

F1 INTRODUCTION

These design requirements have been prepared to provide guidance in the preparation of the Subdivision Grading Plans as well as individual lot grading plans (Siting & Grading Plans).

Guidelines for grading design for individual Site Plan lots are provided in Section H - Site Plan Guidelines.

F2 RESIDENTIAL LOT GRADING

F2.1 General

Grading design for Subdivisions shall provide for proper surface drainage and maximize usable land area, in accordance with the Engineering Standards and the following criteria:

- Overall grading must account for and accommodate external drainage tributary to the Subdivision
- Grading must direct storm runoff to major and/or minor system
- Road's ROW major flow route must be designed to safely convey flows above minor storm to an accepted outlet. Any other overland flow routes (eg swale) must be designed to safely convey flows to an accepted outlet system
- Drainage shall be directed away from structures
- Drainage must be contained within the site boundaries and directed to an accepted outlet
- Proposed grades shall match the existing ground elevations at the limit of the Subdivision
- Existing trees shall be preserved, where identified, as per the Tree Preservation Plan
- A minimum of 0.6 m undisturbed strip shall be required where abutting existing lots
- Lot drainage for each phase of the Subdivision shall be self-contained

F2.2 Lot Grading

The grading design for residential lots on the Subdivision Grading Plans shall be as follows:

- Lots including drainage ditches, swales and boulevards shall be completely top-soiled and sodded with a minimum depth of 200 mm of topsoil and Number (#1) grade Turfgrass Nursery Sod; quality and source to comply with standards outlined in Canadian Nursery Landscape Association – Canadian Standards for Nursery Stock – latest edition.
- A minimum depth of 750 mm of topsoil shall be provided in designated tree planting trenches
- Minimum yard slope = 2%
- Maximum yard slope = 5%
- Minimum driveway slope = 2%; all driveways must slope away from the dwelling units
- Maximum driveway slope = 8%
- Front yards and driveways of residential lots shall be graded to drain towards the street
- Maximum grade between houses in any direction shall be 3 horizontal : 1 vertical
- Any required 3 : 1 slope shall commence at least 5.0 m from the rear wall of any dwelling unit
- To provide access to rear yards, a minimum 0.60 m wide flat access strip (at 2%) shall be provided along at least one side of the building where side yard setback permits (usually

- along the garage side or side door entrance). This may not be possible for some walkouts in which case 3 : 1 slope, as per City's criteria shall be used
- A minimum of 0.15 m shall be provided between the highest lot grade adjacent to the house and the top of the foundation wall
 - Clear stone, rather than topsoil and sod, shall be required for combined side yards between two buildings that are 1.20 m or less. For side yards greater than 1.2 m, clear stone may be required at the discretion of the Director of Engineering
 - Rear yards which drain through abutting lower back-to-front type lots are permitted where:
 - A maximum of four rear yards or 0.1 ha may drain to a single swale
 - Sufficient fall shall be available between the adjacent streets to achieve desired grades for swales and yards
 - Cut-off swales along the rear lot lines shall direct runoff from the upper lots into the lower lot side yard swales
 - Proposed and existing elevations shall be shown at all lot corners as a minimum. Additional grading information shall be provided as per the Engineering Standards

F2.3 Block Grading

The grading design for blocks on the Subdivision Grading Plans shall be as follows:

- Minimum slope = 2%
- Maximum slope = 5%
- Block drainage shall be self-contained, with overland flow directed to adjacent roads or other outlet as accepted by the Director of Engineering

F2.4 Park Grading

The grading design for park blocks on the Subdivision Grading Plans shall be as follows:

- Minimum slope = 2%
- Maximum slope = 5%
- Park drainage shall be self-contained, with overland flow directed to adjacent roads or other outlets as accepted by the Director of Engineering
- Where parks abut residential or commercial lots, cut-off swale shall be constructed on the parklands to intercept any drainage and to drain it to the accepted outlet
- A minimum depth of 300 mm of topsoil shall be provided in a park block
- A minimum depth of 750 mm of topsoil shall be provided in designated tree planting trenches in a park block
- Park grading and grading of lots adjacent to parks shall be reviewed by Urban Design Department

F2.5 Overland Flow Route

- Maximum flow depth on road's ROW shall be 250 mm
- Maximum flow depth on other overland flow routes (eg through an easement) shall be 250 mm with at least 50 mm freeboard

F2.6 Swales

- Minimum Longitudinal slope = 2%
- Maximum Longitudinal slope = 5%
- Side slopes = maximum 3 horizontal to 1 vertical
- Location of swales = as per Engineering Standards
- Rear Yard Swale To Rear Lot Catch Basin:
 - Maximum swale depth = 300 mm
 - Minimum swale depth = 150 mm
 - Maximum length of rear yard swale shall be 4 lots width or 50 m whichever is less
- Minimum Side Yard Swale Depth = 150 mm
- Maximum Side Yard Swale Depth = 250 mm
- Driveways are not permitted as outlets for drainage swales

F2.7 Retaining Walls

The use of retaining walls shall be avoided, wherever possible. Where required, retaining walls shall conform to the following requirements:

- Retaining walls are generally required where 3 : 1 slope cannot be achieved
- Details of retaining walls over 0.90 m shall be submitted with the Grading Plans and stamped by a Professional Structural Engineer
- Retaining walls over 0.9 m are subject to peer review at Owner's expense.
- Letter of Credit is required for retaining walls over 0.9 m
- All retaining walls shall be constructed from dry stone (interlocking, stacking type no tiebacks), when adjacent to public property. Construction materials shall be acceptable to Engineering, Operations and Urban Design departments
- Timber retaining walls are permitted only for internal grading of blocks or lots and between properties and shall be constructed of pressure treated lumber only
- A minimum setback of 1.0 m shall be maintained from the tiebacks to the foundation of any structure and underground services
- Certification by the Consulting Engineer stating that the retaining wall is designed and constructed to meet the most recent design standards as to granular backfill, structural integrity, materials, tie backs, line and grade is required
- All structural drawings shall be signed and stamped by a Professional Structural Engineer (P. Eng.) for the design and structural stability of the retaining walls
- A 1.5 m high fence shall be required where a retaining wall height exceeds 0.9 m. Details of the fence and its installation on or adjacent to the wall shall be provided on the Engineering Drawings

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- Retaining walls, in INFILL areas, shall be constructed completely on the higher property, adjacent to the property line and in such a manner not to block the property line drainage
- Retaining walls, in NEW Subdivision areas, shall be constructed completely on the lower property, adjacent to the property line
- Drainage swale shall be constructed along top and bottom of retaining wall to divert flows to an acceptable outlet
- All retaining walls shall be constructed with a minimum setback of 150 mm from the property line

F3 SITING & GRADING DESIGN, PLANS AND CERTIFICATION**F3.1 Design**

A Siting & Grading Plan shall be prepared for each individual housing unit, or group of units, in order to confirm conformance with the general grading concept as shown on the Subdivision Grading Plan.

Each Siting & Grading Plan shall be certified by the Consulting Engineer for conformance with the Subdivision Grading Plan.

All elevations shall be relative to the benchmarks provided on the Subdivision Grading Plans.

F3.2 Information to be Shown on Siting & Grading Plans

Siting & Grading Plans shall generally be prepared at a scale of 1 : 250 unless clarity of presentation dictates otherwise. The following information shall be shown on each Siting & Grading Plan:

- Road layout including curbs, sidewalks and centre line road elevations
- Above ground services including curbs, sidewalks, catchbasins, valves, hydrants, light poles, transformers, utility pedestals and other street furniture
- House connections (Water, SAN, STM) lateral invert elevations at the street line
- First floor elevations of adjacent units and adjacent land uses/grading
- Existing trees to be preserved
- Proposed elevations for lot corners, swale inverts and intermediate points of grade change at reasonable intervals along the boundaries of the lot to illustrate the drainage of the lot in relation to the surrounding lands and buildings
- Side yard swale inverts opposite each corner of the unit
- For front draining lots, the rear yard swale invert elevation shall also be shown at the high point. This elevation shall be a minimum of 0.15 m below the grade adjacent to the rear entrance
- Direction of surface water runoff shall be shown by an arrow
- Grate and invert elevations of all rear yard catchbasins
- Proposed fencing including acoustical, privacy and flankage fencing
- Proposed building location, including porches and steps/stairs
- House elevations including finished first floor, basement slab and underside of footing

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- Engineered fill and extended footing information, where required
- Sill elevations at side entrances where elevation differs from the finished first floor
- The number of risers at each entrance to the dwelling
- Elevation at the centre of driveway at the street line as well as the garage entrance elevation
- Proposed retaining walls with proposed spot elevations indicated at top and bottom of wall
- Driveway grades

F3.3 Certification

Three (3) copies of the Siting & Grading Plan, certified by the Consulting Engineer, shall be submitted to the Director of Engineering prior to issuance of a building permit.

The lot grading shall be inspected by the Consulting Engineer prior to final grading and for lot certification after the lot is sodded.

Final Siting & Grading Certification shall be completed by the Consulting Engineer, and the certificates shall be provided to the Director of Engineering.

F4 FENCING

Fencing, in general, shall be in accordance with the Fence By-law and the most recent requirements and specifications of the City's Urban Design (Community Design Plan, Architectural Controls etc.). All fencing (acoustic, privacy, etc.) shall be shown in General Plans, Grading Plans and Composite Utility Plans.

The acoustic fence shall be of heavy wood, solid with no gaps along its length and having a minimum face density of 20 kg/m² (4 lb/ft²) or equivalent material accepted by the Director of Engineering. Any access gates shall be of the same material as the acoustic fence and should seal reasonably, when closed.

F5 INFILL RESIDENTIAL CONSTRUCTION**F5.1 Scope**

This section shall apply to the following situations:

- New residential development of lands not governed by a current Subdivision/Construction Agreement
- As requested by the Director of Engineering

F5.2 Objectives

- To ensure that positive storm drainage is achieved on infill sites according to City Standards
- To ensure that proposed grading and drainage scheme will not adversely affect abutting properties or cause water to accumulate around the proposed dwelling unit
- To ensure tree preservation is achieved as may be required

F5.3 Siting & Grading Design

Siting & Grading design for infill residential developments shall conform F2.2, F2.6, and F2.7 and to the following:

- The existing and proposed elevations shall relate to a geodetic benchmark
- Grading shall be performed so as to preserve existing trees, where possible
- A 0.6 m minimum undisturbed strip shall be maintained along all sides and rear property boundaries
- During infill construction, siltation control methods shall be undertaken around the lot perimeter to prevent erosion and sedimentation on adjacent properties
- Grades shall be compatible with adjacent road grades, abutting properties and any proposed local improvements
- The capacity and alignment of boundary swales shall not adversely affect adjacent properties
- The builder must perform all necessary works to ensure that no surface drainage problems are created on or adjacent to private or public lands because of their development

F5.4 Information to be Shown on Infill Siting & Grading Plans

Siting and Grading Plans for infill residential developments shall comply with Section F3.2. Additional information to be shown on the drawing shall include the following:

- Proposed culverts and curb cuts
- Existing and proposed elevations shall be indicated min. 5.0 m beyond property boundaries to illustrate the drainage of the lot in relation to the surrounding lands and buildings
- First floor elevations of adjacent units and adjacent land uses/grading

F5.5 Certification of Grading

- The Owner shall be required to submit an "As-Constructed" survey indicating both proposed and as-constructed elevations prior to the release of the Lot Grading Deposit
- The Owner shall provide grading certification from the Consulting Engineer/Landscape Architect/Ontario Land Surveyor (OLS), certifying that grading is in accordance with the accepted grading plans and function as designed, prior to release of the Lot Grading Deposit
- The Owner shall be responsible for notifying the Engineering Department upon completion of the lot grading and all other construction to arrange for inspection and the release of the Lot Grading Deposit pertaining to lot grading