



Stantec

**ENGINEERS REPORT
HAZELDEAN ROAD MUNICIPAL
DRAIN AND WATERCOURSE
MANAGEMENT PLAN**

Prepared for:

The City of Ottawa

Prepared by:

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1.0 Introduction

With respect to a petition submitted under Section 4 of the *Drainage Act* R.S.O. 1990 Chapter D.17, Stantec Consulting Ltd. (Stantec) was appointed under Section 8 and 10 of the *Drainage Act*.

An on-site meeting, in accordance to Section 9 of the *Drainage Act*, was held on August, 13 2008. At that meeting the Engineer determined that the area requiring drainage complies with Section 4 of the *Drainage Act*.

In accordance with the appointment, preparation of an Engineer's report, as per Section 8 of the Act, was dependent on the completion and acceptance of a Preliminary Report, as per Section 10 of the Act.

The preliminary report was presented on August 27, 2009, and council then requested Stantec to prepare a final report. In support of the Engineers report, a technical report containing an analysis to confirm sufficient outlet at West Ridge Road, as required under Section 15 of the Act, was completed.

The proposed Hazeldean Road Municipal "Drain and Watercourse Management Plan" is an approved "drainage works" as defined under Section 4 of the *Drainage Act* R.S.O. 1990 Chapter D.17. With the adoption of this report, the City will have the right to manage the watercourse, as set out in the report. The report deals with various aspects of Municipal Drainage, including such items as location, environmental protection, watercourse management, inspection, allowances, grant structures, future maintenance, etc.

Once this Drainage and Watercourse Management By-law has been passed, the Municipality has no authority to alter the assessments or make revisions which alter the intent of the Report under the *Drainage Act*, RSO. It is therefore important that any desired changes relating to construction be requested at the Meeting to Consider the Report.

The property owners are requested to examine the Report as it relates to their own properties, with particular attention to the location of properties and the location of the watercourse.

The Schedules included in this Report deal with the following:

- Schedule "A" Schedule of Assessments
- Schedule "B" Schedule of Allowances and Net Assessments
- Schedule "C" Plan and Profile
- Schedule "D" Detail Drawings or Figures
- Schedule "E" Permits
- Schedule "F" Technical Background Report (under separate cover).

2.0 History

The existing watercourse has no status under the *Drainage Act*. Part of the watercourse follows an existing unopened road allowance and was likely excavated along this alignment.

A chronology, using available air photos from 1948 to the present, shows that as the drainage situation deteriorated, the abutting land uses changed. From 1948 to 1976, lands with suitable soils were used for pasturing and hay. There were some wetlands, however, they were small in size and there was more mature bush than wetland. The 1976 photo shows the lands becoming increasingly wet. The aerial photos show the forest area to be reducing and the wetlands to be increasing. Also, the wetland is encroaching onto the hay and pasture lands. It appears that there is a landuse progression that can be correlated to drainage. Specifically, as the beaver activity increases, especially dam building and flooding of adjacent areas, the forest ecology and farm landuses change. Where the damming impinges onto forest areas, there is a destruction of trees, and where it impacts on pasture growth there is an abandonment of farming practices.

In 2003 a petition was submitted and it was decided that maintenance, such as the removal of minor obstructions and beaver dams, carried out along the unopened Road Allowance (between Lots 20&21 Conc.11), may be sufficient. However, this maintenance attempt did not provide sufficient outlet for the landowners thus leading to this latest petition by the area owners.

As part of the onsite meeting, in the late summer of 2008, the landowner group at the meeting, along with the City and the Mississippi Conservation Authority discussed a means to allow for improved drainage. It was concluded that the preferred approach would be to restore the channel to pre-existing conditions, substantially to remove the obstructions, and allow for surface drainage of abutting lands. In November of 2008 a preliminary survey was carried out to establish geodetic elevations at key locations from Station 1+000 (Lot18 Conc.12 at Hwy 7) downstream to Poole Creek station 5+923.8 (i.e. Lot 22 Conc. 11). An additional survey was carried out on February 25, 2009 to verify culvert inverts, water levels, profiles, watershed areas, and beaver dams on the lower portion south of the old CN railway (now the Trans Canada Trail).

A final survey was conducted on November 23 2009, and the design/existing profile including some of the existing (i.e. at the time) beaver dam locations is provided in Schedule "B".

3.0 Location

The Main Watercourse commences at Hwy #7 station 1+000 in Lot 18 Concession 12 and flows in a southeasterly direction for approximately 400m meters where it crosses a new concrete culvert under a newly constructed Rothbourne Road at station 1+636. It then continues in a southeasterly direction to the south limits of Lot 20 at station 2+443.7. From here the watercourse crosses Hazeldean Road through a concrete box culvert. It then turns 90 degrees east and flows along the south boundary of Hazeldean Road for a distance of approximately 270 meters to station 2+717.3. At this point the watercourse turns 90 degrees south and follows the unopened road allowance between Lots 20 and 21 Conc.11 for a distance of approximately 722.7 meters to station 3+440. At this point the lands are very flat to depressional and the abutting lands are inundated with water. The flooded area impacts approximately 1100 meters of the channel reach extending from approximately station 3+440 to the abandoned CN railway (Trans Canada Trail) at station 4+475.7 (Lot 20 Conc. 10 & 11). The watercourse crosses the Trans Canada Trail flowing south, through a concrete culvert and flows in a southerly direction to station 4+796 (between Lots 20 and 21 Conc.10) where it then turns to flow north easterly. It crosses the abandoned CN railway flowing north at station 5+212.6 (approximately midpoint of Lot 21 between Conc.10 and 11). It then turn east and continues in an easterly direction to outlet into Poole Creek at station 5+923.5, at West Ridge Road. (In Lot 22 Conc. 11)

The length of this watercourse is 4,923 meters and the drainage area is approximately 858 hectares.

The actual location of the Main Watercourse is shown on the attached location plan, watershed and watercourse profile (Schedule C).

4.0 Watershed Characteristics

4.1 SOILS

The subject watershed is comprised of a large number of soils of varying physical make up. The soils within the watershed basin are described under two general groups for the purpose of identifying their physical makeup and stability as follows:

4.1.1 - Organic Soils

Goulbourn peat soils along with Grenville fine textured soils is the predominate soil found along the watercourse from station 2+443.7 (Hazeldean Rd. to its outlet at 5+779.8 (West Ridge Rd).

The peat soil is generally comprised of an organic layer of varying depths made up of partially decomposed vegetative matter underlain by sandy or loamy soils. Peat soil has a reasonable agricultural potential when properly maintained and drained.

Peat soil is unstable and presents problems when excavated as part of a channelization project. The Hazeldean Road watercourse intersects the predominately peat soil type from station 4+475 (Trans Canada Trail) to station 3+440. Pockets of this soil are expected at various other locations along the drain.

4.1.2 Fine Textured Soils

Jockvale sand is the predominate soil found at the upstream end, from Station 1+000 to Station 2+443 of the watercourse. This soil is a fine sandy loam and is unstable when encountered during excavation. It has limited agricultural capability but can be used for pasture and hay crops.

Farmington soils are a fine textured soil consisting of shallow soils overlying limestone. It tends to be limited in agricultural capability. Prior to the current poor drainage conditions, the Farmington loam soils were farmed as pasture lands and hay fields. Although a significant soil type within the watershed, the subject watercourse does not intersect this soil group.

4.2 WETLANDS (GOULBOURN COMPLEX)

Within the subject watershed, the City of Ottawa Official Plan (OP) has identified approximately 200 ha of the Goulbourn wetland complex. The Hazeldean Road Watercourse provides outlet for this wetland. The purpose of the proposed drainage works centers on beaver dam removal and control, therefore the depressional wetland areas within the watershed will remain unaffected by the proposed drainage and watercourse management plan.

4.3 THE UPSTREAM/DOWNSTREAM IMPACTS OF BEAVER DAMS

The cost of maintaining beaver pond levels is not considered feasible, and the flooding effects of a beaver community cannot be managed. Typically, the MNR would acknowledge that beaver dams are temporary structures, rather than attempting to incorporate beaver dam ponding as part of the stream hydraulics.

It is recognized that the development of a drainage and watercourse management plan, in an area of diverse interests and resources, must be carried out in a manner which recognizes the various constraints imposed by the regulatory agencies. Accordingly, permits are required prior to proceeding with any work.

Under **Section 6** of the *Drainage Act*, a specified public agency may request an environmental appraisal of the drains affect on the area, "the cost thereof shall be paid by the party who requested it".

4.4 LEGAL AND SUFFICIENT OUTLET

In compliance with Section 15 of *Drainage Act R.S.O. 1990 Chapter D.17*, "Subject to section 32 (Allowance for damage due to insufficient outlet), every drainage works constructed under this Act shall be continued to a sufficient outlet", a technical report was prepared to assess the hydrological sensitivity of the watercourse before and after the recommended improvements.

A technical analysis of the proposed drainage works is attached in Schedule F. That analysis concluded that the flow impacts of the proposed beaver dam removals are as follows:

- For significant flood events, there is an insignificant reduction in flow rate.
- For a minor rainfall event there is a minor increase in flow rate.

The technical analysis indicates that, Poole Creek at West Ridge Road is a good and sufficient outlet. Accordingly there is no requirement to extend the Hazeldean Road Municipal Drain and Watercourse Management Plan beyond the West Ridge culvert.

5.0 Area Requiring Drainage

The benefits of the proposed Hazeldean Road Municipal Drain and Watercourse Management Plan will include:

- Improved outlet for the City Roads and MTO's Highway 7.
- Improved agricultural land use for the agricultural lands upstream of Hazeldean Road.
- Profile grade improvements are not cost/environmentally justified. By removing obstructions from the watercourse, the basic channel characteristics will be restored to pre existing conditions.
- The removal of beaver dams and other obstructions will reduce the risk of a catastrophic water release due to a dam failure, (i.e. Protecting City Roads and Trans Canada Trail stream crossings).
- The control and removal of the nuisance beaver activity from the Hazeldean Road Municipal Drain will assist in reducing the rate of its territorial expansion downstream along Poole Creek.

6.0 Improvements and Recommendations

The petitioners throughout the basin are in areas of severely degraded natural drainage and in order to restore preexisting farming operations there must be improvements to the drainage system.

It is my recommendation that the existing watercourse be given legal status under the *Drainage Act*. By providing for a working space along the watercourse, the City will be able to remove the beaver dams and other obstructions within the watercourse, thus improving the watercourse hydraulics. Also the Engineers Report proposes that the Trans Canada Trail culvert be replaced, and there would be an initial overall cleaning of the watercourse. However, the channel shall not be deepened beyond the existing grade.

The Municipal Drain and Watercourse Management status will end at Station 5+923.8 (i.e. the culvert at West Ridge Road). Upstream of West Ridge Road the improvements are described as follows:

- Upstream from Station 5+923 (i.e. the outlet at Poole Creek); to Station 4+475 the removal of beaver dams and obstructions is proposed.
- The Trans Canada Trail (TCT) culvert crossing at station 4+475.7 (Center Line) would be replaced with a culvert of equivalent size and at the same invert.
- No excavations will be carried out in the flooded area upstream of the Trail culvert between Stations 3+440 to 4+475.7.
- Upstream of station 3+440 to 1+000 the channel cleaning may include minor channel excavations but not deepening. The excavated material will be spread out along the adjacent land, outside of any inundated wetland.

7.0 Design Recommendations

It is my recommendation that the watercourse be improved in accordance with the accompanying Plans, Profile and Specifications. I feel that the recommendations in this report will provide the roads and benefitting lands in the watershed with adequate drainage without extensive excavation that could impact downstream flows.

This report provides Municipal Drainage Act status to this watercourse from the upper construction limits at Hwy 7 to Poole Creek at West Ridge Drive. This status will provide the municipality with a means to remove debris and to maintain a reasonable conveyance capacity.

The following sections deal with the various aspects of Municipal Drainage as it relates to construction.

7.1 CONSTRUCTION PROVISIONS-GENERAL

All the owners having the watercourse passing through their lands are requested to review all construction provisions for their lands, including earth disposal locations, spoil pile disposals, rip rap locations, private culverts, tile outlets, fencing locations, and excavation locations. Any request for changes to any of these provisions must be made at the Meeting to Consider the Engineering Report.

7.1.1 Design

The design of the watercourse is based on lowering standing water levels by the removal of beaver dams, some minor channel cleaning and the repair of culverts.

7.1.2 Channel Section

Random and limited channel cleaning may also require some channel reshaping to stabilize the banks against erosion.

Channel reshaping shall be from one side of the drain, maintaining the existing vegetation as much as possible. In unstable sand areas (i.e. upstream of Hazeldean Road, and along Hazeldean Road) the new channel side slope shall be 2.5 horizontal to 1 vertical, and in quasi-stable silt areas (i.e. downstream of Hazeldean Road to station 3+440 and downstream of the Trans Canada Trail Culvert to the Station 5+923.8) the channel side slope shall be 1.5 horizontal to 1 vertical.

7.1.3 Alignment

The channel alignment is noted on Drawing #1. Changes in alignment are not allowed after the report is adopted by the Municipality, therefore any relocation or changes must be established before the Meeting to Consider the Engineers Report.

7.1.4 Private Crossings

At present there are no existing private culverts. Any additional culverts are to be determined at the meetings to consider this report as mentioned in the Construction Provisions- General section.

Future private crossings installed by the landowner shall not impact upstream land usage by obstructing drainage flow. The proponent of a new private crossing shall obtain approval from CA/DFO/M.N.R. and the Municipality Drainage Superintendent. Provided the costs are paid for by the proponent there is no requirement to update this drainage report for new private crossings.

7.1.5 Road/Trans Canada Trail Crossings

The Rothbourne Road concrete culvert at station 1+636 is of sufficient size and width and does not need to be replaced.

The Hazeldean Road concrete culvert at Station 2+443 is of sufficient size and depth and does not need to be replaced. Any work required to clean out the existing concrete culvert will be at the cost of and carried out by the Road Authority.

The second concrete culvert crossing Hazeldean Road at station 2+717 is of sufficient size and depth and does not need to be replaced. Any work required to clean out the existing concrete culvert will be at the cost of and carried out by the Road Authority.

The Trans Canada Trail concrete culvert at Station 4+475 is of sufficient size and depth. However it appears to be damaged and partially blocked. It needs to be replaced with a 6.5 meter long 1390mm by 970mm pipe arch CSP. The invert should be placed 200mm below the channel invert as indicated on the report profile. Any work required to replace the culvert will be at the cost of and carried out by the Road Authority.

New road culverts are to be sized in accordance with local municipal requirements. Proponents of these road crossings shall obtain all necessary approvals as is required by Municipal, Provincial and Federal regulations. Provided the costs are paid for by the proponent there is no requirement to update this drainage report for new culverts installed as part of a road crossing.

7.1.6 Environmental Consideration

Whenever possible the design includes measures which are intended to minimize environmental degradation.

Prior to construction and as the work progresses, sediment/erosion control measures are to be implemented by the Contractor to reduce the possibility of sediment being transported downstream. Sediment traps are required downstream of each excavation area.

7.1.7 Plans and Profiles

The plans show the general location of the works and adjacent lands and have been determined by use of aerial field measurements and Municipal records. The profiles show the dimensions, grades, and any other particulars of the works.

7.1.8 Obstruction and Damage of the Watercourse

Attention is drawn to Sections 80, 82 and 83 of the *Drainage Act* regarding responsibilities of owners with respect to the obstruction and damages to the watercourse.

7.1.9 Clearing

Landowners are advised that the Contractor will clear only those trees, which may affect its operation within the working area. All trees having a diameter of 150 mm or greater shall be cleared of limbs and cut in reasonable length and neatly piled clear of the watercourse so that the wood may be salvaged by the property owner. All brush, limbs, stumps and other debris resulting from the cleaning operation shall be piled on the adjacent lands as directed by the landowners.

7.1.10 Excavation

The watercourse shall be maintained as open channel with side slopes and watercourse bottom width as specified on the design profile and plans.

7.1.11 Disposal of Excavated Materials

Except for the removal of obstructions (i.e. beaver dams and debris), there is no excavation. Debris excavated from the watercourse will be spread on site, adjacent to the watercourse.

All landowners having the watercourse pass through their properties are asked to review the material disposal provision and make any request before the Meeting to Consider the Engineering Report.

7.1.12 Permit Requirements & Underground Utilities

It is expected that underground utilities lines will be encountered during the construction of the Trail Culvert. A copy of the drawing must be submitted by the contractor to the Public Utilities so that these Public Utility companies may show their underground lines on the plan. A copy of the plan must be returned to the Engineering Firm prior to commencing with the construction. The contractor shall also require all Public Utilities to mark all underground utilities in the field before commencing with the construction.

All necessary permits from Public Utilities and the Conservation Authorities will be obtained prior to work commencing. The Conservation Authority Permit is attached hereto.

7.1.13 Erosion Control**1) Seeding**

There is no new seeding along this drain. To maintain the natural vegetative environment the excavated material will be left natural and allowed to vegetate with native plant species.

2) Buffer Strips

A buffer strip of natural vegetation, at least 5 meters wide along the watercourse edge is recommended. It is recommended that access to the drain be from one side where the buffer could be natural grasses and opposite side should include tree cover to enhance cooling of the water. It is recommended that the farmers take hay off their buffer strips but do not till the soil.

3) Fencing

Where fences are encountered or for access to the watercourse, it will be the contractor's responsibility to remove the existing fence and re-erect the fence in a condition equal to or better than the condition of the fence prior to the commencement of the work.

Any fencing required to prevent cattle from entering the watercourse shall be at the cost and responsibility of the individual landowner.

4) Rip Rap or Bio Engineering Erosion protection

Rip Rap with filter cloth may be placed at the ends of new culverts. Elsewhere, at bends, lateral drains and channel drops, where erosion is observed to be a problem, bio engineering techniques such as root wads, live staking, brush layering, and coir logs shall be used to retain the soils from further erosion.

5) Straw Bale Flow checks and Sediment Trap

Sediment trap excavation shall be 15 m in length and 0.3 m below the proposed grade (watercourse bottom) directly upstream of the straw bale flow checks. Accumulated sediment in sediment traps shall be removed as necessary to affect maintenance repairs and immediately prior to the removal of the flow check.

8.0 Assessments

The following sections deal with the various aspects of Municipal Drainage as it relates to costs, allowances, grant structure and assessments.

8.1 COST ESTIMATE

The cost is an approximate cost and would be subject to tender and final construction costs. Increases over the estimated cost are covered under section 59 of the Act. The contingencies are set at 15%.

8.1.1 Main Watercourse

Cleaning and Beaver control	\$19,000.00	
Supply and Place Trail Culvert (Section 26)	\$20,000.00	
Sediment Traps 3 each @ \$1,000.00	\$3,000.00	
Sub Construction Cost (Main Drain)	\$41,750.00	\$42,000.00

8.1.2 Other Costs

Preliminary Engineers Report	\$36,000.00	
Engineer's Report including meetings	\$20,000.00	
Technical Report	\$25,000.00	
Contract Administration and Supervision	\$20,000.00	
Carrying Costs	\$10,000.00	
SUB-TOTAL (Other Costs)	\$111,000.00	\$111,000.00
Allowances for future access	\$12,000.00	\$12,000.00
Construction Contingency Allowance 15 %	\$23,000.00	\$23,000.00
Total Estimated Cost		\$188,000.00

8.1.3 Construction cost

This cost is calculated using estimated quantities of material required to complete the proposed initial drainage tasks, and using the results of past projects that have established average Tender Prices for each item of work. The final value of the construction portion cannot be established until tenders are called and opened. If a tender that may be accepted is 33%

greater than the estimate herein, a further meeting may be held to discuss the project with the affected owners (Section 59). The project costs then stop upon payment of engineering fees, be continued, be re-tendered, or be referred back to the Engineer for modification.

Included in the cost estimate are contingency items that may be applied towards the cost of unforeseen obstacles or additional work. Unfavorable, soil conditions (fine soils and high water table, very stony conditions, and rock) and private underground utilities or site erosion control are examples of the work that these contingency items may be applied towards.

8.1.4 Allowances

Allowances are made under Section 29 & 30 of the *Drainage Act* for the right-of-way and for damages to lands on which the drainage works is constructed and to those lands on which excavated material will be spread.

The *Drainage Act* provides that the Engineer shall estimate and allow money to the owners for any land that is necessary to use for construction of improvements and for disposal of material removed from the drainage works or for damages to the land.

Allowances are to be provided for right-of way (Section 29) access and damage or limitations to land or crops, (Section 30).

Where it is necessary to gain access to the route of the watercourse by crossing private lands, a nominal amount has been included. The contractor is expected to confine his travel along one route until reaching the working space along the drain.

The area damaged is calculated using the length and width of the affected area.

8.1.5 Engineering

The Engineering cost estimate is divided into four parts; preparation of the Preliminary Engineers report, preparation of a final Engineer's Report preparation of a Technical Report, and Contract Administration and Supervision. The cost of the preliminary report is known at the time of the report filing.

The engineers cost related to possible tribunal hearings, Ministry approvals or referring the report back to the engineer is not included in the estimate.

8.1.6 Changing the Scope of the work

Should charges, deletions or extensions in construction be requested or required after the by-law is passed and the contract is awarded the report must be amended and a revised By-law must be passed. Since this project will be constructed through provisions of the *Drainage Act*, a By-law must first be passed to authorize the work. Changes to the work are not to be undertaken without a change in the by-law unless the changes can generally be completed for

less than the contingency estimate of 10% of the construction costs, if it is desired to make any substantial increase or decrease in the scope of work as designed it will be necessary that either a revised report be prepared and processed or if the desired works are considered to be a gross error in accordance with the *Drainage Act*, that an application be made to the Ontario Drainage Tribunal pursuant to Section 58(4) of the *Drainage Act* to obtain approval for such change. If unforeseen obstacles are encountered and can be completed for the amount within the contingency allowance, the by-law does not require modification. If any individual or group of owners require additional work and are prepared to apply for such and do not wish to be part of the Drainage Works they may make their own arrangements with the contractor but the Engineer must approve such an order.

8.2 COST RECOVERY

The *Drainage Act* requires that the total estimated cost be assessed against the affected lands and roads. The various assessments are described in the *Drainage Act* from Section 21 to 28.

8.2.1 Benefit

Benefit by definition under the *Drainage Act* is the advantage to any lands, roads, buildings or other structure from the construction improvements, repairs or maintenance of a drainage works such as will result in a higher market value or increased crop production or improved appearance or better control of the surface or subsurface water, or any other advantage relating to the betterment of lands, roads, buildings, or other structures.

8.2.2 Outlet

Lands and roads which may be accessible for outlet liability are those lands that use a drainage works as an outlet or for which after construction or improvements of the drainage works an improved outlet is provided. The outlet or improved outlet may be provided either directly or indirectly through any drainage works, swale, ravine, creek or drain. Assessments for outlet are based on location, area and rate of flow.

8.2.3 Special Benefit & Assessment

Means any additional work or feature included in the construction, repair or improvement of the drainage works that has no affect on the functioning of the drainage works.

8.3 GRANTS

A one third grant may be available for agricultural lands. If the proposed drainage and watercourse management plan proceeds it will be entered onto the "Drain Queue Notification" to The Director with the Environmental Policy and Program Branch of the Ministry of Agriculture, Food and Rural Affairs.

8.4 ACTUAL COSTS

The actual costs will be used to determine the final assessments. The amount of the final bill will be prorated with the assessments so that all the costs are recovered.

9.0 Future Maintenance

Future Maintenance associated with the Hazeldean Road Municipal Watercourse Management Plan shall be the responsibility of the Corporation of the City of Ottawa, although the individual owners shall be responsible for periodic inspection of the watercourse and reporting maintenance problems to the City of Ottawa.

The Mississippi Valley Conservation Authority on behalf of DFO will undertake a Fish Habitat and Class Authorization of the watercourse for its future maintenance. This will streamline the review and approval process related to impacts of watercourse maintenance activities on fish habitat.

In accordance with the MVCA permit, future channel maintenance, including beaver dam and related sediment removals, shall be limited to a distance of 5% over the drain length (4,923 metres). The debris and excavated material shall be spread on lands adjacent to the watercourse but shall not affect wetlands that are inundated by water. All future maintenance shall be done in accordance with the Construction Provisions in this report.

The Contractor shall be responsible for making good any construction defects found in the work for a period of one year from final acceptance date of the work. This obligation shall include such items as culverts, Rip Rap etc. but shall not include for normal erosion or sedimentation of the drain. Special Benefit Assessments are not applicable in prorating future maintenance assessment noted within Schedule A.

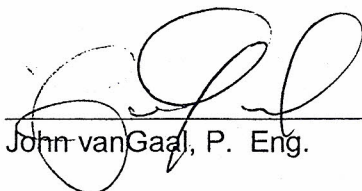
Maintenance of Private Culverts and Fences shall be the responsibility of the Landowner.

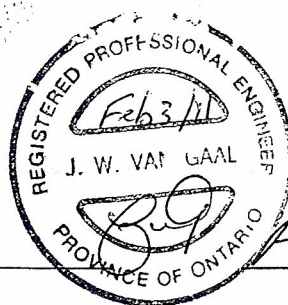
9.1 WORKING SPACE SECTION 63, THE DRAINAGE ACT, RSO

Under this section of the Act the working space of the Watercourse shall be 15 meters from the Top of Bank, on the west and north sides. No obstructions should be within this working space.

This provision allows the City's Drainage Superintendent access to the affected lands for watercourse maintenance

All of which is respectively submitted,


John van Gaal, P. Eng.



Feb 3, 2011
Date