

**TOWN OF BERWICK**

**MUNICIPAL SERVICES SPECIFICATION**  
**MANUAL**

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## 1.0 DEFINITIONS

Whenever, in any part of these Specifications, the following terms are used, the intent and meaning shall be interpreted as follows:

**Approval** - The approval of the Engineer. The Engineer's decision will be final and binding in matters of design and construction.

**Arterial Road** - A road intended to move a relatively large volume of traffic at medium to high speed used where traffic movement is the primary consideration and land access secondary.

**Collector Road** - A road intended to collect traffic from local streets and move it to the arterials, used where traffic movement and land access are of equal importance.

**Cul-de-Sac** - A street having only one entrance / exit.

**Department of Transportation and Public Works** - The Nova Scotia Department of Transportation and Public Works.

**Development Officer** - The Development Officer for the Town of Berwick acting directly, or through an assistant or representatives duly authorized by the Development Officer, and acting only within the scope of the particular duties assigned or within the tested scope of the authority.

**Engineer** - The Municipal Engineer for the Town of Berwick acting directly, or through an assistant or representatives duly authorized by the Municipal Engineer, and acting only within the scope of the particular duties assigned or within the tested scope of the authority.

**Forcemain** - A section of sanitary sewer or watermain through which sewage or water respectively is either pumped or flows by gravity under a low pressure head.

**Fully Serviced Public Streets** - A public street that has concrete curb and gutter, storm sewer, catch basins, concrete sidewalks, asphalt concrete wearing surface in addition to the road bed, and appertaining structures necessary for proper drainage and protection. (Refer to Drawing No. 2)

**Inspection** - Field inspection by the Engineer at various stages of construction.

**Lateral** - A service pipe for either sanitary sewage, storm water or potable water that extends from the main to the property line.

**Local Road** - A road which has the main function of providing land access.

**Main Line** - A main line refers to the primary pipeline in a water or sewer system. In the case of a sewer line a main line includes both collection and trunk lines, and in the case of a water main includes both distribution and transmission lines.

**Maintenance Period** - One year from the date of final approval of a subdivision as issued by the Development Officer. For final asphaltic paving, the maintenance period shall extend one year from the date of approval by the Engineer.

**Municipality** - The Town of Berwick

**Natural Watercourse** - The bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, whether it contains water or not.

**Public Street or Highway** means any:

- (i) **municipal public street** means any street or highway owned and maintained by a Regional Municipality;
- (ii) **provincial public street** means any street or highway owned and maintained by the Department of Transportation and Public Works of the Province, excluding designated controlled highways pursuant to Section 20 of the Public Highways Act.

**Professional Engineer** - A Professional Engineer who is a member of the Association of Professional Engineers of Nova Scotia.

**Roadbed** - That portion of the roadway extending from shoulder line to shoulder line, and includes the subgrade and shoulders considered as a unit.

**Roadway** - The portion of highway included between the outside lines of gutters, or side ditches; including all the appertaining structures, and all slopes, ditches, channels, waterways etc. necessary for proper drainage and protection.

**Road Right-of-Way** - An area of land that is legally described in a registered deed for the provision of providing access and egress on which there is a public street or private road.

**Run-off** - Overland flow that occurs when the rainfall rate exceeds the soil's capacity to absorb water.

**Sanitary Sewage** - Wastewater from residential, industrial, institutional, and commercial buildings, excluding storm water runoff and ground water.

**Set Back Line** - A line drawn parallel to the boundary of a highway or street which is offset the setback distances required under a Land Use Bylaw or the Subdivision By-Law of the Town.

**Services** - All of the sanitary sewer, storm, and water systems.

**Standard Specifications for Municipal Services** means Standard Specifications for Municipal Services, latest edition, as published by the Nova Scotia Road-builders Association and the Nova Scotia Consulting Engineers Association, a joint committee on contract documents.

**Storm Sewer** - A buried drain for conveyance of storm water that includes the storm sewer main, manholes, laterals, catch basins, and catch basin leads.

**Street** - The entire width between the boundary lines of a highway, and includes a public thoroughfare.

**Sub-Base Course** - The crushed rock or aggregate which is placed immediately upon the subgrade.

**Subdivision** - The division of any area of land into two or more parcels, and includes a re-subdivision or a consolidation of two or more parcels.

**Subgrade** - That portion of the roadbed upon which the sub-base course is to be placed.

**Tributary Area** - The area that contributes runoff flow to an inlet or given point immediately downstream of the contributing area. For the purposes of calculating infiltration into a sanitary sewer, the Tributary Area for a given section of sewer shall extend to the subdivision boundary.

**Wearing Surface** - The exposed material, placed directly upon the base course, which comprises the travelling surfaces.



## 2.0 SUBMISSION REQUIREMENTS

This section is intended to assist the applicant for subdivision approval prepare a submission for the approval of **municipal services**.

## 2.1 TENTATIVE APPROVAL

General

A copy of the Permit to Construct from the Nova Scotia Department of Environment will be required prior to approval of the Tentative Plan.

The following information is required with an application for tentative approval of subdivisions:

### **General Service Plan**

Plan indicating proposed road layout, tributary service areas, and existing and proposed services; including pipe sizes, valves, hydrants, manholes, lift stations, directions of flow, and points of connection to existing systems.

### **Drainage Plan**

Plan indicating contributing area, the area tributary to each inlet, natural watercourse, and existing and proposed storm drainage systems; including run-off rates at each inlet and outlet, pipe/culvert size, and other relevant features. Lot grading plans and minimum basement elevations may be required for areas prone to flooding.

### **Survey Plan**

A Tentative plan of survey showing the proposed lot layout and all proposed public highways, road reserves, and easements to be transferred to the Town and include the following:

### **Detailed Design Drawings**

- Plan and profile drawings (1" = 40' horizontal, 1" = 4' vertical), drawing size D (24" X 36" overall dimensions) indicating lot layout, manhole locations, lateral locations, valves, hydrants, pipe size, material, and slope, horizontal and vertical road alignment data, existing and proposed road centerline profiles, and proposed ditch profiles.
- Cross section elements if different than standard.
- Details for lift stations indicating pump data, invert elevations for gravity inlet, overflow, and forcemain, float elevations, base elevation, top elevation, wet well size, bypass piping arrangement, and other relevant details.
- Details for environmental control measures, and other relevant details as required or as requested by the Engineer.

## **Design Submission**

Depending on the size of the proposed subdivision development, the following information may be required by the Engineer

- Design summary for the sewer system in tabular form giving population density, peak flow, design flow, pipe size, slope, minimum and maximum velocity, and depth of flow.
- Design summary for the water system in tabular form giving population density, domestic demand, fire flow requirements, maximum and minimum static pressures under normal operating conditions, and residual pressures under fire flow conditions.
- Design information for the storm drainage system in tabular form giving run-off rates at each inlet and outlet, design flow, pipe, culvert, or channel size, and depth of flow.
- Design information in tabular form for lift stations and forcemains giving minimum, maximum, and peak flow rates, pipe size, velocity on forcemain, and pump cycle time.
- System and Pump curves for lift stations and forcemains.
- Erosion and sedimentation control plan.

## **2.2**

### **FINAL APPROVAL**

The following information is required for final approval of a public street and services:

#### **Record Drawings**

- Reproducible record drawings stamped by a Professional Engineer.

#### **Deeds and Easement Documentation**

- Warranty Deed for all road right-of-ways and road reserves.
- Easement agreements for water, sanitary sewer, and storm drainage easements. (See Appendix B)
- Title certificate by developer's solicitor for land and easements being transferred.
- Legal Plan of Subdivision submitted for final approval.

#### **Maintenance Deposit**

- Statement of construction costs.
- Statutory declaration from developer indicating that all accounts for labour and material used in the construction of the subdivision and statutory liens have been paid in full (See Appendix C).
- Maintenance deposit in the form of cash or certified cheque for 10% of construction costs, to be held for the duration of the warranty period

## **Road Completion Agreement and Bond for Street Completion**

- Completion Agreement - (See Appendix D)  
Agreement to be signed, sealed, and delivered for final approval.
- Standby Letter of Credit, or other permitted surety, in the amount of 120% of the estimated cost to complete the wearing surface of the road, to be held for a period of 2 years from the date of final approval of the subdivision, as granted by the Development Officer. (See Appendix A)

## **Operation and Maintenance Manuals**

- O & M Manuals are required for pumps and other similar equipment.

## **Certificate of compliance**

- A Certificate of Compliance is required from a Professional Engineer stating that the roads and services have been constructed in accordance with the approved plans and these specifications.

## **Inspection and Testing Reports**

The following inspection and testing results as applicable, must be provided by the subdivider as a matter of course:

- Video inspection tape and report for sanitary sewer.
- Test results for air tests for the sanitary sewer, stamped by a Professional Engineer.
- Test results for hydrostatic leakage tests for water lines, stamped by a Professional Engineer.
- Bacteriological test results for water lines.
- Sieve Analyses for base and sub-base gravel.
- Compaction test results on trench compaction, subgrade, sub-base, and base courses.
- Test results for asphaltic concrete paving will be required after completion, and prior to release of standby letter of credit.

## **2.3**

### **LISTING PROCEDURE FOR PUBLIC STREETS**

Before the constructed streets are accepted for listing, the Town must receive confirmation from the Nova Scotia Department of the Environment that all their requirements have been met.

When the preceding information has been submitted and approved, the developer may then officially request the Town take over the public street system in the subdivision. The request should be accompanied by 12 copies of a final plan showing the entire subdivision, its boundaries and road layout. A fee of two hundred dollars plus document registration costs must also be paid at the time of the request. The Engineer may then recommend that the Development Officer officially list the streets in the subdivision.

### **3.0 SANITARY SEWER SYSTEM SPECIFICATIONS**

#### **3.1 SCOPE**

This section specifies the requirements for a central sanitary sewer collection system. A sanitary sewer consists of main lines, laterals, pressure sewers and appurtenances (including manholes and lift stations).

In addition to these design criteria, all sanitary sewage systems shall conform to the *Nova Scotia Department of the Environment Standard and Guidelines for the Collection, Treatment and Disposal of Sanitary Sewage*. No systems shall be constructed until the design has been approved by the Engineer and by the Nova Scotia Department of the Environment.

### **4.0 STORM DRAINAGE SYSTEM SPECIFICATIONS**

#### **4.1 SCOPE**

This section specifies the requirements for a storm drainage system. A storm drainage system is a system which receives, carries, and regulates flows in response to rain and snow including overland flows, sub-surface flows, groundwater flows, and snow melt.

The following design objectives are to be followed for the design of storm drainage systems in the Town of Berwick;

- Prevent Loss of life and protect structures and property from damage due to a major storm event.
- Provide for safe and convenient use of streets, lots, and other improvements during and following storm events.
- Preserve natural watercourses and other natural features and minimize the long term effect of development on receiving watercourses and groundwater.
- Convey stormwater from upstream and on-site sources, and mitigate the adverse effects of such flow on downstream properties.

In addition to the following specifications, all storm drainage systems shall meet the requirements of the Nova Scotia Department of the Environment. No system shall be constructed until the design has been approved by both the Engineer and the Nova Scotia Department of the Environment.

### **5.0 PUBLIC STREETS, SIDEWALKS & CURBS**

#### **5.1 SCOPE**

This section specifies the requirements for design of all Public Streets and Fully Serviced Public Streets within the Town of Berwick.

For the approval of a municipal street, the public street shall consist of the road bed and all slopes, ditches, channels, waterways and appertaining structures necessary for proper drainage and protection.

The developer shall construct a Fully Serviced Public Street that shall consist of concrete curb and gutter, storm sewer, catch basins, concrete sidewalks, asphalt concrete wearing surface in addition to the road bed, and appertaining structures necessary for proper drainage and protection.

The normal completion date for street construction and related works within a subdivision is to be November 30 of each year in order to allow for inspection and approval by the Municipal Engineer. Street construction will not be approved from December 1<sup>st</sup> to May 1<sup>st</sup>, or during such time as spring weight restrictions are administered on the highway.

The developer will be responsible for access, with suitable culverts, to all lots on which a structure exists at the time of listing.

All sewers, water mains, electrical, telephone and such utilities located on the street must have Town approval with respect to location, prior to their installation. All utilities shall be approved by the Engineer prior to Final Approval.

“The function of locating roads and building lots relative to topographical features, constitutes the practice of engineering as defined by the engineering profession act of Nova Scotia. Therefore, the design of subdivisions and their services when submitted to the Town must be over the **Seal of a Professional Engineer.**”

All design shall conform to the Nova Scotia Department of Environment and Department of Transportation standards and guidelines.

## **6.0 NATURAL GAS PIPELINE**

### **1. SPECIFICATIONS**

- (a) Natural gas pipelines proposed to be installed within Town streets shall be located so as to not interfere with, damage or impede maintenance access to any existing municipal infrastructure.
- (b) The gas distribution system shall be designed, installed and maintained to meet or exceed the standard set out in all applicable Federal, Provincial, and Municipal enactments, codes and specifications, and the Canadian Standards Association (CSA) Oil and Gas Pipeline Systems Standard.
- (c) Tracer wire, which facilitates the location of the pipeline with commercially available pipe locators, shall be installed on all pipelines.
- (d) Warning marker tape shall be installed in all gas pipeline trenches.
- (e) Unless considered impractical in the opinion of the Engineer, any pipeline extension shall be a minimum of one block in length.

### **2. ENGINEERING PLAN**

Prior to any work within the street right of way, a detail engineering plan must be submitted showing accurately the location, depth and dimensions of proposed pipelines and existing sewer pipes, watermains, service connections and other underground utilities within 3.0 meters of the proposed gas pipelines and also including pavement surface, curbs, drainage ditches, sidewalks, trees, street lights, fire hydrants, curb stops, valve boxes, property lines and other relevant features, with respect to the construction to be undertaken.

### **3. INSTALLATION WITHIN EXISTING STREETS**

- (a) Unless otherwise authorized by the Engineer and subject to sections 3.5 and 3.6 of the guidelines, gas pipelines shall be installed outside of the vehicular traveled way and located between 0.5 m and 1 m from the street line.
- (b) Wherever possible, trenchless technology methods shall be used.
- (c) Notwithstanding section 3.3, all service connection pipes which cross the vehicular traveled way must be installed using technology methods or alternatively gas pipelines shall be installed on both sides of the street in accordance with section 3.3 of the guideline.
- (d) Where it is necessary in the opinion of the Engineer to install pipelines within the vehicular traveled way, service connection pipes shall be installed to the boundary of each parcel abutting the street.

- (e) Horizontal separation of gas pipelines shall be a minimum of one and a half meters from sewer mains and other utilities.
- (f) Gas pipelines shall not be located within the bounds (top of slope) of the drainage ditch.
- (g) Where there are existing structures (buildings, retaining walls, etc.) located at or to the rear of street lines, gas pipelines shall be located to accommodate the future reconstruction of such structures.
- (h) Gas pipelines shall be located such that the primary root system of trees are not damaged. As a general rule, roots over 25 mm in diameter shall not be damaged for trees with a diameter less than 150 mm in diameter; for trees with diameter greater than 150 mm, roots over 50 mm shall not be damaged.

#### **4. INSTALLATION WITHIN NEW STREETS**

- (a) Pipelines shall be located 1 meter inside of the street line.
- (b) All service connections which cross under the vehicular traveled way must be installed before completion of street construction or by using trenchless technology methods.

#### **5. DEPTH OF COVER**

The depth of cover of gas pipelines and service connections shall be a minimum of 60 cm below grade for local streets and a minimum of 75 cm below grade for all other street classes and shall comply with the CSA Oil and Gas Pipeline Systems Standard. The Engineer may require a greater depth to allow for future road construction.

#### **6. RECORD DRAWINGS**

The utility shall provide record drawings to the Engineer in hard copy and electronic format compatible with the Town's GIS system, within thirty days of completing the installation of any of the works.

#### **7. STREET RESTORATION**

- (a) This section applies to the restoration of existing streets after the installation of natural gas pipelines.
- (b) All construction shall meet the requirements of the Town's Specification Standard Supplement together with the Standard Specification for Municipal Services, Part II as developed by the Nova Scotia Road Builders Association and the Nova Scotia Consulting Engineers Association Joint Committee on Contract Documents.

- (c) All surfaces shall be restored to the same or better condition as previous to the pipeline installation to the satisfaction of the Engineer.
- (d) Upon approval by the Engineer, pipelines installed by trenching within the vehicular traveled way shall comply with the following:
  - (i) Where the street has been paved within 5 years of the installation, the asphaltic or portland cement concrete pavement shall be cut and reinstated as indicated on standard detail drawings and the entire paved surface shall be profiled and over laid with a minimum of 50 mm of asphaltic concrete or entirely repaved for portland cement concrete surfaces.
  - (ii) Where it has been longer than 5 years since the street was last paved, the asphalt or concrete pavement shall be cut and reinstated as indicated on standard detail drawings.
  - (iii) Unless otherwise approved by the Engineer, pipe trenches shall be backfilled with type 1 gravel compacted to 100% standard proctor and the minimum width of trench shall be 600 mm plus the pipe diameter.
- (e) Pipelines installed outside of the vehicular traveled way must be installed without damage to any sidewalks, trees, street lights, fire hydrants, curb stops, valve boxes or any other municipal infrastructure.
  - (i) If any sidewalk is undermined or otherwise damaged in the opinion of the Engineer, then it shall be reconstructed to meet the requirements of Section for Walks, Curbs, and Gutters.

## **7. UNDERGROUND WIRING AND POWER**

Underground wiring and power proposed within the right of ways shall be installed so as not to interfere with other infrastructure.

The underground wiring shall be designed and installed to meet or exceed the standard set out in all applicable Provincial and Town codes and specifications specifically "Distribution Standard for Underground Wiring (metric) Nova Scotia Power Corporation".

Wiring to be installed in conduit with pull manholes and pad mounted transformers.

## **8.0 COMPUTER AIDED DRAWINGS STRUCTURE**

All computer aided drawings files must contain a definite structure with respect to layering, linetypes, symbols, lettering and dimensions.

### **Layers**

Layers have been defined to hold specific features. Each feature must be placed on the correct drawing layer. All layers are defined in the phototype drawing for the specific application.

Plan view is to be extruded as a separate file from the Plan and Profile drawing. All other data, i.e. legend, neatline, insets, profile grids, etc. must be removed. This requirement is made to facilitate incorporation into GIS layers. All layer requirements identified apply to this file.

## **Linetypes**

Standard linetypes must be used in all CAD drawings. Features must be coded with the correct linetype and placed in the correct layer.

## **Symbols**

Standard symbols must be used to identify all features in engineering drawings.

## **AutoCad Data Entry**

Automated drafting work done for the Town of Berwick must be done using AUTOCAD unless otherwise approved by the project supervisor. Drawings prepared using other CAD packages are acceptable if and only if they meet the requirements defined in the procedure.

The following guidelines are recommended for data entry using AUTOCAD:

- (a) Specialized AUTOCAD functions (e.g. Circle) which may cause problems when translating from CAD to GIS should be avoided.
- (b) When digitizing is necessary, stream mode should be avoided. In the event that stream mode is used, weeding of points should be applied to a level which maintains the integrity of the curve. The PLINE command should be used instead of the LINE command if stream mode is necessary.
- (c) If data is obtained through digitizing, document all source map information including: scale, date, file (sheet) numbering, originator, method of data capture/creation.
- (d) Any feature, other than point and line features, that can be created as a polygon, should be created as a polygon. Further, no hatching will be applied to any polygon feature (e.g. buildings, sidewalks, boardwalks, etc.)
- (e) Do not double digitize boundary lines which separate adjacent polygons. Adjacent polygons (within a thematic layer) should share a common boundary.
- (f) All features outlines will be captured so that the feature lies to the right of the line (right hand rule).
- (g) All single line features which possess a director of flow will be captured in the direction of flow (e.g. streams, sewer pipes, etc.)
- (h) Features such as utility poles, catch basins, manholes, fire hydrants, water valves, and other such features suitable for display as points should be supplied as point data. Avoid the use of symbols.
- (i) All features shall have a corresponding label file.

## **General Compilation Rules**

Point or line features must not be displaced for cartographic enhancement.

All features which enclose a defined area between layers must snap.

Straight line features must be captured as two point line segments. Vertices should only be present in a line feature when there is a change of direction in that feature.

All curved line features representing man made objects must appear cartographically smooth when viewed at 1:500 scale.

The consultants shall be required to use the Nova Scotia Topo Database Feature Codes, Version 4.00, edited November 24, 1994 and the symbols and codes used by Engineers and Architects for automated drafting purposes as a secondary source.

### **Delivery of CAD Files (Re: Consultants)**

CAD files must be provided for all projects. The following guidelines must be followed for acceptable delivery of CAD files to the Town of Berwick.

Delivery Media:

- (a) 3.5" High Density Disk
- (b) 4mm Digital Tape
- (c) CD ROM

Format:

- (a) AUTOCAD DXF., or
- (b) MAPINFO Format

Any files that require compression must be supplied with extraction utility and labelled as compressed. Files which have been backed up must be supplied with necessary information for restoring files.

Complete documentation will be supplied which includes file names, descriptions of files, size of files, and other information which may assist. Where information relating to attributes, such as: source, accuracy, collection method and party who collected data.

## **APPENDIX 'A'**

### **STANDARD STANDBY LETTER OF CREDIT**

**LETTER OF CREDIT**

NAME OF FINANCIAL INSTITUTION: \_\_\_\_\_

Date Issued: \_\_\_\_\_

Branch:

\_\_\_\_\_

Letter of Credit No. \_\_\_\_\_ Amount: \_\_\_\_\_

Issued subject to the Uniform Customs and Practices for Documentary Credits being ICC Publication UCP 500.

TO: The Town of Berwick (TheTown)

ADDRESS: 236 Commercial Street  
P.O. Box 130  
Berwick, Nova Scotia  
B0P 1E0

WE HEREBY AUTHORIZE YOU TO DRAW ON THE

\_\_\_\_\_

(Name of Financial Institution), being a Schedule 1 or Schedule 2 chartered bank  
for the account of

\_\_\_\_\_

(Name of Customer)

UP TO AN AGGREGATE AMOUNT OF \_\_\_\_\_  
Dollars (\$ \_\_\_\_\_) available on demand.

PURSUANT TO THE REQUEST OF OUR CUSTOMER: \_\_\_\_\_

we the \_\_\_\_\_

(Name of Financial Institution)

hereby establish and give you an irrevocable Letter of Credit in your favour in the above amount which may be drawn on by you at any time and from time to time, upon written demand for payment made upon us by you which demand we shall honour without enquiring whether you have the right as between yourself and the said Customer to make such demand, and without recognizing any claim of our said Customer, or objection by it to payment by us.

DEMAND shall be by way of a Letter signed by the Clerk of the Town under the corporate seal attached to which shall be the original Letter of Credit. Presentation shall be made to the Financial Institution at:

\_\_\_\_\_

(Address)

THE LETTER OF CREDIT, we understand, relates to those Municipal services and financial obligations set out in an Agreement between the Customer and the Town and referred to as: \_\_\_\_\_

\_\_\_\_\_  
(Name of Project or Agreement)

THE AMOUNT of this Letter of Credit may be reduced from time to time as advised by notice, in writing, to the undersigned by the Clerk of the Town.

THIS LETTER OF CREDIT will continue in force for a period of one year, but shall be subject to the condition hereinafter set forth.

IT IS A CONDITION of this Letter of Credit that it shall be deemed to be automatically extended without amendment from year to year from the present or any future expiration date hereof, unless at least 30 days prior to the present or any future expiration date, we notify you in writing by registered mail that we elect not to consider this Letter of Credit to be renewable for any additional period.

DATED at \_\_\_\_\_, Nova Scotia this the \_\_\_\_\_ day of \_\_\_\_\_, 199\_\_.

COUNTERSIGNED BY:

\_\_\_\_\_  
(NAME OF FINANCIAL INSTITUTION)

PER: \_\_\_\_\_  
(Authorized Signing Officer)

## **APPENDIX 'B'**

# **STANDARD DRAINAGE EASEMENT AGREEMENT**

**DRAINAGE EASEMENT AGREEMENT**

**THIS DRAINAGE EASEMENT** dated this \_\_\_\_\_ day of \_\_\_\_\_, A.D., 200\_\_ is made:

**BETWEEN:**

\_\_\_\_\_ of \_\_\_\_\_ Kings County, Nova Scotia, the "Grantor"

- and -

**THE TOWN OF BERWICK**, a body corporate pursuant to the provisions of the Municipal Government Act, 1999, the "Grantee"

See \_\_\_\_\_ **WHEREAS** the Grantor owns Lot(s) \_\_\_\_\_ in \_\_\_\_\_ Note 1 Subdivision, Berwick, Nova Scotia;

or

See \_\_\_\_\_ **AND WHEREAS** the Grantor owns lands immediately to the \_\_\_\_\_ Note 2 of \_\_\_\_\_ Subdivision, Berwick, Nova Scotia;

**AND WHEREAS** the Grantor has consented to the construction and maintenance of ditches under the terms of this Grant of Easement.

**WITNESS THAT** in consideration of the sum of ONE DOLLAR (\$1.00) now paid by the Grantee to the Grantor, the receipt of which is hereby acknowledged:

- See Note 3 1. The Grantor conveys to the Grantee:
  - a. An easement in perpetuity to enter, construct, maintain, inspect, alter and repair a storm drainage system including ditches and all appurtenances thereto, on and under a portion of the lands described in Schedule \_\_\_ annexed hereto;
  - b. The right at all times for the Grantee, its servants, agents, contractors and employees to enter in the lands of the Grantor with machinery, material, vehicles and equipment necessary for the repairs and maintenance of the said drainage easement.

- See Note 4 2. The Grantor conveys to the Grantee:
  - a. An easement in perpetuity to discharge onto the adjacent lands of the Grantor as shown on the survey plan prepared by \_\_\_\_\_, NSLS No. \_\_\_\_\_ and dated \_\_\_\_\_, 200 \_\_, under his/her file number of \_\_\_\_\_;

- b. The right at all times for the Grantee, its servants, agents, contractors and employees to enter on the lands of the Grantor with machinery, material, vehicles and equipment necessary for the repairs to and maintenance of the said drainage easement.

3. The Grantee covenants:

See  
Note 4

- a. To fill in all excavations and as far as possible restore the surface to the same condition as prior to the commencement of construction or of any subsequent work on the easement.
  - b. That upon creation of new roadways upon the affected lands of the Grantor to the end that drainage from the municipal highways within \_\_\_\_\_ Subdivision can be directed into any ditching or storm sewer system within or under such new roadways on the said lands presently owned by the Grantor or others, the Grantee will upon presentation to it of a suitable form of release, relinquish its rights to the natural drainage system granted herein.
4. The easement herein is declared to be appurtenant to and exists for the benefit of municipal highways of the Grantee within \_\_\_\_\_ Subdivision, and said lands of the Grantor described in Schedule \_\_\_\_\_ hereto and referred to herein are made subject to the said easement.

**Explanatory Notes:**

- 1. Required for an Easement within the boundaries of a Subdivision.
- 2. Required for an Easement adjacent to a Subdivision.
- 3. Required for an Easement which contains a ditch, storm sewer, or other appurtenances that are to be owned and maintained by the Town.
- 4. Required for an Easement which permits the discharge of storm water runoff onto adjacent land, either over land or through a ditch that is not owned or maintained by the Town.

## **APPENDIX 'C'**

### **STANDARD STATUTORY DECLARATION**

**STATUTORY DECLARATION**

CANADA  
PROVINCE OF NOVA SCOTIA  
TOWN OF BERWICK

IN THE MATTER OF:

A construction Contract entered into by \_\_\_\_\_, the  
"Contractor" for the construction of:

- Highway
- Storm Sewer
- Sanitary Sewer
- Water Line

In the \_\_\_\_\_ Subdivision at Berwick, Nova Scotia.

I, \_\_\_\_\_ of \_\_\_\_\_, in the County of Kings  
and Province of Nova Scotia, do solemnly declare:

1. THAT I am the  President or  \_\_\_\_\_ of the Contractor  
named in the contract above mentioned, and as such have a personal knowledge  
of the facts hereunder declared.
2. THAT no accounts due and payable by the Contractor on or before the  
date hereof with respect to subcontractors, labour and materials  
whatsoever entering into the construction of that work remain unpaid.
3. THAT all wages have been paid in full.
4. THAT all amounts owing by the Contractor for Worker's Compensation,  
employee's income tax deducted at source, employment insurance  
deducted from wages and salaries, vacation pay allowances and all other  
charges of whatsoever nature due or payable by reason of the  
performance of that work covered by the said contract have been duly  
deducted and/or paid according to law.
5. THAT I am authorized by the Contractor to make this declaration on its  
behalf.

AND I make this solemn declaration conscientiously believing it to be true and knowing  
that it is of the same force and effect as if made under oath and by virtue of the Canada  
Evidence Act.

DECLARED BEFORE ME at \_\_\_\_\_,  
in the County of Kings and Province of Nova Scotia  
this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_.

---

A Barrister (Commissioner) of the  
Supreme Court of Nova Scotia

---

President or Responsible Official

**APPENDIX 'D'**

**STANDARD ROAD MAINTENANCE AGREEMENT**

# ROAD MAINTENANCE AGREEMENT

This Agreement made this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_

## BETWEEN:

\_\_\_\_\_, a body corporate with  
Head Office at \_\_\_\_\_, in the County  
of \_\_\_\_\_ and Province of Nova Scotia.

“the Developer”

OR

----- ( a n d )  
----- ( b o t h ) o f  
\_\_\_\_\_  
in the County of \_\_\_\_\_ and Province of Nova Scotia.

“the Developer”

## AND

The Town of Berwick, a body corporate of the Province of Nova Scotia,  
having its chief place of business at Berwick in the County of Kings and  
Province of Nova Scotia.

“the Town”

**Whereas** the Developer has applied to the Development Officer of the Town for final subdivision approval of lots within the Subdivision (“the Subdivision”) located at Berwick in the County of Kings;

**And Whereas** the Town has agreed to authorize the Development Officer to give final approval to such lots within the Subdivision upon the terms herein provided upon the Developer entering into and carrying out this Agreement;

**And Whereas** the Planning Act S. 99(3)(c) authorizes a subdivider to enter into a bond or other security satisfactory to Council to install and provide the streets and other services to the standards set out in the Subdivision Bylaw, which provisions are set forth in Part 5 of the Subdivision Bylaw.

**Witnesses** that in consideration of the premises and of the promises and undertakings herein contained the parties agree to and with one another as follows:

## Street Dedication

1. The Developer will forthwith convey to the Town any roads, streets or highways within the Subdivision required to be so conveyed together with any required easements or rights-of-way and will simultaneously cause its solicitor to provide a certificate to the Town that the Developer has good title to such roads, street or highways, easements and rights-of-way free and clear of encumbrances, and that the Developer has corporate capacity and has taken all required actions to authorize the execution and delivery to the Town of the deed of the said roads, streets or highways, easements and rights-of-way.

**Security**

2. The Developer will provide to the Town cash, certified cheque, bond or letter of credit for street completion meeting the requirements of the Subdivision Bylaw of the Town and the reasonable approval of counsel acting on behalf of the Town.

**Amount of Security**

3. The amount of the security referred to in Paragraph 3 shall be 120% of the cost of construction, as estimated by the Developer’s Consulting Engineer, and in any event shall be not less than \$ \_\_\_\_\_.

**Completion Date and Requirements**

4. The Developer will within 20 days of completion of construction of the roads, streets or highways referred to herein, which completion of construction will be completed by no later than \_\_\_\_\_, 200\_\_ (“the Completion Date”), provide to the Development Officer a certificate of a licensed Professional Engineer (Civil) that the roads, streets or highways meet all standards of the Subdivision Bylaw and the Municipal Services Specification Manual of the Town.

**Approval by Development Officer**

5. The Town will authorize the Development Officer, subject to compliance by the Developer with all relevant matters specified in the Subdivision Bylaw other than as dealt with herein, to grant final approval to the lots within the Subdivision qualifying for approval under this Agreement.

**Acceptance of Dedication**

6. The Town will accept dedication of the roads, street or highway together with required easements and rights-of-way.

**Steps on Default**

7. If the Developer fails to complete the said work by the Completion Date, the Town through its Municipal Engineer may serve notice on the Developer, by registered mail posted at Berwick, Nova Scotia and addressed to the Developer at \_\_\_\_\_, Nova Scotia, requiring the Developer to proceed with said work immediately.

### **Right to Cure**

8. If the Developer fails to complete said work forthwith or within thirty days after the service of such notice, the Town may complete the work pursuant to the direction of the Municipal Engineer at the expense of the Developer. The cost of such work completed by the Town shall be certified by the Municipal Engineer and shall be done and payable by the Developer immediately upon the completion of work.

### **Rights on Default in Performance**

9. If said sum so due and payable is not paid by the Developer to the Town immediately, the same may be realized out of the security held by the Town in respect of the work or under the terms of this agreement or any agreement collateral hereto, or may be sued for in any court of competent jurisdiction. In particular, the Town, after satisfying any and all costs due and payable by the Developer under this agreement, shall pay the balance remaining, if any, to the Developer, provided one year has elapsed from the date the said streets and services are finally completed. The remedies of the Town are cumulative and not exclusive.

### **Release of Security**

10. Upon completion of the said work by the developer and the approval of the same by the Municipal Engineer or the Engineer appointed by the Town, and upon compliance with all other terms of this agreement by the Developer and payment of all sums of money owing to the Town under this agreement collateral hereto shall be released, provided one year has elapsed from the date of completion of the said streets and no costs for maintenance or repairs of same as provided hereunder is outstanding.

### **Maintenance Agreement**

11. The Developer agrees to maintain and keep in good repair the streets and services to a level prescribed by the Subdivision Bylaw (which streets were constructed by the Developer and conveyed to the Town) for a period of one year from the date all of the said streets and all work contemplated by this agreement is finally completed and the Subdivider agrees to abide by any direction reasonably made by the Municipal Engineer regarding such maintenance and repair. This maintenance and repair obligation does not include removal of snow and ice which is the responsibility of the Town.

**Settlement of Disagreement**

12. Should the parties hereto disagree as to whether the said work is being done or has been done in accordance with the said regulations or with due diligence, the matters in dispute shall be referred to the Municipal Engineer whose decision shall be final and binding upon the parties hereto. A certificate signed by the Municipal Engineer disclosing the Developer's failure to complete the work maintenance contemplated by this agreement shall be conclusive evidence that the Developer has breached this agreement and the Town therefore is entitled to realize on its security as provided herein.

**Maintenance Agreement**

13. The Developer will also, upon request by the Development Officer, post a maintenance bond in favour of the Town as contemplated by 5.4 of the Subdivision Bylaw.

**Ownership**

14. The Developer warrants that it is the owner in fee simple of the lands referred to herein and can give full effect to all the promises and undertakings made herein.

**Benefit and Binding**

15. This Agreement shall ensure for the benefit of land and be binding upon not only the parties hereto but also their respective heirs, representatives, successors and assigns.

**IN WITNESS WHEREOF** the Developer and Town have executed this Agreement the day and year first above written.

**SIGNED, SEALED AND DELIVERED**

_____	)	
	)	Name of Developer
	)	
	)	
	)	Per :
_____	)	
Witness	)	Per :
_____	)	
	)	<b>TOWN OF BERWICK</b>
	)	

)  
) Per:

\_\_\_\_\_  
\_\_\_\_\_)  
Witness

) Per:

\_\_\_\_\_

**APPENDIX 'E'**  
**STANDARD SEWER EASEMENT**

**SEWER EASEMENT**

**THIS GRANT OF EASEMENT** dated \_\_\_\_\_, 200\_\_ is made

**BETWEEN**

\_\_\_\_\_ of \_\_\_\_\_, Kings County, Nova Scotia, the "Grantor(s)"

**AND**

**THE TOWN OF BERWICK**, a body corporate pursuant to the provisions of the Municipal Government Act, 1999, the "Grantee"

**BACKGROUND:**

- 1. The Grantor(s) own lot(s) \_\_\_\_\_ in \_\_\_\_\_ Subdivision, Berwick, Nova Scotia.
- 2. The Mortgagee has an interest in the Lot under a mortgage granted to the Mortgagee by the Grantors.
- 3. The Grantee intends to run a new sewer line across the lands of the Grantor(s) for public benefit.
- 4. The Grantor(s) and the Mortgagee have consented to the construction and maintenance of such sewer line under the terms of this Grant of Easement.

**TERMS:**

- 5. In consideration of the sum of **ONE DOLLAR (\$1.00)** now paid by the Grantee to the Grantor(s) and the Mortgagee, the receipt of which is hereby acknowledged, the Grantor(s) and the Mortgagee convey to the Grantee, an easement:

to enter, construct, maintain, inspect, alter and repair an underground sewer line including all appurtenances to the line, on and under the lands described in Schedule "A";

for the servants, agents, contractors and employees of the Grantee to enter on the lands with machinery, material, vehicles and equipment necessary for the use of the easement.

6. The Grantee covenants to fill in all excavations and as far as possible restore the surface to the same condition as prior to the commencement of construction or of any subsequent work on the easement.
7. This easement is declared to be appurtenant to and for the benefit of lands of the Grantee described in Schedule "B".

**APPENDIX 'F'**  
**STANDARD DATA LICENSE**

## Data License

For the

SCALE	DESCRIPTION OF LAYER	FEATURE CODE
-------	----------------------	--------------

OR ANY PART THEREOF, hereinafter call the **Database**

**BETWEEN:**

**THE TOWN OF BERWICK**, Nova Scotia hereinafter called "the Town"

**AND**

\_\_\_\_\_  
Name of Company, Department or Agency Receiving the Database,  
hereinafter called "the User"

### Conditions of Use

The following conditions apply to the release of the Database by the Town:

1. The Database is a single user copy and will be used only by:

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
TELEPHONE \_\_\_\_\_ FAX \_\_\_\_\_  
E-MAIL \_\_\_\_\_

2. The Database is released to the User to be used exclusively for Contract  
\_\_\_\_\_ (provide contract number).

3. The user shall not copy, distribute, loan, lease, sell or otherwise make the database available for any other use other than the contract number referenced in Section 2, or make the Database available to any other party without the prior written consent of the Town.

The above conditions are agreed to:

\_\_\_\_\_

Date

\_\_\_\_\_

Signature of User

4. The Town shall not be liable to the User or to any other person acting under the direction of the User for any loss or damage of any kind including the personal injury or death arising from the use of the Database or accompanying written materials or from errors, deficiencies or faults therein, whether such damage is caused by negligence or otherwise. If errors or omissions are found, the Town will be notified by the User.
5. This agreement is the entire agreement between the parties and supersedes all previous agreements, or understandings between the Town and the User thereto whether written or oral, in connection with or incidental to the Database.
6. This agreement shall be binding upon the parties hereto and each or their executors, administrators, successors and assigns and shall ensure the benefit of such executors, administrators, successors and authorized assigns.
7. This agreement will be in effect after signed copy is received by the Town at the following address:

236 Commercial Street  
P.O. Box 130  
Berwick, Nova Scotia  
B0P 1E0

## **APPENDIX “G”**

### **CONNECTION OF THE BUILDING SEWER LATERAL TO THE PUBLIC SEWER SYSTEM**

## CONNECTION OF THE BUILDING SEWER LATERAL TO THE PUBLIC SEWER SYSTEM

### OWNER'S CONNECTION RESPONSIBILITIES:

1. The owner of a building, shop, store, office, the nearest part of which is not more than one hundred feet (100 ') from any portion of a public sewer shall be required at the owners expense to construct a building sewer connection therefrom and connect the same to the said public sewer in accordance with the provisions of the Sewer By-law. The construction of the required building sewer and the connecting of same to the public sewer must be fully completed within one hundred and twenty (120) days after the date of the receipt of written notice from the Town of Berwick to do so.
2. No unauthorized person shall uncover, make any connections with or openings into, use, alter or disturb any public sewer or appurtenance thereof without first obtaining a permit from the Engineer. The property owner seeking such permit shall make application on a form furnished by the Engineer. The permit application shall be supplemented by plans, specifications and other information as is deemed necessary by the Engineer.
3. The owner shall have the connection inspected by the Town prior to covering of the connection.
4. No person shall connect a water storm, sump pump, basement tile, floor drains, or roof drains to a public sanitary sewer.
5. In the construction of a building sewer connection, the size, slope, alignment, and the materials of construction together with the methods used in excavating, placing of pipe, jointing, testing, backfilling the trench, and connecting to the public sewer must all conform with the requirements and standards set out by the Engineer.
6. Every sanitary sewer drainage system shall have an internal cleanout that will permit the cleaning of the entire system from the house to the public sewer system.
7. Every sanitary sewer drainage system shall have an internal backwater valve in case of possible surcharging of the public sewer system
8. Every person connecting to a public sewerage system shall construct the connection according to the requirements of the National Building Code and all Plumbing Codes in force at the time of such connection.
9. Where a building has been connected to the public sewer system or the Engineer has ordered, in writing, a building to be so connected, the Engineering may thereafter order the owners of any outhouse or private sewage disposal system

situate on the subject property to remove such outhouse, destroy or fill the private sewage disposal system within ninety (90) days of the giving of such order.

10. All costs associated with the installation, connection, maintenance or repair of a building sewer connection to the public sewer system, including the costs of any necessary permits, are the sole responsibility of the owner. The owner shall further indemnify the Region from any loss or damage that may be directly or indirectly occasioned by the installation, connection, maintenance or repair of the building sewer connection.
11. It shall be the duty of any person, firm or corporation who constructs any private sewer or building sewer connection, to securely protect the resulting opening or excavation in accordance with the Nova Scotia Occupational Health and Safety Act, and the Nova Scotia Department of Labour Regulations.
12. The Town of Berwick is not responsible for any part of a building sewer connection that is not in a public street, highway or sewer easement.

#### **CONNECTION FEE:**

1. There will be a one time connection fee of ninety dollars (\$90.00) per owner. This must be paid when obtaining a permit to connect from the Town of Berwick. A sample permit form is attached.

#### **SEWER USER FEE:**

1. Every owner of land on which any building is connected to a public sewer system, or on which a building is situate that the Engineer has ordered connected to a public sewer system, and the time allocated for such connection has expired, shall pay to the Town an annual sewer service charge.
2. Sewer user fees shall be levied on the owners of all properties commencing four (4) months from the date on which a property owner has been notified in writing that municipal sewerage services are now available to his/her property or the date on which a building on the property has been connected to the public sewer, whichever is the earlier.

### **SERVICE CONNECTION SPECIFICATIONS**

#### **PART 1 - GENERAL**

##### **Description**

This section specifies requirements for supplying and constructing sanitary sewer building service connections.

## Definitions

Bedding: Material used to support pipe below and up to spring line.

12" Cover Material : Material placed from top of bedding to a minimum distance of 12" above outside top of pipe.

## PART 2 - PRODUCTS

### House Service Connections

#### 1. Polyvinyl Chloride (PVC) Gravity Pipe:

a) Manufacture: to CSA B182.1

b) Materials: Use PVC Compound 12 454-B, 12454-C or 12364-C, all conforming to ASTM D1784

c) Joints: Bell & Spigot with rubber gasket

d) Supply: Pipe to be supplied from plant certified by CSA

e) 4" diameter DR28 or DR35 PVC

#### 2. Polyethylene Pipe Forcemain:

a) Manufacture to CSA B 137.1

b) **Connection Methods:** Polyethylene pipe can be joined together or to fittings through the use of insert fittings.

c) **Insert Fittings** are pushed inside of the pipe and stainless steel external clamps are placed around the outside of the pipe forcing the pipe surface into the serrations of the fitting. The method provides a satisfactory water-tight joint on pipe up to 2 inches in diameter.

d) Minimum 2" diameter Series 75 PSI Canron Red Stripe Equivalent

#### 3. **Cleanouts:**

Every building sewer lateral shall have an internal cleanout installed to permit the cleaning of the entire sewer system from the building to the public sewer system.

#### 4. **Backwater Valve:**

Every building sewer lateral shall have an internal backwater valve installed to prevent possible surcharging of the public sewer system into the building.

## **Pipe Bedding Materials**

1. Do not include materials greater than  $\frac{3}{4}$ " in size;
2. Class "A" to NSDOTC Specifications.

## **Cover Materials**

1. Do not include materials greater than  $\frac{3}{4}$ " in size;
2. Class "A" to NSDOTC Specifications.

## **PART 3 - EXECUTION**

### **Depth of Pipes**

1. Minimum depth of sanitary sewer pipe to be five (5) feet to top of pipe in order to prevent freezing.
2. If minimum depth of five (5) feet cannot be maintained, insulate as per attached insulation details.

### **Pipe Bedding**

1. Place bedding materials as shown on Drawings.
2. Shape bed true to line and grade, free from sags and high points.
3. Shape bedding to cylindrical surface with radius conforming to pipe in accordance with pipe manufacturer's recommendations.
4. Place bedding materials simultaneously on each side of spring (centerline) of pipe.
5. Compact full width of bed to 98% maximum dry density in accordance with Standard Proctor Density.
6. Keep pipe joint clear of bedding materials to permit jointing. After jointing is completed, place bedding materials as specified.

### **Installation of Pipes**

1. Install pipes as specified herein and in accordance with the following:
  - a) PVC pipe as recommended by PVC manufacturer.
  - b) Commence laying at outlet and proceed in upstream direction with socket

ends of pipe facing upgrade.

- c) Lay pipes on prepared bed, true to line and grade as shown on Drawings.
- d) Ensure that barrel of each pipe is in contact with shaped bed throughout its full length.
- e) Ensure that ends of pipe about against each other so that there is no unevenness along inside.
- f) Lower pipe into trench carefully.
- g) Keep ends of pipe clean.
- h) Do not expose pipes to localized high temperatures.
- i) Handle pipe with special care during temperatures below freezing.
- j) Keep pipe clean as work progresses. Do not allow water to flow through pipe during construction.
- k) Keep trench dry and do not lay pipe in water.
- l) Whenever work is suspended, install a removable watertight bulkhead at open ends of last pipe laid.
- m) Do not lay pipe until preceding pipe joint has been completed and pipe is carefully embedded and secured in place.
- n) PVC Pipe: make use of pipe flexibility without exceeding manufacturer's recommended maximum deflection.
- o) Do not exceed Pipe manufacturer's recommendation in deflecting pipe joints.
- p) Maintain minimum 2% grade and maximum 8% grade.
- q) Make up required horizontal and vertical bends from standards bends of 45° or less, separated by straight section of pipe, having minimum length of four pipe diameters. Use long sweep bends where possible.

### **Jointing Polyvinyl Chloride (PVC) Pipe**

1. Insert gasket in groove of bell end of pipe if gaskets are supplied separately.
2. Lubricate spigot.
3. Insert and push spigot end into bell up to but not beyond depth of stop reference mark.

### **Placing Cover**

1. Place cover materials from pipe bedding to 12" above top of pipe.
2. Place cover materials in uniform layers not exceeding 6".
3. Compact each layer to 98% maximum dry density in accordance with Standard Proctor Density.
4. Provide 10" layer of cover material above pipe before using mechanical compactor on top of pipe.

### **Service Inspection**

1. Do not backfill house service connections until inspected and measurements of locations have been taken by the Engineer or someone acting in his stead.

## **APPENDICES "H" "H1" "H2"**

## **STOPPING SIGHT DISTANCE**



**APPENDIX “H”**

<b>STOPPING SIGHT DISTANCE</b>								
LOT NO.	SPEED ZONE	DISTANCE FROM LOT LEFT/RIGHT	LEFT		RIGHT		PASS OR FAIL	COMMENTS
			GRADE	DISTANCE	GRADE	DISTANCE		

**APPENDIX “H1”**

**STOPPING SIGHT DISTANCES - IN METERS**

**TABLE I**

**POSITIVE GRADES**

<b>APPROACH SPEED km/h</b>	<b>0%</b>	<b>+1%</b>	<b>+2%</b>	<b>+3%</b>	<b>+4%</b>	<b>+5%</b>	<b>+6%</b>	<b>+7%</b>	<b>+8%</b>	<b>+9%</b>	<b>+10%</b>
30	30	30	30	29	29	29	29	29	29	28	28
35	37	37	36	36	36	36	35	35	35	35	34
40	44	44	44	43	43	42	42	42	41	41	41
45	53	52	52	51	51	50	50	49	49	49	48
50	62	61	61	60	59	59	58	58	57	57	56
55	72	71	70	70	69	68	67	67	66	65	65
60	83	82	81	80	79	78	77	76	75	75	74
65	96	94	93	91	90	89	88	87	86	85	84
70	109	107	105	104	102	101	99	98	97	96	95
75	122	120	118	116	115	113	111	110	108	107	105
80	137	137	132	130	128	126	124	122	120	119	117
85	152	149	147	144	142	139	137	135	133	131	129
90	169	165	162	159	156	154	151	149	146	144	142
95	184	181	177	174	171	168	165	162	160	157	155
100	194	190	186	183	179	176	173	170	168	165	163
105	205	200	196	192	189	185	182	179	176	173	171
110	216	211	206	202	198	194	191	188	184	182	179
115	225	220	215	211	207	203	199	195	192	189	186
120	235	230	225	220	215	211	207	203	200	196	193
125	246	240	234	229	224	220	215	211	208	204	200
130	257	250	244	239	234	229	224	220	216	212	208

EYE HEIGHT = 1.05m

OBJECT HEIGHT = 150mm - FOR INTERSECTIONS, COMMERCIAL & INSTITUTIONAL LOTS  
 = 600mm - RESIDENTIAL PROPERTIES

**APPENDIX “H2”**

**STOPPING SIGHT DISTANCES - IN METERS**

**TABLE II**

**NEGATIVE GRADES**

<b>APPROACH SPEED km/h</b>	<b>0%</b>	<b>-1%</b>	<b>-2%</b>	<b>-3%</b>	<b>-4%</b>	<b>-5%</b>	<b>-6%</b>	<b>-7%</b>	<b>-8%</b>	<b>-9%</b>	<b>-10%</b>
----------------------------	-----------	------------	------------	------------	------------	------------	------------	------------	------------	------------	-------------

30	30	30	30	31	31	32	32	32	33	33	34
35	37	37	38	38	39	39	39	40	40	41	42
40	44	45	45	46	46	47	47	48	49	50	50
45	53	53	54	55	55	56	57	58	59	60	61
50	62	63	64	65	66	67	68	69	70	71	73
55	72	73	74	75	77	78	79	81	82	84	86
60	83	85	86	87	89	91	92	94	96	98	101
65	96	97	99	101	103	105	107	109	112	114	117
70	109	111	113	115	118	120	123	126	129	133	136
75	122	125	127	130	133	136	139	143	146	151	155
80	137	140	142	146	149	153	156	161	165	170	176
85	152	155	159	163	166	171	175	180	185	191	198
90	169	173	176	181	185	190	195	201	208	214	222
95	184	189	193	198	203	208	214	221	228	235	244
100	194	198	203	208	214	219	226	233	240	248	257
105	205	209	214	220	226	232	239	247	255	264	274
110	216	221	226	232	239	246	253	261	270	280	291
115	225	231	237	243	250	258	266	275	285	296	308
120	235	241	248	255	262	270	279	289	300	312	325
125	246	252	259	267	275	284	293	304	316	329	343
130	257	264	271	279	288	298	308	320	332	347	362

EYE HEIGHT = 1.05m

OBJECT HEIGHT = 150mm - FOR INTERSECTIONS, COMMERCIAL & INSTITUTIONAL LOTS  
= 600mm - RESIDENTIAL PROPERTIES