

Oakville Acres Detention Pond Watercourse and Wetland Alteration Application Supplementary Information Report

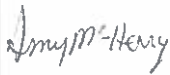

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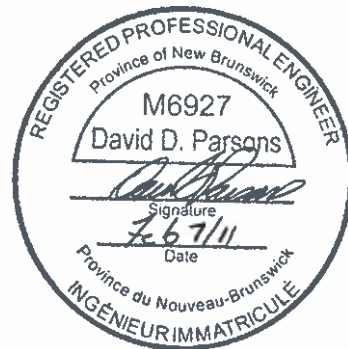


CBCL LIMITED

Consulting Engineers

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CHAPTER 1 GENERAL PROJECT INFORMATION

1.1 Introduction

The Town of Rothesay (Town) has engaged the services of CBCL Limited (CBCL) to complete the necessary engineering, design and environmental permitting associated with the construction of a detention pond at Oakville Acres and installation of an emergency diversion pipe.

This document has been prepared to supplement the Watercourse and Wetland Alteration (WAWA) Permit Application, which is included in Appendix A, originally submitted to NB Department of Environment (NBDENV) on December 23, 2010. The limits of the project, as well watercourses and delineated wetlands can be seen on Drawing B1 - WAWA.

This project involves the construction of a storm water detention pond with approximately 50,000 m³ of storage along with the installation of 99 m of 1800 mm dia. overflow pipe and 268 m of 2400 mm x 1800 mm diversion box culvert. The overflow and diversion pipe system runs along a proposed easement between Monaco Drive and the Hampton Road. The new storm water diversion pipe will be installed in a new easement parallel to existing power and communication lines. A WAWA Permit is required for work being performed near or within the following watercourses / wetlands. All watercourses / wetlands are located in Kings County in the Parish of Rothesay.

1. Delineated Wetlands: Construction of the detention pond and installation of outlet pipe to an unnamed watercourse. (PID 30189617, 30186811, 30185995, 00074906, 00231316, 30252068, 30053219, 30186068 30077754, 30277636, 30276125, 30182604 30021539, 00441998)
2. Unnamed Watercourse tributary to Salmon Creek: Installation of the diversion pipe outfall to and within a second unnamed watercourse. (PID 30196570)

This document is also meant to be a complete document containing all environmental reports completed for the Oakville Acres Detention Pond Project including general project information, description of fish and fish habitat, Watercourse and Wetland Alteration (WAWA) Permit Application (Appendix A), Environmental Management Plan (EMP) Draft Report (Appendix C), and the Wetland Delineation and Preliminary Functional Analysis Report (Appendix D). Additional follow up to the preliminary functional analysis report will be completed in late spring.

It should be noted that on December 14th and 15th, 2010 CBCL personnel completed the field work to delineate the wetland area affected by the proposed project as well as further information to complete the preliminary functional analysis report. On January 5th, 2011, CBCL visited the site with Leanda Delaney from Fisheries and Oceans Canada (DFO). During that visit, DFO informed CBCL that the alterations involving both unnamed watercourses were likely to result in a Harmful Alteration, Disruption or Destruction (HADD) of fish and fish habitat.

Including all areas disturbed by both the detention pond and the diversion pipe, the estimated total HADD footprint for the project is approximately 988.1 m². As the watercourse flowing through the proposed detention pond site is fed by storm sewers, the amount of water in the watercourse varies along the length of the detention pond. The amount of water flowing through the watercourse in upper reach of the detention site is significantly less than found in the lower portion. DFO personnel recommended electrofishing of the upper reaches of the watercourse in the spring. This would determine whether or not a portion of the watercourse could be deemed as non-fish bearing resulting in a potential reduced HADD footprint.

1.2 Proponent

Name of the Undertaking:	Oakville Acres Detention Pond
Name of the Proponent:	Town of Rothesay 70 Hampton Road Rothesay, NB E2E 5L5
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Engineering Consultant Contact:	Amy McHarg, M.A.Sc., P.Eng. CBCL Limited 22 King Street P.O. Box 20040 Saint John, NB E2L 5B2 Tel: (506) 633-6650 Fax: (506) 633-6659 Email: amym@cbcl.ca

CHAPTER 2 THE UNDERTAKING

2.1 Project Overview

Over the past few years, the residents of the area known as Oakville Acres (Rothesay, NB) have been hit with severe flooding on multiple occasions (Tropical Storm Hanna – September 2008 and Tropical Storm Danny – August 2009). During the major storm events, large amounts of water, at excessive rates, flow through this otherwise peaceful neighbourhood creating turbulent, dangerous conditions in the ditches that run in front and through the yards of the neighbourhood.

After the first storm and subsequent flooding, the Town of Rothesay commissioned CBCL Limited to study the cause of the flooding and to investigate possible means to reduce flood risks.

The study, entitled “Salmon Brook Watershed – Flood Reduction Study” was submitted to the Town in January 2009.

A closer look at the watershed and drainage pattern in the Rothesay / Quispamsis area has revealed that run off from a large, well developed area (190 hectares) up gradient to Oakville Acres funnels through this subdivision. Contour mapping clearly shows that these houses were built in a flood plain and as such, in significant storm events, there is a high risk of flooding.

2.2 Need for Undertaking

In January 2009, a report on the extents and causes of flooding that occurred in Oakville Acres subdivision on September 6th and 7th 2008, was submitted to the Town and presented to Council on February 9th, 2009. The Salmon Brook Watershed – Flood Reduction Study determined that the channel through the study area conveys flows from the upper reaches of the Salmon Creek watershed, an area of approximately 190 hectares. Most of the tributary area is developed; the undeveloped areas are at the highest reaches in the watershed and in the areas immediately adjacent the study area.

As the watershed upstream from the site is mostly developed and at a relatively steep grade, storm water collects very rapidly. The existing storm water channel is situated behind several houses. During large rainfall events the backyards become very quickly flooded with fast flowing flood

waters. Located in a well populated residential area these flood waters pose a great risk to residents property, health and safety.

The 2009 study looked at various options to reduce the flood waters through Oakville Acres by means of detention and diverting the storm water around the subdivision. Diverting the water around the subdivision without including detention was not a viable option as it only moved the flood risk further downstream. This left the option for storm water detention combined with overflow diversion as the solution. The area required for the detention pond to handle a 1:100 year rainfall event was not available therefore the detention pond has the capacity to hold an approximate 1:50 year event with the diversion overflow capable of handling the 1:100 year flow. As the majority of the watershed is already developed, available land with sufficient capacity to accommodate a detention pond of the required size is extremely limited. The only land available that has adequate size and location is the proposed site. The existing site contours form a partial bowl that would require site grading and construction in order to detain the required detention volume. With the site for the proposed detention pond decided, the overflow and diversion pipe alignment was chosen.

With limited access to available land, the diversion pipe route was selected to run between Monaco Drive and the Hampton Road. This pipe would then discharge into an existing unnamed storm water channel that is a tributary to Salmon Creek. This diversion pipe is required to carry flows from the pond once the pond storage capacity has been exceeded.

2.3 Fish and Fish Habitat

The watercourse of concern for this project is a small, unnamed tributary of Salmon Creek, which is a coldwater stream that drains into the Kennebecasis River before discharging into the Bay of Fundy via the St. John River. The watercourse originates as apparent drainage in a highly developed area of Rothesay. The most northern, upstream reach of the watercourse begins near the Pettingill Road where water collects along the roadway and drains under the road, towards the site, via a culvert. This then joins with the drainage water discharging through culverts from the heavily developed areas up gradient of the site. The resultant watercourse then flows through residential development and discharges into Salmon Creek downstream of the project site.



Unnamed tributary flowing through a wooded area near a residential development.

Land uses adjacent to the unnamed tributary include primarily residential development, commercial, some small wooded sections, and the heavily developed areas at the upstream ends as noted above.

Habitat characteristics throughout the residential portions included in the site appear to be supportive of important fish species such as trout and include numerous pools and ample in-stream

cover. In-stream substrate varied by location, but was generally composed of sand, fines and pebble, with some cobble and rock in places. Bankside vegetation was a mixture of trees (hardwood and softwood), shrubs and grasses. Upstream residential sections appeared to be increasingly influenced by adjacent development as litter became more prominent in the streambed and surrounding environment and water clarity decreased.

The most northern stem of the watercourse included in the site had habitat characteristics that were not ideal for species such as trout. The channel was less defined, water flow was low and bankside vegetation was minimal to none. Where this section approached the confluence of the main drainage channel and entered a wooded area, the habitat characteristics became more favourable. However, it is uncertain if trout inhabit this vicinity and a future electrofishing survey, to be conducted in the spring, will confirm their absence or presence.



Upstream reach of the unnamed tributary as it approaches a wooded area.

Culverts draining the parking lot and buildings of the developed area at the upper reaches of the main channel are set at a steep slope and are exceeding a length typically travelled by trout. This area is therefore not considered fish habitat. The culverts themselves also extend outside of the project site.

The unnamed tributary to Salmon Creek does provide good habitat for some fish species, despite non-ideal in-stream habitat characteristics in upstream reaches. A 2009 electrofishing survey conducted by Atlantic Coastal Action Program, Saint John (ACAPSJ) in an area just downstream of the project site resulted in the collection of four fish comprising two species; blacknose dace (*Rhinichthys atratulus*) and brook trout (*Salvelinus fontinalis*). A similar survey conducted on Salmon Creek itself found 11 fish comprising three species; the addition of American eel (*Anguilla rostrata*).

The St. John River supports a wide assemblage of fish species. While the presence of the above mentioned species has been confirmed through electrofishing in the area, being hydraulically connected to the St. John River, it may also be utilized by other species within areas of the proposed activity. Other species that could be found in upstream reaches of Salmon Creek and possibly extending to the unnamed tributary of interest include rainbow smelt (*Osmerus mordax*), smallmouth bass (*Micropterus dolomieu*), brown bullhead (*Ameiurus nebulosus*), shortnose sturgeon (*Acipenser brevirostrum*), chain pickerel (*Esox niger*), Atlantic salmon (*Salmo salar*) and several species of minnows and stickleback. Of all of the potential species to be found within the area of the proposed activity, those of interest within the commercial fishery include only American eel and rainbow smelt. Species of importance that are both confirmed and suspected to be within the area of the proposed activity are discussed further below:

2.3.1 Brook Trout

The brook trout, or speckled trout, is native to North America and is distributed widely throughout the Maritimes. It is a very popular species for angling in New Brunswick as they can live in a variety of different waters including ponds, rivers, and lakes. Their preferred habitat includes cool, clear waters with deep pools and ample hiding places with temperatures that range from 10 to 18°C. Spawning for brook trout occurs in the fall, typically from September to November. They rely on shallow, gravel-bottomed streams to lay their eggs in which the young emerge from in the spring after overwintering there.

Migration periods for trout that go to sea for short periods occurs in the spring and early summer, remaining in waters near their home streams for approximately two months before returning to freshwater. Trout are considered mature at three years old and rarely live greater than five years. In an electrofishing survey conducted by ACAPSJ in 2009, brook trout were confirmed to be in the unnamed tributary of concern for this project.

2.3.2 Atlantic Salmon

Atlantic salmon inhabit 7 major rivers of the “Outer Fundy” region of Southwestern New Brunswick which includes the Saint John River. Atlantic salmon that spawn in the St. John River are of the same population that migrate to Greenland and Labrador to feed and mature. In 2001, spawning returns to the St. John River was less than 3,000 adult and grilse. The vast majority of adult St. John River salmon pass through the St. John Harbor between June 1 and July 15 (DFO, 1997).

Since the year 2000, Atlantic salmon representative of the St. John River and members of the Bay of Fundy population has not met its conservation requirement. The reasons for their decline in the region are unknown, but the lead causes of decline in freshwater habitats have been attributed to habitat loss and interbreeding with cultured species.

2.3.3 American Eel

The American eel was assessed by the Committee of the Status of endangered Wildlife in Canada (COSEWIC) as a species of Special Concern in April 2006. Since the 1970s, American eel abundance has declined significantly in the Upper St. Lawrence River and in Lake Ontario. Possible causes of the observed decline have been related to habitat alteration, dams, fishery harvest, oscillations in ocean conditions, acid rain and contaminants (COSEWIC, 2006). There have been no signs of significant American eel decline within the Maritime region due to the collapse of the Lake Ontario/ Upper St. Lawrence population; however, it has been noted that the timeframe has not been long enough to fully understand possible implications.

The American eel is catadromous, spending most of its life in freshwater and returning to salt water to spawn between August and December. Peak migration occurs in the September to October period. Eels may remain in freshwater from 5 to 20 years. Eels also undertake long oceanic migrations to the Sargasso Sea to spawn. The buoyant eggs float to the surface, hatch and develop into larvae, which drift with ocean currents to the coastal areas of North America. Glass eels (juveniles) are attracted to freshwater and actively migrate into brackish estuaries and freshwater. Glass eels and elvers reach the Maritime coast in April and May. The St. John River does support a

small eel fishery and recent catch trends of American eel have been relatively healthy throughout the St. John River in areas where barriers to migration are not present. In an electrofishing survey conducted by ACAPJS in 2009, American eel were found in Salmon Creek, but were not captured in its tributary, the watercourse of concern for this project.

2.3.4 Shortnose sturgeon

This species is ancient and long-lived and is known to only one river system in Canada, the St. John River. This anadromous species requires unhindered access to freshwater for spawning, however it is suspected that this population may have been divided since 1967 by the Mactaquac Dam. These large, slow growing, late maturing fish are conservation dependent. There is some risk to the species through mortality from hydroelectric facilities, by-catch in alewife and shad fisheries, and poaching. However, there is no immediate threat that would lead to elimination of the population in a very short period of time (COSEWIC, 2005). It was, however, designated a species of special concern in 1980. The shortnose sturgeon is known to the St. John and Kennebecasis River systems which are connected to the watercourse of concern. While younger, smaller specimens often travel further upstream than their older, larger counterparts, it is unlikely that they would be found as far upstream as Salmon Creek and its tributaries.

2.4 Description of Work

Task 1 CONSTRUCTION OF DETENTION POND

Based on mapping completed by CBCL Limited in December 2010, the proposed detention pond will be constructed around an existing wetland and watercourse (Drawing B2 - WAWA). In the middle of the wetland there is 397 lineal metres of an unnamed watercourse, which is fed by municipal storm sewers.

On January 5th, 2010, CBCL visited the site with a DFO representative. During the site visit, multiple fish were observed in the unnamed watercourse. Based on observation and previous information, the DFO representative informed CBCL that the impacts of the detention pond construction will likely result in a HADD. Due to a lack of alternative sites, the location of the proposed detention pond cannot be moved to avoid this area.

Due to the existing ground contours, this site currently provides limited stormwater detention. With low stream bank height, the existing unnamed watercourse currently floods its banks during large rainfall events. Observations while on site confirmed debris and sediment outside the primary channel. As there were no major restrictions within the existing watercourse, the stormwater storage potential in the wetland has not yet been reached. Water currently floods beyond the banks of the unnamed watercourse and surcharges the existing channel downstream in Oakville Acres causing flooding in the residential area.

As the detention pond will cause new fluctuations in the watercourse water level, the entire length of watercourse through the detention pond is considered a potential HADD. The footprint of the HADD due to the detention pond construction will result in 833.9 m² of watercourse alteration. Refer to Drawing B5-WAWA for the future flood limits within the proposed detention pond.

The banks of the watercourse are vegetated. The width of the unnamed watercourse is between 1 m and 3.4 m wide. Looking downstream, the height of the right and left banks are approximately 0.8 m and greater than 1.0 m, respectively.

As the watercourse is fed by storm sewers the amount of water in the channel varies along the length of the detention pond, with flow in the upper reach being limited. DFO personnel recommended electrofishing of the upper reaches of the watercourse in the spring. This would determine whether or not some of the watercourse could be deemed as non-fish bearing, resulting in a reduced HADD footprint.

The construction of the detention pond had two objectives; first to achieve 50,000 m³ of storage capacity and secondly to disturb as little wetland and watercourse as possible. As the detention pond must be in a position to receive storm water, it is required to be situated around the watercourse. Also, due to the nature of the detention pond, requiring a large flat area around the watercourse, it is very difficult to avoid the wetland areas. Once the site was chosen, it was decided to disturb as little wetland and watercourse as possible.

The main detention berm must be built across the watercourse in order to achieve the required storage volume at the detention pond outlet. At this location the berm crosses perpendicular for 40 metres of the watercourse and through the wetland. In the centre of the berm there will be a storm water pipe that will allow fish passage in and out of the detention pond. This storm water pipe will be constructed to DFO fish passage guidelines and will allow for everyday flow to pass unobstructed through the berm and will include a plunge pool at both ends of the pipe.

At the upper north-east end of the detention pond there is an existing pumping station. In order to protect the pumping station from the rising stormwater, a berm will need to be built around the pumping station. Once completed, the toe of the berm will be located in what is now the watercourse/wetland. This will require a permanent shifting of the watercourse approximately 5 m toward the west for a length of 45 m along the berm. It should be noted that 20 m of the watercourse in this areas is already flowing in a man-made channel.

Several existing culverts currently feed the unnamed watercourse. In order to construct the berms three culverts will need to be extended. The three culverts will need to be extended to convey runoff through the proposed detention pond berms. See Drawing B3-WAWA for culverts to be extended.

Prior to in-stream work, the existing channel will be dammed and electrofished. Once the fish are rescued, the water within the channel will be pumped either to a holding pond or to a vegetated area outside the 30 m buffer of any wetland or other watercourse. During construction, water upstream of the channel will be screened and pumped to either a holding pond or a vegetated area outside the 30 m buffer of any wetland or other watercourse. Once the toe of slope has been established, the channel will be reconstructed in such a way to promote fish passage and ensure

proper fish habitat for spawning grounds and nursery, rearing, food supply and migration areas. The channel shall consist of a series of pools, riffles and runs.

Through the centre of the detention pond there is an access road that was built by filling in the existing wetland (refer to Drawing B2-WAWA). It is proposed that in this area the fill will be removed to gain additional storage capacity in the detention pond. In order to achieve the amount required for detention, a section of wetland to the north-west will also be excavated. This area is directly adjacent to the section that was in-filled and it too will be excavated. These areas will be excavated to the same grade sloping toward the existing watercourse creating a backwater channel. With the high water table in the area, it is expected that removing the fill in these areas will initiate the creation of wetland. The backwater channel will be higher in elevation than the existing channel such that during regular flow conditions the watercourse will not flow into the back water channel.

The remaining areas around the detention pond are high enough in elevation that, although they will be within the 30m buffer, construction activities will not take place within the actual watercourse or wetland. In the areas where a 30 m vegetated border cannot be maintained and land contours would make it possible for runoff to enter the wetland, sediment control fencing will be installed at the edge of the construction zone, parallel to the wetlands. Also, prior to the start of the project high visibility flagging will be used to indicate the delineated border of the wetlands. No machinery will be allowed within the wetland and no vegetation will be cleared within those limits until the WAWA permit is acquired. The backwater will drain to the watercourse in normal flow conditions.

The landscape revegetation component of this project would include the re-establishment of native vegetation on disturbed areas as a result of construction. Revegetation will be required in both the wetlands areas and the upland areas. A Preliminary Functional Analysis Report (Appendix D) documents the various plant communities present on site. Revegetation efforts would include re-establishing the tree and shrub canopy layers as well as the herb layer in different locations throughout the project area as needed. The native plant material required for this project can be acquired from on-site through the re-use of the stockpiled grubblings and topsoil. The grubblings and topsoil act as a seed bank for much of the native plant material warranted for the project. This can be of considerable savings to the project and every effort should be made to salvage the topsoil and grubblings. The grubblings can house the roots and shoots as well as provide the microbial environment necessary to help re-establish the landscape.

For wetlands being disturbed, effort should be placed on salvaging existing wetland plant material (roots and stems) and using it to inoculate the new wetland areas once grading is complete. This effort can be augmented by planting wetland transplant plugs (typically these would be aquatic emergent plant types such as sedges and cattails), wetland tolerant shrubs and seeding. Seeding in wetlands should be done using a broad-spectrum seed mix, whereby the mix of seed is broad enough to cover a variety of moisture regimes or gradients. The end result for the wetlands restoration work would be typical of a wet meadow/ shrub swamp depending on species composition and water depth.

For upland areas, salvaged grubblings (minus any large tree stumps, brush and limbs greater than 50 mm) can be spread over the disturbed area after final grading is complete. Again, plantings of native trees and shrubs can be used to augment the restoration. Efforts will be placed to seed entire area with a broad-spectrum, native seed mix. The end result would be a naturalized –old pasture type of landscape.

In both cases, keeping the restored area moist during establishment is critical in achieving a successful project. Type of finished landscape, time of year, duration of construction, type of plant material and availability of plant material (and seed on really large projects) are all factors that need consideration in preparing a landscape restoration plan.

Task 2 INSTALLATION OF DIVERSION PIPES

The diversion pipe will outfall to a second unnamed watercourse, tributary to Salmon Creek. Although the actual pipe will not be installed within the watercourse, construction will take place within the watercourse to provide erosion protection of the existing banks (Drawing B4-WAWA). From discussions with DFO personnel this section of watercourse is deemed as fish bearing and will likely result in a HADD.

The footprint of the stream alteration in this area will result in a potential 159.2 m² of disturbance. The proposed diversion pipe will consist of a 2400 mm x 1800 mm box culvert. The outfall of the culvert will end within 30 m of the watercourse. The outfall will be directed toward the watercourse at approximately a 45 degree angle to reduce potential energy and erosion of the existing channel banks. Once the storm water leaves the pipe, a rip rap lined channel will carry the storm water to the watercourse. In order to secure the existing banks of the watercourse, in stream work will need to take place. As this pipe will only carry water during extreme high water levels and will carry no flow during low periods, fish passage is not required of this piping.

The banks of the ditch are scarcely vegetated. The width of this unnamed watercourse ranges between 3.7 m and 5.7 m wide. Looking downstream, the height of the right and left banks are approximately 0.8 m and 0.5 m, respectively. The work along the watercourse in this area will take place along an approximate 40 m length of the channel.

Prior to in-stream work, the existing channel will be dammed and electrofished. Once the fish are rescued, the water within the channel will be pumped either to a holding pond or to a vegetated area outside the 30 m buffer of any wetland or other watercourse. During construction, water upstream of the construction site will be screened and pumped to either to a holding pond or to a vegetated area outside the 30 m buffer of any wetland or other watercourse. Once the erosion protection is installed, the pumps will be turned off, the screens removed and the water will be allowed back into the channel.

2.5 Schedule

Subject to approvals, it is anticipated the project will be designed and tendered for construction by early spring 2011. Due to the size of this project it is anticipated that project construction will take place over the entire 2011 construction season.

It is expected that construction activities will take place between the hours of 7 AM and 7 PM from Monday to Friday with possible Saturday work depending upon weather and schedule compliance. Any work required in or around fish-bearing streams will be completed between June 1st and September 30th. This may involve the installation and capping of certain pipe sections approaching a watercourse, which can be coupled into the remaining sections of the diversion pipe at a later date.

APPENDIX A

WAWA Permit Application

APPENDIX B

Report Figures

APPENDIX C

Environmental Management Plan – Draft Report

APPENDIX D

Wetland Delineation and Preliminary Functional Analysis Report