectional dimensions such as right-of-way width, boulevard width and pavement width on the right-hand side of the plan section.
- 7.6.20 Pipe crossing table.

8.0 Utility Coordination Plan

8.1 The Utility Coordination Plan (UCP) should indicate, but not necessarily be limited to, the following:

- 8.1.1 All proposed above ground utilities (Street Lights, Hydro Transformers, Cable TV, Bell Canada).
- 8.1.2 Offset dimensions of all above-ground utilities not located on property lines.
- 8.1.3 Location and detail(s) of all road crossings, duct banks and gas mains.
- 8.1.4 Proposed boulevard tree locations to ensure there are no conflicts with proposed utility locations. Minimum offsets for trees are as follows:

Infrastructure	Minimum Offset (in metres)
Transformer	2.0
Pedestals	1.0
Light poles	6.0
Hydrants	3.0
Driveways	1.5
Stop signs	5.0
Water valves	1.0
Trees	6.0
Intersection	15.0

- 8.1.5 Community mailbox location including concrete pad and walkway as per Canada Post standards and City Standard Drawings P-900 or P-901.
- 8.1.6 Proposed driveway apron widths and location.
- 8.2 Signature Blocks are to be provided on the plan for sign off by all required utilities, Canada Post and the Region of Durham. This plan is to be circulated to the respective parties for signature prior to approval from the City.
- 8.3 A separate Streetlighting Design must be provided and approved before approval of the UCP.
- 8.4 Joint Utility Trench Detail as per City Standard Drawing P-721.
- 9.0 Traffic Signage and Pavement Marking Plan**
- 9.1 The Traffic Signage and Pavement Marking Plan should indicate, but not necessarily be limited to, the following:
 - 9.1.1 All traffic signage including, but not necessarily limited to, Speed Limit, Stop and any other warning signs as per the Ontario Traffic Manual, Book 11.
 - 9.1.2 All pavement markings as per the Ontario Traffic Manual, Book 11.
- 10.0 Erosion and Sediment Control Plan**
- 10.1 Phased Erosion and Sediment Control (ESC) Plans must be submitted to identify ESC measures at different stages of development: earthworks, servicing and building construction.
- 10.2 All ESC measures and maintenance procedures are to be indicated on a Lot Grading Plan and titled "Erosion & Sediment Control Plan".
- 10.3 The plan shall indicate the location of the temporary construction access/egress, if required, including a detail of its construction as per City Standard Drawing P-824.1 or P-824.2.
- 10.4 All catchbasins, including double, rear yard, and ditch inlet, shall be equipped with sediment control devices. Road catchbasins shall be protected with silt sacks. A detail of these devices shall be shown.
- 10.5 Protective fencing is required around the perimeter of the site prior to pre-grading or topsoil stripping. A detail showing both frozen and thaw conditions is required on this plan.

- 10.6 Protective fencing, as per City Standard Drawing P-1100, shall be placed to protect trees located within the tree preservation zone. Fencing shall be placed at the drip line, or as indicated by the Tree Preservation Plan/Report.
- 10.7 Check dam locations and details are required in any temporary drainage swales.
- 10.8 The topsoil stockpile shall be a maximum height of 3.0 metres and must be stabilized and contained.
- 10.8 Include "Erosion & Sediment Control General Notes" as per Appendix B.

11.0 Construction Management Plan

- 11.1 The Construction Management Plan (CMP) should address, but not necessarily be limited to, the following:
 - 11.1.1 Erosion and sediment controls, including maintenance procedures.
 - 11.1.2 Mud and dust control during all phases of development.
 - 11.1.3 Use of temporary swales equipped with check dams, including detail.
 - 11.1.4 Site access/egress including mud mat, if required.
- 11.2 Environmental protection of local watercourses and valley lands, if applicable, including sediment and erosion controls for downstream watercourses during all phases of construction.
- 11.3 Topsoil stockpile location and stabilization treatment, if required.
- 11.4 Road cleaning program.
- 11.5 Protection of trees in conjunction with the Tree Preservation Plan/Report.
- 11.6 Utilization of removed material.
- 11.7 Management and/or relocation of existing trees.
- 11.8 Maintenance of overland flow routes and control of base flow into wetland areas.
- 11.9 Location of site trailer and/or sales office.
- 11.10 Building material storage.
- 11.11 Storage of construction equipment.

- 11.12 Servicing of construction equipment, and disposal of waste associated with servicing.
- 11.13 Details of Spill Response Plan.
- 11.14 Parking areas for construction workers during all phases of development, ensuring accordance with City by-laws. All areas to be provided on-site.
- 11.15 Location of concrete wash outs.
- 11.16 Working hours, ensuring accordance with City by-laws.
- 11.17 Emergency contacts, including name and telephone number.
- 11.18 Location of temporary washroom facilities.
- 11.19 Construction refuse management.
- 11.20 Ensure adherence to all requirements of other studies and/or reports provided and/or approved for the development.
- 11.21 Rehabilitation of all areas disturbed during all phases of construction.
- 11.22 Construction access limits and/or restrictions.
- 11.23 Conservation of existing wildlife.

12.0 Final Engineering Submission

Upon final approval of all engineering plans signed by the Director, Engineering Services, the following must be submitted:

- 12.1 Three (3) sets of full-sized engineering plans.
- 12.2 Three (3) sets of reduced engineering plans (11"x17").
- 12.3 One (1) set of streetlight design plans.
- 12.4 Digital version of the all approved drawings in AutoCAD format (dwg file, which may include LDD or Civil 3D) as follows:
 - 12.4.1 All Paper Space Title Blocks and Plot Style Tables.
 - 12.4.2 All existing survey points are to be contained in the drawing.
 - 12.4.3 All proposed TIN's, grading models and/or contour lines are to be contained in the drawing.

- 12.4.4 All line work must be in Model Space at 1:1 scale and not rotated in a World Coordinate System (WCS).
 - 12.4.5 Drawing units are to be in metric.
 - 12.4.6 Purge all old or extra drawing layers.
 - 12.4.7 Bind all XRef files (no external attachments upon submission).
 - 12.4.8 Georeferenced plans are preferred, but not mandatory for submission.
- 12.5 Digital version of the approved drawing set in an Adobe format (.pdf file), complete with all required signatures and City approval stamp signed by the Director, Engineering Services.
- 12.6 Digital version of approved reports and studies with appendices in Adobe format (.pdf file).

13.0 Inspections and As-Constructed Record Drawings

- 13.1 As a condition of a functional system, the owner shall conduct video inspections of the underground storm sewer system required to be constructed or installed and shall provide a colour digital video file record and written report of those inspections to the satisfaction of the Director, Engineering Services.
- Should the video inspection detect pipe deflections then all polyvinyl chloride (PVC) and high-density polyethylene (HDPE) pipes shall be tested for deflection as per OPSS 410. Ring deflection testing will be performed on all sewer pipes constructed using plastic pipes. Pipes in sizes 250 millimetres to 450 millimetres in diameter will have an allowable deflection of 7.5% of the base inside diameter of the pipe. The test will be carried out a minimum of 30 days after the sewer trench has been backfilled and installation of service connections or prior to paving the roadways.
- 13.2 Final Measurement Sketch Form Sheets for storm sewer systems, including storm sewer and rear lot catchbasin easement certification when applicable, are required to be received and approved prior to the start of the maintenance period. Digital versions in pdf form are acceptable.
- 13.3 Prior to assumption, the applicant is required to provide a complete project package to the City. As-constructed drawings are to be provided in digital format, complete with all required signatures and all required as constructed information. Digital as constructed drawings are to be provided in Adobe (.pdf) and AutoCAD (.dwg) formats. AutoCAD drawing shall be in a format compatible with the City of Pickering's current version of AutoCAD.

“As Constructed” shall be indicated in the revision block with the date. This package is to include the following:

- 13.3.1 Lot Grading Plans showing as constructed grading elevations compared to the proposed grading elevations. The drawing(s) must be supplied to the City within the six months immediately following the sodding of the lot(s).
- 13.3.2 As constructed plan and profile drawings showing as constructed vs proposed sewer lengths, sewer grades, maintenance hole invert elevations and road centre line elevations. Original design information shall remain on the drawing with a line struck through. As-built information is to be boxed in, adjacent to the original design information, as per the following example:
 - i.e. ~~INV. 98.55~~ (Original Design Information)
 - INV. 98.63 (As-built Information)
- 13.3.3 Digital project support files which do not reside in AutoCAD including, but not limited to, stormwater calculations and technical reports.
- 13.3.4 Lot Grading Certification.
- 13.3.5 Streetlighting design files and certification of installation of the streetlighting system. Certification and acceptance from the Electrical Safety Authority (ESA).
- 13.3.6 Certifications from an Ontario Land Surveyor (OLS), as per the Subdivision/Development agreement.
- 13.3.7 Landscape drawings and certifications by a Landscape Architect, licenced in the Province of Ontario and a full member of the Ontario Association of Landscape Architects (OALA).
- 13.3.8 Operation and Maintenance Manuals for all stormwater management works.
- 13.3.9 Any other certifications required by the Subdivision/Development Agreement.