

CITY OF CHARLOTTETOWN LOT GRADING GUIDELINES

Urban Growth

Stormwater management is one of the key issues in maintaining and enhancing the City of Charlottetown's livability. As the City of Charlottetown grows, urban development changes the quality, runoff rate, and the volume of stormwater entering the natural drainage system. The runoff is no longer delayed by minor topographic depressions, vegetative cover, or the indirect routes natural surface runoff typically follows. Instead, runoff rates are increased due to the large area of impervious surfaces directing runoff into sewer pipe systems and more efficient drainage channels. These pipes and channels are capable of conveying the runoff to the receiving streams more quickly than under pre-development conditions. If channel erosion occurs, it causes cloudy (turbid) water that negatively affects the organisms in the stream and the downstream users of the water by destroying habitat and reducing aesthetic quality.

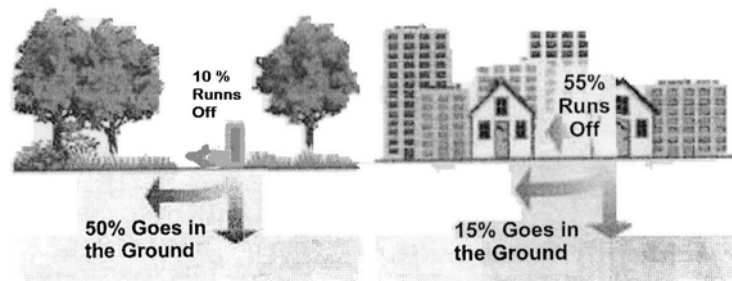


Figure 1: roofs, parking lots, and roads prohibit natural absorption

Conversely, if the present stormwater system is not adequate to convey the greater amount of water created by the impervious surfaces, flooding will occur.

In addition to the effects of increased runoff to receiving waters, the natural nutrient rich topsoil can be eroded away, making re-establishment of vegetation difficult. In such cases, additional soil and the application of fertilizers are required. Impervious surfaces also reduce the area available for rainwater infiltration, which may result in a lowering of the water table and a potential reduction in the amount of groundwater that typically recharges streams during seasonal dry periods.

Runoff from urban areas contains pollution such as: nutrients, bacteria, sediment, heavy metals, oil, grease, and road salt. These pollutants can seriously impair the environmental quality of receiving waters. Another possible effect of Urban Growth is that runoff tends to be warmer due to the fact that it is exposed on

impervious surfaces or in treatment and detention ponds. This, in combination with the fact that there is a reduction in cooler groundwater recharge to the receiving water bodies, can have lethal effects on habitat. The rise in temperature reduces the maximum available dissolved oxygen and may cause algae blooms that further reduce the dissolved oxygen in the water.

Stormwater runoff reduces surface water quality in a number of ways, the most obvious being that contaminants are washed off the landscape and into the streams and ponds. In a more natural state where much of the land area is covered with vegetation, stormwater is allowed to penetrate into the ground where sediments are filtered out, pathogens are diluted, and nutrients are used by nearby vegetation. In developed areas, the natural treatment capabilities of the soil and vegetation are bypassed.

Introduction

As part of the Zoning and Development Bylaw amendments completed in October 2006, Section 4.63A of the Bylaw requires that all development on a lot be graded in accordance with an approved Surface Drainage Plan. For most developments this is a three-step process:

Step 1: A Surface Drainage Plan is submitted with a Building Permit Application.

Step 2: A Rough Grading Certificate is submitted after foundation backfill and rough lot shaping is complete (Schedule "A").

Step 3: A Final Grading Certificate is submitted when final shaping is complete and all stormwater management features are installed (Schedule "B").

Purpose

The purpose of the guidelines is to provide some Stormwater management principles to help preserve the natural environment, minimize sewer system problems, and reduce the impacts of any increased Stormwater runoff, flow quantity, erosion and pollutions resulting from new development. The purpose of lot grading is to provide drainage away from buildings for the benefit of property owners. The purpose of the Surface Drainage Bylaw is to regulate lot grading and surface drainage requirements within private properties and to City right-of-ways.

Surface Drainage Plans

Surface Drainage Plans have been part of the approval process for residential properties since 1995. The plans are required for all new developments and are approved by the City of Charlottetown Planning or Public Works Departments on behalf of City Council. Surface Drainage Plans specify design elevations, surface gradients, lot types, swale locations, and other drainage information required for lot grading. The new regulations along with these guidelines and a proper Surface Drainage Plan will establish the drainage relationship between adjacent properties and its approval is an effective basis for the control of lot

grading. As part of these plans the Consultant must provide information on the plan as stipulated under Lot Grading Certificates (P. 7 & 8).

Lot Grading Approval Procedure

Lot Grading Approval Procedure is usually done in two stages. The Rough Grade Stage is generally the responsibility of the homebuilder and the Final Grade Stage is generally the responsibility of the owner. It is the builder's responsibility to ensure that the downspouts (roof leaders) and sump pump discharge are draining correctly.

Rough Grade Stage

This stage includes backfilling the foundation and shaping of the lot to conform to the approved Surface Drainage Plan within acceptable tolerances. The Rough Grade Approval Procedure should occur within **60 days** of the start of Development. From November to April the Owner must ensure appropriate siltation / mulching measures are in place to avoid / mitigate excess surface water run off or erosion during this time period (see section on Erosion under subdivisions p.15 & 16).

Rough Grade Approval Process

1. The builder has the lot surveyed by a PEI Land Surveyor, Professional Engineer or Landscape Architect who prepares a Lot Grading Certificate based on the already prepared Surface Drainage Plan.
2. The Lot Grading Certificate is submitted to the City of Charlottetown. Digital submissions are required and the reference data must be shown on the plan and include the following; Geodetic monument used, published elevation and observed elevation if different. The method used in obtaining the elevations must also be documented – total station, level, GPS observations. If GPS is used the Geoid model must be specified. If a total station or level is used, the allowable misclosures of level loop should be second order class II. The digital copy must be ready for addition to the City of Charlottetown (ArcMap v8.3 or later) GIS system, an ACAD drawing or DXF format.
3. The owner and/or the builder must provide information on their preferred method of contact to receive a Lot Grading Inspection Report. The methods of contact are: fax, e-mail or mail.
4. The Consultant conducts a site inspection and an inspection report is sent to the builder and the City indicating that the Rough Grade is in substantial compliance with the Surface Drainage Plan or that deficiencies exist.
5. If deficiencies exist, the builder must correct the deficiencies within 15 days and notify the City for inspection. If the City has requested a re-submission of a Lot Grading Certificate to verify corrections or to provide additional

information, an inspection can not occur until receipt of the new Lot Grading Certificate.

6. When Rough Grade is approved, the builder and/or the property owner are both notified. Additional information, regarding final grading and the approval process, is also sent to the builder and/or the property owner.

NOTE: If a builder or a property owner chooses to proceed directly to final grading, they have the option to bypass the Rough Grade Approval Process and proceed directly to the Final Grade Approval Process provided that during the planning of a new subdivision, a qualified Consultant has provided a Storm Water Management Plan which must take into account not only the specific conditions of the subject property, but also the storm water flow conditions of the surrounding area. A storm water management plan which, along with establishing the grade and storm water system for the street, has established the grade for the lots, top of foundation height, and designed swales where required, then they may proceed directly to the Final Grade Approval Process.

Final Grade Stage

This stage must be initiated by the owner within three (3) months of the Rough Grade Approval. The rough grade has been left approximately 7 to 20 cm below final grade for topsoil placement. The topsoil should be smoothly spread out, compacted and ready for sod, rocks, etc. Please be advised that if rocks, wood chips or other decorative material is planned, the clay base (rough grade) must be raised to final grade before placing the decorative material. Rock or wood chips do not make up for the 7 to 20 cm of final grade since surface water can flow through these materials. The Development Officer may suspend the three (3) month requirement for the Final Grading of a Lot from November to April provided the Owner has rough graded the Lot and provided appropriate siltation / mulching measures are in place to avoid / mitigate excess surface water run off or erosion during this time period (see section on Erosion under subdivisions).

The owner of a lot located adjacent to a storm water management pond or storage area, ravine, or natural watercourse must comply with the terms and conditions of any registered easement, right-of-way, caveat or restrictive covenant.

Final Grade Approval Process

1. The Final Lot Grading Certificate is submitted to the City of Charlottetown by the Consultant. The homeowner and/or contractor must provide information on their preferred method of contact to receive approval from the City. The methods of contact are: fax, e-mail or mail.
2. The Consultant conducts a site inspection and an inspection report is sent to the builder and the City indicating that the Final Grade is in substantial

compliance with the Rough Surface Drainage Plan or that deficiencies exist. If deficiencies exist a certificate can not be issued at this time.

3. If deficiencies exist, the homeowner must correct the deficiencies within 15 days and notify the City of Charlottetown and the consultant when completed. The consultant must then submit to the City of Charlottetown the Final Lot Grading Certificate to verify corrections or to provide additional information.
4. A City of Charlottetown may conduct a visual inspection but not until the Final Lot Grading Certificate is received from the consultant. The owner will be sent a copy of the Final Lot Grading Certificate from the consultant.

Lot Grading Requirements

The following requirements must be met prior to the issuance of Rough or Final Grade Approval. Any requirements that are not met will be marked as deficiencies on the Lot Grading Inspection Report.

Site Servicing

Each property must dispose of water from parking lots, downspouts and sump discharges in the manner specified by the site servicing requirements.

1. Downspout extensions or splash pads must be placed under discharge points.
2. In all R-1S, R-1L, R-1N, R2, R-2S zones, all downspouts and sump discharge pipes should be surface discharged to a drainage easement or public right-of way, or directed to a storm sewer system. Permission must be received from the City to connect to a piped storm sewer system in all zones.
3. Parking lots and other hard or semi-permeable surfaces must be connected to a storm sewer system. Permission must be received from the City to connect to a piped storm sewer system in all zones.

Surface Elevations (Design Grades)

Approved Surface Drainage Plans have proposed design grades at specific locations for each lot. The Lot Grading Certificate has as-built elevations taken at the same locations.

1. Acceptable as-built tolerances from the approved grades:
 - a) **Between -7 cm to – 20 cm below design grade for clay**
Example: Design Grade 82.25 m, Existing Grade 82.10 m = 15 cm below design grade.
 - b) **Between 0 cm to – 10 cm below design grade for topsoil**
Note: "0" is at approved design grade.

- Example: Design Grade 82.25 m, Existing Grade 82.20 m = 5 cm below design grade.
- c) **Between – 10 cm to + 10 cm above or below design grade for finish landscaping (sod, concrete)**
Example: Design Grade 82.25 m, Existing Grade 82.30 m = 5 cm above design grade.
- d) The surface elevation below decorative rock, washed rock or wood chips, must be within the tolerance of design grade.
2. The City has the discretion to accept elevations that are not within tolerance when the following conditions occur:
- a) The landscaping is graded to match an existing fence, walkway, wetland or watercourse, park, curb, sidewalk, road or lane and there is no impact on the surface drainage.
- b) A proposal is submitted to revise the design elevations on the approved Surface Drainage Plan to existing elevations, providing that there is no negative impact on surface drainage and any affected property owners agree to the revision and the grading makes allowances for community water control and mitigation to other properties.

Drainage Swales

Drainage swales are shallow, sloped ditches intended for the conveyance of surface runoff. Grading of swales should be in accordance with the approved Surface Drainage Plan. Drainage swales are usually located on the common property lines and on lots that drain from rear to front, a swale is located in the back yard. Swales on a common property line must provide a minimum of 15 cm of unobstructed width within each property (total 30 cm). Swales convey surface runoff to the nearest street, lane, dry pond or stormwater management lake, thus preventing lot-to-lot drainage. However, due to the topography of some neighbourhoods, approved lot-to-lot drainage may occur. On some lots, an easement or right-of-way is registered to allow for the construction of a concrete or a grass drainage swale. Easements are shown on an approved Surface Drainage Plan and must be displayed on a Lot Grading Certificate. All new subdivisions require easements for drainage swales. Fences should not impede drainage swales and should be set back an appropriate distance. Minimum swale slope requirements are 2 % for a grass drainage swale and 1% for a concrete drainage swale.

Downspouts

Downspouts must have an elbow and splash pad. A downspout elbow should be directed away from the foundation walls towards a drainage easement or to a public right-of-way. Downspout extensions or splash pads must not project past the property line and must maintain a minimum distance of 15 cm from an adjacent private property and 30 cm from an adjacent City property. Hinged downspout extensions are not recommended as they are easily damaged or left in the up-position however; hinged extensions are acceptable in some cases

provided they do not extend on to adjacent property (see diagram under the section on - How Do I Improve My Lot Drainage?)

Sump Pump Discharge

A sump pump is part of a building's foundation drainage system. A sump pump discharges groundwater from weeping tile to the ground surface or directly to a storm sewer system. If a sump pump discharges to the ground surface, then it is important to provide a splash pad or a flexible hose at the discharge point. This minimizes soil erosion at the foundation wall and the re-circulation of the groundwater back to the weeping tile. The flexible hose or splash pad should be directed to drainage swales and not onto an adjacent property. A sump pump discharge hose should be disconnected during the winter months to prevent freezing in the hose.

Splash Pads

The accumulation of rainwater from a major storm can back up drainage systems and flood basements anywhere in the City. Just 10 mm of rain on the roof of an average sized bungalow equals 1,200 liters of runoff.

1. Splash pads convey roof water and groundwater past the foundation excavation zone and away from the foundation walls. They minimize soil erosion and recycling of water through the foundation drainage system. The recommended standard concrete splash pad is 30 cm x 107 cm.
2. Where a direct connection to a storm sewer system is not available, splash pads are to be placed:
 - a. Underneath all downspouts draining onto soft landscaping (sod, topsoil and/or gravel).
 - b. Underneath a sump pump discharge outlet where it is draining onto soft landscaping (sod, topsoil and/or gravel).

(see diagram under the section on - How Do I Improve My Lot Drainage?)

Lot Grading Certificates

An approved Surface Drainage Plan and a Lot Grading Certificate is required for approval of Rough and Final Grade. Digital submissions are required and the reference data must be shown on the plan and include the following; Geodetic monument used, published elevation and observed elevation if different. The method used in obtaining the elevations must also be documented – total station, level, GPS observations. If GPS is used the Geoid model must be specified. If a total station or level is used, the allowable misclosures of level loop should be second order class II. The digital copy must be ready for addition to the City of Charlottetown (ArcMap v8.3 or later) GIS system, an ACAD drawing or DXF format.

Lot Grading Certificates for Rough and Final Grade are to display the following information:

- Certification by a PEI Land Surveyor, Professional Engineer or a Landscape Architect
- Name of the Company that produced the Certificate
- Property Information: Legal Description and/or PID#
- Surface condition of the Lot: i.e. Clay, Topsoil, Sod or Landscaped
- Design and existing elevations referenced to metric geodetic datum, with an asterisk designating existing elevations that exceed the grade tolerance
- As-built elevations of structures such as: retaining walls, sidewalks, driveways, fences
- As-built elevations of the adjacent property at the design elevation locations
- Building ties to boundaries from foundation walls
- Foundation elevation
- Elevations adjacent to and 2-3 metres away from foundation
- Location of buildings on adjacent lots and elevations of the land and foundation at least adjoining this lot (three points - front of lot middle and back) and in some cases the plan may have to show more elevations on other lots to confirm drainage for the area.
- As-built swale invert elevations at 6 metre intervals
- Elevation of as-built high point on split grade lots if location is different from the design
- Date of Survey
- Scale of drawing
- House layout and finished floor elevation
- North Arrow
- Drainage Easements and Right-of-Ways
- Location of discharge into storm sewer system, ditch or natural wetlands or watercourse
- Projected storm flow rates for new subdivisions
- Detailed surveys for lots adjacent to storm water management ponds or storage areas including the location and elevations of structures or features within maintenance and overflow areas
- Lot Orientation is Portrait, with the rear of the lot at the top of the page and the "FRONT" of the lot or Street Name labeled
- Name of the applicant and the information required to send inspection reports or grading approval i.e. Mail, fax number or e-mail address

Storm Pond, Natural Wetlands, Watercourses or Top of Bank Lots

Development along shorelines, watercourses or wetlands is also covered under Section 4.73 of the Zoning and Development Bylaw for setbacks of buildings to these areas. Properties located adjacent to storm water management ponds or storage areas, ravines, natural wetlands, watercourses or tops of banks must have a right-of-way, easement or restrictive covenant registered in favor of the City of Charlottetown and require a Lot Grading Certificate to display the location and elevation of any and all features constructed within the affected area.

Features to note include, but are not limited to: decks, fire-pits, ponds, paths,

bridges, retaining walls, buildings, raised gardens or unusual grade alterations. Inclusion of these details will enable Drainage Services to evaluate the impact these features have on drainage requirements. This information must be included on the Lot Grading Certificate prior to the request for an inspection or re-inspection.

Irrigation Systems

Irrigation systems, consisting of a permanent system of pipes and sprinklers or drip hoses, are prohibited on any slope over 10%.

Extreme Grade Differential

Lot Grading with substantial grade differences from the front of the house to the rear of the house can accommodate Walk-Out basements. Grading for these homes may require a retaining wall or some form of grade stabilization at the transition point at the rear corner(s) of the house. Swales along the rear and side property lines should correspond to the approved lot grading plan for the area. The first property that is graded within tolerance sets the precedence for the adjacent developments to match (with or without grade separation). This situation may occasionally occur on non walk-out basements as well.

Any retaining wall that exceeds 0.60 m in height should be of an engineered design and construction. For permits, please contact the City of Charlottetown Planning and Development Department.

Lot Grading Maintenance

Once Final Grade Approval has been issued is it the property owner's responsibility to maintain the surface grading in perpetuity. The City of Charlottetown may, at any time, require maintenance on the surface grading if alterations or settlements result in surface drainage problems. This requirement is enforceable under the Zoning and Development Bylaw.

Enforcement

Reports, Letters, or Notices will be utilized to convey notification of impending enforcement to an owner, builder, or developer. Subsequent fines may then be imposed for those properties that do not comply with the Lot Grading Guidelines or the provisions of the Zoning and Development Bylaw. In most cases, notification will be sent to the current assessed property owner. This Bylaw is enforceable for all properties. In deciding whether to enforce the Zoning and Development Bylaw, the City may take into account practical concerns, existing conditions, and complaints or inquiries. Each property owner in the City is ultimately responsible for their own lot grading and due diligence to their neighbour for surface grading and water runoff. The City of Charlottetown does not provide any funding for repairs to surface grading.

In-fill Housing Development

In-fill Housing is the term used when an older existing property is re-developed. This usually occurs on vacant lots or where houses have been demolished within the City. In older areas, surface drainage plans (lot grading plans) often do not exist. The City of Charlottetown has bylaws and guidelines in place to regulate lot grading and surface drainage requirements in all developed neighbourhoods.

Lot Grading for In-fill Housing Development

Since in-fill housing development usually occurs in the areas of the City that do not have approved surface drainage plans, common sense and practical considerations must be used to determine the best drainage system. Evaluating the existing drainage pattern is an important element in the planning of additions, garages and new in-fill homes. In areas of the City that are served by a combined sanitary and storm sewer system, new development must be even more particular about surface discharge of roof and foundation water. Consideration of the grading of adjacent properties is essential in planning the location of the downspouts and sump discharge.

Increased drainage onto adjacent property is not recommended unless there is an established common drainage area that crosses a number of properties. Although a common lot line is the preferred location to convey surface drainage off the lot, the location and elevation of pre-existing landscape features is an important factor in planning a surface drainage system. Existing trees, shrubs, flowerbeds, fences, footpaths, patios, decks, retaining walls and raised gardens are valuable assets and need not be an impediment to a surface drainage scheme. In situations where existing grading of the common lot line will not accommodate the flow of surface run-off, a retaining wall may be the solution. The retaining wall should allow for an internal swale and eliminate drainage onto adjacent properties. Consultation with adjacent property owners is an important factor in evaluating a proposed drainage pattern. Site inspections and grading approvals can be arranged by submitting a Lot Grading Certificate to the Planning Department.

The following items summarize what must be considered when an In-fill Housing Development is to be undertaken:

1. Plan how your lot will carry surface drainage to the right of way or storm system. Roof drainage downspouts should be an important part of this plan.
2. Take into consideration the potential impact to your neighbour's lot. Consultation with the neighbour is recommended.
3. Ensure that drainage features, such as downspouts and sump pump discharges are properly located. Downspouts should not be directed onto adjacent

properties. In some areas, underground storm servicing is provided for these features. Please contact Public Works at 894-5208 for more information.

4. Slope away from the foundation walls.
5. Grade any drainage swales within side yards to carry surface drainage off the lot without impacting adjacent properties.
6. Ensure that any steps or decks are properly backfilled.
7. Utilize window wells to ensure slope away from foundation walls. Window wells must be set to accommodate finished grade and have an appropriate cover.

The responsibility for establishing and maintaining lot grading rests with the owner for as long as they own the property. The City may revisit the property when a complaint, inquiry or sale of the home takes place.

Roof and Lot Drainage Guide

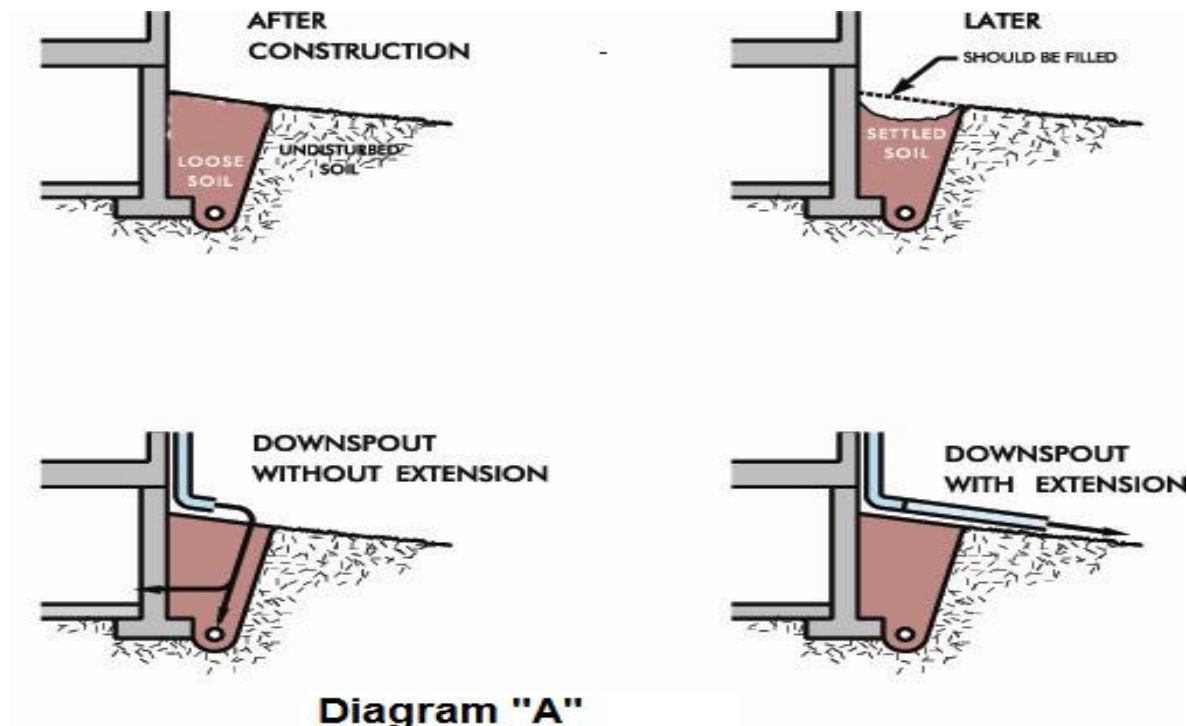
The accumulation of rainwater from a major storm can back up drainage systems and flood basements anywhere in the City. Just 10 mm of rain on the roof of an average sized bungalow equals 1,200 liters of runoff. Ensuring that stormwater drains away from your home properly is an important maintenance issue that requires periodic inspection.

Rain and melted snow on the roof are collected by the eaves troughs and channeled to the ground by downspouts. These downspouts are then connected to an extension pipe or splash pad which carries the rainwater away from the house, ensuring that it does not soak into the ground near the foundation. If water discharges too close to your basement wall without the downspout extensions, it can seep through tiny cracks and create a damp, clammy basement. If left unchecked, this condition could even damage the foundation of your house.

Water drained too close to your house can also overload the sanitary sewer by draining through your weeping tile. Poor drainage can also result in or lead to excessive sump pump discharge and even pump failure.

How Do I Improve My Lot Drainage?

First, inspect the immediate area around your foundation. To allow for workspace during construction, the excavation hole was dug large enough to leave a few feet around the foundation walls. Upon completion of the foundation, the extra space is backfilled with soil but is often not compacted as much as the original ground. Consequently, this soil is more likely to allow water to pass through it and is also likely to settle and subside. In areas where foundation



settlement has occurred, add appropriate fill materials and regrade the land to create a slope away from your home (see Diagram A).

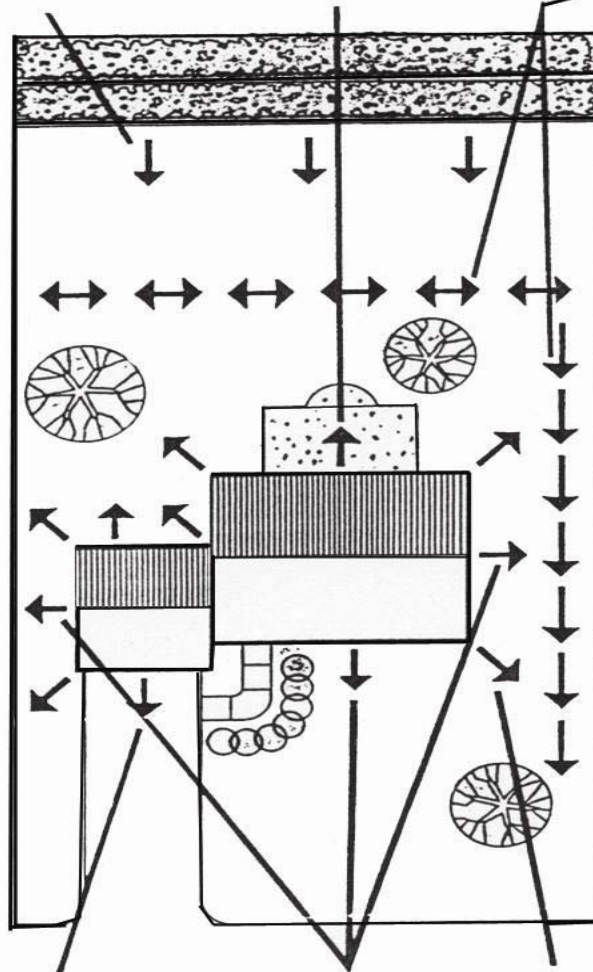
Second, make sure you have a permanent extension attached to your downspouts, or a concrete splash pad to direct water away from the foundation wall (See Diagram A).

Third, it is also important that you create drainage swales between your property and that of your neighbours so that stormwater is directed off the lot to prevent drainage into your basements (See Diagram B).

Retaining walls require weep holes or other drainage systems so groundwater doesn't backup behind them.

Patios and other paved surfaces should slope away from the house a minimum of 1" to 4'.

Swales across a site - or from front to back - serve as channels that intercept runoff and direct it to storm sewers or natural drainage areas.



A driveway should slope away from garage doors at least 1" in 4'.

Water that collects around a foundation can seep into your basement.

Water from downspouts can threaten basements and foundations. Downspout extenders and splash pads can help prevent problems.

Diagram "B"

Drainage and Sediment Control during Construction

- Prevent runoff from entering the construction site and divert runoff away from cleared areas using berms or swales
- Use approved silt fences around soil stockpiles and sloped areas
- Collect runoff into site sediment traps prior to discharge off site. A sediment trap should be at least 1% of the drainage area.

Temporary and permanent erosion and sediment control practices must be maintained and repaired as needed to assure continued performance of their intended function.

Erosion and Sediment Control

In urban environments, construction sites are the primary cause of exposed soils. Sediments are washed off areas of exposed soil during rainy periods and enter the storm drain system. Even surface runoff from relatively small construction sites can cause large amounts of sediments to be washed off.

This is an important issue as the storm drains (i.e. the roadside and parking lot drains) are separate from the sanitary sewer and may discharge untreated water into watercourses. Creeks and streams form an important drainage network that provides natural habitat for trout and other sensitive aquatic organisms.

Sediments from construction sites can also plug catch basins and restrict flows in sewers creating local flooding conditions and can increase the costs of maintaining the drainage system.

Other construction site pollutants that may enter the storm drain system include cements, paints, adhesives, solvents, cleaners, sealing compounds, and gyproc fillers.

Soil Erosion Control During Construction

- The preferred method is to revegetate or landscape stockpiles of soil as a result of grading activity if it is to be left for more than a few weeks; but if left for less than two months the piles may be covered temporarily with plastic or tarps held down with stakes and /or weights, when bad weather is expected. Plastic covers will also protect against windblown dust during dry periods. At no time shall these stockpiles be left on site after completing the final grading phase of a home or no longer than two (3) months.
- Backfill the basement walls as soon as possible and rough grade the lot
- Remove excess soil from the site immediately after backfilling to eliminate sediment loss from surplus fill
- Revegetate or landscape the site as soon as practically possible, and if this can not be carried out due to the season, from November to April the Owner must ensure appropriate siltation / mulching measures are in place to avoid / mitigate excess surface water run off or erosion during this time period
- Limit machine access and operations to prepared access areas only
- Erect sediment and silt fences for the construction site or for any stock piling of fill to prevent runoff onto adjoining lots or to a ditch or stream or water.

Note: See also erosion control under the Subdivision Section

Spills

Any soil that has been spilled onto the streets, sidewalks, or outside of the perimeter ditches must be cleaned up with shovels and brooms. **Do not wash soils and sediments onto streets or into the storm drain system.** Spills onto City property will be reported to the City Public Works department at 894-5208. If City crews are required to clean up soil spills, the responsible party will be billed for the clean up.

SUBDIVISIONS

The City requires a Storm Water Management Plan to be conducted by a qualified engineer for the proposed subdivision. As a subdivision may be located in a watershed area that has or will have additional surface water runoff to the proposed location of the new subdivision, the management plan must take this into consideration in its recommendations to the City.

Best Management Practices

The Stormwater Management Plan must be designed to minimize the impacts of development on the surface and ground water systems. They should contain schedules of activities, prohibitions of practices, maintenance procedures and managerial practices, that when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to the waters. To reduce the amount of contaminants entering the storm drain system from construction activities the following policies should be considered in the plan:

- Mark clearing limits
- Establish construction assess
- Control flow rates
- Install sediment controls
- Stabilize soils
- Protect slopes
- Protect drain inlets
- Stabilize channels and outlets
- Control pollutants
- Control dewatering
- Maintain Best Management Practices and
- Manage and monitor project
- Create swales between properties or at the back of properties to allow surface water runoff.
- Have easements shown on a plan of subdivision for required swales

Site Layout and Clearing

Phase the clearing and excavation activities so that they occur no sooner than is necessary for subsequent construction activities.

- Remove as little of the existing vegetation cover as possible. Vegetation holds the soil in place and reduces the velocity of runoff on the site. Apply

temporary cover – seeding or erosion control blankets – to bare areas that will remain dormant for extended periods.

- Store excavated soils away from surface waters and storm drains so that runoff will be filtered by existing vegetation or collected in perimeter ditches.
- Prevent vehicles and equipment from tracking mud offsite by installing a stabilized construction entrance (crushed gravel on the driveway area), and restrict traffic to this area where practical.

Drainage and Sediment Control

- Prevent runoff from entering the construction site and divert runoff away from cleared areas using berms or swales
- Use approved silt fences around soil stockpiles and sloped areas
- Collect runoff into site sediment traps prior to discharge off site. A sediment trap should be at least 1% of the drainage area.

Temporary and permanent erosion and sediment control practices must be maintained and repaired as needed to assure continued performance of their intended function.

Soil Erosion Control

- The preferred method is to revegetate or landscape stockpiles of soil as a result of subdivision activity if it is to be left for more than two months; but if left for less than a two months the piles may be covered temporarily with plastic or tarps held down with stakes and /or weights, when bad weather is expected. Plastic covers will also protect against windblown dust during dry periods. At no time shall these stockpiles be left on site after completing the grading phase of a home or no longer than Final Acceptance of the Subdivision. Stock Piles related to the construction of a subdivision must be less than 3 meters (10 ft.) high and must be removed or spread on the land no later than the Final Acceptance of the subdivision by the City of Charlottetown.
- Any excavation on lots in a subdivision require approval of the City of Charlottetown, and at all times exposed land in the subdivision shall be revegetate or landscape immediately to prevent dust and surface water runoff and erosion effects in the area.
- Backfill the basement walls as soon as possible and rough grade the lot
- Remove excess soil from the site immediately after backfilling to eliminate sediment loss from surplus fill
- Revegetate or landscape the site as soon as practically possible
- Limit machine access and operations to prepared access areas only
- Erect sediment and silt fences for the construction site or for any stock piling of fill to prevent runoff onto adjoining lots or to a ditch or stream or water.

Please consult the Provincial Web page of Transportation and Public Works for details on Sediment and erosion control methods;

<http://www.gov.pe.ca/photos/original/spec2006.pdf>

Storm Pond, Natural Watercourses or Top of Bank Lots

Subdivisions located adjacent to storm water management ponds or storage areas, ravines, natural watercourses or tops of banks must have a right-of-way, easement registered in favor of the City of Charlottetown to protect this area and gain access for maintenance.

Establishing Grades and Elevations for Homes

Given the detail required for a Stormwater Management Plan the developer and his engineer should set the desired elevations for all buildings (top of foundation) and grading of the lots in a subdivision and these must then be given to all builders. A hold back by the Developer or the City of Charlottetown may be required to insure the plan is followed and conformation of the elevations.

It is important that all drainage easements along property boundaries be part of the survey plan for the subdivision at the early planning stages to avoid costly corrections later.

Spills

Any soil that has been spilled onto the streets, sidewalks, or outside of the perimeter ditches must be cleaned up with shovels and brooms. **Do not wash soils and sediments onto streets or into the storm drain system.** Spills onto City property will be reported to the City Public Works department at 894-5208. If City crews are required to clean up soil spills, the responsible party will be billed for the clean up.

Problem Lands and Flood Risk Areas

There is a significant amount of developed and undeveloped land throughout the City that is at risk of flooding. Areas near watercourses or wetlands are particularly vulnerable to heavy rain events, storm surges, and sea level rise. To develop such areas a Storm Water Management Plan must take into account not only the specific conditions of the subject property, but also the storm water flow conditions of the surrounding area.

Development in flood risk areas must meet applicable Federal, Provincial and Municipal regulations and guidelines. The City will require documentation that all such applicable approvals have been obtained. It is advisable to contact the City Planning Department and obtain a Consultant early on so that development limitations may be identified. It is not advisable to assume that a parcel of land may be developed as desired without first investigating the specific conditions of the site in detail. This is especially the case with undeveloped land in existing urban areas.

A 2002 study entitled, *The Coastal Impacts of Climate Change and Sea-level Rise on PEI* found Charlottetown to be increasingly vulnerable to flooding from sea-level rise and storm surge over the next 100 years. Low, medium, and high

projections are identified in the study based on the combined effect of sea-level rise and storm surge. In the short time since the release of this study, the evidence that climate change is affecting the globe is growing evermore convincing. As such, precautions must be taken when building in potentially high risk areas of the City.

Based on the findings of the study, the City requires that habitable space in new buildings be located above 4.93 m above sea level Chart Datum (3.25 m Geodetic or contour level). The building design must consider access to the building and parking in the event of flooding or natural sea level rise over the life expectancy of the building. Basements below the projected sea level rise must not be used for habitable space or for the storage of immovable objects, flammable, explosive, toxic, or otherwise hazardous material. Electrical and mechanical rooms must also be located above the 4.93 m (3.25 m Geodetic) elevation or protected or movable as normal water levels rise over the years.

The City has chosen to ask for rock and earth fill to be used to raise the land elevation of a building above possible projected flood levels. The type of soils in the area may also require pilings to support the building and berms or flood walls may be requested for the site. Depending on the area, the Federal and Provincial Departments of Environment may be involved in the development proposal and the City will require evidence that these bodies have been consulted for infill along high risk areas.

Grading up to the foundation should not exceed a slope of 1 in 30 for a distance of 4.5 metres after which it can be increased to 1 in 4 slope down to the original grade, if it is planned to allow the basement or parking area in the building to flood. Proper anchorage for all buildings to the foundation walls or piers should be designed as per good engineering practice. Footings, foundation walls or floor slabs must be designed to resist all effects of lands and other influences (ice) that might be expected during a flood, including hydrostatic pressure.

Over the life of the building erected in a flood risk area the surface parking or parking within the building may be at risk or access to the building may become at risk even though the building was built high enough to not flood. In this case the owner is responsible for ongoing maintenance and infill or berms and other measure to prevent flooding of the site and to maintain access to the building. In so doing permits are required and a professional engineer must take into consideration adjoining properties and perhaps coordinate efforts with these property owners.

Definitions

- (a) *“Consultant” means a qualified Engineer, Landscape Architect or Surveyor.*
- (b) *“Development” means any change in use or elevation of land, any new Building or Structure, any addition to an existing Building or Structure, any replacement Building or Structure, and any Parking Lot, Outdoor Display Court or Outdoor Storage Area(s). Any building less than 20 sq metres is exempt from this definition;*
- (c) *“Final Grading” means surface elevations and surface grades of a Lot, as established preparatory to or including the finished landscaping or surfacing;*
- (d) *“Lot grading” means the reshaping or sloping of the land in such a way that surface drainage from rainstorms, snowmelt or groundwater is directed away from the buildings and is controlled in a manner that eliminates or minimizes the impact on adjacent properties and employs good Stormwater management principles.*
- (e) *“Lot Grading Certificate” means the Rough Grading and the Final Lot Grading Certificates;*
- (f) *“Rough Grading” means surface elevations and surface Grades of a Lot established in accordance with the Lot Grading Guidelines preceding the establishment of final grading;*
- (g) *“Surface Drainage Plan” means a surface drainage plan that complies with the minimum requirements set out in these Lot Grading Guidelines and is duly sealed and signed by a qualified landscape architect, surveyor or a qualified engineer on the prescribed Lot Grading Certificate.*