From: Geurts, Hugh (MECP)
To: Gandhi, Nilima (MECP); Smith, Ryan (MECP); Munro, Alison (MECP)
Cc: Lehouillier, Jason (MECP)
Subject: RE: MECP contact for Wiarton area
Date: March 3, 2021 4:55:00 PM

I have had no dealings with Georgian Bay Innovation Group

From: Gandhi, Nilima (MECP) <Nilima.Gandhi@ontario.ca>
Sent: March 03, 2021 4:30 PM
To: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Smith, Ryan (MECP) <Ryan.Smith@ontario.ca>; Munro, Alison (MECP) <Alison.Munro@ontario.ca>
Cc: Lehouillier, Jason (MECP) <Jason.Lehouillier@ontario.ca>
Subject: FW: MECP contact for Wiarton area

Good afternoon everyone,
I have been contacted by Michael from OMAFRA to find an MECP contact for the below Client and their Aquaculture project (please see the message below). I could not find any information in IDS based on the Client's name and Site address. There is no ECA or PTTW issued, unless it is registered under a different Client's name. If this rings a bell to you or you provided reviews on their ECA and/or PTTW applications, could you please help out Michael?
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Nilima

From: McQuire, Michael (OMAFRA) <Michael.McQuire@ontario.ca>
Sent: March 3, 2021 1:51 PM
To: Gandhi, Nilima (MECP) <Nilima.Gandhi@ontario.ca>
Cc: Khan, Mohammad Sajjad (MECP) <mohammad.khan@ontario.ca>; Relf, Mike (OMAFRA) <mike.relf@ontario.ca>
Subject: RE: MECP contact for Wiarton area

Hi Nilima,

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s.21

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Thanks

Mike

Michael McQuire
Aquaculture and Aquaponics Specialist
Ontario Ministry of Agriculture, Food and Rural Affairs
Agricultural Development Branch
(519) 841-4699
michael.mcquire@ontario.ca

-

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-

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Sent: March 3, 2021 12:52 PM
To: McQuire, Michael (OMAFRA) <Michael.McQuire@ontario.ca>
Cc: Khan, Mohammad Sajjad (MECP) <mohammad.khan@ontario.ca>
Subject: Re: MECP contact for Wiarton area

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Sajjad

==========

Mohammad Sajjad Khan, Ph.D., P.Eng.
Surface Water Specialist, West Central Region
Ontario Ministry of the Environment, Conservation and Parks
119 King Street West, 12th Floor, Hamilton ON L8P 4Y7
Tel: 365-889-1553 (off); Fax: 905 521-7820
E-mail: mohammad.khan@ontario.ca

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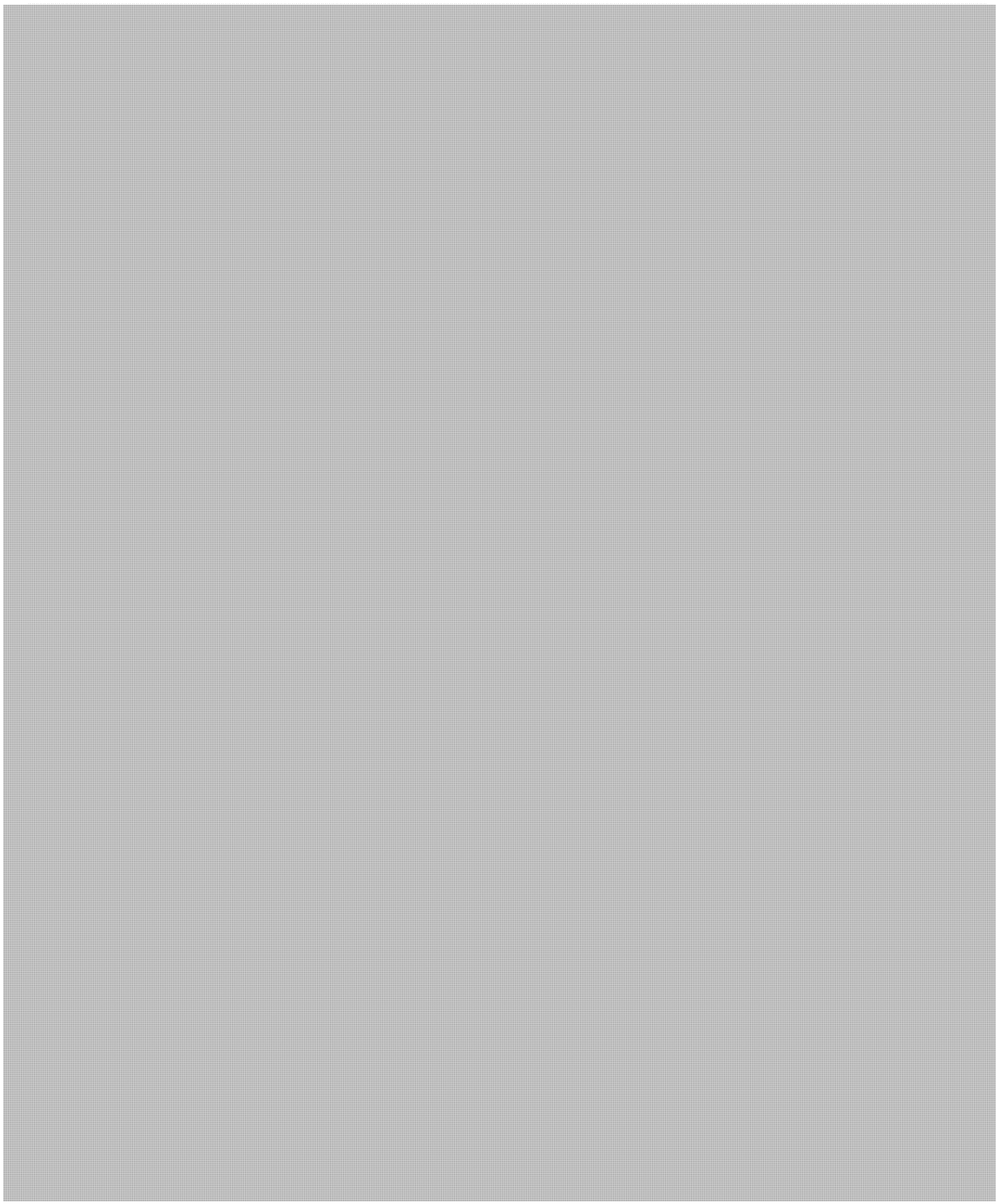
From: Gandhi, Nilima (MECP)
To: Smith, Ryan (MECP); Geurts, Hugh (MECP); Munro, Alison (MECP)
Cc: Lehouillier, Jason (MECP)
Subject: RE: MECP contact for Wiarton area
Date: March 4, 2021 9:52:40 AM

Ok…finally I was able to tack it down! The client contacted Ian Mitchell yesterday for their PTTW and ECA applications. I have put Mike (OMAFRA) in contact with Ian to sort out his concerns on this project.
Nilima

s.N/R



[redacted]

From: Gandhi, Nilima (MECP) <Nilima.Gandhi@ontario.ca>
s.N/R **Sent:** Wednesday, March 3, 2021 4:30 PM
To: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Smith, Ryan (MECP) <Ryan.Smith@ontario.ca>; Munro, Alison (MECP) <Alison.Munro@ontario.ca>
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Subject: FW: MECP contact for Wiarton area

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Pages 8 to / à 11

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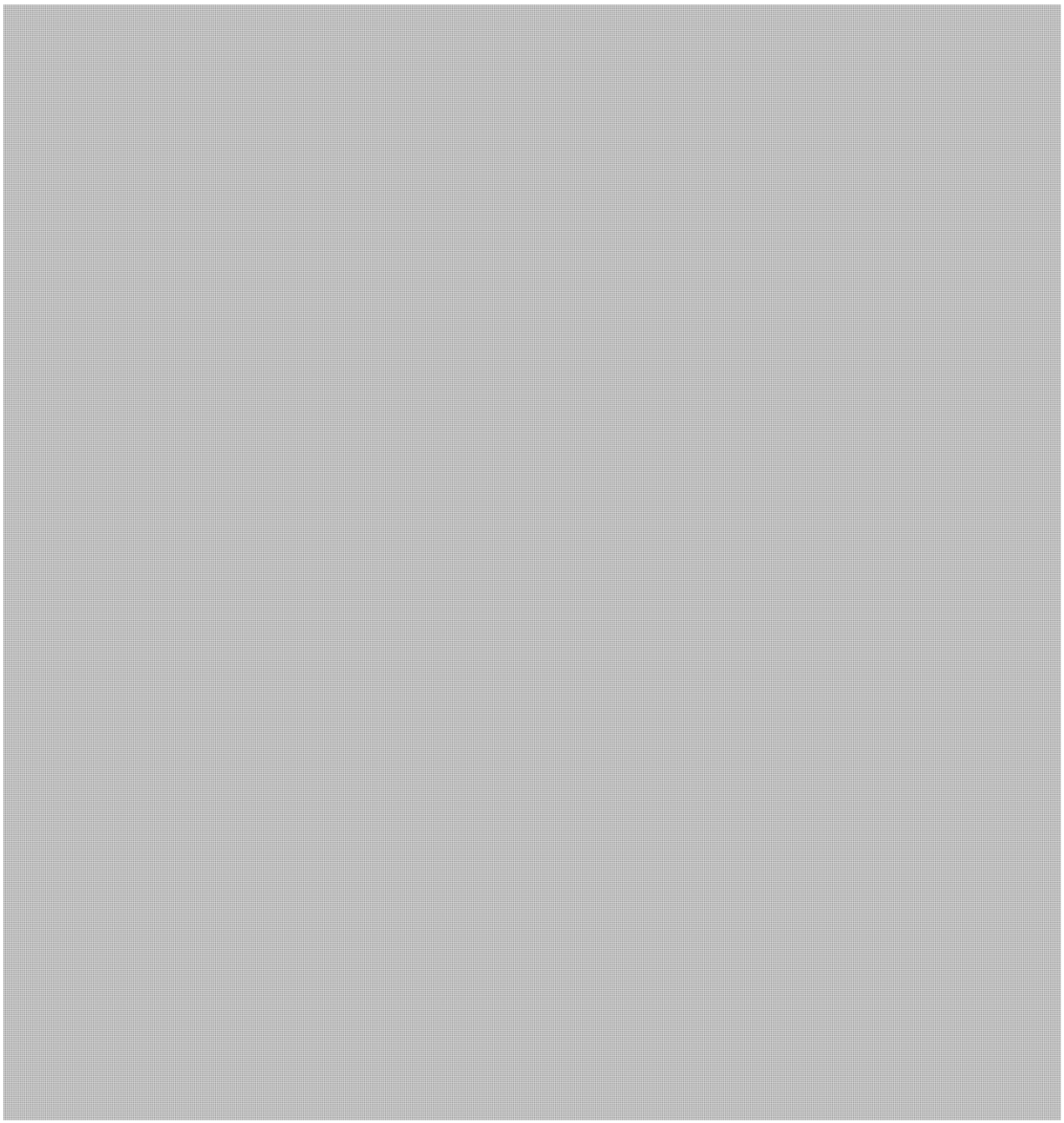

From: Dan Hurley <dhurley@tathameng.com>
Sent: May 18, 2021 4:37 PM
To: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>
Subject: GBIG Land Based Fish Farm - Berford Road Wiarton

Hello Hugh and Renee – further to our pre-consultation discussion a few weeks back. We have retained the assistance of Hutchison Environmental Sciences to assist with the water quality and mixing component of the

application. We would like to have a discussion to resolve the terms of reference and scope of their work to fulfill the application requirements for the ECA. Do you have time next Wed-Fri to have a short call with our team to discuss. If so what windows in that time frame would work.

Dan Hurley, B.A.Sc., P.Eng., LEED AP
President

Tatham Engineering Limited
115 Sandford Fleming Drive, Suite 200 | Collingwood | Ontario | L9Y 5A6
T 705-444-2565 x2040 | **C** 705-444-7571 | dhurley@tathameng.com | tathameng.com

Page 17

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Sent: May 18, 2021 4:37 PM
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T 705-444-2565 x2040 | **C** 705-444-7571 | dhurley@tathameng.com | tathameng.com

From:	Geurts, Hugh (MECP)
To:	Winter, Jennifer (MECP)
Cc:	Lehouillier, Jason (MECP); Howell, Todd (MECP)
Subject:	Fish farm proposed for Colpoy bay near wiarton - Lake Huron.
Date:	May 26, 2021 3:54:00 PM

Hello Jennifer.

Southwest Region Tech Support could use your unit's assistance on a proposed project.

A very large inland fish farm is proposed near Wiarton . Initial production will be 50,000 atlantic salmon per year (picture a building the size of a Costco filled with huge 200,000 litre tanks) .

The Municipality and the Province are supposedly big proponents of this project so there is already political interest on the project

The proposed discharge is to Colpoy Bay on Lake Huron. This area of Huron is extremely oligotrophic and the discharge point is an enclosed bay. Simply , the Region has serious concerns about the potential impact this discharge may have on the Bay with regard to phosphorus.

Given Todd's extensive knowledge of Lake Huron and phosphorus patterns in the lakes, we would like to consult with Todd as we develop conditions for the ECA to ensure that we have everything covered with respect to providing initial up front and post development monitoring and modelling .

I would envision his assistance would be measured in hours to possibly a few days as required over the next 4 months , I do not believe any major commitment in time is necessary. Likely some time after project completion to review monitoring and modelling results of real time discharge data.

I have spoken to Todd about this project already and Todd noted he can offer his services as required provided you were made aware and had no concerns.

Hopefully this is something your unit can assist with. If you need more information, I'd be happy to discuss further at your leisure

Hope you are staying well.

Hugh

Hugh Geurts

Surface Water Evaluator

Southwest Regional Office

Ontario Ministry of the Environment, Conservation and Parks

Ministère de l'Environnement, de la Protection de la nature et des Parcs

733 Exeter Road, London

N6E 1L3

(548) 388-7471

From: Geurts, Hugh (MECP)
To: Winter, Jennifer (MECP)
Cc: Lehouillier, Jason (MECP)
Subject: RE: Fish farm proposed for Colpoy bay near wiarton - Lake Huron.
Date: May 27, 2021 4:20:00 PM

Hello Jennifer:

Does the attachment you sent have the actual form or a link to it . If so could you point out where. I must be reading right over it.

Thank You

Hugh

From: Winter, Jennifer (MECP) <Jennifer.Winter@ontario.ca>
Sent: May 26, 2021 4:02 PM
To: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>
Cc: Lehouillier, Jason (MECP) <Jason.Lehouillier@ontario.ca>; Howell, Todd (MECP) <Todd.Howell@ontario.ca>; Martherus, Jim (MECP) <Jim.Martherus@ontario.ca>
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Hi Hugh, this is an area and issue we have expertise in and likely can provide support on; I suggest you include Ngan Diep in the conversations too, together with Todd.

The preferred approach would be that you & Jason fill in & submit the technical services request form as it helps us with our work planning and tracking. I'll let the group who receives the forms know it's coming.

Thanks so much,

Jenny

<< File: 2021 EMRB Scientific and Technical Field Services Guide_DEC7-2021.pdf >>

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Page 24

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From: Lehouillier, Jason (MECP)
To: Morrison, Sean (MECP)
Cc: Geurts, Hugh (MECP)
Subject: Fw: Fish farm proposed for Colpoy bay near wiarton - Lake Huron.
Date: June 18, 2021 3:52:45 PM
Attachments: GBIG aquafarm 2021_RegionalRequest_distributed.pdf

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Hi Sean,

This was sent to Lee previously but he didn't get to it.

Can you please review and let me know if I have Director approval for EMRB support for a large fish operation in Owen Sound District? We are looking for some additional support (i.e. modelling).

Thanks,

Jason

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Hello Jennifer.

Southwest Region Tech Support could use your unit's assistance on a proposed project.

A very large inland fish farm is proposed near Wiarton . Initial production will be 50,000 atlantic salmon per year (picture a building the size of a Costco filled with huge 200,000 litre tanks) .

The Municipality and the Province are supposedly big proponents of this project so there is already political interest on the project

The proposed discharge is to Colpoy Bay on Lake Huron. This area of Huron is extremely oligotrophic and the discharge point is an enclosed bay. Simply , the Region has serious concerns about the potential impact this discharge may have on the Bay with regard to phosphorus.

Given Todd's extensive knowledge of Lake Huron and phosphorus patterns in the lakes, we would like to consult with Todd as we develop conditions for the ECA to ensure that we have everything covered with respect to providing initial up front and post development monitoring and modelling .

I would envision his assistance would be measured in hours to possibly a few days as required over the next 4 months , I do not believe any major commitment in time is necessary. Likely some time after project completion to review monitoring and modelling results of real time discharge data.

I have spoken to Todd about this project already and Todd noted he can offer his services as required provided you were made aware and had no concerns.

Hopefully this is something your unit can assist with. If you need more information, I'd be happy to discuss further at your leisure

Hope you are staying well.

Hugh

Hugh Geurts
Surface Water Evaluator
Southwest Regional Office
Ontario Ministry of the Environment, Conservation and Parks

Ministère de l’Environnement, de la Protection de la nature et des Parcs
733 Exeter Road, London
N6E 1L3
(548) 388-7471

Environmental Monitoring and Reporting Branch

Scientific & Technical Field Service Request Form

2021

Area of Investigation Surface Water **Priority** Medium

Request from Drinking Water and Environmental Compliance Division:

Region: ○ **Northern** ○ **Central** ◉ **Southwest** ○ **West Central** ○ **Eastern**

Technical Support Section: ☑ (Business and) Program Services Section: ☐

District Office:
○ Sudbury ○ York-Durham ◉ Owen Sound ○ Hamilton ○ Peterborough
○ Thunder Bay ○ Halton-Peel ○ London ○ Guelph ○ Kingston
○ Timmins ○ Toronto ○ Sarnia ○ Niagara ○ Ottawa
○ Barrie

Area Office:
○ Sault Ste Marie ○ Windsor ○ Belleville
○ Kenora ○ Cornwall
○ North Bay

Other DWECD Client: ☐ Name of Branch/Office:

Request from Other Division: ☐ Name of Division/Branch/Office:

Location of Investigation (City/Town/Name of Lake or River)

Municipality of South Bruce Peninsula - Colpoy Bay

Facility Name (if applicable)

GBIG AquaFarm Ltd.

Facility Address (if applicable)

TBD

Service Requested:

*Critical review of wastewater plume modelling for Large Inland Fish Farm that has direct discharge to Colpoy Bay, Lake Huron.
* Assist in identification of assessment tools and criteria in post development condition.

Study Objective / Rationale / Target Compounds:

Determine potential impact of wastewater plume to Colpoy. Specifically potential impact of phosphorus and total ammonia/nitrate on development of substrate algae

Previous Investigations Conducted? ○ Yes ◉ No **Year(s):**

Description of Previous Investigation (if applicable)

Preferred Sampling Window (Typical field season is April – October) **Date Report Required**

From: To:

Supporting Documentation Provided (Guide to Technical & Field Requests outlines any specific requirements):

field sampling as required can be undertaken by proponent

technical memorandum from proponent pending

Contact Information (May be contacted for additional information):

Name	Hugh Geurts	Phone Number	548-388-7471
Title	Surface Water Evaluator	Email	hugh.geurts@ontario

Approvals:

Manager/Supervisor Name:

Director Name:

Branch/Region:

Date of Director Approval:

To save a copy of this form, click File --> Save As

Use the **Submit button** in the top right-hand corner when ready to send

Please send all comments and questions to:

Cynthia.Carr@ontario.ca

Phone: (416) 235-6262

From:	Mitchell, Ian (MECP)
To:	Graham, Robert G. (MECP)
Cc:	Geurts, Hugh (MECP); Belanger, Renee (MECP)
Subject:	Wiarton WWTP
Date:	May 27, 2021 11:13:03 AM
Attachments:	Wiarton NUMBER 6045-ARDJS7.pdf

Hi Bob we just got off the phone regarding a proposed aquafarm that will be discharging to Colpoy's bay They asked about the location of the Wiarton STP discharge. Do you happen to have a figure or something that shows the discharge location? Also is the attached the current ECA for Wiarton? I think it is… but there were a number of fairly recent amendments from what I can see so I want to be sure.

Thanks

Ian Mitchell
District Engineer
Ministry of the Environment, Conservation and Parks
Owen Sound District
101-17th St E
Owen Sound ON N4K 0A5
Phone (519) 374-1388
Fax (519) 371-2905

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 6045-ARDJS7
Issue Date: November 23, 2017

The Corporation of the Town of South Bruce Peninsula
315 George St
South Bruce Peninsula, Ontario
N0H 2T0

Site Location: Wiarton Wastewater Treatment Plant
441048 Elm Street (Lot 2, Concession 21E)
Georgian Bluffs Township, County of Grey
N0H 2T0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

Establishment, usage and operation of an existing municipal sewage works in accordance with Section 53 of OWRA, for the collection, transmission, treatment of sanitary sewage and disposal of effluent to Colpoys Bay via a Sewage Treatment Plant, Wiarton Wastewater Treatment Plant, located in Lot 2, Concession 21E, Township of Georgian Bluffs, as follows:

Classification of Collection System: Separate Sewer System

Capacity of Sewage Treatment Plant:

- **Rated Capacity -** Based on the commissioned Previous Works: 4,400 m^3/d

PROPOSED WORKS :

Septage Equalization Storage Pond

- One (1) 8.4 L/s capacity pump conveying septage from the Septage Receiving Management System described below and discharging through one (1) 100 mm diameter 40 m long forcemain to the Septage Equalization Storage Pond described below;

- One (1) Septage Equalization Storage Pond having a total storage capacity of 2,000 m^3,

consisting of a pond interior berm with 3H:1V slopes, pond bottom area of 250 m^2, and pond top area of 1220 m^2, providing a 0.6 m freeboard, equipped with 200 mm diameter pond drain pipe discharging by gravity to the filter backwash pumping station described below under Effluent Filtration Plant section;

- One (1) 56 kW air blowers providing 660 L/s @ 40 kPa of air for mixing of contents of the septage receiving and equalization storage pond described above, equipped with soundproof enclosures and silencers, to be located in the existing Filter and Disinfection Building;

Standby Power Diesel Generator

- One (1) 300 kW and 375 kVA capacity stand-by power diesel generator and one (1) 2,270 L capacity double-walled diesel storage tank, designed to provide 24-hour fuel supply, equipped with acoustic silencer and piping, and to be located outdoors; and

All in accordance with the submitted supporting documents listed in Schedule A.

PREVIOUS WORKS APPROVED ON OCTOBER 6, 2015 UNDER ECA No. 6375-A2PKKS:

Septage Receiving Management System

- One (1) septage reception station including piping and magnetic flow meter to be installed in an underground concrete chamber, equipped with controlled access and record keeping of septage being received, discharging to an existing filter backwash pumping station described below under Effluent Filtration Plant section;

Screening of Raw Sewage

- One (1) concrete channel with approximate dimensions of 0.5 m width x 1.1 m depth x 8.85 m length housing one (1) mechanical stainless steel fine screen (Escalator ^{R} Fine Screen or equivalent) with 6 mm openings operating in upstream water depth of 0.45 m, equipped with 0.5 hp screen drive motor, screen cleaning brush, and 2.0 hp screened solids compactor, discharging to the Moving Bed Biofilm Reactor (MBBR) described below;

- One (1) concrete channel located parallel to the mechanical screen channel described above, designed to handle overflows and having an approximate dimensions of 1.4 m depth x 1.05 m width x 8.5 m length, equipped with one (1) overflow weir, one (1) fixed screen with 12 mm x 12 mm openings, and one (1) fixed screen with 6 mm x 6 mm openings, discharging to the Moving Bed Biofilm Reactor (MBBR) described below;

Moving Bed Biofilm Reactor (MBBR)

- One (1) Moving Bed Biofilm Reactor (MBBR) consisting of three (3) concrete cells, with Cell #1 having approximate dimensions of 11.0 m wide x 6.0 m deep x 5.3 m long, Cell

#2 having approximate dimensions of 11.0 m wide x 6.0 m deep x 5.3 m long, and Cell #3 having approximate dimensions of 11.0 m wide x 6.0 m deep x 9.5 m long, consisting of:

- Cell #1 and Cell #2 to be used for BOD_5 removal providing a total reactor volume of 632.5 m^3 at 5.0 m liquid depth, filled with disk shaped free-floating carrier media (Anox ™ K5 free-floating media or equivalent), providing a total of 233,990 m^2 media carrier surface area, equipped with two (2) medium bubble stainless steel aeration system in Cell 1, two (2) medium bubble stainless steel aeration system in Cell 2, and media retaining sieves with 6 mm diameter openings;

- Cell #3 to be used for nitrification providing a total reactor volume of 519.1 m^3 at 5.0 m liquid depth, filled with disk shaped free-floating carrier media (Anox ™ K5 free-floating media or equivalent), providing a total of 183,152 m^2 media carrier surface area, equipped with three (3) medium bubble stainless steel aeration system and media retaining sieves with 6 mm diameter openings;

- Two (2) 30 hp air blowers (one duty, one standby) providing 1,675 Nm^3/h at 7.9 Psi of air to the Moving Bed Biofilm Reactors (MBBR) equipped with soundproof enclosures and silencers; and

Floating Islands Wetland and Lagoon Mixers

- Installation of constructed Floating Treatment Wetlands in Waste Stabilization Lagoons (Cell #2 and Cell #3), consisting of approximately five thousand (5,000) modules of PhytoLinks floating treatment wetlands, each PhytoLinks module is an engineered hexagon-shaped floating material designed to grow emergent aquatic macrophytes hydroponically, installed downstream of the MBBR to provide effluent polishing;

- Installation of wastewater circulation devices with a combined total capacity of circulating up to 361,700 m^3/d of wastewater, designed to provide passive mixing and aeration on the bottom of the lagoon to digest the sludge; and

- Including all controls and associated appurtenances.

All in accordance with the submitted supporting documents listed in Schedule A.

PREVIOUS WORKS APPROVED ON SEPTEMBER 23, 2011 UNDER ECA No. 8533-8L3HJ3 :

Lagoon Influent Distribution Chamber

Decommissioning of the existing lagoon influent distribution chamber and installation of a new concrete influent distribution chamber with overall approximate dimension of 5.35 m long x 4.00 m wide x 3.00 m high equipped with the following:

- One (1) 300 mm diameter PVC influent inlet forcemain and one (1) spare 300 mm

diameter PVC influent inlet forcemain, both equipped with a 300 mm diameter knife gate valves, discharging to an influent chamber described below;

- One (1) 165 m long 300 mm diameter PVC influent bypass forcemain equipped with a 300 mm diameter knife gate valve discharging to Lagoon Cell No. 2;

- One (1) 150 mm diameter PVC filter backwash inlet forcemain equipped with a 150 mm diameter knife gate valves discharging to an influent chamber described below;

- One (1) 25 m long 150 mm diameter PVC filter backwash bypass forcemain equipped with a 150 mm diameter knife gate valve discharging to Lagoon Cell No. 2;

- One (1) influent inlet chamber with approximate dimension of 3.40 m wide x 1.20 m long x 1.2 m high equipped with two (2) aluminium sluice gate valves discharging to two (2) influent outlet chambers described below:

- One (1) influent outlet chamber with approximate dimension of 1.60 m wide x 1.20 m long x 1.2 m high discharging through a 40 m long 400 mm diameter PVC influent pipe to Lagoon Cell No. 1;

- One (1) influent outlet chamber with approximate dimension of 1.60 m wide x 1.20 m long x 1.2 m high discharging through a 25 m long 450 mm diameter PVC overflow pipe to Lagoon Cell No. 1; and

- Including all controls and associated appurtenances.

All in accordance with the submitted supporting documents listed in Schedule A.

PREVIOUS WORKS APPROVED ON APRIL 26, 2006:

Sewage Pumping Station No. 1 (Taylor Street Pumping Station)

Upgrades to the existing Sewage Pumping Station No.1 located at No. 524 Taylor Street, approximately 60 m south of George Street consisting of:

- An existing wet well with two compartments, each approximately 3.1 m x 2.35 m x 0.95 m (operating depth for duty pump) with flow control gates, emergency isolating sluice gate, access ladders, railing, platform and ventilation;

- Installation of two (2) new 60 hp 1775 rpm sewage pumps located in a dry well each with a rated capacity of 103.0 L/sec at a TDH of 29.0 m (one duty, one standby) and a combined rated capacity of 130.0 L/sec at a TDH of 39.0 m;

- Installation of a forcemain air relief and/or vacuum relief valve in the dry well;

- Installation of three (3) new air relief and/or vacuum relief valve chambers along the

forcemain between Sewage Pumping Stations No. 1 and No. 2;

- One (1) existing flow meter; and
- Including minor modifications to pump inlet and discharge piping, electrical, pump controls, and associated appurtenances and other mechanical upgrades.

Sewage Lagoons

- Add a second outlet pipe from the splitter box into Cell No. 1 to prevent any sewage overflow;

All in accordance with the submitted supporting documents listed in Schedule A.

PREVIOUS WORKS APPROVED ON OR BEFORE NOVEMBER 9, 2005:

TRUNK SEWERS

Construction of a trunk sewer as follows:

STREET	FROM	TO
Blue Water Park	William St. approx. 135 m East of Claude St.	Brown St. approx. 200 m north of George St.
Easement	Brown St. approx. 200 m north of George St.	Scott St. approx. 70 m north of George St.
Easement	Scott St. 70 m north of George St.	George St. approx. 125 m east of Scott St.
Easement	George St. approx. 125 m east of Scott St.	Pumping Station (# 524 Taylor St.)
George St.	Existing Pumping Station George St./Taylor St.	George St. approx. 125 m east of Scott Street

SEWAGE PUMPING STATIONS

Sewage Pumping Station No. 2

Sanitary Sewage Pumping Station No. 2 to be constructed on a site on the southwest corner of the intersection of Elm Street and Taylor Street, consisting of:

- An inground divided wet well equipped with three (3) submersible sewage pumps each with a rated capacity of 116 L/sec at a TDH of 30.5 m (one duty, two standby) and two (2) pumps in parallel having a rated capacity of 164.81 L/sec at a TDH of 36.68 m (two duty, one standby);
- Ultrasonic liquid level float control system with alarms and backup float control system, piping, inlet bar screen, lockable access hatchway, ladder, benching, mechanical ventilation system c/w two (2) goosenecked vents with bird screens;
- An overflow to Elm Street, connecting sanitary sewer from Elm Street and connecting inlet and outlet sanitary forcemain discharge piping to Taylor Street;

- A separate attached inground valve chamber housing a valved bypass piping, valves and piping, and a goose-necked vent with bird screen; and

- An above ground Control Building located on the southwest corner of the intersection of Elm Street and Taylor Street adjacent to and east of the Sanitary Sewage Pumping Station No. 2 housing a 250 kW diesel generator set, control panel, ventilation, etc., together with a below floor level pipe chase housing a flowmeter and valves and piping;

STANDBY POWER AND EMERGENCY OVERFLOW SYSTEM

- Emergency station overflow sewer 600 mm diameter approximately 120 m in length from the pumping station to manhole at Taylor Street / George Street and manhole connection to the Marine outfall at the intersection of Tyson Street / George Street, with control sluice gate;

- Standby power to be provided by a 125 kW diesel generator set to be located at the station;

- Provision of an emergency bypass connection on the discharge forcemain;

- Including all the necessary appurtenances and controls, heating, ventilation, and electrical works.

WASTE STABILIZATION LAGOONS

Sewage Lagoons

Expansion of the existing three-cell waste stabilization pond (total 6 ha) from an existing 760 m^3/day at a nominal operating depth of 1.52 m to 2006 m^3/day with continuous discharge to Colpoy's Bay, located on Lot 1, Concession 21, Township of Keppel, County of Grey, and consisting of:

- Improvements to existing berms by addition of fill material, grading, and seeding;

- New control structure (inlet, outlet, and inter-cell);

- Installation of additional interconnecting pipes between adjacent cells;

Lagoon Aeration System

Installation of a submerged air diffusion system consisting of header feeder pipes, and distribution diffusion tubes installed across the cells as follows:

- Cell No. 1 - 37 lines at spacings varying from 3.05 m to 6.1 m centre to centre;

- Cell No. 2 - 10 lines at spacing of 17 m centre to centre;
- Cell No. 3 - 5 lines at spacing of 38 m centre to centre;
- Two (2) rotary positive displacement blowers, each rated at 165 L/sec against a head of 42 kPa (one as standby) and belt driven by 15 kW motors;
- Installation of new fine-bubble aeration system in Cell 1, including new air header and lateral pipes and membrane diffusion tubes;
- Replacement of all aeration tubes in Cells 2 and 3 with new ones;
- Modification of piping and ventilation system in existing blower building;

PHOSPHORUS REMOVAL SYSTEM

- Installation of a 22,700 L chemical storage tank for storage of phosphorus removal chemical;
- Installation of two (2) positive displacement type chemical metering pumps (one on standby) each capable of pumping 41 L/hr at 1034 kPa, for dosing phosphorus removal chemical to the sewage at a dosing point located in the outlet forcemain;

EFFLUENT FILTRATION PLANT

Construction of an Effluent Filtration Plant with a peak design flow capacity of 5,734 m^3/day located in a filtration building consisting of the following:

- Three (3) effluent filter cells, each cell having two (2) filter modules, providing a total filtration area of 27.9 m^2 and filtration depth of 2.0 m, equipped with air compressors for continuous filter backwash, influent flow measurement weir with ultrasonic level detector, and a bypass weir to allow filter bypass during events of high peak flows exceeding 5,734 m^3/day;
- One (1) 3.0 m diameter and 6.5 m deep precast concrete wet well for receiving filter backwash and septage, equipped with two (2) submersible pumps each with a capacity of 23.3 L/sec @ 19.5 m TDH and a 2.7 m x 2.1 m precast valve chamber, discharging into Cell No. 1 through a 200 mm diameter forcemain;
- One (1) 12,000 L capacity coagulant storage tank (2.13 m diameter x 3.5 m high), equipped with two (2) coagulant metering pumps (one duty and one standby) dosing coagulant at a flow paced rate upstream of the filtration units;
- Installation of a third rotary positive displacement blower rated at 165 L/sec against a

head of 42 kPa and belt driven by 15 kW motors (standby blower); and

- Including controls, instrumentation, and associated appurtenances.

EFFLUENT DISINFECTION SYSTEM

installation of an Ultraviolet Disinfection System (Wedeco Model TAK55M 6-2 or Equivalent) designed for a of 8,000 m^3/day, consisting of:

- One (1) UV disinfection unit with approximate dimensions of 2.0 m long x 0.470 m wide x 0.684 m minimum water depth, containing one (1) UV bank with two (2) UV modules each with twelve (12) high intensity low pressure UV lamps (a total of 24 lamps), designed to provide a 30.0 mJ/cm^2 UV dosage at 55 % Transmittance at 254 nm during peak design flow of 8,000 m^3/day;

- Provision of a hypochlorite solution storage tank complete with 100% spill containment, and an 11.36 L/hr capacity metering pump for seasonal chlorination of lagoon effluent (before filtration and UV disinfection) for control of algae growth between May and September of each year.

OUTFALL AND OVERFLOW SEWERS

- Construction of outfall (including marine section) and overflow sewers as follows:

STREET	FROM	TO
Lagoon Site	Effluent Chambers	Elm Street / Taylor Street intersection
Taylor Street	Elm Street	George Street
Taylor Street	Pumping Station	George Street
George Street	Taylor Street	Tyson Street
George Street	Isaac Street	Tyson Street

- Construction of a new section of 300 mm diameter outfall sewer north of Cell 3 and conversion of an existing 200 mm diameter back-up forcemain to a second effluent outfall sewer;

- Including all the necessary appurtenances.

LAGOON FACILITY CONTROL BUILDING

Construction of a 10.6 m x 6.9 m building to accommodate the following:

- Two (2) motor driven blowers complete with connecting pipework and all necessary appurtenances;

- Motor control centre; and

- Including yard piping, electrical power supply and equipment, heating and ventilation equipment and all other necessary appurtenances and controls.

All in accordance with the submitted supporting documents listed in Schedule A.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Annual Average Effluent Concentration" means the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year, weighted by the quantity of the Final Effluent discharged over the days deemed to be represented by each sample;

2. "Annual Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar year divided by the number of days during which Final Effluent was discharged that year;

3. "Annual Average Daily Effluent Loading" means the value obtained by multiplying the Annual Average Effluent Concentration of a contaminant by the Annual Average Daily Effluent Flow over the same calendar year;

4. "Annual Average Daily Influent Flow" means the cumulative total sewage flow of Influent to the Sewage Treatment Plant during a calendar year divided by the number of days during which sewage was flowing to the Sewage Treatment Plant that year;

5. "Approval" means this entire document and any schedules attached to it, and the application;

6. "BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;

7. "Bypass" means diversion of sewage around one or more unit processes within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point;

8. "CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

9. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

10. "*E. coli* " refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

11. "EPA" means the *Environmental Protection Act* , R.S.O. 1990, c.E.19, as amended;

12. "Equivalent Equipment" means alternate piece(s) of equipment that meets the design requirements

and performance specifications of the piece(s) of equipment to be substituted;

13. "Event" means an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the last Bypass or Overflow. Overflows and Bypasses are separate Events even when they occur concurrently;

14. "Final Effluent" means effluent that are discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point;

15. "Geometric Mean Density" means the geometric mean of all Single Sample Results of density measurement in the samples taken over the period specified;

16. "Imported Sewage" means portable toilet waste, holding tank waste, leachate, septage, processed organics hauled to the Sewage Treatment Plant by licensed waste management system operators and at the specific characteristics and quantities approved for co-treatment in the Sewage Treatment Plant;

17. "Influent" means flows to the Sewage Treatment Plant from the collection system and Imported Sewage but excluding process return flows;

18. "Limited Operational Flexibility" (LOF) means the protocol under which the Owner shall follow in order to undertake any modification that is pre-approved in this Approval;

19. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

20. "Monthly Average Effluent Concentration" means the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month, weighted by the quantity of the Final Effluent discharged over the days deemed to be represented by each sample;

21. "Monthly Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar month divided by the number of days during which Final Effluent was discharged that month;

22. "Monthly Average Daily Effluent Loading" means the value obtained by multiplying the Monthly Average Effluent Concentration of a contaminant by the Monthly Average Daily Effluent Flow over the same calendar month:

23. "Overflow" means a discharge to the environment from the Works at a location other than the approved effluent disposal facilities or via the effluent disposal facilities downstream of the Final Effluent sampling point;

24. "Owner" means The Corporation of the Town of South Bruce Peninsula and its successors and

assignees;

25. "OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

26. "Peak Daily Flow Rate" (also referred to as maximum daily flow or maximum day flow) means the largest volume of flow to be received during a one-day period for which the sewage treatment process unit or equipment is designed to handle;

27. "Peak Hourly Flow Rate" (also referred to as maximum hourly flow or maximum hour flow) means the largest volume of flow to be received during a one-hour period for which the sewage treatment process unit or equipment is designed to handle;

28. "Peak Instantaneous Flow Rate" means the instantaneous maximum flow rate as measured by a metering device for which the sewage treatment process unit or equipment is designed to handle;

29. "Preliminary Treatment System" means all facilities in the Sewage Treatment Plant associated with screening and grit removal;

30. "Previous Works" means those portions of the Works included in the Approval that have been constructed previously;

31. "Primary Treatment System" means all facilities in the Sewage Treatment Plant associated with the primary sedimentation unit process and includes chemically enhanced primary treatment;

32. "Proposed Works" means those portions of the Works included in the Approval that are under construction or to be constructed;

33. "Rated Capacity" means the Annual Average Daily Influent Flow for which the Sewage Treatment Plant is designed to handle;

34. "Sanitary Sewers" means pipes that collect and convey wastewater from residential, commercial, institutional and industrial buildings, and some infiltration and inflow from extraneous sources such as groundwater and surface runoff through means other than stormwater catch basins;

35. "Secondary Treatment System" means all facilities in the Sewage Treatment Plant associated with biological treatment, secondary sedimentation and phosphorus removal unit processes;

36. "Sewage Treatment Plant" means the entire sewage treatment excluding the Final Effluent disposal facilities;

37. "Single Sample Result" means the test result of a parameter in the effluent discharged on any day, as measured by a probe, analyzer or in a composite or grab sample, as required;

38. "Water Supervisor" means the Water Compliance Supervisor for the Safe Drinking Water Branch (SDWB) for the London office of the Ministry;

39. "Works" means the approved sewage works, and includes Proposed Works, Previous Works and modifications made under Limited Operational Flexibility.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

1. The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the terms and conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

2. The Owner shall design, construct, operate and maintain the Works in accordance with the conditions of this Approval.

3. Where there is a conflict between a provision of any document referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence.

2. CHANGE OF OWNER AND OPERATOR

1. The Owner shall, within thirty (30) calendar days of issuance of this Approval, prepare/update and submit to the Water Supervisor the Municipal and Local Services Board Wastewater System Profile Information Form (obtainable from the Water Supervisor) under any of the following situations:

   a. the form has not been previously submitted for the sewage works;

   b. this Approval is issued for extension, re-rating or process treatment upgrade of the sewage works;

   c. every time when a notification is provided to the Water Supervisor in compliance with requirements of change of Owner or operator under this condition.

2. The Owner shall notify the Water Supervisor and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

   a. change of address of Owner;

b. change of Owner, including address of new owner;

c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act, R.S.O. 1990, c. B.17* , as amended, shall be included in the notification;

d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act, R.S.O. 1990, c. C.39* , as amended, shall be included in the notification.

3. The Owner shall notify the Water Supervisor, in writing, of any of the following changes within thirty (30) days of the change occurring:

   a. change of address of operator;

   b. change of operator, including address of new operator.

4. In the event of any change in ownership of the Works, the Owner shall notify the succeeding owner in writing, of the existence of this Approval, and forward a copy of the notice to the Water Supervisor.

5. The Owner shall ensure that all communications made pursuant to this condition refer to the number at the top of this Approval.

3. TIMING FOR CONSTRUCTION OF PROPOSED WORKS

1. All Proposed Works in this Approval shall be constructed and installed and must commence operation within five (5) years of issuance of this Approval, after which time the Approval cease to apply in respect of any portions of the Works not in operation.

2. One (1) week prior to commissioning operation of any portion of the Proposed Works, the Owner shall notify the Water Supervisor, in writing, of the pending start up date. The notification shall include a statement, certified by a Professional Engineer, that the portion of the Proposed Works to be commissioned is constructed in accordance with this Approval.

3. Within one (1) year of completion of construction of the Proposed Works, a set of record drawings of the Works shall be prepared or updated. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be retained at the Works for the operational life of the Works.

4. In the event that the construction, installation and/or operation of any portion of the Proposed Works is anticipated to be delayed beyond the time period stipulated in paragraph 1 of this condition, the Owner shall submit to the Director an application to amend the Approval to extend this time period, at least six (6) months prior to the end of the period. The amendment

application shall include the reason(s) for the delay and whether there is any design change(s).

4. BYPASSES

1. Any Bypass is prohibited, except:

   a. in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of a treatment process or when an unforeseen flow condition exceeds the design capacity of a treatment process that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not bypassed; and

   b. where the Bypass is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the Water Supervisor in writing at least fifteen (15) days prior to the occurrence of Bypass, including an estimated quantity and duration of the Bypass, an assessment of the impact on the quality of the Final Effluent and the mitigation measures if necessary, and the Water Supervisor has given written consent of the Bypass.

2. At the beginning of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the beginning of the Bypass;

   b. the location of the Bypass and the treatment process(es) bypassed;

   c. the reason(s) for the Bypass.

3. Upon confirmation of the end of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the end of the Bypass;

   b. the measured or estimated volume of Bypass.

4. For any Bypass Event, the Owner shall collect daily sample(s) of the Final Effluent, inclusive of the Event and analyze for all effluent parameters outlined in Compliance Limits condition, following the same protocol specified in the Monitoring and Recording condition as for the regular samples. The sample(s) shall be in addition to the regular Final Effluent samples required under the monitoring and recording condition, except when the Event occurs on a scheduled routine monitoring day.

5. The Owner shall submit a summary report of the Bypass Event(s) to the Water Supervisor on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary reports shall contain, at a minimum, the types of information set out in Subsections (2), (3) and (4) and assessment of the impact of the Event(s) on Final Effluent, plant operation and the receiver, and planned mitigation strategies, as appropriate.

5. OVERFLOWS

1. Any Overflow is prohibited, except:

   a. in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of the Works or when an unforeseen flow condition exceeds the design capacity of the Works that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not overflowed;

   b. where the Overflow is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the Water Supervisor in writing at least fifteen (15) days prior to the occurrence of Overflow, including an estimated quantity and duration of the Overflow, an assessment of the impact on the environment and the mitigation measures if necessary, and the Water Supervisor has given written consent of the Overflow;

2. At the beginning of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the beginning of the Overflow;

   b. the location of the Overflow and the receiver and disinfection status of the Overflow;

   c. the reason(s) for the Overflow.

3. Upon confirmation of the end of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the end of the Overflow;

   b. the measured or estimated volume of the Overflow;

   c. the mitigation measures taken.

4. For any Overflow Event in the Sewage Treatment Plant, the Owner shall collect grab sample(s) of the Overflow, one near the beginning of the Event and one every eight (8) hours for the duration of the Event, and have them analyzed at least for CBOD5, total suspended solids, total phosphorus, total ammonia nitrogen, total Kjeldahl nitrogen, *E. coli* , except that raw sewage and primary treated effluent Overflow shall be analyzed for BOD5, total suspended solids, total phosphorus and total Kjeldahl nitrogen only. For any Overflow Event at a sewage pumping station in the collection system, the Owner shall collect at least one (1) grab sample representative of the Overflow Event and have it analyzed for BOD5, total suspended solids, total phosphorus and total Kjeldahl nitrogen.

5. The Owner shall submit a summary report of the Overflow Event(s) to the Water Supervisor on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary report shall contain, at a minimum; the types of information set out in Subsections (2), (3) and (4) and assessment of the impact of the Event(s) on plant operation and the receiver, and planned mitigation strategies, as appropriate.

6. DESIGN OBJECTIVES

1. The Owner shall design and operate the Sewage Treatment Plant in accordance with the following objectives:

   a. Final Effluent parameters design objectives listed in the table(s) included in Schedule B:

   b. Final Effluent is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.

   c. Annual Average Daily Influent Flow is within the Rated Capacity of the Sewage Treatment Plant.

2. The Owner shall make an assessment of the issues and recommendations for pro-active actions if any is required under the following situations and include in the annual report to the Water Supervisor:

   a. when any of the design objectives is not achieved more than 50% of the time in a year;

   b. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity.

7. COMPLIANCE LIMITS

1. The Owner shall operate and maintain the Sewage Treatment Plant such that the Final Effluent

parameters compliance limits listed in the table(s) included in Schedule C are met.

8. OPERATION AND MAINTENANCE

1. The Owner shall exercise due diligence in ensuring that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, including training in all procedures and other requirements of this Approval and the OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.

2. The Owner shall prepare/update the operations manual for the Works within six (6) months of completion of construction of the Proposed Works, that includes, but not necessarily limited to, the following information:

    a. operating procedures for routine operation of the Works;

    b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;

    c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;

    d. procedures for the inspection and calibration of monitoring equipment;

    e. a spill prevention and contingency plan, consisting of contingency plans and procedures for dealing with equipment breakdowns, potential spills and any other abnormal situations, including notification of the Water Supervisor;

    f. procedures for receiving, responding and recording public complaints, including recording any followup actions taken.

3. The Owner shall maintain the operations manual up-to-date and retain a copy at the location of the Works for the operational life of the Works and upon request, make the manual available to Ministry staff.

4. The Owner shall provide for the overall operation of the Works an operator who possesses the level of knowledge, training and experience sufficient to allow for the safe and environmentally sound operation of the Works in accordance with the requirements of this Approval and, where required by regulation, holds a licence that is applicable to those type and class of the facilities included in the Works. At least three (3) months prior to commissioning of the Works, the Owner shall submit a statement of qualifications of the person to be appointed as the operator of the Works, including copies of certificates, license as required, to the Water Supervisor for

review and approval of the appointment.

9. MONITORING AND RECORDING

1. The Owner shall, upon commencement of operation of the Works, carry out a routine monitoring program of collecting samples at the required sampling points, at the frequency specified or higher, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D and record all results, as follows:

    a. all samples and measurements are to be taken at a time and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored.

    b. a schedule of the day of the week/month and time of the day for the routine sampling shall be forwarded to the Water Supervisor for record. The sampling schedule shall be revised and updated every year through rotation of the day of the week/month and time of the day for the routine sampling program.

    c. definitions and preparation requirements for each sample type are included in document referenced in paragraph 4.b.

    d. definitions for frequency:

        i. Daily means once every day;
        ii. Weekly means once every week;
        iii. Bi-weekly means once every two weeks;
        iv. Monthly means once every month;
        v. Quarterly means once every three months; and
        vi. Annually means once every year.

2. In addition to the routine monitoring program required in paragraph 1, the Owner shall collect samples of the Final Effluent, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D on any day when there is any abnormal operating conditions with or without occurrence of Bypass or Overflow.

3. The Single Sample Results obtained on any routine monitoring day are deemed to be representative of the quality of the Final Effluent on that day and the calendar days that followed until the next routine monitoring day, except for any intervening day(s) when abnormal operating conditions occurred.

4. The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following documents:

    a. the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for

Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended;

b. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater Version 2.0" (January 2016), PIBS 2724e02, as amended; and

c. the publication "Standard Methods for the Examination of Water and Wastewater", as amended.

5. The temperature and pH of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen. The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended.

6. The Owner shall monitor and record the flow rate and daily quantity of the following sewage streams with an accuracy to within plus or minus 15 per cent (+/- 15%) of the actual flowrate:

   a. Influent flow to the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates, or in lieu of an actual installation of equipment, adopt the flow measurements of the Final Effluent for the purpose of estimating Influent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;

   b. Final Effluent discharged from the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates, or in lieu of an actual installation of equipment, adopt the flow measurements of the Influent for the purpose of estimating Final Effluent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;

   c. Each type of Imported Sewage received for co-treatment at the Sewage Treatment Plant by flow measuring devices and instrumentations/pumping rates/haul truck manifests.

7. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

10. LIMITED OPERATIONAL FLEXIBILITY

1. The Owner may make pre-authorized modifications to the sewage pumping stations and Sewage Treatment Plant of the Works in accordance with the document “Limited Operational Flexibility - Protocol for Pre-Authorized Modifications to Municipal Sewage Works”, included as Schedule E of this Approval, subject to the following:

   a. the modifications will not involve the addition of any new treatment process or the removal of an existing treatment process, including chemical systems, from the liquid or solids

treatment trains as originally designed and approved.

b. the scope and technical aspects of the modifications are in line with those delineated in Schedule E and conform with the Ministry's publication "Design Guidelines for Sewage Works 2008", as amended, MOE regulations, policies, guidelines, and industry engineering standards;

c. the modifications shall not negatively impact on the performance of any process or equipment in the Works or result in deterioration in the Final Effluent quality;

d. where the pre-authorized modification requires notification, a "Notice of Modifications to Sewage Works" (included in Schedule E) shall be completed with declarations from a Professional Engineer and the Owner and submitted to the Water Supervisor at least thirty (30) days prior to the scheduled implementation date. The notification shall also include technical memorandum, engineering plans and specifications, as applicable and appropriate to support the declarations that the modifications conform with LOF.

2. The following modifications are not pre-authorized under Limited Operational Flexibility:

a. Modifications that involve addition or extension of process structures, tankages or channels;

b. Modifications that involves relocation of the Final Effluent outfall or any other discharge location or that may require reassessment of the impact to the receiver or environment;

c. Modifications that involves addition of or change in technology of a treatment process or that may involve reassessment of the treatment train process design;

d. Modifications that requires changes to be made to the emergency response, spill prevention and contingency plan; or

e. Modifications that are required pursuant to an order issued by the Ministry.

11. REPORTING

1. The Owner shall report to the Water Supervisor orally as soon as possible any non-compliance with the compliance limits, and in writing within seven (7) days of non-compliance.

2. The Owner shall, within fifteen (15) days of occurrence of a spill within the meaning of Part X of the *Environmental Protection Act* , submit a full written report of the occurrence to the Water Supervisor describing the cause and discovery of the spill, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation, in addition to fulfilling the requirements under the EPA and Ont. Reg. 675/98 "Classification and Exemption of Spills and Reporting of Discharges".

3. The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

4. The Owner shall prepare performance reports on a calendar year basis and submit to the Water Supervisor by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:

    a. a summary and interpretation of all Influent and Imported Sewage monitoring data, including sewage characteristics, flow rates and a comparison to the values used in the design of the Works;

    b. a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;

    c. a summary of all operating issues encountered and corrective actions taken;

    d. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;

    e. a summary of any effluent quality assurance or control measures undertaken;

    f. a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment;

    g. a summary of efforts made to achieve the design objectives;

    h. a tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

    i. a summary of any complaints received and any steps taken to address the complaints;

    j. a summary of all Bypasses, Overflows, spills within the meaning of Part X of EPA and abnormal discharge events, and other abnormal operating conditions;

    k. a copy of all Notice of Modifications to Sewage Works submitted to the Water Supervisor under paragraph 1.d. of Condition 10, with a summary report on status of implementation of all modification.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 regarding general provisions is imposed to ensure that the Works are constructed and

operated in the manner in which they were described and upon which approval was granted.

2. Condition 2 regarding change of owner and operator is included to ensure that the Ministry records are kept accurate and current with respect to ownership and operator of the Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Condition 3 regarding timing for construction of proposed works is included to ensure that the Works are constructed in a timely manner so that standards applicable at the time of Approval of the Works are still applicable at the time of construction to ensure the ongoing protection of the environment, and that prior to the commencement of construction of the portion of the Works that are approved in principle only, the Director will have the opportunity to review detailed design drawings, specifications and an engineer's report containing detailed design calculations for that portion of the Works, to determine capability to comply with the Ministry's requirements stipulated in the terms and conditions of the Approval, and also. ensure that the Works are constructed in accordance with the Approval and that record drawings of the Works "as constructed" are updated and maintained for future references.

4. Condition 4 regarding Bypasses is included to indicate that Bypass is prohibited, except in circumstances where the failure to Bypass could result in greater damage to the environment than the Bypass itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Bypass Events.

5. Condition 5 regarding Overflows is included to indicate that Overflow of untreated or partially treated sewage to the receiver is prohibited, except in circumstances where the failure to Overflow could result in greater damage to the environment than the Overflow itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Overflow Events.

6. Condition 6 regarding design objectives is imposed to establish non-enforceable design objectives to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

7. Condition 7 regarding compliance limits is imposed to ensure that the Final Effluent discharged from the Works to the environment meets the Ministry's effluent quality requirements.

8. Condition 8 regarding operation and maintenance is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

9. Condition 9 regarding monitoring and recording is included to enable the Owner to evaluate and

demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and compliance limits.

10. Condition 10 regarding Limited Operational Flexibility is included to ensure that the Works are constructed, maintained and operated in accordance with the Approval, and that any pre-approved modification will not negatively impact on the performance of the Works.

11. Condition 11 regarding reporting is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for this Approval.

Schedule A

PREVIOUS WORKS APPROVED ON OR BEFORE NOVEMBER 9, 2005:

1. Application for Approval of Municipal and Private Sewage Works submitted by The Town of South Bruce Peninsula.

2. Environmental Assessment Report, design brief, plans and specifications together with associated pipework, mechanical and electrical works, instrumentation and controls prepared by Henderson, Paddon & Associates Limited.

3. Application for Approval of Municipal and Private Sewage Works submitted by the Town of South Bruce Peninsula dated August 30, 2002, and drawing and design specifications prepared by Henderson, Paddon & Associates Limited in the document titled "Design Brief - Effluent Filtration System for Former Town of Wiarton Wastewater Treatment Lagoons - Town of South Bruce Peninsula" dated September 2002.

4. Application for Approval of Municipal and Private Sewage Works submitted by the Town of South Bruce Peninsula dated June 3, 2005, and drawing and design specifications prepared by Henderson, Paddon & Associates Limited.

5. "Design Summary - Effluent Filtration System for Former Town of Wiarton Wastewater Treatment Lagoons - Installation of UV Disinfection System, Town of South Bruce Peninsula" dated March 2003.

PREVIOUS WORKS APPROVED ON APRIL 26, 2006:

1. Application for Approval of Municipal and Private Sewage Works submitted by The Town of South Bruce Peninsula dated January 17, 2006, and design specifications and drawings prepared by Henderson, Paddon & Associates Limited, Consulting Engineers, Owen Sound, Ontario.

2. "Design Report, Upgrades to Existing Sanitary Sewage Pumping Station No. 1, Former Town of Wiarton, Town of Bruce Peninsula" dated January 2006, prepared by Henderson, Paddon & Associates Limited, Consulting Engineers.

PREVIOUS WORKS APPROVED ON SEPTEMBER 23, 2011 UNDER ECA No. 8533-8L3HJ3 :

1. Application for Approval of Sewage Works submitted by The Town of South Bruce Peninsula dated July 29, 2011 and design specifications and drawings prepared by Gamsby and Mannerow Limited, Guelph, Ontario;

2. "Wiarton Sewage Lagoons Influent Distribution Chamber Replacement Design Brief" dated July 2011, prepared by Gamsby and Mannerow Limited, Guelph, Ontario.

PREVIOUS WORKS APPROVED ON ON OCTOBER 6, 2015 UNDER ECA No. 6375-A2PKKS:

1. Application for Environmental Compliance Approval submitted by The Town of South Bruce Peninsula dated July 6, 2015 and design brief and engineering drawings prepared by Exp Services Inc., Brampton, Ontario.

2. Completion of Study Completion of Municipal Class EA for the proposed expansion of the Wiarton Wastewater Treatment Plant dated April 30, 2015.

3. Class EA, Detailed Design and Contract Administration for Expansion / Upgrade of Wiarton Wastewater Treatment System - MOE Meeting and Meeting Minutes - October 3, 2014.

PROPOSED WORKS:

1. Application for Environmental Compliance Approval submitted by The Town of South Bruce Peninsula dated December 22, 2016 and design brief and engineering drawings prepared by B. M. Ross and Associates Ltd., Town of Goderich, Ontario.

Schedule B

Final Effluent Design Objectives

Concentration Objectives - Commissioned Previous Works

Final Effluent Parameter	**Averaging Calculator**	**Objective** (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	10.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	10.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.15 mg/L
Total Ammonia Nitrogen (May 1 to October 31)	Monthly Average Effluent Concentration	3.0 mg/L
Total Ammonia Nitrogen (November 1 to April 30)	Monthly Average Effluent Concentration	6.0 mg/L

Schedule C

Final Effluent Compliance Limits

Concentration Limits

Final Effluent Parameter	**Averaging Calculator**	**Limit** (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	15.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	15.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.3 mg/L
Total Ammonia Nitrogen (May 1 to October 31)	Monthly Average Effluent Concentration	3.0 mg/L
Total Ammonia Nitrogen (November 1 to April 30)	Monthly Average Effluent Concentration	6.0 mg/L
E. coli (May 15 - September 15)	Monthly Geometric Mean Density	200 organisms per 100 mL
pH	Single Sample Result	between 6.0 - 9.5 inclusive

Loading Limits

Final Effluent Parameter	**Averaging Calculator**	**Limit** (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Loading	66.0 kg/d
Total Suspended Solids	Monthly Average Effluent Loading	66.0 kg/d
Total Phosphorus	Monthly Average Effluent Loading	1.32 kg/d
Total Ammonia Nitrogen (May 1 to October 31)	Monthly Average Effluent Loading	13.2 kg/d
Total Ammonia Nitrogen (November 1 to April 30)	Monthly Average Effluent Loading	26.4 kg/d

Schedule D

Monitoring Program

Influent - Influent sampling point

Parameters	Sample Type	Frequency
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly

Final Effluent - Final Effluent sampling point

Parameters	Sample Type	Frequency
CBOD5	8 hour composite	Biweekly
Total Suspended Solids	8 hour composite	Biweekly
Total Phosphorus	8 hour composite	Biweekly
Total Ammonia Nitrogen	8 hour composite	Biweekly
E. coli	Grab	Biweekly
pH	Grab	Biweekly
Temperature	Grab	Biweekly

Imported Sewage - Imported Sewage (Septage) Receiving Station

Parameters	Sample Type	Frequency *NOTE 1
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly
Total Ammonia Nitrogen	Grab	Monthly
Chemical Oxygen Demand	Grab	Monthly
Metals: Aluminum, Arsenic, Barium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Tin, Zinc *NOTE 2		
Organics: Acetone, Benzene, Ethylbenzene, Isopropyl alcohol, Methyl alcohol, Methylene chloride, Methyl ethyl ketone, Toluene, Xylene *NOTE 1		

*NOTE 1: The Owner shall record the quantity of septage received at the Works and sample the septage at least at a monthly frequency when a septage is received.
*NOTE 2: Sample Type is Grab and Frequency is Quarterly

Schedule E

Limited Operational Flexibility

Protocol for Pre-Authorized Modifications to Municipal Sewage Works

1. General

    1. Pre-authorized modifications are permitted only where Limited Operational Flexibility has already been granted in the Approval and only permitted to be made at the pumping stations and sewage treatment plant in the Works, subject to the conditions of the Approval.

    2. Where there is a conflict between the types and scope of pre-authorized modifications listed in this document, and the Approval where Limited Operational Flexibility has been granted, the Approval shall take precedence.

    3. The Owner shall consult the Water Supervisor on any proposed modifications that may fall within the scope and intention of the Limited Operational Flexibility but is not listed explicitly or included as an example in this document.

    4. The Owner shall ensure that any pre-authorized modifications will not:

        a. adversely affect the hydraulic profile of the Sewage Treatment Plant or the performance of any upstream or downstream processes, both in terms of hydraulics and treatment performance;

        b. result in new Overflow or Bypass locations, or any potential increase in frequency or quantity of Overflow(s) or Bypass(es).

        c. result in a reduction in the required Peak Flow Rate of the treatment process or equipment as originally designed.

2. Modifications that do not require pre-authorization:

    1. Sewage works that are exempt from Ministry approval requirements;

    2. Modifications to the electrical system, instrumentation and control system.

3. Pre-authorized modifications that do not require prior notification

    1. Normal or emergency maintenance activities, such as repairs, renovations, refurbishments and replacements with Equivalent Equipment, or other improvements to an existing approved piece of equipment of a treatment process do not require pre-authorization. Examples of these activities are:

        a. Repairing a piece of equipment and putting it back into operation, including replacement of minor

components such as belts, gear boxes, seals, bearings;

b. Repairing a piece of equipment by replacing a major component of the equipment such as motor, with the same make and model or another with the same or very close power rating but the capacity of the pump or blower will still be essentially the same as originally designed and approved;

c. Replacing the entire piece of equipment with Equivalent Equipment.

2. Improvements to equipment efficiency or treatment process control do not require pre-authorization. Examples of these activities are:

a. Adding variable frequency drive to pumps;

b. Adding on-line analyzer, dissolved oxygen probe, ORP probe, flow measurement or other process control device.

4. Pre-Authorized Modifications that require notification

1. Pumping Stations

a. Replacement, realignment of existing sewers including manholes, valves, gates, weirs and associated appurtenances provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved.

b. Extension or partition of wetwell to increase retention time for emergency response and improve station maintenance and pump operation;

c. Replacement or installation of inlet screens to the wetwell;

d. Replacement or installation of flowmeters, construction of station bypass;

e. Replacement, reconfiguration or addition of pumps and modifications to pump suctions and discharge pipings including valve, gates, motors, variable frequency drives and associated appurtenances to maintain firm pumping capacity or modulate the pump rate provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head or an increase in the peak pumping rate of the pumping station as originally designed;

f. Replacement, realignment of existing forcemain(s) valves, gates, and associated appurtenances provided that the modifications will not reduce the flow capacity or increase the total dynamic head and transient in the forcemain.

2. Sewage Treatment Plant

1. Sewers and appurtenances

a. Replacement, realignment of existing sewers (including pipes and channels) or construction of

new sewers, including manholes, valves, gates, weirs and associated appurtenances within the a sewage treatment plant, provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved and that the modifications will remove hydraulic bottlenecks or improve the conveyance of sewage into and through the sewage works.

2. Flow Distribution Chambers/Splitters

    a. Replacement or modification of existing flow distribution chamber/splitters or construction of new flow distribution chamber/splitters, including replacements and installation of sluice gates, weirs, valves for distribution of flows to the downstream process trains, provided that the modifications will not result in a change in flow distribution ratio to the downstream process trains as originally designed.

3. Preliminary Treatment System

    a. Replacement of existing screens and grit removal units with equipment of the same or higher process performance technology, including where necessary replacement and upgrading of existing screenings dewatering washing compactors, hydrocyclones, grit classifiers, grit pumps, air blowers conveyor system, disposal bins and other ancillary equipment to the screening and grit removal processes.

    b. Replacement and installation of channel aeration systems, including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers.

4. Primary Treatment System

    a. Replacement of existing sludge removal mechanism, including sludge chamber;

    b. Replacement and installation of scum removal mechanism, including scum chamber;

    c. Replacement and installation of primary sludge pumps, scum pumps, provided that:the modifications will not result in a reduction in the firm pumping capacity or discharge head that the primary sludge pump(s) and scum pump(s) are originally designed to handle.

5. Secondary Treatment System

    1. Biological Treatment

        a. Conversion of complete mix aeration tank to plug-flow multi-pass aeration tank, including modifications to internal structural configuration;

        b. Addition of inlet gates in multi-pass aeration tank for step-feed operation mode;

        c. Partitioning of an anoxic/flip zone in the inlet of the aeration tank, including installation of

submersible mixer(s);

d. Replacement of aeration system including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers, provided that the modifications will not result in a reduction in the firm capacity or discharge pressure that the blowers are originally designed to supply or in the net oxygen transferred to the wastewater required for biological treatment as originally required.

2. Secondary Sedimentation

a. Replacement of sludge removal mechanism, including sludge chamber;

b. Replacement and installation of scum removal mechanism, including scum chamber;

c. Replacement and installation of return activated sludge pump(s), waste activated sludge pump(s), scum pump(s), provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head that the activated sludge pump(s) and scum pump(s) are originally designed to handle.

6. Tertiary Treatment System

a. Replacement of filtration system with equipment of the same filtration technology, including feed pumps, backwash pumps, filter reject pumps, filtrate extract pumps, holding tanks associated with the pumping system, provided that the modifications will not result in a reduction in the capacity of the filtration system as originally designed.

7. Disinfection System

1. UV Irridation

a. Replacement of UV irridation system, provided that the modifications will not result in a reduction in the design capacity of the disinfection system or the radiation level as originally designed.

2. Chlorination/Dechlorination and Ozonation Systems

a. Extension and reconfiguration of contact tank to increase retention time for effective disinfection and reduce dead zones and minimize short-circuiting;

b. Replacement and installation of chemical storage tanks, provided that the tanks are provided with effective spill containment.

8. Supplementary Treatment Systems

1. Chemical systems

a. Replacement, relocation and installation of chemical storage tanks for existing chemical systems only, provided that the tanks are sited with effective spill containment;

b. Replacement and installation of chemical dosing pumps provided that the modifications will not result in a reduction in the firm capacity that the dosing pumps are originally designed to handle.

c. Relocation and addition of chemical dosing point(s) including chemical feed pipes and valves and controls, to improve phosphorus removal efficiency;

d. Use of an alternate chemical provided that it is a non-proprietary product and is a commonly used alternative to the chemical approved in the Works, provided that the chemical storage tanks, chemical dosing pumps, feed pipes and controls are also upgraded, as necessary..

9. Final Effluent Disposal Facilities

a. Replacement and realignment of the Final Effluent channel, sewer or forcemain, including manholes, valves and appurtenances from the end of the treatment train to the discharge outfall section, provided that the sewer conveys only effluent discharged from the Sewage Treatment Plant and that the replacement or re-aligned sewer has similar dimensions and performance criteria and is in the same or approximately the same location and that the hydraulic capacity will not be reduced.

10. Sludge Management System

1. Sludge Holding and Thickening

a. Replacement and installation of sludge holding tanks, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;

2. Sludge Digestion

a. Replacement and installation of digesters, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;

b. replacement of sludge digester covers.

3. Sludge Dewatering and Disposal

a. Replacement of sludge dewatering equipment, sludge handling pumps, such as transfer pumps, feed pumps, cake pumps, loading pumps, provided that modifications will not result in reduction in solids storage or handling capacities.

11. Standby Power System

    1. Replacement and installation of standby power system, including feed from alternate power grid, emergency power generator, fuel supply and storage systems, provided that the existing standby power generation capacity is not reduced.

12. Pilot Study

    1. Small side-stream pilot study for existing or new technologies, alternative treatment process or chemical, provided:

        i. all effluent from the pilot system is hauled off-site for proper disposal or returned back to the sewage treatment plant for at a point no further than immediately downstream of the location from where the side-stream is drawn;

        ii. no proprietary treatment process or propriety chemical is involved in the pilot study;

        iii. the effluent from the pilot system returned to the sewage treatment plant does not significantly alter the composition/concentration of or add any new contaminant/inhibiting substances to the sewage to be treated in the downstream process;

        iv. the pilot study will not have any negative impacts on the operation of the sewage treatment plant or cause a deterioration of effluent quality;

        v. the pilot study does not exceed a maximum of two years and a notification of completion shall be submitted to the Water Supervisor within one month of completion of the pilot project.

13. Lagoons

    a. installing baffles in lagoon provided that the operating capacity of the lagoon system is not reduced;

    b. raise top elevation of lagoon berms to increase free-board;

    c. replace and install interconnecting pipes and chambers between cells, provided that the process design operating sequence is not changed;

    d. replace and install mechanical aerators, or replace mechanical aerators with diffused aeration system provided that the mixing and aeration capacity are not reduced;

    e. removal of accumulated sludge and disposal to an approved location offsite.

This page contains an image of the form entitled "Notice of Modification to Sewage Works"

Ontario
Ministry of the Environment

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA AND SEND A COPY TO THE WATER SUPERVISOR (FOR MUNICIPAL) OR DISTRICT MANAGER (FOR NON-MUNICIPAL SYSTEMS)

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility

(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)

ECA Owner	Municipality

Part 2: Description of the modifications as part of the Limited Operational Flexibility

(Attach a detailed description of the sewage works)

Description shall include:
1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name (Print)	PEO License Number

Signature	Date (mm/dd/yy)

Name of Employer

Part 4 – Declaration by Owner

I hereby declare that:
1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modification; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)

Owner Representative's Signature	Date (mm/dd/yy)

EAB Form December 2, 2013

Notice of Modifications Dec-2013.pdf

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 6211-AGEU4W issued on February 24, 2017

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 23rd day of November, 2017

Fariha Pannu.

Fariha Pannu, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

SH/

c: DWMD Supervisor, MOECC Owen Sound
Andrew Garland, BM Ross and Associates Ltd., The Corporation of the Town of South Bruce Peninsula

Notice of Modifications Dec-2013.pdf

From: Mitchell, Ian (MECP)
To: Graham, Robert G. (MECP)
Cc: Geurts, Hugh (MECP); Belanger, Renee (MECP)
Subject: RE: Wiarton WWTP
Date: May 27, 2021 1:45:31 PM

Bob

Are you aware if we have ever been notified of any nuisance algal blooms in the vicinity of the WWTP outfall?

Ian Mitchell
District Engineer
Ministry of the Environment, Conservation and Parks
Owen Sound District
101-17th St E
Owen Sound ON N4K 0A5
Phone (519) 374-1388
Fax (519) 371-2905

From: Mitchell, Ian (MECP)
Sent: May 27, 2021 11:59 AM
To: Graham, Robert G. (MECP) <Robert.G.Graham@ontario.ca>
Cc: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>
Subject: RE: Wiarton WWTP

Thanks Bob I think I'll have the proponent contact the municipality for any drawings and to locate the discharge so you don't need to bother, unless you want it for your information

Thanks for the quick response

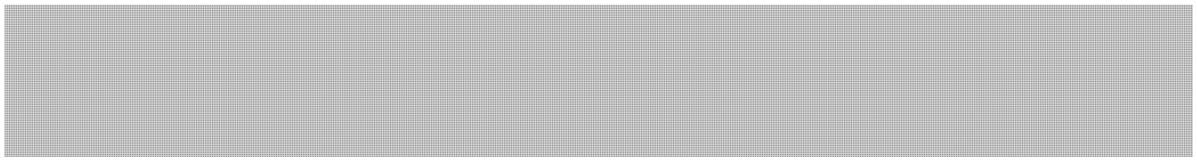
Ian Mitchell
District Engineer
Ministry of the Environment, Conservation and Parks
Owen Sound District
101-17th St E
Owen Sound ON N4K 0A5
Phone (519) 374-1388
Fax (519) 371-2905

From: Graham, Robert G. (MECP) <Robert.G.Graham@ontario.ca>
Sent: May 27, 2021 11:56 AM
To: Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
Cc: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>
Subject: RE: Wiarton WWTP

Hi Ian,

Amended ECA No. 6045-ARDJS7 dated November 23, 2017 is the current control document. Please find attached a copy of the 2020 AR which may assist with additional information. The Report identifies that the plant discharge utilizes the pipe located on Mary Street to Isaac Street (original) as well as the original abandoned force main on Taylor Street. Both pipes intersect at the discharge pipe located at George and Tyson Streets.

s.N/R



Bob Graham

Provincial Officer
Drinking Water and Environmental Compliance Division
Ministry of the Environment, Conservation and Parks
Owen Sound District Office 101-17th Street East
Owen Sound ON N4K 0A5
Telephone (519) 374-0216
Fax: (519) 371-2905
E-mail: robert.g.graham@ontario.ca

We want to hear from you. How was my service? You can provide feedback at 1-888-745-8888 or ontario.ca/inspectionfeedback

Nous attendons vos commentaires. Qu'avez-vous pensé de mon service? Vous pouvez nous faire part de vos commentaires au 1-888-745-8888 ou à ontario.ca/retroactioninspection

From: Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
Sent: May-27-21 11:12 AM
To: Graham, Robert G. (MECP) <Robert.G.Graham@ontario.ca>
Cc: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>
Subject: Wiarton WWTP

Hi Bob we just got off the phone regarding a proposed aquafarm that will be discharging to Colpoy's bay They asked about the location of the Wiarton STP discharge. Do you happen to have a figure or something that shows the discharge location? Also is the attached the current ECA for Wiarton? I think it is… but there were a number of fairly recent amendments from what I can see so I want to be sure.

Thanks

Ian Mitchell
District Engineer
Ministry of the Environment, Conservation and Parks
Owen Sound District
101-17th St E
Owen Sound ON N4K 0A5
Phone (519) 374-1388
Fax (519) 371-2905

s.N/R

From: Graham, Robert G. (MECP) <Robert.G.Graham@ontario.ca>
Sent: May 31, 2021 8:28 AM
To: Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
Subject: RE: Wiarton WWTP

Hi Ian,

To my knowledge we have not been notified of any nuisance algal blooms in the vicinity of the drinking water intake or the WWTP outfall (Shayne may have further insight as the previous inspector).
The municipality does have a monitoring plan as a condition of the MECP Municipal Drinking Water Licence.

Bob Graham

Provincial Officer
Drinking Water and Environmental Compliance Division
Ministry of the Environment, Conservation and Parks
Owen Sound District Office 101-17th Street East
Owen Sound ON N4K 0A5
Telephone (519) 374-0216
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Please consider the environment before printing this email note.

From: Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
Sent: May-27-21 1:46 PM
To: Graham, Robert G. (MECP) <Robert.G.Graham@ontario.ca>
Cc: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>
Subject: RE: Wiarton WWTP

Bob

Are you aware if we have ever been notified of any nuisance algal blooms in the vicinity of the WWTP outfall?

Ian Mitchell
District Engineer
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Cc: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>
Subject: RE: Wiarton WWTP

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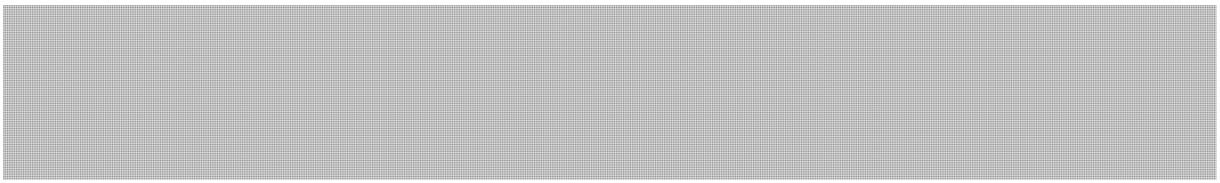

Bob Graham

Provincial Officer
Drinking Water and Environmental Compliance Division
Ministry of the Environment, Conservation and Parks
Owen Sound District Office 101-17th Street East
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Subject: Wiarton WWTP

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Thanks

Ian Mitchell
District Engineer
Ministry of the Environment, Conservation and Parks
Owen Sound District
101-17th St E
Owen Sound ON N4K 0A5
Phone (519) 374-1388
Fax (519) 371-2905

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From:	Mitchell, Ian (MECP)
To:	Graham, Robert G. (MECP)
Cc:	Geurts, Hugh (MECP)
Subject:	FW: Wiarton WWTP
Date:	June 2, 2021 4:02:25 PM
Attachments:	WIARTON SANITARY SEWER SYSTEM.pdf

Thanks Bob

Hugh was wondering if we can provide this to the consultant for the Aquafarm proposal.

Ian Mitchell
District Engineer
Ministry of the Environment, Conservation and Parks
Owen Sound District
101-17th St E
Owen Sound ON N4K 0A5
Phone (519) 374-1388
Fax (519) 371-2905

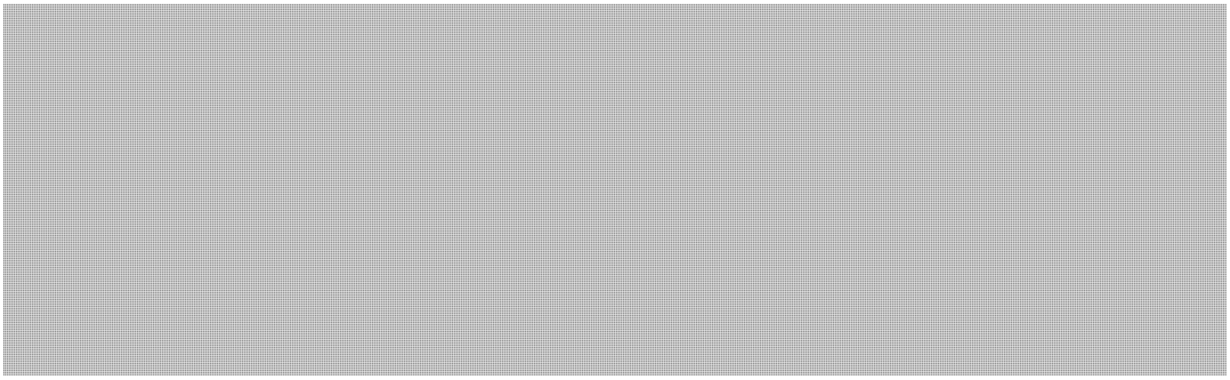
From: Graham, Robert G. (MECP) <Robert.G.Graham@ontario.ca>
Sent: June 2, 2021 1:26 PM
To: Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
Subject: FW: Wiarton WWTP

A little delayed, but attached is a copy of the Wiarton WWTP sanitary sewer collection system and the outfall location.

Bob Graham

Provincial Officer
Drinking Water and Environmental Compliance Division
Ministry of the Environment, Conservation and Parks
Owen Sound District Office 101-17th Street East
Owen Sound ON N4K 0A5
Telephone (519) 374-0216
Fax: (519) 371-2905
E-mail: robert.g.graham@ontario.ca

s.N/R



From: Karla Young <KYoung@ocwa.com>
Sent: June-02-21 12:48 PM
To: Graham, Robert G. (MECP) <Robert.G.Graham@ontario.ca>
Cc: Leo Paul Frigault <lfrigault@ocwa.com>
Subject: RE: Wiarton WWTP

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Bob

Attached is the schematic for the Wiarton WWTP. Let me know if you need anything else.

Karla

Karla Young
Process & Compliance Technician
Grey-Bruce/Bruce Hubs
Georgian Highlands Region
Ontario Clean Water Agency
kyoung@ocwa.com
(519) 374 - 5782

From: Graham, Robert G. (MECP) <Robert.G.Graham@ontario.ca>
Sent: May-27-21 11:58 AM
To: Karla Young <KYoung@ocwa.com>; Leo-Paul Frigault <LFrigault@ocwa.com>
Subject: Wiarton WWTP

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi,

If available, can you kindly forward to me a copy of a schematic that details the Wiarton WWTP sanitary sewers collection system and discharge location to Georgian Bay.

Thanks,

Bob Graham

Provincial Officer
Drinking Water and Environmental Compliance Division
Ministry of the Environment, Conservation and Parks
Owen Sound District Office 101-17th Street East
Owen Sound ON N4K 0A5
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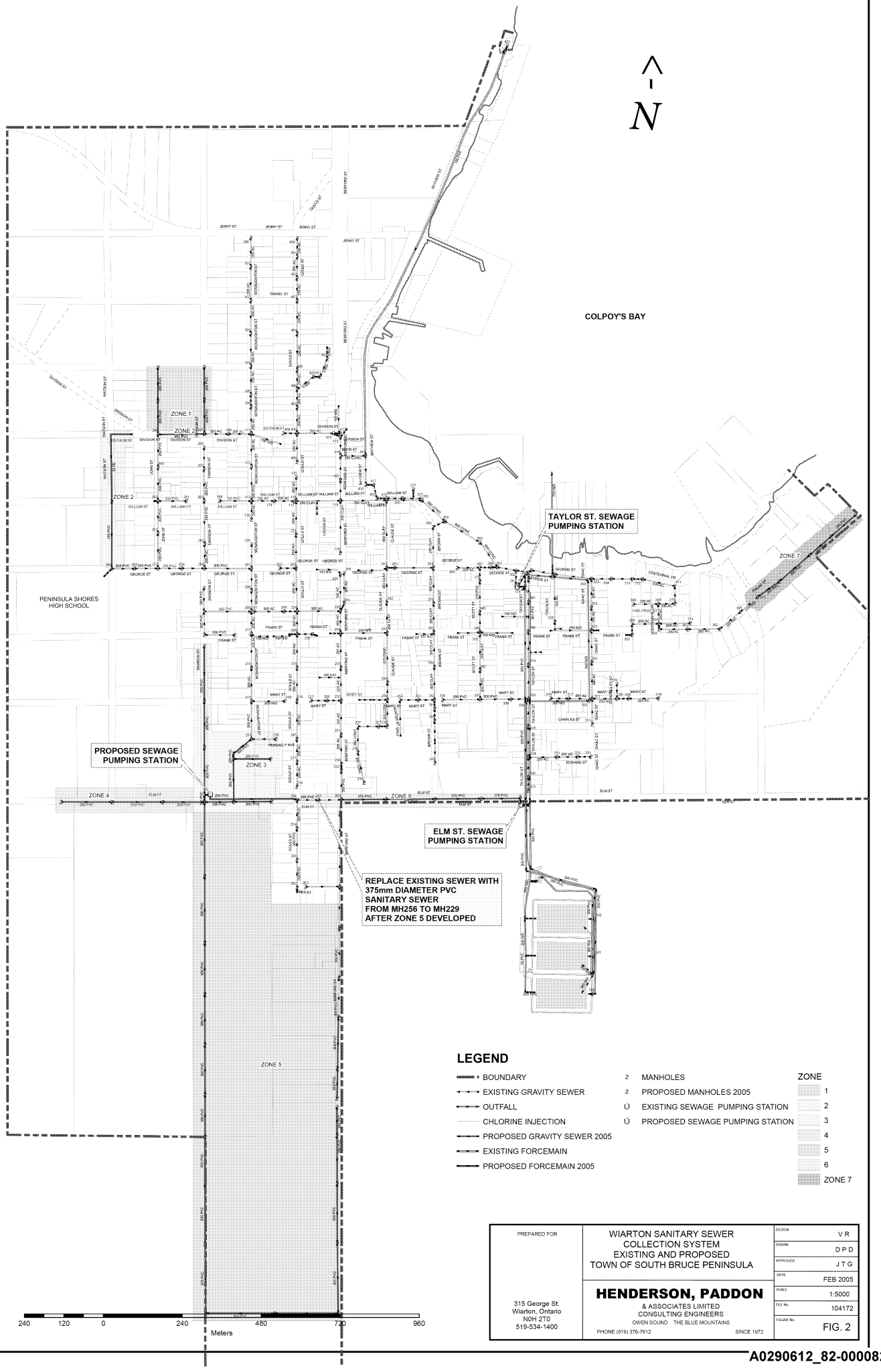


PREPARED FOR

315 George St.
Wiarton, Ontario
N0H 2T0
519-534-1400

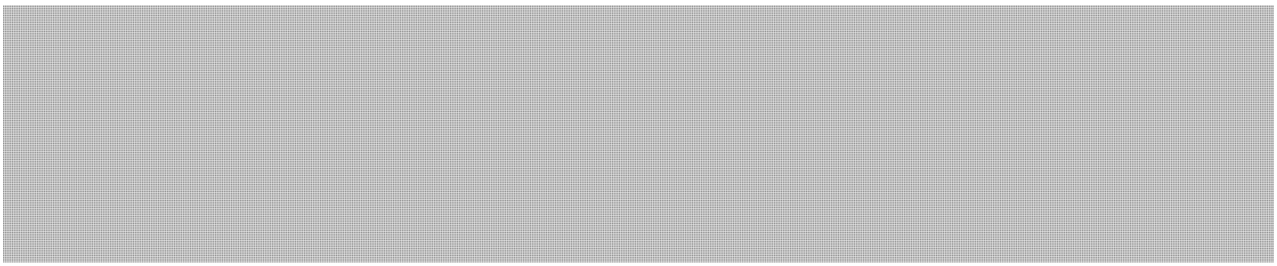
WIARTON SANITARY SEWER
COLLECTION SYSTEM
EXISTING AND PROPOSED
TOWN OF SOUTH BRUCE PENINSULA

HENDERSON, PADDON
& ASSOCIATES LIMITED
CONSULTING ENGINEERS
OWEN SOUND THE BLUE MOUNTAINS
PHONE (519) 376-7612 SINCE 1972

DESIGN	V R
DRAWN	D P D
APPROVED	J T G
DATE	FEB 2005
SCALE	1:5000
FILE No.	104172
FIGURE No.	FIG. 2

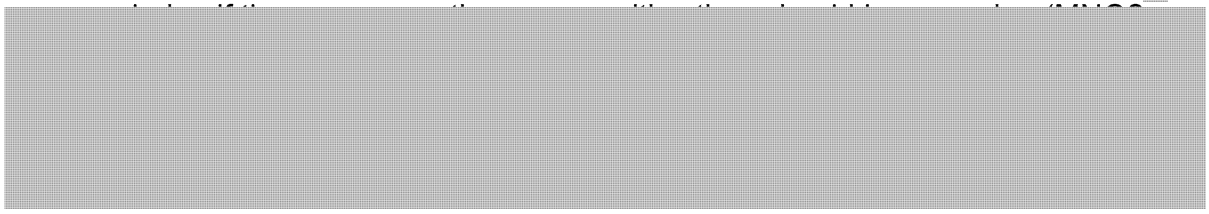
A0290612_82-000082

s.N/R
s.13



We just got off the phone regarding a proposed aquafarm that will be discharging waste water to Colpoy's bay and will also be taking water from Colpoy's Bay. We mentioned the need for consultation and they have initiated discussion with SON.

s.13



Thanks

Ian Mitchell
District Engineer
Ministry of the Environment, Conservation and Parks
Owen Sound District
101-17th St E
Owen Sound ON N4K 0A5
Phone (519) 374-1388
Fax (519) 371-2905

From: Deborah Sinclair
To: Geurts, Hugh (MECP); Dan Hurley
Cc: Belanger, Renee (MECP); Mitchell, Ian (MECP)
Subject: RE: assimilative studies _ Wiarton Waste water treatment plant
Date: May 27, 2021 12:07:33 PM

Perfect – thank you.

I look forward to the ECA.

From: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>
Sent: May 27, 2021 12:03 PM
To: Deborah Sinclair <Deborah.Sinclair@environmentalsciences.ca>; Dan Hurley <dhurley@tathameng.com>
Cc: Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>; Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
Subject: assimilative studies _ Wiarton Waste water treatment plant

Hello Deborah.

I just went through the Wiarton Files to see if there was an assimilative capacity study done.

The last time the plant went thru a re rating was 2017. It appears that through each staged progressive expansion of the plant, they have committed to improving their treatment to remain within their previous loading limits. As such they are not required to do an assimilative study so that information does not exist.

Once Ian can confirm he has the latest copy of the Wiarton ECA, he or I will send it to you.

Thanks

Hugh

Hugh Geurts
Surface Water Evaluator
Southwest Regional Office
Ontario Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs
733 Exeter Road, London
N6E 1L3

(548) 388-7471

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 6045-ARDJS7
Issue Date: November 23, 2017

The Corporation of the Town of South Bruce Peninsula
315 George St
South Bruce Peninsula, Ontario
N0H 2T0

Site Location: Wiarton Wastewater Treatment Plant
441048 Elm Street (Lot 2, Concession 21E)
Georgian Bluffs Township, County of Grey
N0H 2T0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

Establishment, usage and operation of an existing municipal sewage works in accordance with Section 53 of OWRA, for the collection, transmission, treatment of sanitary sewage and disposal of effluent to Colpoys Bay via a Sewage Treatment Plant, Wiarton Wastewater Treatment Plant, located in Lot 2, Concession 21E, Township of Georgian Bluffs, as follows:

Classification of Collection System: Separate Sewer System

Capacity of Sewage Treatment Plant:

- **Rated Capacity -** Based on the commissioned Previous Works: 4,400 m^3/d

PROPOSED WORKS :

Septage Equalization Storage Pond

- One (1) 8.4 L/s capacity pump conveying septage from the Septage Receiving Management System described below and discharging through one (1) 100 mm diameter 40 m long forcemain to the Septage Equalization Storage Pond described below;

- One (1) Septage Equalization Storage Pond having a total storage capacity of 2,000 m^3,

consisting of a pond interior berm with 3H:1V slopes, pond bottom area of 250 m^2, and pond top area of 1220 m^2, providing a 0.6 m freeboard, equipped with 200 mm diameter pond drain pipe discharging by gravity to the filter backwash pumping station described below under Effluent Filtration Plant section;

- One (1) 56 kW air blowers providing 660 L/s @ 40 kPa of air for mixing of contents of the septage receiving and equalization storage pond described above, equipped with soundproof enclosures and silencers, to be located in the existing Filter and Disinfection Building;

Standby Power Diesel Generator

- One (1) 300 kW and 375 kVA capacity stand-by power diesel generator and one (1) 2,270 L capacity double-walled diesel storage tank, designed to provide 24-hour fuel supply, equipped with acoustic silencer and piping, and to be located outdoors; and

All in accordance with the submitted supporting documents listed in Schedule A.

PREVIOUS WORKS APPROVED ON OCTOBER 6, 2015 UNDER ECA No. 6375-A2PKKS:

Septage Receiving Management System

- One (1) septage reception station including piping and magnetic flow meter to be installed in an underground concrete chamber, equipped with controlled access and record keeping of septage being received, discharging to an existing filter backwash pumping station described below under Effluent Filtration Plant section;

Screening of Raw Sewage

- One (1) concrete channel with approximate dimensions of 0.5 m width x 1.1 m depth x 8.85 m length housing one (1) mechanical stainless steel fine screen (Escalator ^{R} Fine Screen or equivalent) with 6 mm openings operating in upstream water depth of 0.45 m, equipped with 0.5 hp screen drive motor, screen cleaning brush, and 2.0 hp screened solids compactor, discharging to the Moving Bed Biofilm Reactor (MBBR) described below;

- One (1) concrete channel located parallel to the mechanical screen channel described above, designed to handle overflows and having an approximate dimensions of 1.4 m depth x 1.05 m width x 8.5 m length, equipped with one (1) overflow weir, one (1) fixed screen with 12 mm x 12 mm openings, and one (1) fixed screen with 6 mm x 6 mm openings, discharging to the Moving Bed Biofilm Reactor (MBBR) described below;

Moving Bed Biofilm Reactor (MBBR)

- One (1) Moving Bed Biofilm Reactor (MBBR) consisting of three (3) concrete cells, with Cell #1 having approximate dimensions of 11.0 m wide x 6.0 m deep x 5.3 m long, Cell

#2 having approximate dimensions of 11.0 m wide x 6.0 m deep x 5.3 m long, and Cell #3 having approximate dimensions of 11.0 m wide x 6.0 m deep x 9.5 m long, consisting of:

- Cell #1 and Cell #2 to be used for BOD_5 removal providing a total reactor volume of 632.5 m^3 at 5.0 m liquid depth, filled with disk shaped free-floating carrier media (Anox ™ K5 free-floating media or equivalent), providing a total of 233,990 m^2 media carrier surface area, equipped with two (2) medium bubble stainless steel aeration system in Cell 1, two (2) medium bubble stainless steel aeration system in Cell 2, and media retaining sieves with 6 mm diameter openings;

- Cell #3 to be used for nitrification providing a total reactor volume of 519.1 m^3 at 5.0 m liquid depth, filled with disk shaped free-floating carrier media (Anox ™ K5 free-floating media or equivalent), providing a total of 183,152 m^2 media carrier surface area, equipped with three (3) medium bubble stainless steel aeration system and media retaining sieves with 6 mm diameter openings;

- Two (2) 30 hp air blowers (one duty, one standby) providing 1,675 Nm^3/h at 7.9 Psi of air to the Moving Bed Biofilm Reactors (MBBR) equipped with soundproof enclosures and silencers; and

Floating Islands Wetland and Lagoon Mixers

- Installation of constructed Floating Treatment Wetlands in Waste Stabilization Lagoons (Cell #2 and Cell #3), consisting of approximately five thousand (5,000) modules of PhytoLinks floating treatment wetlands, each PhytoLinks module is an engineered hexagon-shaped floating material designed to grow emergent aquatic macrophytes hydroponically, installed downstream of the MBBR to provide effluent polishing;

- Installation of wastewater circulation devices with a combined total capacity of circulating up to 361,700 m^3/d of wastewater, designed to provide passive mixing and aeration on the bottom of the lagoon to digest the sludge; and

- Including all controls and associated appurtenances.

All in accordance with the submitted supporting documents listed in Schedule A.

PREVIOUS WORKS APPROVED ON SEPTEMBER 23, 2011 UNDER ECA No. 8533-8L3HJ3 :

Lagoon Influent Distribution Chamber

Decommissioning of the existing lagoon influent distribution chamber and installation of a new concrete influent distribution chamber with overall approximate dimension of 5.35 m long x 4.00 m wide x 3.00 m high equipped with the following:

- One (1) 300 mm diameter PVC influent inlet forcemain and one (1) spare 300 mm

diameter PVC influent inlet forcemain, both equipped with a 300 mm diameter knife gate valves, discharging to an influent chamber described below;

- One (1) 165 m long 300 mm diameter PVC influent bypass forcemain equipped with a 300 mm diameter knife gate valve discharging to Lagoon Cell No. 2;

- One (1) 150 mm diameter PVC filter backwash inlet forcemain equipped with a 150 mm diameter knife gate valves discharging to an influent chamber described below;

- One (1) 25 m long 150 mm diameter PVC filter backwash bypass forcemain equipped with a 150 mm diameter knife gate valve discharging to Lagoon Cell No. 2;

- One (1) influent inlet chamber with approximate dimension of 3.40 m wide x 1.20 m long x 1.2 m high equipped with two (2) aluminium sluice gate valves discharging to two (2) influent outlet chambers described below:

- One (1) influent outlet chamber with approximate dimension of 1.60 m wide x 1.20 m long x 1.2 m high discharging through a 40 m long 400 mm diameter PVC influent pipe to Lagoon Cell No. 1;

- One (1) influent outlet chamber with approximate dimension of 1.60 m wide x 1.20 m long x 1.2 m high discharging through a 25 m long 450 mm diameter PVC overflow pipe to Lagoon Cell No. 1; and

- Including all controls and associated appurtenances.

All in accordance with the submitted supporting documents listed in Schedule A.

PREVIOUS WORKS APPROVED ON APRIL 26, 2006:

Sewage Pumping Station No. 1 (Taylor Street Pumping Station)

Upgrades to the existing Sewage Pumping Station No.1 located at No. 524 Taylor Street, approximately 60 m south of George Street consisting of:

- An existing wet well with two compartments, each approximately 3.1 m x 2.35 m x 0.95 m (operating depth for duty pump) with flow control gates, emergency isolating sluice gate, access ladders, railing, platform and ventilation;

- Installation of two (2) new 60 hp 1775 rpm sewage pumps located in a dry well each with a rated capacity of 103.0 L/sec at a TDH of 29.0 m (one duty, one standby) and a combined rated capacity of 130.0 L/sec at a TDH of 39.0 m;

- Installation of a forcemain air relief and/or vacuum relief valve in the dry well;

- Installation of three (3) new air relief and/or vacuum relief valve chambers along the

forcemain between Sewage Pumping Stations No. 1 and No. 2;

- One (1) existing flow meter; and
- Including minor modifications to pump inlet and discharge piping, electrical, pump controls, and associated appurtenances and other mechanical upgrades.

Sewage Lagoons

- Add a second outlet pipe from the splitter box into Cell No. 1 to prevent any sewage overflow;

All in accordance with the submitted supporting documents listed in Schedule A.

PREVIOUS WORKS APPROVED ON OR BEFORE NOVEMBER 9, 2005:

TRUNK SEWERS

Construction of a trunk sewer as follows:

STREET	FROM	TO
Blue Water Park	William St. approx. 135 m East of Claude St.	Brown St. approx. 200 m north of George St.
Easement	Brown St. approx. 200 m north of George St.	Scott St. approx. 70 m north of George St.
Easement	Scott St. 70 m north of George St.	George St. approx. 125 m east of Scott St.
Easement	George St. approx. 125 m east of Scott St.	Pumping Station (# 524 Taylor St.)
George St.	Existing Pumping Station George St./Taylor St.	George St. approx. 125 m east of Scott Street

SEWAGE PUMPING STATIONS

Sewage Pumping Station No. 2

Sanitary Sewage Pumping Station No. 2 to be constructed on a site on the southwest corner of the intersection of Elm Street and Taylor Street, consisting of:

- An inground divided wet well equipped with three (3) submersible sewage pumps each with a rated capacity of 116 L/sec at a TDH of 30.5 m (one duty, two standby) and two (2) pumps in parallel having a rated capacity of 164.81 L/sec at a TDH of 36.68 m (two duty, one standby);
- Ultrasonic liquid level float control system with alarms and backup float control system, piping, inlet bar screen, lockable access hatchway, ladder, benching, mechanical ventilation system c/w two (2) goosenecked vents with bird screens;
- An overflow to Elm Street, connecting sanitary sewer from Elm Street and connecting inlet and outlet sanitary forcemain discharge piping to Taylor Street;

- A separate attached inground valve chamber housing a valved bypass piping, valves and piping, and a goose-necked vent with bird screen; and

- An above ground Control Building located on the southwest corner of the intersection of Elm Street and Taylor Street adjacent to and east of the Sanitary Sewage Pumping Station No. 2 housing a 250 kW diesel generator set, control panel, ventilation, etc., together with a below floor level pipe chase housing a flowmeter and valves and piping;

STANDBY POWER AND EMERGENCY OVERFLOW SYSTEM

- Emergency station overflow sewer 600 mm diameter approximately 120 m in length from the pumping station to manhole at Taylor Street / George Street and manhole connection to the Marine outfall at the intersection of Tyson Street / George Street, with control sluice gate;

- Standby power to be provided by a 125 kW diesel generator set to be located at the station;

- Provision of an emergency bypass connection on the discharge forcemain;

- Including all the necessary appurtenances and controls, heating, ventilation, and electrical works.

WASTE STABILIZATION LAGOONS

Sewage Lagoons

Expansion of the existing three-cell waste stabilization pond (total 6 ha) from an existing 760 m^3/day at a nominal operating depth of 1.52 m to 2006 m^3/day with continuous discharge to Colpoy's Bay, located on Lot 1, Concession 21, Township of Keppel, County of Grey, and consisting of:

- Improvements to existing berms by addition of fill material, grading, and seeding;

- New control structure (inlet, outlet, and inter-cell);

- Installation of additional interconnecting pipes between adjacent cells;

Lagoon Aeration System

Installation of a submerged air diffusion system consisting of header feeder pipes, and distribution diffusion tubes installed across the cells as follows:

- Cell No. 1 - 37 lines at spacings varying from 3.05 m to 6.1 m centre to centre;

- Cell No. 2 - 10 lines at spacing of 17 m centre to centre;
- Cell No. 3 - 5 lines at spacing of 38 m centre to centre;
- Two (2) rotary positive displacement blowers, each rated at 165 L/sec against a head of 42 kPa (one as standby) and belt driven by 15 kW motors;
- Installation of new fine-bubble aeration system in Cell 1, including new air header and lateral pipes and membrane diffusion tubes;
- Replacement of all aeration tubes in Cells 2 and 3 with new ones;
- Modification of piping and ventilation system in existing blower building;

PHOSPHORUS REMOVAL SYSTEM

- Installation of a 22,700 L chemical storage tank for storage of phosphorus removal chemical;
- Installation of two (2) positive displacement type chemical metering pumps (one on standby) each capable of pumping 41 L/hr at 1034 kPa, for dosing phosphorus removal chemical to the sewage at a dosing point located in the outlet forcemain;

EFFLUENT FILTRATION PLANT

Construction of an Effluent Filtration Plant with a peak design flow capacity of 5,734 m^3/day located in a filtration building consisting of the following:

- Three (3) effluent filter cells, each cell having two (2) filter modules, providing a total filtration area of 27.9 m^2 and filtration depth of 2.0 m, equipped with air compressors for continuous filter backwash, influent flow measurement weir with ultrasonic level detector, and a bypass weir to allow filter bypass during events of high peak flows exceeding 5,734 m^3/day;
- One (1) 3.0 m diameter and 6.5 m deep precast concrete wet well for receiving filter backwash and septage, equipped with two (2) submersible pumps each with a capacity of 23.3 L/sec @ 19.5 m TDH and a 2.7 m x 2.1 m precast valve chamber, discharging into Cell No. 1 through a 200 mm diameter forcemain;
- One (1) 12,000 L capacity coagulant storage tank (2.13 m diameter x 3.5 m high), equipped with two (2) coagulant metering pumps (one duty and one standby) dosing coagulant at a flow paced rate upstream of the filtration units;
- Installation of a third rotary positive displacement blower rated at 165 L/sec against a

head of 42 kPa and belt driven by 15 kW motors (standby blower); and

- Including controls, instrumentation, and associated appurtenances.

EFFLUENT DISINFECTION SYSTEM

installation of an Ultraviolet Disinfection System (Wedeco Model TAK55M 6-2 or Equivalent) designed for a of 8,000 m^3/day, consisting of:

- One (1) UV disinfection unit with approximate dimensions of 2.0 m long x 0.470 m wide x 0.684 m minimum water depth, containing one (1) UV bank with two (2) UV modules each with twelve (12) high intensity low pressure UV lamps (a total of 24 lamps), designed to provide a 30.0 mJ/cm^2 UV dosage at 55 % Transmittance at 254 nm during peak design flow of 8,000 m^3/day;

- Provision of a hypochlorite solution storage tank complete with 100% spill containment, and an 11.36 L/hr capacity metering pump for seasonal chlorination of lagoon effluent (before filtration and UV disinfection) for control of algae growth between May and September of each year.

OUTFALL AND OVERFLOW SEWERS

- Construction of outfall (including marine section) and overflow sewers as follows:

STREET	FROM	TO
Lagoon Site	Effluent Chambers	Elm Street / Taylor Street intersection
Taylor Street	Elm Street	George Street
Taylor Street	Pumping Station	George Street
George Street	Taylor Street	Tyson Street
George Street	Isaac Street	Tyson Street

- Construction of a new section of 300 mm diameter outfall sewer north of Cell 3 and conversion of an existing 200 mm diameter back-up forcemain to a second effluent outfall sewer;

- Including all the necessary appurtenances.

LAGOON FACILITY CONTROL BUILDING

Construction of a 10.6 m x 6.9 m building to accommodate the following:

- Two (2) motor driven blowers complete with connecting pipework and all necessary appurtenances;

- Motor control centre; and

- Including yard piping, electrical power supply and equipment, heating and ventilation equipment and all other necessary appurtenances and controls.

All in accordance with the submitted supporting documents listed in Schedule A.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Annual Average Effluent Concentration" means the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year, weighted by the quantity of the Final Effluent discharged over the days deemed to be represented by each sample;

2. "Annual Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar year divided by the number of days during which Final Effluent was discharged that year;

3. "Annual Average Daily Effluent Loading" means the value obtained by multiplying the Annual Average Effluent Concentration of a contaminant by the Annual Average Daily Effluent Flow over the same calendar year;

4. "Annual Average Daily Influent Flow" means the cumulative total sewage flow of Influent to the Sewage Treatment Plant during a calendar year divided by the number of days during which sewage was flowing to the Sewage Treatment Plant that year;

5. "Approval" means this entire document and any schedules attached to it, and the application;

6. "BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;

7. "Bypass" means diversion of sewage around one or more unit processes within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point;

8. "CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

9. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

10. "*E. coli* " refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

11. "EPA" means the *Environmental Protection Act* , R.S.O. 1990, c.E.19, as amended;

12. "Equivalent Equipment" means alternate piece(s) of equipment that meets the design requirements

and performance specifications of the piece(s) of equipment to be substituted;

13. "Event" means an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the last Bypass or Overflow. Overflows and Bypasses are separate Events even when they occur concurrently;

14. "Final Effluent" means effluent that are discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point;

15. "Geometric Mean Density" means the geometric mean of all Single Sample Results of density measurement in the samples taken over the period specified;

16. "Imported Sewage" means portable toilet waste, holding tank waste, leachate, septage, processed organics hauled to the Sewage Treatment Plant by licensed waste management system operators and at the specific characteristics and quantities approved for co-treatment in the Sewage Treatment Plant;

17. "Influent" means flows to the Sewage Treatment Plant from the collection system and Imported Sewage but excluding process return flows;

18. "Limited Operational Flexibility" (LOF) means the protocol under which the Owner shall follow in order to undertake any modification that is pre-approved in this Approval;

19. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and includes all officials, employees or other persons acting on its behalf;

20. "Monthly Average Effluent Concentration" means the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month, weighted by the quantity of the Final Effluent discharged over the days deemed to be represented by each sample;

21. "Monthly Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar month divided by the number of days during which Final Effluent was discharged that month;

22. "Monthly Average Daily Effluent Loading" means the value obtained by multiplying the Monthly Average Effluent Concentration of a contaminant by the Monthly Average Daily Effluent Flow over the same calendar month:

23. "Overflow" means a discharge to the environment from the Works at a location other than the approved effluent disposal facilities or via the effluent disposal facilities downstream of the Final Effluent sampling point;

24. "Owner" means The Corporation of the Town of South Bruce Peninsula and its successors and

assignees;

25. "OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

26. "Peak Daily Flow Rate" (also referred to as maximum daily flow or maximum day flow) means the largest volume of flow to be received during a one-day period for which the sewage treatment process unit or equipment is designed to handle;

27. "Peak Hourly Flow Rate" (also referred to as maximum hourly flow or maximum hour flow) means the largest volume of flow to be received during a one-hour period for which the sewage treatment process unit or equipment is designed to handle;

28. "Peak Instantaneous Flow Rate" means the instantaneous maximum flow rate as measured by a metering device for which the sewage treatment process unit or equipment is designed to handle;

29. "Preliminary Treatment System" means all facilities in the Sewage Treatment Plant associated with screening and grit removal;

30. "Previous Works" means those portions of the Works included in the Approval that have been constructed previously;

31. "Primary Treatment System" means all facilities in the Sewage Treatment Plant associated with the primary sedimentation unit process and includes chemically enhanced primary treatment;

32. "Proposed Works" means those portions of the Works included in the Approval that are under construction or to be constructed;

33. "Rated Capacity" means the Annual Average Daily Influent Flow for which the Sewage Treatment Plant is designed to handle;

34. "Sanitary Sewers" means pipes that collect and convey wastewater from residential, commercial, institutional and industrial buildings, and some infiltration and inflow from extraneous sources such as groundwater and surface runoff through means other than stormwater catch basins;

35. "Secondary Treatment System" means all facilities in the Sewage Treatment Plant associated with biological treatment, secondary sedimentation and phosphorus removal unit processes;

36. "Sewage Treatment Plant" means the entire sewage treatment excluding the Final Effluent disposal facilities;

37. "Single Sample Result" means the test result of a parameter in the effluent discharged on any day, as measured by a probe, analyzer or in a composite or grab sample, as required;

38. "Water Supervisor" means the Water Compliance Supervisor for the Safe Drinking Water Branch (SDWB) for the London office of the Ministry;

39. "Works" means the approved sewage works, and includes Proposed Works, Previous Works and modifications made under Limited Operational Flexibility.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

1. The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the terms and conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

2. The Owner shall design, construct, operate and maintain the Works in accordance with the conditions of this Approval.

3. Where there is a conflict between a provision of any document referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence.

2. CHANGE OF OWNER AND OPERATOR

1. The Owner shall, within thirty (30) calendar days of issuance of this Approval, prepare/update and submit to the Water Supervisor the Municipal and Local Services Board Wastewater System Profile Information Form (obtainable from the Water Supervisor) under any of the following situations:

   a. the form has not been previously submitted for the sewage works;

   b. this Approval is issued for extension, re-rating or process treatment upgrade of the sewage works;

   c. every time when a notification is provided to the Water Supervisor in compliance with requirements of change of Owner or operator under this condition.

2. The Owner shall notify the Water Supervisor and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:

   a. change of address of Owner;

b. change of Owner, including address of new owner;

c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act, R.S.O. 1990, c. B.17* , as amended, shall be included in the notification;

d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current information filed under the *Corporations Information Act, R.S.O. 1990, c. C.39* , as amended, shall be included in the notification.

3. The Owner shall notify the Water Supervisor, in writing, of any of the following changes within thirty (30) days of the change occurring:

   a. change of address of operator;

   b. change of operator, including address of new operator.

4. In the event of any change in ownership of the Works, the Owner shall notify the succeeding owner in writing, of the existence of this Approval, and forward a copy of the notice to the Water Supervisor.

5. The Owner shall ensure that all communications made pursuant to this condition refer to the number at the top of this Approval.

3. TIMING FOR CONSTRUCTION OF PROPOSED WORKS

1. All Proposed Works in this Approval shall be constructed and installed and must commence operation within five (5) years of issuance of this Approval, after which time the Approval cease to apply in respect of any portions of the Works not in operation.

2. One (1) week prior to commissioning operation of any portion of the Proposed Works, the Owner shall notify the Water Supervisor, in writing, of the pending start up date. The notification shall include a statement, certified by a Professional Engineer, that the portion of the Proposed Works to be commissioned is constructed in accordance with this Approval.

3. Within one (1) year of completion of construction of the Proposed Works, a set of record drawings of the Works shall be prepared or updated. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be retained at the Works for the operational life of the Works.

4. In the event that the construction, installation and/or operation of any portion of the Proposed Works is anticipated to be delayed beyond the time period stipulated in paragraph 1 of this condition, the Owner shall submit to the Director an application to amend the Approval to extend this time period, at least six (6) months prior to the end of the period. The amendment

application shall include the reason(s) for the delay and whether there is any design change(s).

4. BYPASSES

1. Any Bypass is prohibited, except:

   a. in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of a treatment process or when an unforeseen flow condition exceeds the design capacity of a treatment process that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not bypassed; and

   b. where the Bypass is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the Water Supervisor in writing at least fifteen (15) days prior to the occurrence of Bypass, including an estimated quantity and duration of the Bypass, an assessment of the impact on the quality of the Final Effluent and the mitigation measures if necessary, and the Water Supervisor has given written consent of the Bypass.

2. At the beginning of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the beginning of the Bypass;

   b. the location of the Bypass and the treatment process(es) bypassed;

   c. the reason(s) for the Bypass.

3. Upon confirmation of the end of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the end of the Bypass;

   b. the measured or estimated volume of Bypass.

4. For any Bypass Event, the Owner shall collect daily sample(s) of the Final Effluent, inclusive of the Event and analyze for all effluent parameters outlined in Compliance Limits condition, following the same protocol specified in the Monitoring and Recording condition as for the regular samples. The sample(s) shall be in addition to the regular Final Effluent samples required under the monitoring and recording condition, except when the Event occurs on a scheduled routine monitoring day.

5. The Owner shall submit a summary report of the Bypass Event(s) to the Water Supervisor on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary reports shall contain, at a minimum, the types of information set out in Subsections (2), (3) and (4) and assessment of the impact of the Event(s) on Final Effluent, plant operation and the receiver, and planned mitigation strategies, as appropriate.

5. OVERFLOWS

1. Any Overflow is prohibited, except:

   a. in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of the Works or when an unforeseen flow condition exceeds the design capacity of the Works that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not overflowed;

   b. where the Overflow is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the Water Supervisor in writing at least fifteen (15) days prior to the occurrence of Overflow, including an estimated quantity and duration of the Overflow, an assessment of the impact on the environment and the mitigation measures if necessary, and the Water Supervisor has given written consent of the Overflow;

2. At the beginning of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the beginning of the Overflow;

   b. the location of the Overflow and the receiver and disinfection status of the Overflow;

   c. the reason(s) for the Overflow.

3. Upon confirmation of the end of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

   a. the date and time of the end of the Overflow;

   b. the measured or estimated volume of the Overflow;

   c. the mitigation measures taken.

4. For any Overflow Event in the Sewage Treatment Plant, the Owner shall collect grab sample(s) of the Overflow, one near the beginning of the Event and one every eight (8) hours for the duration of the Event, and have them analyzed at least for CBOD5, total suspended solids, total phosphorus, total ammonia nitrogen, total Kjeldahl nitrogen, *E. coli* , except that raw sewage and primary treated effluent Overflow shall be analyzed for BOD5, total suspended solids, total phosphorus and total Kjeldahl nitrogen only. For any Overflow Event at a sewage pumping station in the collection system, the Owner shall collect at least one (1) grab sample representative of the Overflow Event and have it analyzed for BOD5, total suspended solids, total phosphorus and total Kjeldahl nitrogen.

5. The Owner shall submit a summary report of the Overflow Event(s) to the Water Supervisor on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary report shall contain, at a minimum; the types of information set out in Subsections (2), (3) and (4) and assessment of the impact of the Event(s) on plant operation and the receiver, and planned mitigation strategies, as appropriate.

6. DESIGN OBJECTIVES

1. The Owner shall design and operate the Sewage Treatment Plant in accordance with the following objectives:

   a. Final Effluent parameters design objectives listed in the table(s) included in Schedule B:

   b. Final Effluent is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.

   c. Annual Average Daily Influent Flow is within the Rated Capacity of the Sewage Treatment Plant.

2. The Owner shall make an assessment of the issues and recommendations for pro-active actions if any is required under the following situations and include in the annual report to the Water Supervisor:

   a. when any of the design objectives is not achieved more than 50% of the time in a year;

   b. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity.

7. COMPLIANCE LIMITS

1. The Owner shall operate and maintain the Sewage Treatment Plant such that the Final Effluent

parameters compliance limits listed in the table(s) included in Schedule C are met.

8. OPERATION AND MAINTENANCE

1. The Owner shall exercise due diligence in ensuring that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, including training in all procedures and other requirements of this Approval and the OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.

2. The Owner shall prepare/update the operations manual for the Works within six (6) months of completion of construction of the Proposed Works, that includes, but not necessarily limited to, the following information:

   a. operating procedures for routine operation of the Works;

   b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;

   c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;

   d. procedures for the inspection and calibration of monitoring equipment;

   e. a spill prevention and contingency plan, consisting of contingency plans and procedures for dealing with equipment breakdowns, potential spills and any other abnormal situations, including notification of the Water Supervisor;

   f. procedures for receiving, responding and recording public complaints, including recording any followup actions taken.

3. The Owner shall maintain the operations manual up-to-date and retain a copy at the location of the Works for the operational life of the Works and upon request, make the manual available to Ministry staff.

4. The Owner shall provide for the overall operation of the Works an operator who possesses the level of knowledge, training and experience sufficient to allow for the safe and environmentally sound operation of the Works in accordance with the requirements of this Approval and, where required by regulation, holds a licence that is applicable to those type and class of the facilities included in the Works. At least three (3) months prior to commissioning of the Works, the Owner shall submit a statement of qualifications of the person to be appointed as the operator of the Works, including copies of certificates, license as required, to the Water Supervisor for

review and approval of the appointment.

9. MONITORING AND RECORDING

1. The Owner shall, upon commencement of operation of the Works, carry out a routine monitoring program of collecting samples at the required sampling points, at the frequency specified or higher, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D and record all results, as follows:

    a. all samples and measurements are to be taken at a time and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored.

    b. a schedule of the day of the week/month and time of the day for the routine sampling shall be forwarded to the Water Supervisor for record. The sampling schedule shall be revised and updated every year through rotation of the day of the week/month and time of the day for the routine sampling program.

    c. definitions and preparation requirements for each sample type are included in document referenced in paragraph 4.b.

    d. definitions for frequency:

        i. Daily means once every day;
        ii. Weekly means once every week;
        iii. Bi-weekly means once every two weeks;
        iv. Monthly means once every month;
        v. Quarterly means once every three months; and
        vi. Annually means once every year.

2. In addition to the routine monitoring program required in paragraph 1, the Owner shall collect samples of the Final Effluent, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D on any day when there is any abnormal operating conditions with or without occurrence of Bypass or Overflow.

3. The Single Sample Results obtained on any routine monitoring day are deemed to be representative of the quality of the Final Effluent on that day and the calendar days that followed until the next routine monitoring day, except for any intervening day(s) when abnormal operating conditions occurred.

4. The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following documents:

    a. the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for

Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended;

b. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater Version 2.0" (January 2016), PIBS 2724e02, as amended; and

c. the publication "Standard Methods for the Examination of Water and Wastewater", as amended.

5. The temperature and pH of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen. The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended.

6. The Owner shall monitor and record the flow rate and daily quantity of the following sewage streams with an accuracy to within plus or minus 15 per cent (+/- 15%) of the actual flowrate:

   a. Influent flow to the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates, or in lieu of an actual installation of equipment, adopt the flow measurements of the Final Effluent for the purpose of estimating Influent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;

   b. Final Effluent discharged from the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates, or in lieu of an actual installation of equipment, adopt the flow measurements of the Influent for the purpose of estimating Final Effluent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;

   c. Each type of Imported Sewage received for co-treatment at the Sewage Treatment Plant by flow measuring devices and instrumentations/pumping rates/haul truck manifests.

7. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

10. LIMITED OPERATIONAL FLEXIBILITY

1. The Owner may make pre-authorized modifications to the sewage pumping stations and Sewage Treatment Plant of the Works in accordance with the document “Limited Operational Flexibility - Protocol for Pre-Authorized Modifications to Municipal Sewage Works”, included as Schedule E of this Approval, subject to the following:

   a. the modifications will not involve the addition of any new treatment process or the removal of an existing treatment process, including chemical systems, from the liquid or solids

treatment trains as originally designed and approved.

b. the scope and technical aspects of the modifications are in line with those delineated in Schedule E and conform with the Ministry's publication "Design Guidelines for Sewage Works 2008", as amended, MOE regulations, policies, guidelines, and industry engineering standards;

c. the modifications shall not negatively impact on the performance of any process or equipment in the Works or result in deterioration in the Final Effluent quality;

d. where the pre-authorized modification requires notification, a "Notice of Modifications to Sewage Works" (included in Schedule E) shall be completed with declarations from a Professional Engineer and the Owner and submitted to the Water Supervisor at least thirty (30) days prior to the scheduled implementation date. The notification shall also include technical memorandum, engineering plans and specifications, as applicable and appropriate to support the declarations that the modifications conform with LOF.

2. The following modifications are not pre-authorized under Limited Operational Flexibility:

a. Modifications that involve addition or extension of process structures, tankages or channels;

b. Modifications that involves relocation of the Final Effluent outfall or any other discharge location or that may require reassessment of the impact to the receiver or environment;

c. Modifications that involves addition of or change in technology of a treatment process or that may involve reassessment of the treatment train process design;

d. Modifications that requires changes to be made to the emergency response, spill prevention and contingency plan; or

e. Modifications that are required pursuant to an order issued by the Ministry.

11. REPORTING

1. The Owner shall report to the Water Supervisor orally as soon as possible any non-compliance with the compliance limits, and in writing within seven (7) days of non-compliance.

2. The Owner shall, within fifteen (15) days of occurrence of a spill within the meaning of Part X of the *Environmental Protection Act* , submit a full written report of the occurrence to the Water Supervisor describing the cause and discovery of the spill, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation, in addition to fulfilling the requirements under the EPA and Ont. Reg. 675/98 "Classification and Exemption of Spills and Reporting of Discharges".

3. The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff.

4. The Owner shall prepare performance reports on a calendar year basis and submit to the Water Supervisor by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:

    a. a summary and interpretation of all Influent and Imported Sewage monitoring data, including sewage characteristics, flow rates and a comparison to the values used in the design of the Works;

    b. a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;

    c. a summary of all operating issues encountered and corrective actions taken;

    d. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;

    e. a summary of any effluent quality assurance or control measures undertaken;

    f. a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment;

    g. a summary of efforts made to achieve the design objectives;

    h. a tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

    i. a summary of any complaints received and any steps taken to address the complaints;

    j. a summary of all Bypasses, Overflows, spills within the meaning of Part X of EPA and abnormal discharge events, and other abnormal operating conditions;

    k. a copy of all Notice of Modifications to Sewage Works submitted to the Water Supervisor under paragraph 1.d. of Condition 10, with a summary report on status of implementation of all modification.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 regarding general provisions is imposed to ensure that the Works are constructed and

operated in the manner in which they were described and upon which approval was granted.

2. Condition 2 regarding change of owner and operator is included to ensure that the Ministry records are kept accurate and current with respect to ownership and operator of the Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.

3. Condition 3 regarding timing for construction of proposed works is included to ensure that the Works are constructed in a timely manner so that standards applicable at the time of Approval of the Works are still applicable at the time of construction to ensure the ongoing protection of the environment, and that prior to the commencement of construction of the portion of the Works that are approved in principle only, the Director will have the opportunity to review detailed design drawings, specifications and an engineer's report containing detailed design calculations for that portion of the Works, to determine capability to comply with the Ministry's requirements stipulated in the terms and conditions of the Approval, and also. ensure that the Works are constructed in accordance with the Approval and that record drawings of the Works "as constructed" are updated and maintained for future references.

4. Condition 4 regarding Bypasses is included to indicate that Bypass is prohibited, except in circumstances where the failure to Bypass could result in greater damage to the environment than the Bypass itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Bypass Events.

5. Condition 5 regarding Overflows is included to indicate that Overflow of untreated or partially treated sewage to the receiver is prohibited, except in circumstances where the failure to Overflow could result in greater damage to the environment than the Overflow itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Overflow Events.

6. Condition 6 regarding design objectives is imposed to establish non-enforceable design objectives to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

7. Condition 7 regarding compliance limits is imposed to ensure that the Final Effluent discharged from the Works to the environment meets the Ministry's effluent quality requirements.

8. Condition 8 regarding operation and maintenance is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

9. Condition 9 regarding monitoring and recording is included to enable the Owner to evaluate and

demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and compliance limits.

10. Condition 10 regarding Limited Operational Flexibility is included to ensure that the Works are constructed, maintained and operated in accordance with the Approval, and that any pre-approved modification will not negatively impact on the performance of the Works.

11. Condition 11 regarding reporting is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for this Approval.

Schedule A

PREVIOUS WORKS APPROVED ON OR BEFORE NOVEMBER 9, 2005:

1. Application for Approval of Municipal and Private Sewage Works submitted by The Town of South Bruce Peninsula.

2. Environmental Assessment Report, design brief, plans and specifications together with associated pipework, mechanical and electrical works, instrumentation and controls prepared by Henderson, Paddon & Associates Limited.

3. Application for Approval of Municipal and Private Sewage Works submitted by the Town of South Bruce Peninsula dated August 30, 2002, and drawing and design specifications prepared by Henderson, Paddon & Associates Limited in the document titled "Design Brief - Effluent Filtration System for Former Town of Wiarton Wastewater Treatment Lagoons - Town of South Bruce Peninsula" dated September 2002.

4. Application for Approval of Municipal and Private Sewage Works submitted by the Town of South Bruce Peninsula dated June 3, 2005, and drawing and design specifications prepared by Henderson, Paddon & Associates Limited.

5. "Design Summary - Effluent Filtration System for Former Town of Wiarton Wastewater Treatment Lagoons - Installation of UV Disinfection System, Town of South Bruce Peninsula" dated March 2003.

PREVIOUS WORKS APPROVED ON APRIL 26, 2006:

1. Application for Approval of Municipal and Private Sewage Works submitted by The Town of South Bruce Peninsula dated January 17, 2006, and design specifications and drawings prepared by Henderson, Paddon & Associates Limited, Consulting Engineers, Owen Sound, Ontario.

2. "Design Report, Upgrades to Existing Sanitary Sewage Pumping Station No. 1, Former Town of Wiarton, Town of Bruce Peninsula" dated January 2006, prepared by Henderson, Paddon & Associates Limited, Consulting Engineers.

PREVIOUS WORKS APPROVED ON SEPTEMBER 23, 2011 UNDER ECA No. 8533-8L3HJ3 :

1. Application for Approval of Sewage Works submitted by The Town of South Bruce Peninsula dated July 29, 2011 and design specifications and drawings prepared by Gamsby and Mannerow Limited, Guelph, Ontario;

2. "Wiarton Sewage Lagoons Influent Distribution Chamber Replacement Design Brief" dated July 2011, prepared by Gamsby and Mannerow Limited, Guelph, Ontario.

PREVIOUS WORKS APPROVED ON ON OCTOBER 6, 2015 UNDER ECA No. 6375-A2PKKS:

1. Application for Environmental Compliance Approval submitted by The Town of South Bruce Peninsula dated July 6, 2015 and design brief and engineering drawings prepared by Exp Services Inc., Brampton, Ontario.

2. Completion of Study Completion of Municipal Class EA for the proposed expansion of the Wiarton Wastewater Treatment Plant dated April 30, 2015.

3. Class EA, Detailed Design and Contract Administration for Expansion / Upgrade of Wiarton Wastewater Treatment System - MOE Meeting and Meeting Minutes - October 3, 2014.

PROPOSED WORKS:

1. Application for Environmental Compliance Approval submitted by The Town of South Bruce Peninsula dated December 22, 2016 and design brief and engineering drawings prepared by B. M. Ross and Associates Ltd., Town of Goderich, Ontario.

Schedule B

Final Effluent Design Objectives

Concentration Objectives - Commissioned Previous Works

Final Effluent Parameter	**Averaging Calculator**	**Objective** (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	10.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	10.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.15 mg/L
Total Ammonia Nitrogen (May 1 to October 31)	Monthly Average Effluent Concentration	3.0 mg/L
Total Ammonia Nitrogen (November 1 to April 30)	Monthly Average Effluent Concentration	6.0 mg/L

Schedule C

Final Effluent Compliance Limits

Concentration Limits

Final Effluent Parameter	**Averaging Calculator**	**Limit** (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	15.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	15.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.3 mg/L
Total Ammonia Nitrogen (May 1 to October 31)	Monthly Average Effluent Concentration	3.0 mg/L
Total Ammonia Nitrogen (November 1 to April 30)	Monthly Average Effluent Concentration	6.0 mg/L
E. coli (May 15 - September 15)	Monthly Geometric Mean Density	200 organisms per 100 mL
pH	Single Sample Result	between 6.0 - 9.5 inclusive

Loading Limits

Final Effluent Parameter	**Averaging Calculator**	**Limit** (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Loading	66.0 kg/d
Total Suspended Solids	Monthly Average Effluent Loading	66.0 kg/d
Total Phosphorus	Monthly Average Effluent Loading	1.32 kg/d
Total Ammonia Nitrogen (May 1 to October 31)	Monthly Average Effluent Loading	13.2 kg/d
Total Ammonia Nitrogen (November 1 to April 30)	Monthly Average Effluent Loading	26.4 kg/d

Schedule D

Monitoring Program

Influent - Influent sampling point

Parameters	Sample Type	Frequency
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly

Final Effluent - Final Effluent sampling point

Parameters	Sample Type	Frequency
CBOD5	8 hour composite	Biweekly
Total Suspended Solids	8 hour composite	Biweekly
Total Phosphorus	8 hour composite	Biweekly
Total Ammonia Nitrogen	8 hour composite	Biweekly
E. coli	Grab	Biweekly
pH	Grab	Biweekly
Temperature	Grab	Biweekly

Imported Sewage - Imported Sewage (Septage) Receiving Station

Parameters	Sample Type	Frequency *NOTE 1
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly
Total Ammonia Nitrogen	Grab	Monthly
Chemical Oxygen Demand	Grab	Monthly
Metals: Aluminum, Arsenic, Barium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Tin, Zinc *NOTE 2		
Organics: Acetone, Benzene, Ethylbenzene, Isopropyl alcohol, Methyl alcohol, Methylene chloride, Methyl ethyl ketone, Toluene, Xylene *NOTE 1		

*NOTE 1: The Owner shall record the quantity of septage received at the Works and sample the septage at least at a monthly frequency when a septage is received.
*NOTE 2: Sample Type is Grab and Frequency is Quarterly

Schedule E

Limited Operational Flexibility

Protocol for Pre-Authorized Modifications to Municipal Sewage Works

1. General

    1. Pre-authorized modifications are permitted only where Limited Operational Flexibility has already been granted in the Approval and only permitted to be made at the pumping stations and sewage treatment plant in the Works, subject to the conditions of the Approval.

    2. Where there is a conflict between the types and scope of pre-authorized modifications listed in this document, and the Approval where Limited Operational Flexibility has been granted, the Approval shall take precedence.

    3. The Owner shall consult the Water Supervisor on any proposed modifications that may fall within the scope and intention of the Limited Operational Flexibility but is not listed explicitly or included as an example in this document.

    4. The Owner shall ensure that any pre-authorized modifications will not:

        a. adversely affect the hydraulic profile of the Sewage Treatment Plant or the performance of any upstream or downstream processes, both in terms of hydraulics and treatment performance;

        b. result in new Overflow or Bypass locations, or any potential increase in frequency or quantity of Overflow(s) or Bypass(es).

        c. result in a reduction in the required Peak Flow Rate of the treatment process or equipment as originally designed.

2. Modifications that do not require pre-authorization:

    1. Sewage works that are exempt from Ministry approval requirements;

    2. Modifications to the electrical system, instrumentation and control system.

3. Pre-authorized modifications that do not require prior notification

    1. Normal or emergency maintenance activities, such as repairs, renovations, refurbishments and replacements with Equivalent Equipment, or other improvements to an existing approved piece of equipment of a treatment process do not require pre-authorization. Examples of these activities are:

        a. Repairing a piece of equipment and putting it back into operation, including replacement of minor

components such as belts, gear boxes, seals, bearings;

b. Repairing a piece of equipment by replacing a major component of the equipment such as motor, with the same make and model or another with the same or very close power rating but the capacity of the pump or blower will still be essentially the same as originally designed and approved;

c. Replacing the entire piece of equipment with Equivalent Equipment.

2. Improvements to equipment efficiency or treatment process control do not require pre-authorization. Examples of these activities are:

a. Adding variable frequency drive to pumps;

b. Adding on-line analyzer, dissolved oxygen probe, ORP probe, flow measurement or other process control device.

4. Pre-Authorized Modifications that require notification

1. Pumping Stations

a. Replacement, realignment of existing sewers including manholes, valves, gates, weirs and associated appurtenances provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved.

b. Extension or partition of wetwell to increase retention time for emergency response and improve station maintenance and pump operation;

c. Replacement or installation of inlet screens to the wetwell;

d. Replacement or installation of flowmeters, construction of station bypass;

e. Replacement, reconfiguration or addition of pumps and modifications to pump suctions and discharge pipings including valve, gates, motors, variable frequency drives and associated appurtenances to maintain firm pumping capacity or modulate the pump rate provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head or an increase in the peak pumping rate of the pumping station as originally designed;

f. Replacement, realignment of existing forcemain(s) valves, gates, and associated appurtenances provided that the modifications will not reduce the flow capacity or increase the total dynamic head and transient in the forcemain.

2. Sewage Treatment Plant

1. Sewers and appurtenances

a. Replacement, realignment of existing sewers (including pipes and channels) or construction of

new sewers, including manholes, valves, gates, weirs and associated appurtenances within the a sewage treatment plant, provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved and that the modifications will remove hydraulic bottlenecks or improve the conveyance of sewage into and through the sewage works.

2. Flow Distribution Chambers/Splitters

    a. Replacement or modification of existing flow distribution chamber/splitters or construction of new flow distribution chamber/splitters, including replacements and installation of sluice gates, weirs, valves for distribution of flows to the downstream process trains, provided that the modifications will not result in a change in flow distribution ratio to the downstream process trains as originally designed.

3. Preliminary Treatment System

    a. Replacement of existing screens and grit removal units with equipment of the same or higher process performance technology, including where necessary replacement and upgrading of existing screenings dewatering washing compactors, hydrocyclones, grit classifiers, grit pumps, air blowers conveyor system, disposal bins and other ancillary equipment to the screening and grit removal processes.

    b. Replacement and installation of channel aeration systems, including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers.

4. Primary Treatment System

    a. Replacement of existing sludge removal mechanism, including sludge chamber;

    b. Replacement and installation of scum removal mechanism, including scum chamber;

    c. Replacement and installation of primary sludge pumps, scum pumps, provided that:the modifications will not result in a reduction in the firm pumping capacity or discharge head that the primary sludge pump(s) and scum pump(s) are originally designed to handle.

5. Secondary Treatment System

    1. Biological Treatment

        a. Conversion of complete mix aeration tank to plug-flow multi-pass aeration tank, including modifications to internal structural configuration;

        b. Addition of inlet gates in multi-pass aeration tank for step-feed operation mode;

        c. Partitioning of an anoxic/flip zone in the inlet of the aeration tank, including installation of

submersible mixer(s);

d. Replacement of aeration system including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers, provided that the modifications will not result in a reduction in the firm capacity or discharge pressure that the blowers are originally designed to supply or in the net oxygen transferred to the wastewater required for biological treatment as originally required.

2. Secondary Sedimentation

a. Replacement of sludge removal mechanism, including sludge chamber;

b. Replacement and installation of scum removal mechanism, including scum chamber;

c. Replacement and installation of return activated sludge pump(s), waste activated sludge pump(s), scum pump(s), provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head that the activated sludge pump(s) and scum pump(s) are originally designed to handle.

6. Tertiary Treatment System

a. Replacement of filtration system with equipment of the same filtration technology, including feed pumps, backwash pumps, filter reject pumps, filtrate extract pumps, holding tanks associated with the pumping system, provided that the modifications will not result in a reduction in the capacity of the filtration system as originally designed.

7. Disinfection System

1. UV Irridation

a. Replacement of UV irridation system, provided that the modifications will not result in a reduction in the design capacity of the disinfection system or the radiation level as originally designed.

2. Chlorination/Dechlorination and Ozonation Systems

a. Extension and reconfiguration of contact tank to increase retention time for effective disinfection and reduce dead zones and minimize short-circuiting;

b. Replacement and installation of chemical storage tanks, provided that the tanks are provided with effective spill containment.

8. Supplementary Treatment Systems

1. Chemical systems

a. Replacement, relocation and installation of chemical storage tanks for existing chemical systems only, provided that the tanks are sited with effective spill containment;

b. Replacement and installation of chemical dosing pumps provided that the modifications will not result in a reduction in the firm capacity that the dosing pumps are originally designed to handle.

c. Relocation and addition of chemical dosing point(s) including chemical feed pipes and valves and controls, to improve phosphorus removal efficiency;

d. Use of an alternate chemical provided that it is a non-proprietary product and is a commonly used alternative to the chemical approved in the Works, provided that the chemical storage tanks, chemical dosing pumps, feed pipes and controls are also upgraded, as necessary..

9. Final Effluent Disposal Facilities

a. Replacement and realignment of the Final Effluent channel, sewer or forcemain, including manholes, valves and appurtenances from the end of the treatment train to the discharge outfall section, provided that the sewer conveys only effluent discharged from the Sewage Treatment Plant and that the replacement or re-aligned sewer has similar dimensions and performance criteria and is in the same or approximately the same location and that the hydraulic capacity will not be reduced.

10. Sludge Management System

1. Sludge Holding and Thickening

a. Replacement and installation of sludge holding tanks, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;

2. Sludge Digestion

a. Replacement and installation of digesters, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;

b. replacement of sludge digester covers.

3. Sludge Dewatering and Disposal

a. Replacement of sludge dewatering equipment, sludge handling pumps, such as transfer pumps, feed pumps, cake pumps, loading pumps, provided that modifications will not result in reduction in solids storage or handling capacities.

11. Standby Power System

    1. Replacement and installation of standby power system, including feed from alternate power grid, emergency power generator, fuel supply and storage systems, provided that the existing standby power generation capacity is not reduced.

12. Pilot Study

    1. Small side-stream pilot study for existing or new technologies, alternative treatment process or chemical, provided:

        i. all effluent from the pilot system is hauled off-site for proper disposal or returned back to the sewage treatment plant for at a point no further than immediately downstream of the location from where the side-stream is drawn;

        ii. no proprietary treatment process or propriety chemical is involved in the pilot study;

        iii. the effluent from the pilot system returned to the sewage treatment plant does not significantly alter the composition/concentration of or add any new contaminant/inhibiting substances to the sewage to be treated in the downstream process;

        iv. the pilot study will not have any negative impacts on the operation of the sewage treatment plant or cause a deterioration of effluent quality;

        v. the pilot study does not exceed a maximum of two years and a notification of completion shall be submitted to the Water Supervisor within one month of completion of the pilot project.

13. Lagoons

    a. installing baffles in lagoon provided that the operating capacity of the lagoon system is not reduced;

    b. raise top elevation of lagoon berms to increase free-board;

    c. replace and install interconnecting pipes and chambers between cells, provided that the process design operating sequence is not changed;

    d. replace and install mechanical aerators, or replace mechanical aerators with diffused aeration system provided that the mixing and aeration capacity are not reduced;

    e. removal of accumulated sludge and disposal to an approved location offsite.

This page contains an image of the form entitled "Notice of Modification to Sewage Works"

Ontario
Ministry of the Environment

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA AND SEND A COPY TO THE WATER SUPERVISOR (FOR MUNICIPAL) OR DISTRICT MANAGER (FOR NON-MUNICIPAL SYSTEMS)

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility

(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)

ECA Owner	Municipality

Part 2: Description of the modifications as part of the Limited Operational Flexibility

(Attach a detailed description of the sewage works)

Description shall include:
1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name (Print)	PEO License Number

Signature	Date (mm/dd/yy)

Name of Employer

Part 4 – Declaration by Owner

I hereby declare that:
1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modification; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)

Owner Representative's Signature	Date (mm/dd/yy)

EAB Form December 2, 2013

Notice of Modifications Dec-2013.pdf

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 6211-AGEU4W issued on February 24, 2017

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 23rd day of November, 2017

Fariha Pannu.

Fariha Pannu, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

SH/

c: DWMD Supervisor, MOECC Owen Sound
Andrew Garland, BM Ross and Associates Ltd., The Corporation of the Town of South Bruce Peninsula

Notice of Modifications Dec-2013.pdf

From:	Mitchell, Ian (MECP)
To:	Dan Hurley; Deborah Sinclair
Cc:	Belanger, Renee (MECP); Geurts, Hugh (MECP)
Subject:	RE: assimilative studies _ Wiarton Waste water treatment plant
Date:	May 27, 2021 12:48:06 PM
Attachments:	Wiarton NUMBER 6045-ARDJS7.pdf

Attached is Amended ECA No. 6045-ARDJS7 dated November 23, 2017 which is the current WWTP control document.

Ian Mitchell
District Engineer
Ministry of the Environment, Conservation and Parks
Owen Sound District
101-17th St E
Owen Sound ON N4K 0A5
Phone (519) 374-1388
Fax (519) 371-2905

We want to hear from you. How was my service? You can provide feedback at 1-888-745-8888 or ontario.ca/inspectionfeedback

From: Dan Hurley <dhurley@tathameng.com>
Sent: May 27, 2021 12:27 PM
To: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Deborah Sinclair <Deborah.Sinclair@environmentalsciences.ca>
Cc: Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>; Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
Subject: RE: assimilative studies _ Wiarton Waste water treatment plant

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Once Ian can confirm he has the latest copy of the Wiarton ECA, he or I will send it to you.

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Hugh

Hugh Geurts
Surface Water Evaluator
Southwest Regional Office
Ontario Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs
733 Exeter Road, London
N6E 1L3
(548) 388-7471

s.N/R

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Sent: May 27, 2021 12:48 PM
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Cc: Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>; Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>
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(548) 388-7471

From: Deborah Sinclair
To: Mitchell, Ian (MECP); Dan Hurley
Cc: Belanger, Renee (MECP); Geurts, Hugh (MECP); Christine Geiger
Subject: RE: assimilative studies _ Wiarton Waste water treatment plant
Date: May 27, 2021 1:39:21 PM

Thanks Ian,

It would be interesting to know if algal growth has been a concern in the vicinity of the WWTP outfall. The ECA TP objective and limit are 0.10 and 0.3 mg/L, respectively. The rated capacity is 4,400 m3/d, ~ 10x the ADF for GBIG. The outfall is in Wiarton where there is likely (?) the least amount of circulation/movement in the bay. I'm guessing that MECP has not been informed of any nuisance algal blooms in the vicinity of the WWTP outfall?

Thanks, Deb

From: Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
Sent: May 27, 2021 12:48 PM
To: Dan Hurley <dhurley@tathameng.com>; Deborah Sinclair <Deborah.Sinclair@environmentalsciences.ca>
Cc: Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>; Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>
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<ian.mitchell@ontario.ca>
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733 Exeter Road, London

N6E 1L3
(548) 388-7471

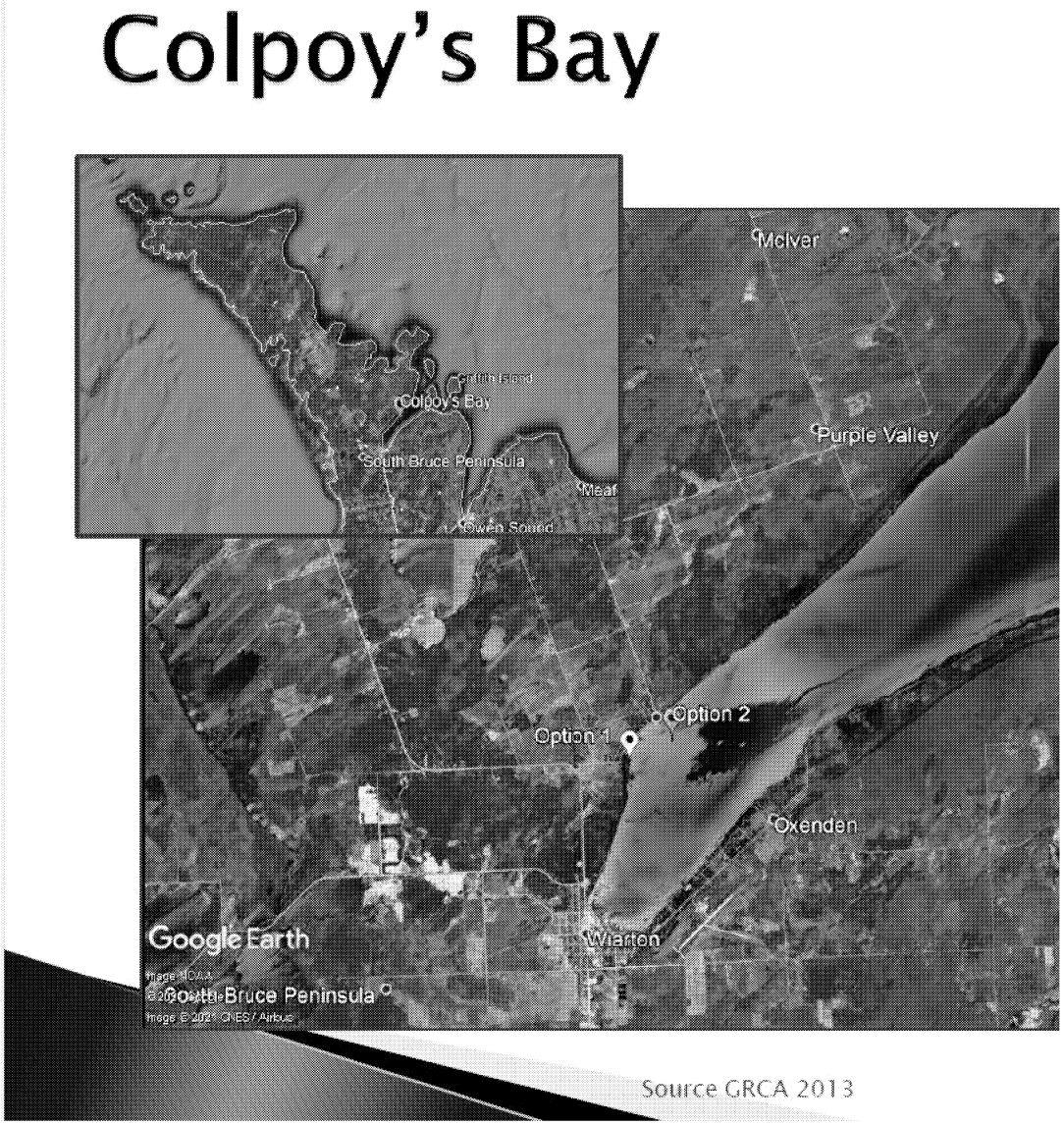
From: Geurts, Hugh (MECP)
Sent: May 30, 2022 10:06 AM
To: Howell, Todd (MECP)
Subject: RE: question on outfall location

Hello Todd.

Here is a screen shot of roughly where the proposed possible outlets may go – with, from what I understand, Option 2 being the heavy favourite.

Thanks for keeping us in mind with your work

Hugh



From: Howell, Todd (MECP) <Todd.Howell@ontario.ca>
Sent: May 30, 2022 8:29 AM
To: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>
Subject: question on outfall location

Hello Hugh

We are conducting field sampling at our nearshore reference station in Colpoys Bay this week as part of our spring surveys on Lake Huron and Georgian Bay. As I indicated earlier I was hoping to go by the proposed outfall location for the new facility and have a look at the lakebed to observe the biological conditions at present. If you can supply the proposed coordinates that would be good.

All the best
Todd

From: Deborah Sinclair
To: Geurts, Hugh (MECP); Belanger, Renee (MECP); Mitchell, Ian (MECP)
Cc: Eric Watkin; Dan Hurley; [redacted] **s.21**
Subject: BGIB Aquafarm - RWA work plan discussion
Date: June 1, 2021 11:00:13 AM

Hi All,
We would like to set up a meeting for HESL to present an approach for the receiving water assessment for Colpoy's Bay. Please provide your availability for a ~1.5 hr meeting on the following days:

Monday June 7 - am and pm
Tuesday June 8 – am and pm
Wednesday June 9 am and pm
Thursday June 10 – am and pm.

Please circulate this email to anyone else who may need to attend.

Many thanks,

Deborah Sinclair, M.A.Sc. | Senior Aquatic Scientist
Hutchinson Environmental Sciences Ltd.
Suite 202, 501 Krug Street, Kitchener ON N2B 1L3
P: 519-576-1711 x 302
www.environmentalsciences.ca

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s.21 **From:** Geurts, Hugh (MECP)
To: Deborah Sinclair; Belanger, Renee (MECP); Mitchell, Ian (MECP)
Cc: Eric Watkin; Dan Hurley; [redacted]
Subject: RE: BGIB Aquafarm - RWA work plan discussion
Date: June 1, 2021 11:25:00 AM

The afternoon for all those days remain open. Available all day on the 8th

From: Deborah Sinclair <Deborah.Sinclair@environmentalsciences.ca>
Sent: June 01, 2021 11:00 AM
To: Geurts, Hugh (MECP) <Hugh.Geurts@ontario.ca>; Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>; Mitchell, Ian (MECP) <ian.mitchell@ontario.ca> s.21
Cc: Eric Watkin <ewatkin@tathameng.com>; Dan Hurley <dhurley@tathameng.com>; [redacted]
Subject: BGIB Aquafarm - RWA work plan discussion

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Cc: Belanger, Renee (MECP) <Renee.Belanger@ontario.ca>; Mitchell, Ian (MECP) <ian.mitchell@ontario.ca>
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733 Exeter Road, London
N6E 1L3
(548) 388-7471

From: Howell, Todd (MECP)
To: Geurts, Hugh (MECP)
Subject: FW: Colpoy"s Bay Modelling
Date: June 2, 2021 9:00:00 AM
Attachments: Owen_Sound_water_quality_study_December_2010_final_final[1].pdf

---

Hello Hugh

I am not sure if you have ever seen the Owen Sound study report from some years back but you might find it helpful background.

Todd

From: Benoit, Nadine (MECP) <Nadine.Benoit@ontario.ca>
Sent: June 2, 2021 8:41 AM
To: Deborah Sinclair <Deborah.Sinclair@environmentalsciences.ca>
Cc: Martherus, Jim (MECP) <Jim.Martherus@ontario.ca>; Howell, Todd (MECP) <Todd.Howell@ontario.ca>
Subject: RE: Colpoy's Bay Modelling

Hi Deborah,

As requested, here is the report for Owen Sound.

Cheers!
Nadine

Nadine Benoit
Surface Water Specialist
Great Lakes Monitoring Unit
Water Monitoring and Reporting Section

Environmental Monitoring and Reporting Branch
Ontario Ministry of the Environment, Conservation and Parks
125 Resources Rd., West Wing
Etobicoke, ON M9P 3V6

Tel: (416)235-6229
Fax: (416)235-6235
e-mail: nadine.benoit@ontario.ca

If you have any accommodation needs or require communication supports or alternate formats, please let me know.
Si vous avez besoin d'un aménagement particulier, de soutien à la communication ou de supports de remplacement, veuillez m'en aviser.


Please consider the environment before printing this email note

---

From: Deborah Sinclair <Deborah.Sinclair@environmentalsciences.ca>
Sent: Tuesday, June 1, 2021 5:12 PM
To: Benoit, Nadine (MECP) <Nadine.Benoit@ontario.ca>
Subject: RE: Colpoy's Bay Modelling

Hi Nadine,

I am just following up on Todd's email. Do you have a report or the data for the Owen Sound study you conducted in 2010?

Thanks, Deb

From: Howell, Todd (MECP) <Todd.Howell@ontario.ca>
Sent: June 1, 2021 12:35 PM
To: Deborah Sinclair <Deborah.Sinclair@environmentalsciences.ca>
Cc: Benoit, Nadine (MECP) <Nadine.Benoit@ontario.ca>; Martherus, Jim (MECP) <Jim.Martherus@ontario.ca>
Subject: RE: Colpoy's Bay Modelling

Hello Deborah

The data collections at While Cloud Island in outer Colpoy's Bay (station 03 610) represents near all the data our group has collected in Colpoys Bay. The station was first sampled in 1996 and also in 2002, 2003 as well as 2009 and 2015 as noted. But note that the 1996 and 2002 sampling consisted of only single station visits due to labour issues those years. I am assuming that you are familiar with the striking changes in water quality in Lake Huron over this periods which will to an undetermined extent be relevant to the area. The sampling regime includes water column profiles of temperature and oxygen. In recent years there are also light profiles which may be useful depending on the nature of your modelling. Benthic invertebrate and sediment chemistry have also been periodically monitored over the years of sampling at station 610. I am not aware of any current-circulation data for the bay.

Our group conducted a water quality study in Owen Sound in 2010 and the report may be helpful as background of sorts given the similar physical aspects of the two bays. Nadine Benoit was the study lead who I have copied here. The only other lead I can think of is Ministry Water Intakes Surveillance program which may or may not have the Wiarton plant as part of the program. The program collects a modest amount of raw water chemistry data from the participating facilities. Reach out to

Cheung, Patrick (MECP) Patrick.Cheung@ontario.ca if you want to follow up.

You likely know Yerubandi, Ram (EC/EC) Ram.Yerubandi@canada.ca who is the best one to start with at ECCC concerning any physical data collection in the area.

It is not a rich data area, nor is the coastline north from there.

All the best
Todd

E. Todd Howell Ph.D.
Great Lakes Ecologist
Water Monitoring and Reporting Section
Environmental Monitoring and Reporting Branch
Ontario Ministry of the Environment, Conservation and Parks
125 Resources Road, Toronto
Ontario, Canada
M9P 3V6
416-235-6225 fax 416-235-6235
todd.howell@ontario.ca

From: Deborah Sinclair <Deborah.Sinclair@environmentalsciences.ca>
Sent: May 31, 2021 5:04 PM
To: Howell, Todd (MECP) <Todd.Howell@ontario.ca>
Subject: Colpoy's Bay Modelling

Hi Todd,

I hope you are doing well. I'm currently putting together a work plan for the MECP (Hugh Geurts and Ian Mitchell) for water quality modelling for Colpoy's Bay and wanted to touch base re available information. We have 2009 & 2015 GLIS data for Colpoy's Bay (station 300010610) and bathymetry. I was wondering if there is any more recent or historical water quality data for the GLIS, other water quality data (including temp/DO profile data) for the bay (within the bay itself), and any water current information?

Thanks, Deborah

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Technical Memorandum

Owen Sound Water Quality Study 2009

Prepared by

N. Benoit and T. Howell
Environmental Monitoring and Reporting Branch
Ontario Ministry of the Environment

Presented to

Southwestern Region
Ministry of the Environment

December 2010

ACKNOWLEDGEMENTS

The authors would like to acknowledge the assistance of several people in the work leading to the preparation of this report. Greg Hobson, Wendy Page and the field crew on Great Lakes Unit, Environmental Monitoring and Reporting Branch. Rhonda Shannon and Scott Gass (SWR-Owen Sound District office) for providing information and data from the Owen Sound WWTP; Scott Abernathy and Hugh Geurts for providing background MOE reports; Krystal Plobner (Veolia-Waterna) for providing discharge information for the Owen Sound WWTP; John Bittorf (GCSA) for providing discharge information from the Pottowatomi River.

Krista Chomicki and Samantha Paul provided assistance with data generation. Zita Lo (EMRB) provided GIS mapping support.

Thanks to Scott Abernethy, Rick Chappell, and Duncan Boyd who reviewed earlier versions of the report.

Executive Summary

Owen Sound is located in southern Georgian Bay, in a deep valley that extends below the Niagara Escarpment. With a population of just over 21,750 residents, the City of Owen Sound represents the largest urban centre in the Bruce Peninsula of Georgian Bay. The City of Owen Sound waste water treatment plant (a primary waste water treatment facility) currently discharges minimally processed waste-water into the southeast corner of Owen Sound.

In 2009, surveys of water quality in Owen Sound were undertaken to characterize conditions prior to an expected upgrade of the Owen Sound wastewater treatment plant to a secondary treatment facility. Four surveys spread over the late spring to fall period were conducted to identify the influences of factors acting upon water quality in the sound such as tributary and shoreline runoff and the discharge of effluent from the Owen Sound waste water treatment plant. The focus of the surveys was on measures of conventional water quality including nutrients, macro ions, fecal pollution indicators and physical features such as turbidity and water clarity. Patterns in water quality over the study area were depicted using extensive field measurements of conductivity, turbidity, chlorophyll a fluorescence and hydrocarbon fluorescence. Surface and whole water column maps derived from field data were used interactively with the laboratory-based data to identify areas of variability and describe conditions among geographic areas within Owen Sound. The area of study extended approximately northward from 10th Street bridge in the inner harbour to roughly 3 km beyound Squaw Point and Bayview Point on the shores of Owen Sound.

Monitoring in 2009 demonstrated that nutrient and limnological features in Owen Sound overall were indicative of a highly oligotrophic environment and similar to ambient conditions in the open waters of western Georgian Bay. The background levels of total phosphorus were estimated as < 4 μg/L and less than the phosphorus concentration objective of 5 μg/L for Lake Huron underlying the phosphorus loading target identified in the Canada-US Great Lakes Water Quality Agreement.

Recurrent patterns of variability in water quality associated with geographic locations over the study area were detected. The mixing of water from inner harbour with the

more open areas of the sound appeared to be the strongest influence on water quality in Owen Sound during surveys. The waters of the inner harbour were characterized by higher levels of most of the water quality parameters assessed including particulate material, phosphorus, nitrate+nitrite, chlorophyll a, dissolved organic carbon and chloride. Inflowing water from the Sydenham River was a strong contributor to conditions in the inner harbour as evidenced by gradients in conditions extending from the south to the north ends of the inner harbour during several surveys.

The discharge from the waste water treatment plant (WWTP) was the second strongest land-based influence on water quality detected over the four surveys. Circulation within Owen Sound strongly shaped the orientation of the discharge mixing areas. Overall the spatial extent of the influence of the outfall appeared to be attenuated by dilution with surrounding lake waters notwithstanding the fact that during one survey a very dilute mixing area could be detected some distance northward from the outfall along the eastern shoreline of the sound. Elevated levels of total phosphorus up to but not exceeding 20 μg/L, were found at the lake surface within 150 m of the outfall. Near the lakebed in the immediate vicinity of the outfall concentrations ranged from 9 to 57 μg/L among surveys. Concentrations reaching 10 μg/L, the interim Provincial Water Quality Objective (PWQO) applicable to the open water of Georgian Bay were measured up to approximately 0.4 km from the outfall during two surveys. The PWQO for free ammonia of 20 μg/L was exceeded by a margin of 12-15 μg/L in samples collected at the lakebed near the outfall during two surveys. There was little indication of bacterial fecal pollution in the vicinity of the outfall at the time of survey based on observed levels of *E.coli*.

It is likely that effluent from the WWTP stimulates growth of phytoplankton in the area of the outfall given the low background concentrations of phosphorus in Owen Sound, however, levels of chlorophyll a measured in the vicinity of the outfall were not strongly elevated. Concentrations of chlorophyll a averaged over a 150 m radius of the outfall did not exceed 1.6 μg/L and remained indicative of oligotrophic conditions.

Water circulation in the sound strongly shapes the mixing of water discharging from the land into Owen Sound. Several circulation regimes were encountered during the four surveys and demonstrate the changeable influence of the inner harbour and waste water treatment plant on water quality features of Owen Sound.

Table of Contents

Appendices

1.0 Introduction

Owen Sound is located in Southern Georgian Bay, in a deep valley that extends below the Niagara Escarpment. With a population of just over 21,750 residents, the City of Owen Sound represents the largest urban centre in the Bruce Peninsula of Georgian Bay. Owen Sound receives discharge from the Sydenham and Pottowatomi Rivers, as well as inputs from smaller tributaries (Indian Creek, Bothwell Creek) and the City of Owen Sound's storm sewers and wastewater treatment plant (WWTP) (**Figure 1**). The Sydenham and Pottowatomi Rivers drain approximately 285 km^2 of land, ultimately discharging into Owen Sound (Chapman and Putman, 1966 in Stantec, 2008). The annual average discharge rate for the Sydenham River between 1968 and 2008 ranged from 1.84 to 5.05 m^3/s; maximal monthly discharge was in March and April (**Appendix 1**). Annual average discharge for the Pottowatomi River from 1968 to 2008 was 0.93 m^3/s (**Appendix 1**). The average discharge for the waste water treatment plant (WWTP) from 2002-2005 was 12,948 m^3/d (approximately 0.15 m^3/s) (CRA, 2006).

The Owen Sound waste water treatment plant (a primary waste water treatment facility) currently discharges minimally processed waste-water into the southeast corner of Owen Sound. There has been limited field-based assessment of the influence of this discharge on water quality in Owen Sound (Hawkins 1984). In 1979 the International Joint Commission (IJC, 1979) identified the Owen Sound sewage treatment plant as having a minor nutrient enrichment effect and one of a number of point-source dischargers to Georgian Bay that needed improvements at the time. Water quality in Owen Sound is also assumed to be influenced by discharge from Sydenham River, the Pottawatomi River and smaller shoreline inputs as well as water exchange between the inner and outer portions of Owen Sound.

Owen Sound is generally characterized as oligotrophic, with clear, deep waters and low phosphorus concentrations. In a limited survey of Owen Sound in 1974, Ross and Chatterjee (1977) described water quality in Owen Sound as oligotrophic. Nutrient enrichment was not considered a problem in the inner (harbour) portion of Owen Sound. No algae-related water quality issues were observed. Ambient water clarity was generally described as excellent. Loading from the Sydenham and Pottawatomi Rivers

and the continuous discharge of effluent from the waste water treatment plant (WWTP) were identified as the primary factors affecting nutrient chemistry. Occasional measurements from 1996-2009 in the Ministry of Environment nearshore monitoring program have shown average phosphorus concentrations well below 10 μg/L at a reference station in Owen Sound. A contributing factor to the oligotrophic character of Owen Sound is the strong mixing with the open waters of Georgian Bay due to the broad opening of the sound at the interface with Georgian Bay and the SW-NE orientation of the sound.

The purpose of this study was to characterize water quality conditions in Owen Sound prior to the upgrade of the Owen Sound wastewater treatment plant from a primary to a secondary treatment facility, by documenting the influences of various inputs on water quality in the sound, including the tributaries, urban runoff, and the Owen Sound waste water treatment facility. The focus was on measures of conventional water quality including nutrients, macro ions, fecal pollution indicators and physical features such as turbidity and water clarity. A descriptive analysis assessing general limnological features, indicators of productivity and tracers of watershed inputs was conducted based information collected at locations distributed from the mouth of the Sydenham River to outer Owen Sound beyond Indian Creek and Squaw Point.

Owen Sound is characterized as a deep narrow basin with depths quickly increasing from approximately 5 m near the shoreline to over 60 m in depth towards the middle of the sound within the study area (**Figure 1**). Outer areas of Owen Sound reach depths of 80 -100 m. At its widest point within the study area, Owen Sound reaches a width of up to 5 km, but continues to widen into the Georgian Bay. The west side of Owen Sound is characterized by a quick increase in depths near the shoreline, while the east side appears to have a slightly more gradual increase in depth near the shoreline.

Four geographic zones were identified for the purpose of calculating summary information and describing results (**Figure 1**). The inner harbour zone is defined here as the lower channelized portion of the lower Sydenham River extending from the bridge on 10th Street to the opening of the river mouth into Owen Sound. The inner sound zone extends from the mouth of the inner harbour northward past the drinking water intake and includes the Great Lakes Index Station (station 611). The WWTP

outfall zone, subsequently referred to as outfall zone, is arbitrarily defined as an area within 150 m of the WWTP outfall. The outer sound is defined as area from approximately 500 m north of the drinking water intake, extending approximately 3 km towards Georgian Bay past Squaw Point to the east and Bayview Point to the west. Both the inner and much of the outer sound areas are within what is referred to as Owen Sound Harbour.

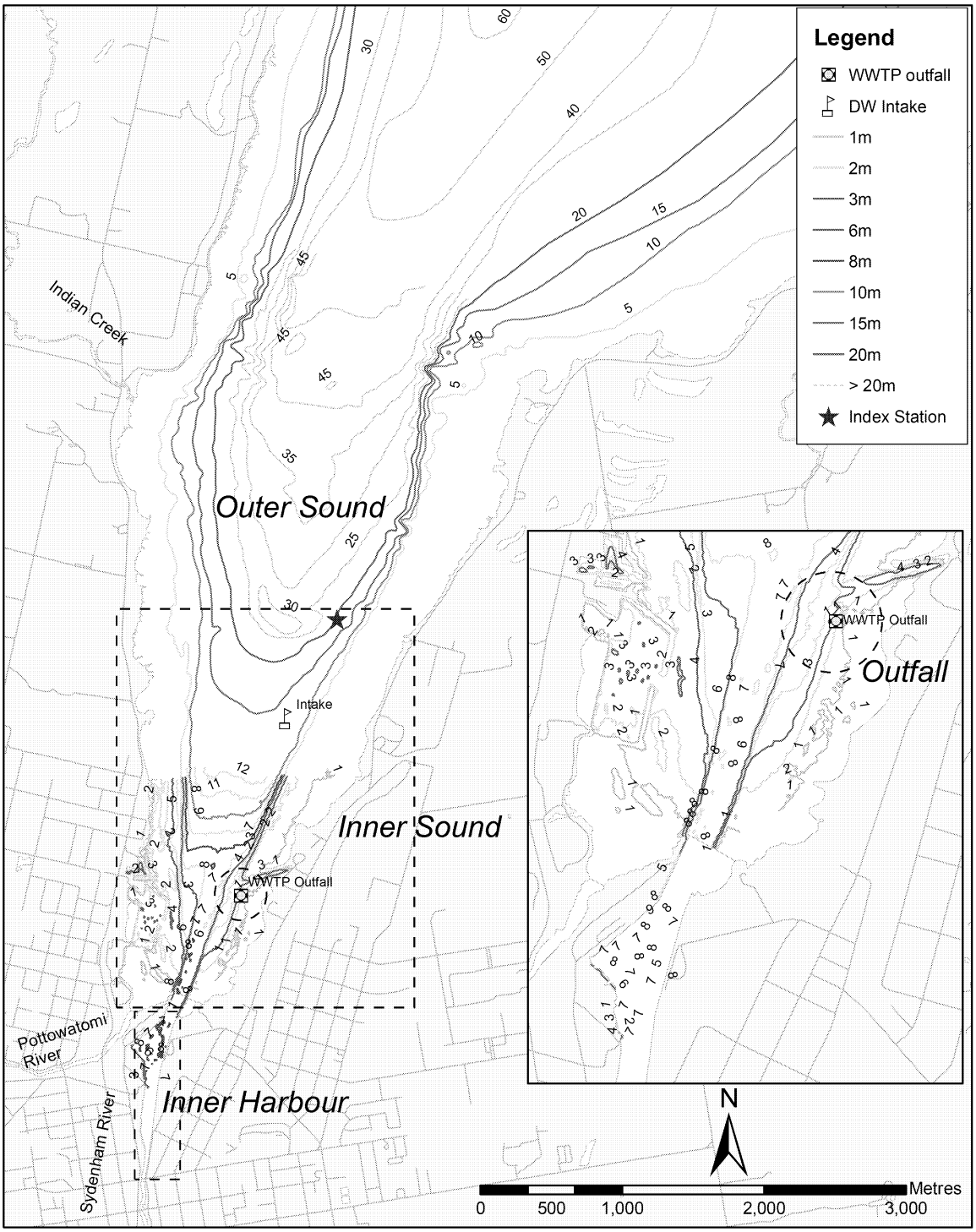

Figure 1: Study area and bathymetric features of Owen Sound. Depth information obtained from NOAA 1m mapping of depth contours for Lake Huron (Great Lakes Coast Watch - http://coastwatch.glerl.noaa.gov/). Inset: Close-up of features in the inner harbour and inner sound near the WWTP.

2.0 Objectives

The objective of this study was to provide information on water quality conditions in Owen Sound prior to the upgrade of the waste water treatment plant from a primary to a secondary treatment facility. As much as possible, an attempt was made to characterize the influence of the WWTP discharge on water quality in the sound, while comparing to conditions in the inner harbour and the influence of discharge from Sydenham River, the Pottowatomi River, and other smaller area tributaries.

Specific questions were:

1) What are the water quality conditions in Owen Sound?
2) What is the current influence of the WWTP on Owen Sound?
3) What are other existing influences on water quality in Owen Sound?

Water quality surveys were conducted during four occasions between June and October 2009. Surveys consisted of in situ monitoring of descriptive water quality features (conductivity, temperature, pH, turbidity and hydrocarbon fluorescence) to provide detailed information on spatial patterns in water quality during these "snapshots". Collected samples for water chemistry at selected stations were taken to provide more diverse water quality information to be coordinated with in-situ water quality monitoring results. Where appropriate, water chemistry results were compared against criteria set out in the Provincial Water Quality Objectives (PWQOs) (MOE 1994).

3.0 Methods

3.1 Water Quality Surveys

Spatial patterns in water quality in Owen Sound were assessed periodically over the study period using a combination of field measurements collected using water quality sensors and lab-based analysis of discrete water samples. Collectively these data were used to describe patterns of variation in nutrients, particulate material, and selected

tracer ions and fecal indicators in Owen Sound. Four surveys were conducted between June and October 2009.

The surveys were initially conducted using the EMRB survey vessel the Great Lakes Guardian over areas with bottom depths of > 2.5 m. Preliminary results suggested that the potential influence of discharge from the WWTP on shallow waters east of the outfall were not captured in the vessel-based surveys. In the final two surveys, a small skiff was used to access sampling points at depths inaccessible by the survey vessel (1 - 3 m depth). The shallow water surveys were conducted concurrently with the vessel survey.

3.2 Vessel-based Surveys

The vessel-based surveys of deeper water (depths >2.5 - 3 m) utilized an array of sensors connected to a flow-through system on the deck of the vessel to provide near-continuous measurement of water quality features at the lake surface. Temperature and conductivity were measured with an Ocean Sensors 3000 CT and RBR XR420 CTf sensors. Chlorophyll a fluorescence was determined with a Chelsea Aquatracka II probe. UV fluorescence in ranges reflective of hydrocarbons was measured with a Chelsea UVtracka probe. The peak excitation and emission wavelengths of the hydrocarbon fluorimeter were 239 and 360 nm respectively. Fluorescence is reported in units relative to fluorescence of μg/L of the compound carbazole used to calibrate the sensor response. Water was drawn from a depth of approximately 1.5 m using a pump, and fed to a sensor manifold. The flow-through transit time to the sensor manifold was < 10 seconds. A Sea Point sensor deployed directly in the lake attached to the side of the vessel collected turbidity data over the survey track.

The vessel followed a survey track at a cruise speed of < 10 km/hr with sensor readings logged at intervals of approximately 5 - 10 m as the vessel navigated a pre-defined zig-zag track along the shoreline (**Appendix 2a**). The coordination, timing and logging of instrument readings were automated using a distance-based fix interval to signal data logging (via software). The survey track was pre-programmed using marine survey software (HYDRO).

Vessel position and depth were integrated with the data string from the sensor array. A Trimble MS860 and Trimble AgGPS 132 provided real-time differential GPS positions. Depth measurements were made by an Navisound depth sounder.

A second profiling sensor array was used to periodically collect profiles throughout the water column at intermittent points over the survey track. These data provided three dimensional representations of patterns in water quality over the area. A Chelsea Instruments Aquapac profiler with temperature, conductivity, pressure and turbidity sensors was used as the interface for additional instruments: a Chelsea Minitracka chlorophyll-a fluorescence sensor, Chelsea Alphatracka transmissometer (660 nm wavelength), Satlantic photosynthetically active radiation (PAR) sensor and Chelsea UVtracka UV fluorescence sensors configured for the hydrocarbon range as above.

Dissolved oxygen profiles were taken at selected stations during the first three surveys. During the first Survey (June 3, 2009), oxygen and temperature were measured using a YSI Dissolved Oxygen probe near the surface and near the bottom of the water column. In subsequent surveys an AMT profiler (Sea & Sun Technologies) was used to measure dissolved oxygen and temperature through the water column.

3.3 Discrete Water Sampling

Discrete samples of water were collected for lab-based chemical and bacteriological analyses at a subset of locations spread over the survey track (**Appendix 3**). With the exception of *E.coli*, the samples were collected by drawing water from a port on the sensor manifold as the vessel stopped at pre-defined sampling locations. Water samples for analysis of *E.coli* were collected from a depth of 1.0 - 1.5 m by submerging sterile sample containers directly into the lake using a sampling pole. Samples were kept on ice after collection and transported to the Toronto MOE laboratory within 24h. Whole water samples were analyzed for suspended solids, turbidity, alkalinity, pH, conductivity, chloride, total phosphorus, reactive phosphorus as phosphate, ammonium+ammonia, nitrite, nitrate + nitrite, kjeldahl nitrogen, silicate and dissolved organic carbon (DOC), dissolved inorganic carbon and *E.coli*. The *E.coli* samples were analyzed within 48 hours.

Additional samples were collected for analysis of chlorophyll a to empirically adjust field measurements of fluorescence of chlorophyll a to "extracted-equivalent" concentrations. Approximately 1 to 2 L of water was filtered through 1.2 µm nylon filters immediately upon collection and filters stored on dry ice until delivered to the lab for analysis.

The majority of the water quality data were collected near the lake surface, however, more limited amounts of data were collected through the water column to examine effect of thermal stratification of the water column and variability with depth. At a subset of stations, water samples were taken near the bottom of the water column (1 m from bottom) for laboratory-based analyses as described for surface water samples. Bacterial samples were limited to the near surface samples.

All laboratory-based water analyses were conducted at the Ministry of Environment's Resources Road laboratories using standard MOE methods for surface waters. Additional duplicate water samples were also sent to the MOE Dorset laboratory for low-level total phosphorus analysis because of the low background level in Georgian Bay approaching the reporting limit of 2 µg/L (<W) for the Laboratory Services Branch (LSB) method 3367. The data from the LSB method 3367 have been used in this report to allow direct comparison with historical Great Lakes data based on this methodology. Dorset results are listed in **Appendix 4**. A comparison of the phosphorus data is included in **Appendix 5**.

Total organic nitrogen (TON) was not directly measured but calculated as Kjeldahl nitrogen minus ammonium + ammonia. Concentrations of nitrogen compounds are expressed on the basis of mass of N. Reactive phosphorus as phosphate concentration in settled whole water samples is expressed on the basis of P mass and reactive silicate on the basis of Si mass.

3.4 Quality assurance-Quality Control sampling (QA/QC)

Two field blanks were collected for each sampling event: 1) from the flow-through sensor manifold and sample collection device, and 2) where the bottom-depth based

sampling was conducted, from the Beta discrete depth sampler. Blanks were sampled only for nutrient analysis after rinsing devices with distilled water.

3.5 Shallow Water Surveys

A small skiff was used to survey portions of the lake ranging in depths from approximately 1.0 - 3.0 m. Field measurement of conductivity and temperature at a depth of 0.2 m below lake surface were made over a survey track using a YSI 650QS probe. Pre-defined survey points were navigated using a Trimble Pathfinder ProXR 12 channel DGPS linked to ESRI Arc Pad running on a hand-held computer.

As with the vessel survey, discrete samples of water for lab-based chemical analysis were collected at locations spread over the survey track. The shoreline survey consisted of two zones: southwest and northeast of the WWTP outfall as approximately depicted in **Appendix 2b**. The water samples were collected at a depth of 0.2 m below the lake surface. Up to 50 field measurements were taken over the two zones, spanning 3 - 4 km, with the collection of eight discrete water samples. The analysis parameters and sample processing were as described for the vessel surveys.

3.6 Data Analysis

Surface and 3D maps of water quality features based on field data, or information derived from the field data were produced by kriging analysis using the Environmental Visualization System software (EVS v9.22). The geographic presentations of the data use 1:10,000 Ontario Basemaps (Ontario Ministry of Natural Resources) as the base map. Arcmap 9.1 software was used in the analysis and presentation of geographic information. Bathymetric information used in parts of the analysis was derived from National Oceanic and Atmospheric Administration (NOAA) digital mapping of 1 m depth contours for Lake Huron. Aerial photography from the Southwestern Ontario Orthophotography Project (SWOOP, 2006) was obtained through the Ontario Geospatial Data Exchange.

To account for variability in the calibration of the field conductivity sensors, the values of field-measured conductivity over survey tracks were adjusted to correspond with

laboratory-based measurements of discrete water samples using linear regression between paired field and lab measurements for each day of survey.

A portion of the analyses results for total phosphorus using LSB method 3367 were below the reporting limit of 2 µg/L (<W). The reporting limit of 2 µg/L was used in the calculation of averages and in the graphical presentation of data when results were flagged as <W.

3.7 Approach to Interpretation of Spatial Variability and Dynamic Features of Water Quality in Owen Sound

Patterns in water quality over the study area were depicted using extensive measurement of features amendable to rapid measurement in the field, and acting as surrogates for broader aspects of environmental variability. Surface and whole water column maps derived from field data were used interactively with the more limited laboratory-based data to identify areas of variability and the spatial orientation of this variability. In this way the locations where external influences on water quality were experienced during the surveys were identified along with insight on the likely causes of these effects. Depending on the conditions, the spatial orientation of affected areas were used to infer water circulation over the study area. Although this empirical approach has appreciable limitations both with respect to the degree to which cause and effect can be determined, and with respect to the assumptions underlying the spatial maps and the data from which it is derived, this type of observational analysis provides insight on the locations and scales of anthropogenic influences in an area and complements more detailed analysis of circulation and loading phenomena.

The suite of field measurements included features indicative of nutrient richness (chlorophyll a fluorescence), level of particulate material and water clarity (turbidity), ionic content (conductivity), and levels of dissolved organic material (hydrocarbon fluorescence). Collectively, the data provide a means to discriminate the open water of Owen Sound and Georgian Bay from water introduced into Owen Sound as runoff or discharges such as from the waste water treatment plant.

The discrimination among multiple sources over a common mixing area may be problematic and is shortcoming of the present approach; however, the covariation between laboratory-determined data and spatial patterns in field data provides a means of extending the spatial interpretations.

Surveys were completed over four days during the study. The interpretation of these limited snapshots of conditions are extended through time by comparing weather and area environmental conditions for the days of study with the longer term norms for the area. Through-time patterns in precipitation, wind, tributary discharge and WWTP discharge rates provide a means to reference the results for the days of survey to the range of conditions typical for the area.

4.0 Results

4.1 Water Quality Conditions in Owen Sound at Index Station 611

Water quality conditions in Owen Sound have been periodically monitored in the Great Lakes Reference and Index station network. The Owen Sound station is located in the open waters of Owen Sound approximately 2.1 km northeast of the WWTP outfall and at a depth of approximately 20 meters **(Figure 1)**. Selected water quality features at Owen Sound (Station 611) are given in **Table 1**. Overall, the data suggest little change in water quality from 1996 to 2009. A slight decrease in TP concentrations and a concurrent increase in average Secchi depth are suggested over time. The data indicate an oligotrophic environment that may be becoming more oligotrophic over the period of study.

Table 1: Summary of historical water quality conditions at the Owen Sound Great Lakes monitoring station (Station 611). Annual averages and seasonal ranges (in parentheses) are presented.

Year	1996 (summer average)	2002/03	2009
Integrated Over Photic Zone			
Total Phosphorus (μg/L)	4 (2-6)	5 (3-9)	3 (2-6)
Nitrate + Nitrite (μg/L)	320 (310-330)	290 (260-330)	270 (240-330)
Ammonia + Ammonium (μg/L)	11 (10-12)	30 (6-67)	30 (9-79)
TON (μg/L)	142 (130-148)	150 (120-190)	140 (89-172)
Conductivity (μS/cm)	199 (199-200)	197 (188-208)	195 (187-207)
Chloride (mg/L)	5.6	6.6 (6.2-7.6)	6.7 (6.5-7)
Chlorophyll a (μg/L)	0.8	1 (0.7-1.3)	0.5 (0.4-0.8)
Secchi depth (m)	7.8	7.8 (5.5-10.5)	10.1 (8.9-11.2)
1-2 m Above Bottom			
Total Phosphorus (μg/L)	2	3.6 (3-4)	2
Nitrate + Nitrite (μg/L)	n/a	300 (280-320)	270 (260-270)
Ammonia + Ammonium (μg/L)	n/a	17 (12-21)	18 (11-30)
TON (μg/L)	n/a	140 (110-160)	120 (110-130)
Conductivity (μS/cm)	n/a	194 (186-199)	194 (186-202)
Chloride (mg/L)	n/a	6.2 (5.8-6.8)	6.6 (6.3-6.7)
Chlorophyll a (μg/L)	1.6	0.8 (0.6-1.1)	0.5 (0.3-0.7)

4.2 Hypolimnetic Oxygen conditions

Hypolimnetic oxygen levels measured at selected stations in Owen Sound during surveys in 2009 suggested no oxygen deficiencies in the sound (**Table 2**). Oxygen levels were above the PWQO guideline (56% saturation), with saturation values ranging from 91% - 114 %. These values suggest that oxygen levels remain protective to maintain cold-water fish species in the sound.

Table 2: Hypolimnetic dissolved oxygen (D.O.) concentrations (% saturation) and Temperature at selected Owen Sound Stations. See Appendix 3 for station locations.

Station	Survey 1 (June 3, 2009)		Survey 2 (July 7, 2009)		Survey 3 (Aug 18, 2009)	
	average Temp (C)	average DO (%)	average Temp (C)	average DO (%)	average Temp (C)	average DO (%)
Station 171	8.2	106.3				
Station 172			10.5	92.4	15.3	95.6
Station 188	4.7	103.4	5.0	114.1	6.1	91.9
Station 178	6.7	107.6	13.6	92.3	15.2	98.0

Survey 1: YSI Profiler was used to sample near bottom of water column - Single value with no hypolimnion point determined

Survey 2-3: AMT Profiler used for continuous measurement. Hypolimnetic D.O. measured as average of values below hypolimnion

4.3 Discharge rates at the Owen Sound Wastewater Treatment Plant

Total daily discharge rates for the WWTP were provided by the Owen Sound WWTP (**Figure 3**). Discharge rates during the 2009 water quality surveys were below historical annual average flow of 13,373 m^3/d from 1991-2008 (Genivar 2009), and represented less than 50% of the rated capacity for the treatment plant.

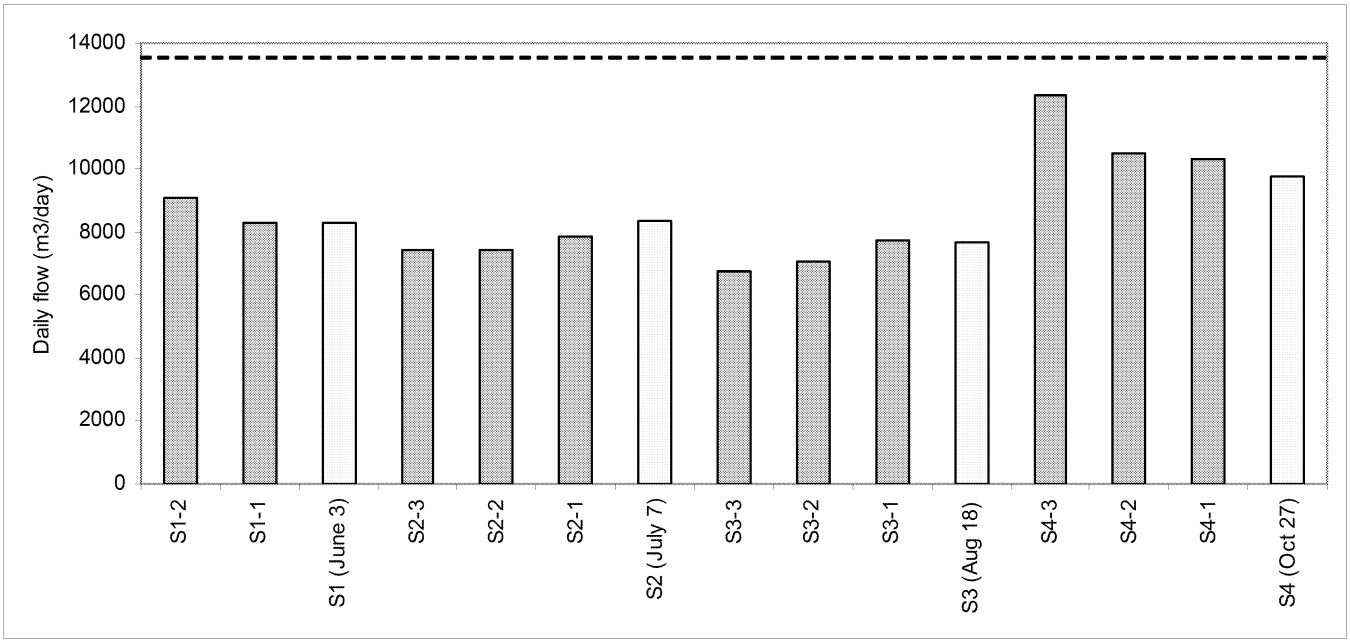

Figure 3: Total daily discharge rates from the Owen Sound WWTP outfall during the four survey periods in 2009. Discharge rates are presented for up to three days prior to the survey dates (blue bars); survey date discharges are depicted in yellow. Dotted lined represents annual average flow conditions reported from 1991 - 2008 (Genivar 2009).

4.4 Water Quality Surveys in 2009

4.4.1 Owen Sound Water Quality Survey June 3, 2009: Late Spring Conditions

1. Weather conditions

Prevailing winds on June 3 as measured at Wiarton Airport were from the west south-west, with median wind speed of 11 km/h (**Table 3**). Environment Canada reported 2.2 mm of rainfall at Wiarton on June 1, 2 days before the first survey. There was no precipitation during or over the day preceding the survey.

Discharge measurements for the Sydenham River at Environment Canada monitoring station 02FB007 from May 31 to June 3 ranged from approximately 2.2 to 2.7 m^3/s (**Appendix 6**).

Table 3: Wind conditions in Owen Sound during and immediately preceding water quality surveys in 2009. Data were calculated from hourly measurements. Highlighted entries signify survey dates

	Measure	Prevailing wind Direction (deg)		Prevailing wind speed (km/h)
All surveys	mode	240	WSW	15
	median	235	WSW	11
Jun-02	mode	340	NNW	0
	median	240	WSW	6
Jun-03	mode	260	WSW	7
	median	240	WSW	11
Jul-06	mode	240	WSW	9
	median	250	WSW	11
Jul-07	mode	270	W	11
	median	260	WSW	12
Aug-17	mode	230	WSW	15
	median	210	SSW	15
Aug-18	mode	230	WSW	19
	median	230	WSW	19
Oct-26	mode	70	ENE	15
	median	90	E	12
Oct-27	mode	250	WSW	13
	median	190	SSW	8

2. Lake temperatures and thermal stratification

Surface water temperature varied moderately over the study area ranging from just under 6 to just over 13°C throughout the survey area (**Figure 4**). Movement of the warmer water of the inner harbour (~9 - 13 °C) into the inner sound and subsequent circulation along the eastern shoreline of Owen Sound was evident as an extended

band of warmer water along the shoreline extending to nearly the northward edge of the survey area. Additional thermal input was detected in the vicinity of the WWTP outfall; temperature near the outfall was approximately 10 - 12^{o}C. Again surface circulation was northward along the eastern shoreline seemingly with a confluence of the inputs from the inner harbour and the WWTP outfall.

Thermal gradients through the water column were strongest in the inner harbour and in the area of the WWTP outfall (**Figure 5**). To varying degrees, thermal stratification affecting mixing of the water column was likely in the inner harbour and inner sound portions of the study area as evidenced by contrasting water quality features between surface and near lakebed samples (**Table 4**). Surface samples were enriched in chloride and DOC compared with bottom samples suggesting that shoreline runoff and tributary discharges to the area were likely more strongly affecting the warmer surface layer. This is consistent with the more rapid warming of the adjacent land, tributaries and drains than compared with the open waters of Georgian Bay in late spring. Thermal depth gradients in the outer sound zone were approximately < 2^{o}C with little indication of stratification (**Figure 5**).

The temperature of effluent at the WWTP outfall relative to the adjacent lake affects its mixing within the water column. The relatively cool lake temperatures on June 3 coupled with the shallow depth and slightly warmer temperatures of the effluent suggest that the discharged effluent was likely to mix through the water column as it dispersed away from the outfall.

3. Surface circulation

Surface water circulation during the first survey as inferred from patterns in conductivity and hydrocarbon fluorescence suggests a counter clockwise flow along the shores of Owen Sound (**Figure 4**). As observed with surface temperature, surface conductivity and hydrocarbon fluorescence patterns indicate discharge from the inner harbour to the inner sound with additional blending of inputs along the eastern shoreline, of which the WWTP discharge is the most apparent; water movement along the eastern shoreline of the study area is strongly suggested. The lack of detected inputs on the western shores

of the sound precludes confirmation of an expected southward flow along the western shoreline of Owen Sound.

4. Conductivity and hydrocarbon fluorescence as tracers of external inputs

Spatial patterns in conductivity and hydrocarbon fluorescence measured near the lake surface were used as tracers of external inputs to Owen Sound. The patterns in conductivity were similar to those of hydrocarbon fluorescence over the survey area. The highest levels of both measures were found in the inner harbour with what appeared to be a mixing area moving along the eastern edge of the shoreline of Owen Sound. Within this region increased conductivity and fluorescence were observed in the area of the WWTP outfall and on the adjacent shoreline to the NE. Conductivity and hydrocarbon fluorescence in the area of the WWTP were within the range of the inner harbour, and given the circulation regime, it is difficult to isolate the response due the WWTP effluent from that of the mixing area extending from the south. The source of the elevated conductivity and hydrocarbon fluorescence along the NE shoreline of the outer Owen Sound zone cannot be attributed with certainty but appears to be an extended mixing area for the accumulated inputs from the south and possibly additional local inputs blended with the mixing area.

Small areas of slightly elevated conductivity and hydrocarbon fluorescence were detected at the mouth of Indian Creek. Shoreline inputs in this area appeared to be moving outward towards the outer sound. Hydrocarbon fluorescence and conductivity was uniform over much of the inner and outer portions of the Owen Sound survey area suggesting that ambient open water conditions prevailed over much of Owen Sound. Hydrocarbon fluorescence and conductivity near the drinking water intake appeared to be similar to background conditions in outer Owen Sound.

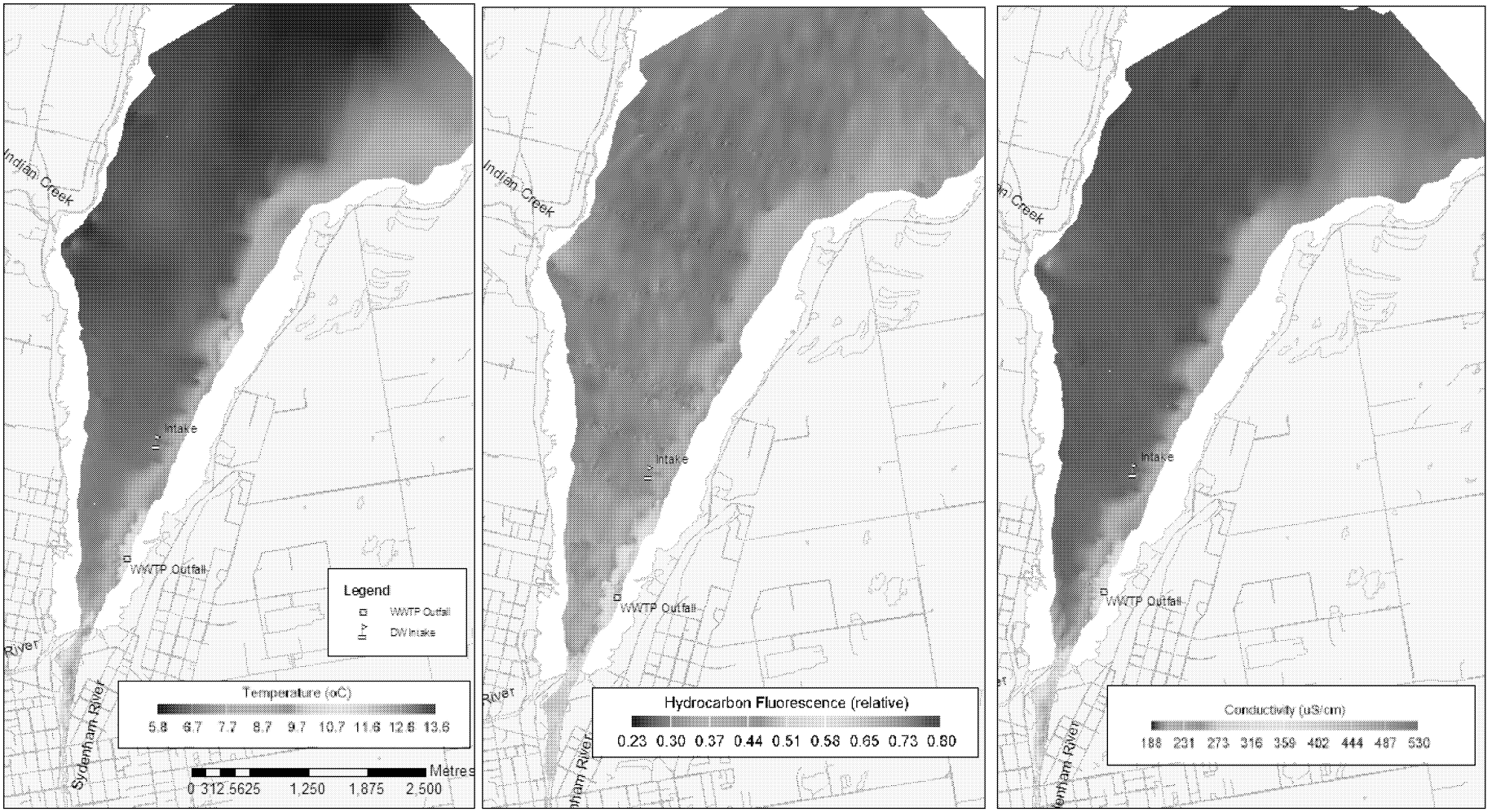

Figure 4: Surface maps of temperature, hydrocarbon fluorescence and conductivity (right to left) on June 3, 2009 (survey1)

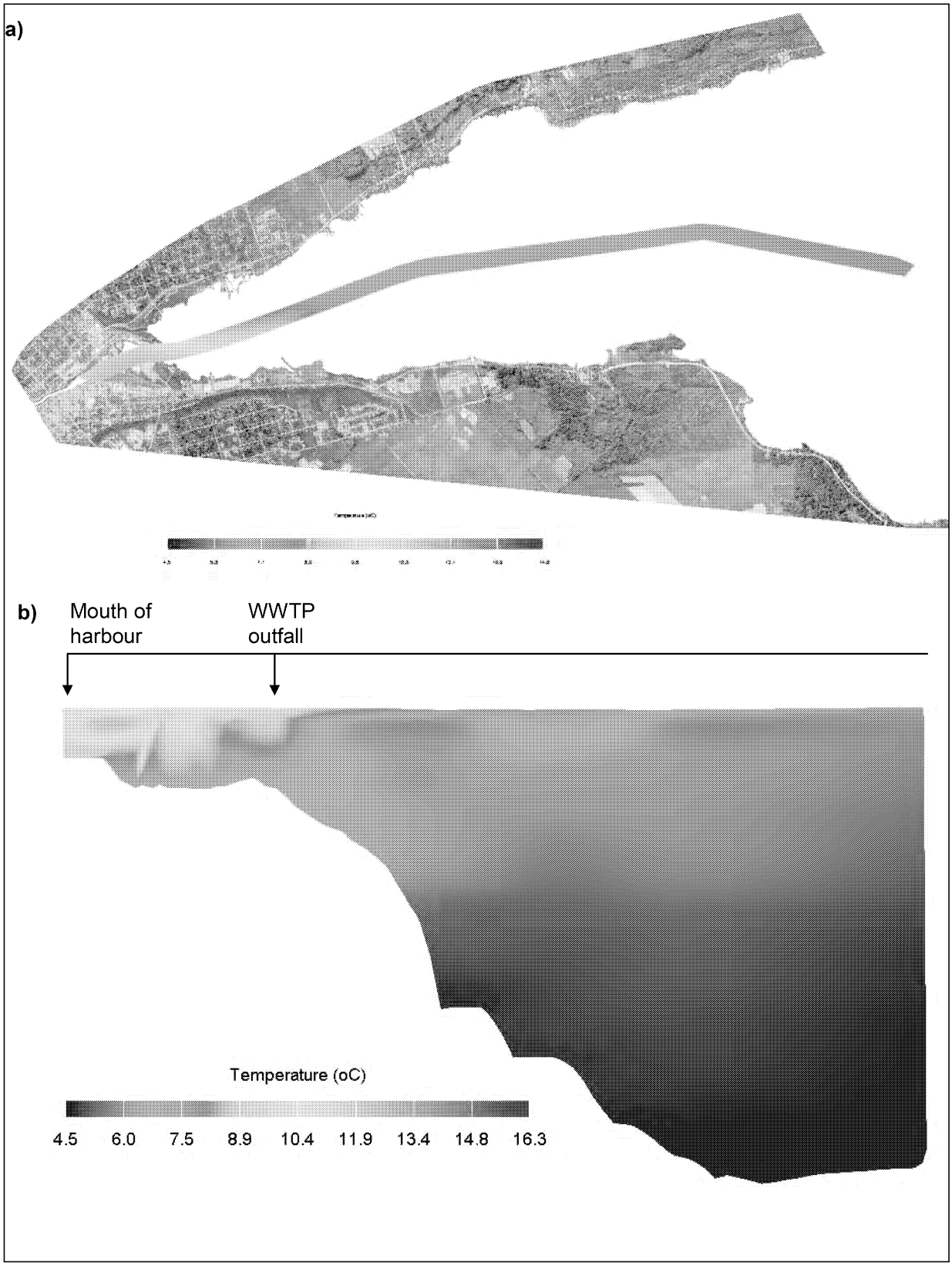

Figure 5: Vertical profile of temperature through a cross section of Owen Sound on June 3, 2009 (Survey 1). The upper panel identifies the position of the cross section. Colour scales are the same in panels a) and b).

5. Turbidity and Chlorophyll a

Low levels of turbidity (<1 FTU) prevailed over much of the study area with the exception of the inner harbour (**Figure 6**). Spatial variability in turbidity resembled that of conductivity and hydrocarbon fluorescence. Overall turbidity ranged from approximately 0.5 - 10 FTU. Higher, yet still relatively moderate levels of turbidity (7.6 - 10 FTU) were found in the south end of the inner harbour, the area most directly affected by the Sydenham River. An area of increased turbidity (up to 4.5 FTU) was associated with the area directly in the vicinity of the WWTP outfall. Turbidity measurements continued to be slightly higher than background along the eastern shoreline, with apparent zones of higher turbidity stretching up to 4 km north/northeast of the WWTP, and up to approximately 590 m offshore at its widest point of influence. Turbidity in the area of the drinking water intake appeared to resemble background conditions in Owen Sound.

Chlorophyll a concentrations were low ranging from 0.3 - 1.5 µg/L over the study area and suggestive of oligotrophic conditions. Slight increases in chlorophyll a concentrations were noted in the inner harbour and in the vicinity of the WWTP outfall (**Figure 6**). In contrast with the patterns of variability in conductivity and hydrocarbon fluorescence, the respective areas of influence of the inner harbour and WWTP on chlorophyll a levels are more clearly separated in the kriged surface maps.

Despite the low productivity levels inferred from chlorophyll a concentrations, the geographic sub-areas over the study area could be characterized by slight variations in chlorophyll a concentrations (**Table 5**). The inner harbour zone had the highest relative productivity (average chlorophyll a 1.06 µg/L), followed by the zone within a radius of 150 m of the outfall (average chlorophyll a 0.67 µg/L) and inner sound zone (0.46 µg/L). The outer sound zone (0.36 µg/L) had the lowest chlorophyll a concentrations.

Table 4: Mean values of selected water quality parameters by geographic zones within the Owen Sound study area for the June 3, 2009 survey. Values in brackets are the minimum and maximum values among samples over the respective areas. See Appendix 3 for the distribution of sampling locations over the study area and Figure 1 for stratification into geographic groups.

	Parameter	Inner Harbour	Inner sound	Outer sound	Outfall
Surface (1.5 m)	Chloride (mg L^{-1})	17.3 (14.7-19.8)	8.6 (6.8-13.5)	7.0 (6.7-8.2)	13.3 (10.9-18.2)
	Ammonia +Ammonium (µg L^{-1})	24 (15-33)	41 (7-153)	13 (6-39)	146 (28-358)
	TON (µg L^{-1})	326 (277-375)	191 (153-277)	143 (114-181)	288 (222-382)
	DOC (mg L^{-1})	3.7 (3.2-4.1)	1.9 (1.6-2.6)	1.7 (1.6-1.8)	2.6 (2.3-2.9)
	E.coli (CFU/100mL)	13 (12-14)	4 (2-20)	2 (2-2)	7 (2-16)
Bottom (1-2 m above the lakebed)	Chloride (mg L^{-1})	7.4	6.8	6.7	26.2
	Ammonia +Ammonium (µg L^{-1})	20	8	8	1090
	TON (µg L^{-1})	160	132	142	660
	DOC (mg L^{-1})	1.7	1.6	1.7	3.4
	E.coli (CFU/100mL)	ns	ns	ns	ns

Notes: 1) Outfall group includes sampling points distributed within approximately 150 m of the outfall for the water pollution control plant; these data are not included in the calculation of values for the inner sound group. 2) Numbers of samples per group (surface) were 2, 9, 5 and 5 for the harbour, inner sound, outer sound and outfall groups respectively. There are single sampling points for the bottom groups. 3) ns - no samples

Table 5: Summary of chlorophyll a concentrations as an indicator of relative productivity in various parts of Owen Sound (Survey 1, June 3, 2009).

Chlorophyll a (µg/L)	**TOTAL STUDY AREA**	**SEPARATE ZONES**			
		Inner Harbour	**Inner sound**	**Outfall**	**Outer sound**
Mean:	0.45	1.06	0.46	0.67	0.36
Median:	0.36	1.09	0.37	0.69	0.36
Range:	0.26-1.50	0.64-1.50	0.26-1.50	0.26-0.91	0.27-0.47
Variance:	0.04	0.02	0.03	0.02	0.00

Notes: Outfall group includes area distributed within approximately 150 m of the outfall for the wastewater treatment plant; these data are not included in the calculation of values for the inner sound group. Estimates derived from node structure underlying kriged surface map of chlorophyll a (total) concentration.

6. Nutrients

Total phosphorus concentrations in much of Owen Sound were indicative of highly oligotrophic conditions, with background levels ranging from < 2 µg/L to 3 µg/L. Variability in levels corresponded approximately with the spatial pattern observed with temperature, conductivity, hydrocarbon fluorescence and turbidity reflecting the same sources of influence. Higher TP concentrations were found within the harbour (9 -15 µg/L) and northward along the eastern shoreline in the vicinity of the WWTP outfall (6 - 18 µg/L). At the time of survey the discharge from the WWTP outfall appeared to impact TP levels over a band of water adjacent to the shoreline from the outfall to at least 500 m to the NE. The TP concentrations over this zone are modest yet notably elevated over background suggesting increased productivity in the mixing area of the outfall as depicted in the turbidity map (**Figures 6 & 7**).

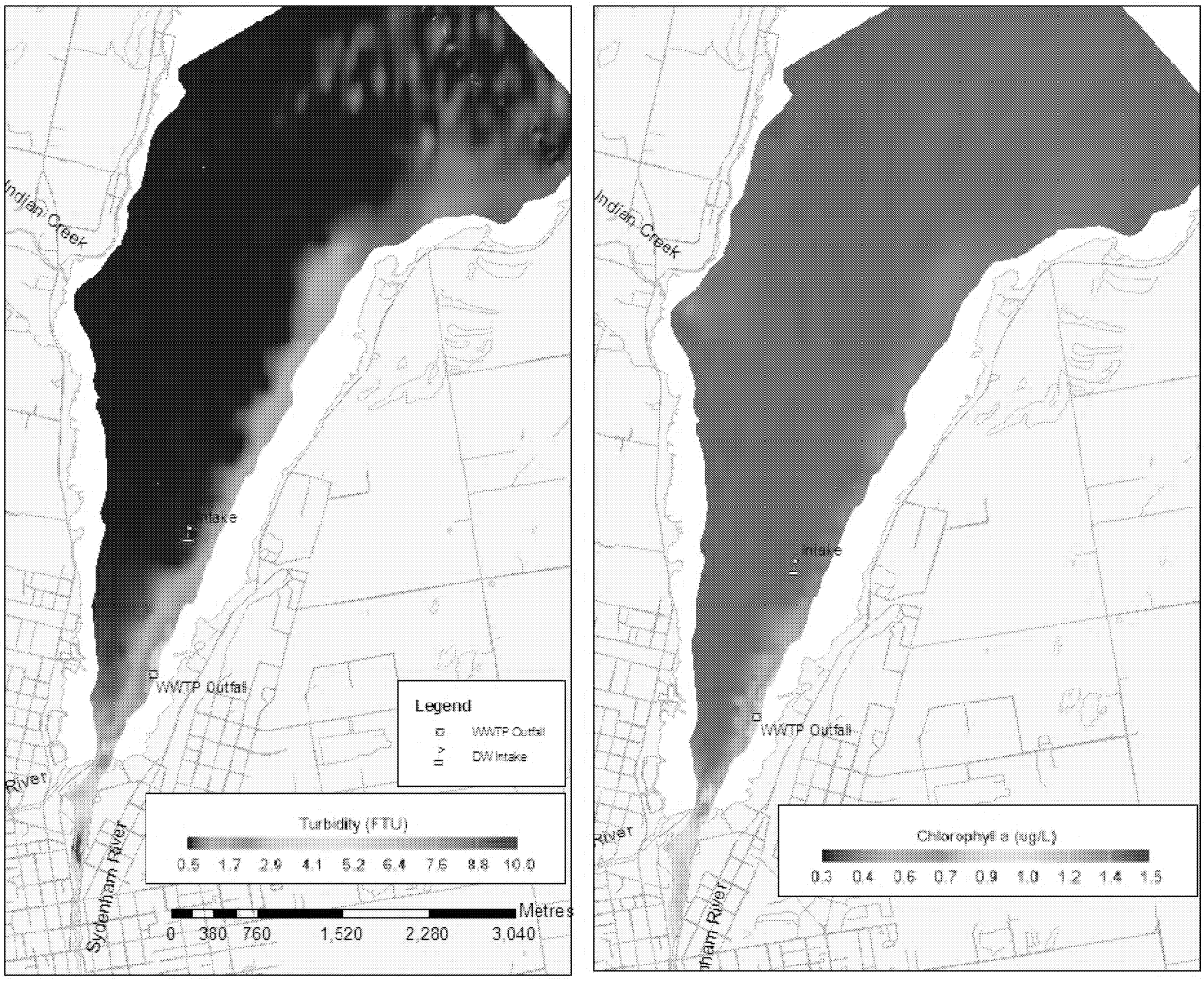

Figure 6: Surface maps of turbidity and chlorophyll a concentrations on June 3, 2009 (survey 1).

Elevated ammonia + ammonium concentrations were found in the vicinity of the WWTP outfall at concentrations that were up to ten times higher than in the inner harbour (**Figure 8**) providing a means to differentiate the influence of circulation of water from the inner harbour from WWTP effluent on the NE shoreline. Ammonia + ammonium surface concentrations in the vicinity of the WWTP outfall averaged 146 µg/L compared to 24 µg/L within the harbour and 13 µg/L in the outer sound (**Table 4**). Mean concentration in the inner sound was higher (41 µg/L), and likely influenced by sample points along the eastern shoreline affected by the discharge from the WWTP (**Figure 8**). Ammonia + ammonium concentrations near the bottom of the water column were elevated near the WWTP outfall (1090 µg/L) compared to the harbour (20 µg/L) and the inner and outer sound areas (8 µg/L) (**Table 4**). Based on temperature and pH in the

sampling area, the concentration near the WWTP outfall exceeded the PWQO for un-ionized ammonia (20 µg/L) near the lakebed, but not in surface samples.

Nitrate + nitrite values were plotted on a conductivity map (**Figure 7**) in an attempt to delineate levels associated with mixing areas along the eastern shoreline from background levels. Higher nitrate + nitrite concentrations were generally noted in areas of higher conductivity indicating circulation of inputs along the eastern shoreline towards the north. Nitrate + nitrite concentrations ranged from 275 - 280 µg/L in background waters. The highest nitrate + nitrite concentrations (392 - 611 µg/L) were found in the harbour and were associated with the highest conductivity readings. Slightly elevated nitrate + nitrite concentrations were found within the inner sound in the vicinity of the WWTP outfall (319 - 362 µg/L).

Average surface TON concentrations were not appreciably elevated over the areas influenced by external inputs. Average surface TON concentrations were most elevated within the inner harbour (326 µg/L) and in the vicinity of the WWTP outfall (288 µg/L) compared with the outer sound (**Table 4**). The highest TON concentrations in near bottom samples were found in the vicinity of the WWTP outfall.

7. Other water quality features

The highest average chloride concentrations in surface waters were found within the harbour (17.3 mg/L), and to a lesser extent in the vicinity of the WWTP outfall (13.3 mg/L) (**Table 4**). These concentrations were approximately twice as high as in the inner sound and outer sound (8.6 and 7.0 mg/L respectively). Bottom chloride concentrations were however considerably higher near the WWTP outfall (26.2 mg/L) compared to the harbour (7.4 mg/L), where concentrations were similar to the inner and outer sound (6.8 and 6.7 mg/L respectively) (**Table 4**).

E.coli concentrations in the first survey were low with only slight differences among geographic area (**Table 4**).

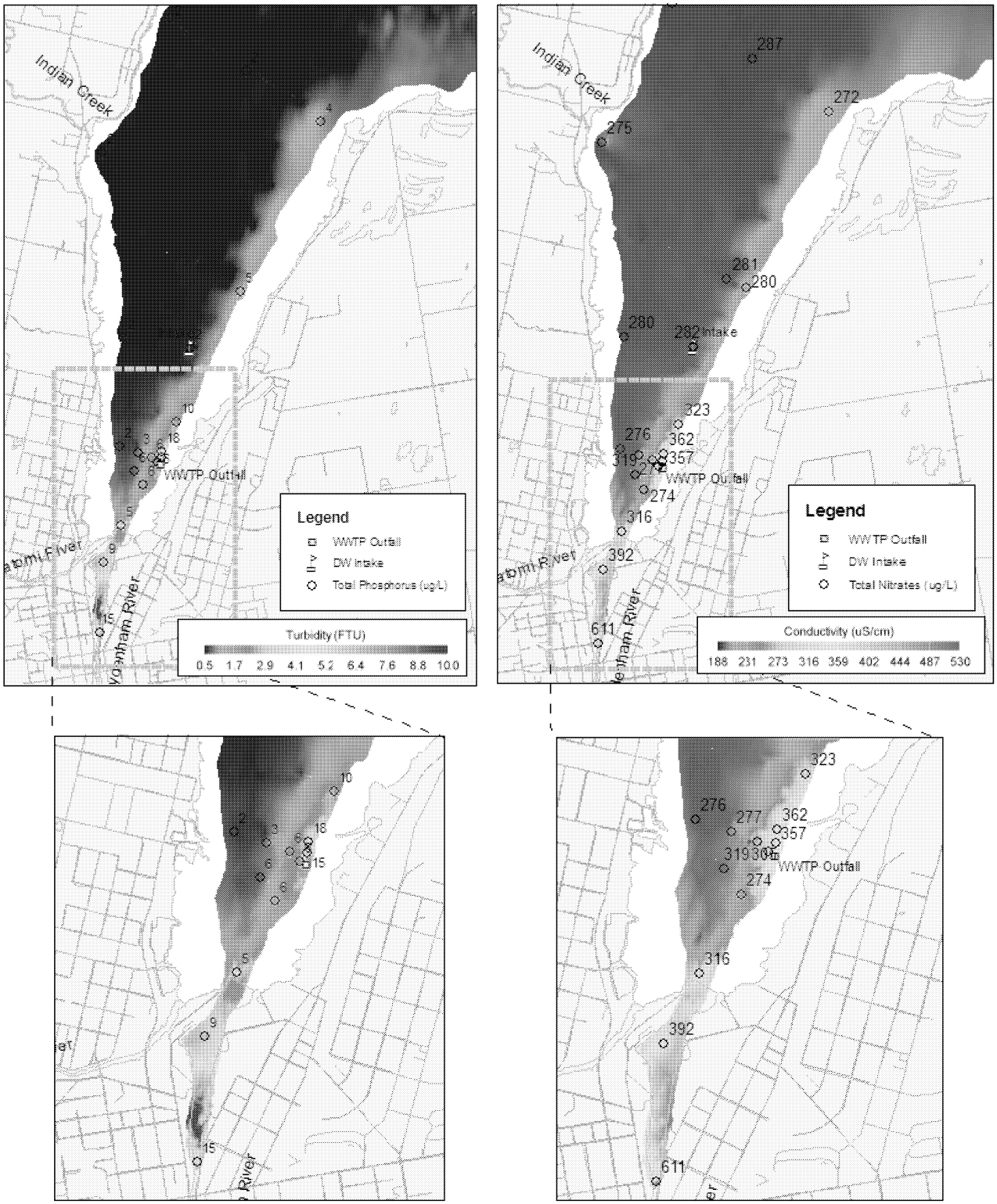

Figure 7: Total phosphorus and nitrate + nitrite concentrations in point samples plotted on surface maps of turbidity and conductivity, respectively on June 3, 2009 (survey 1).

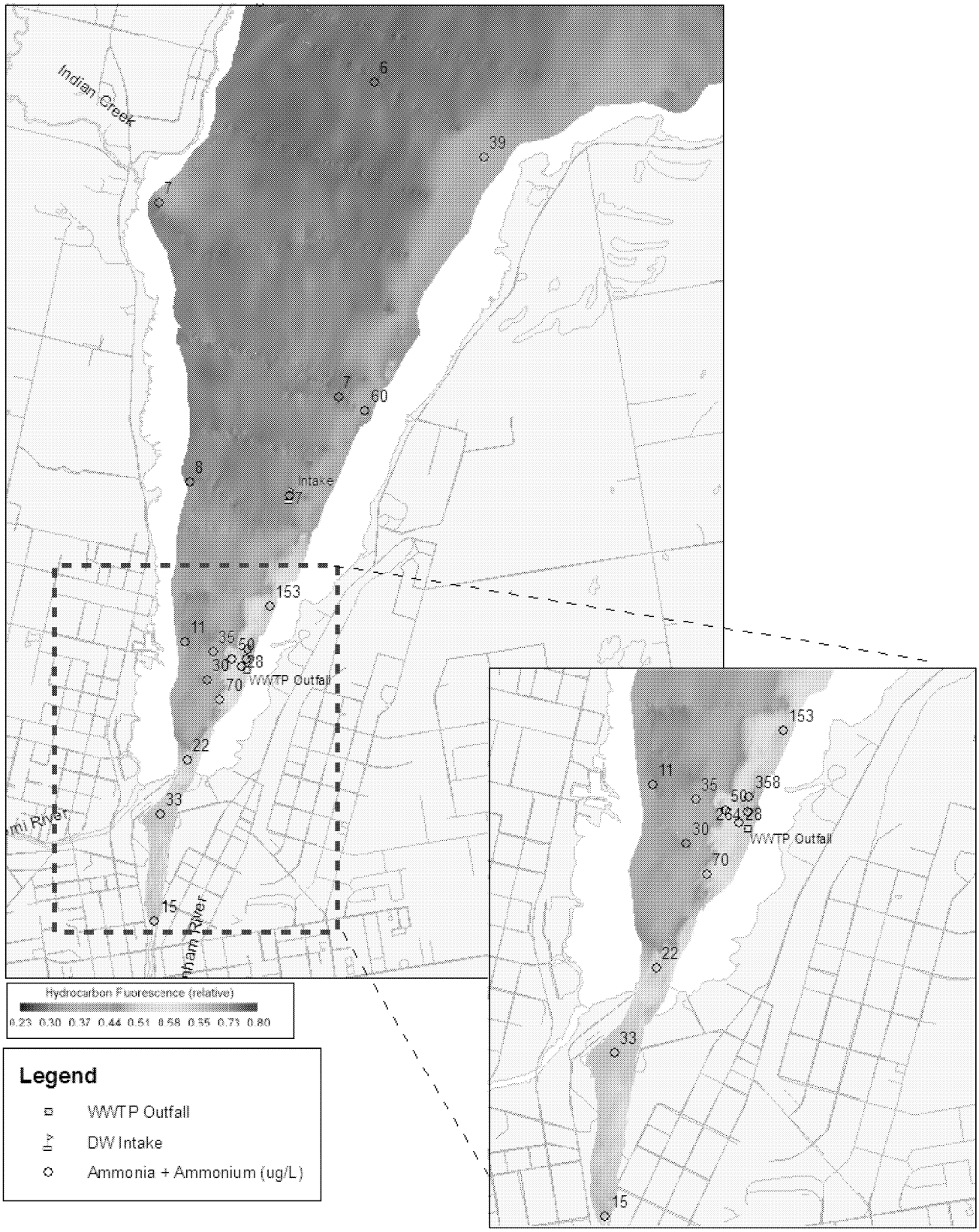

Figure 8: Ammonia + ammonium concentrations in point samples plotted on surface maps of hydrocarbon fluorescence on June 3, 2009 (survey 1).

8. Hydrocarbon fluorescence patterns with depth to infer distribution of mixing area

Fluorescence of organic material under UV light was used to identify the distribution of mixing areas and potential plumes present within the water column attributable to runoff and WWTP discharge in the inner sound (**Figure 9**).

A mixing area was detected in the area of the WWTP outfall in the first survey based on surface hydrocarbon fluorescence readings (e.g. **Figure 8**). Examination of whole water column interpolations derived from profile data suggests that the mixing area was largely limited to near the lake surface (**Figure 9**), and was likely captured with the surface maps. The distribution of water mixing seen through the pattern of hydrocarbon fluorescence was consistent with the thermal conditions of the water column (**Figure 5**), and suggests that warmer waters entering the inner sound from the inner harbour and the WWTP outfall areas appeared to dissipate near the surface.

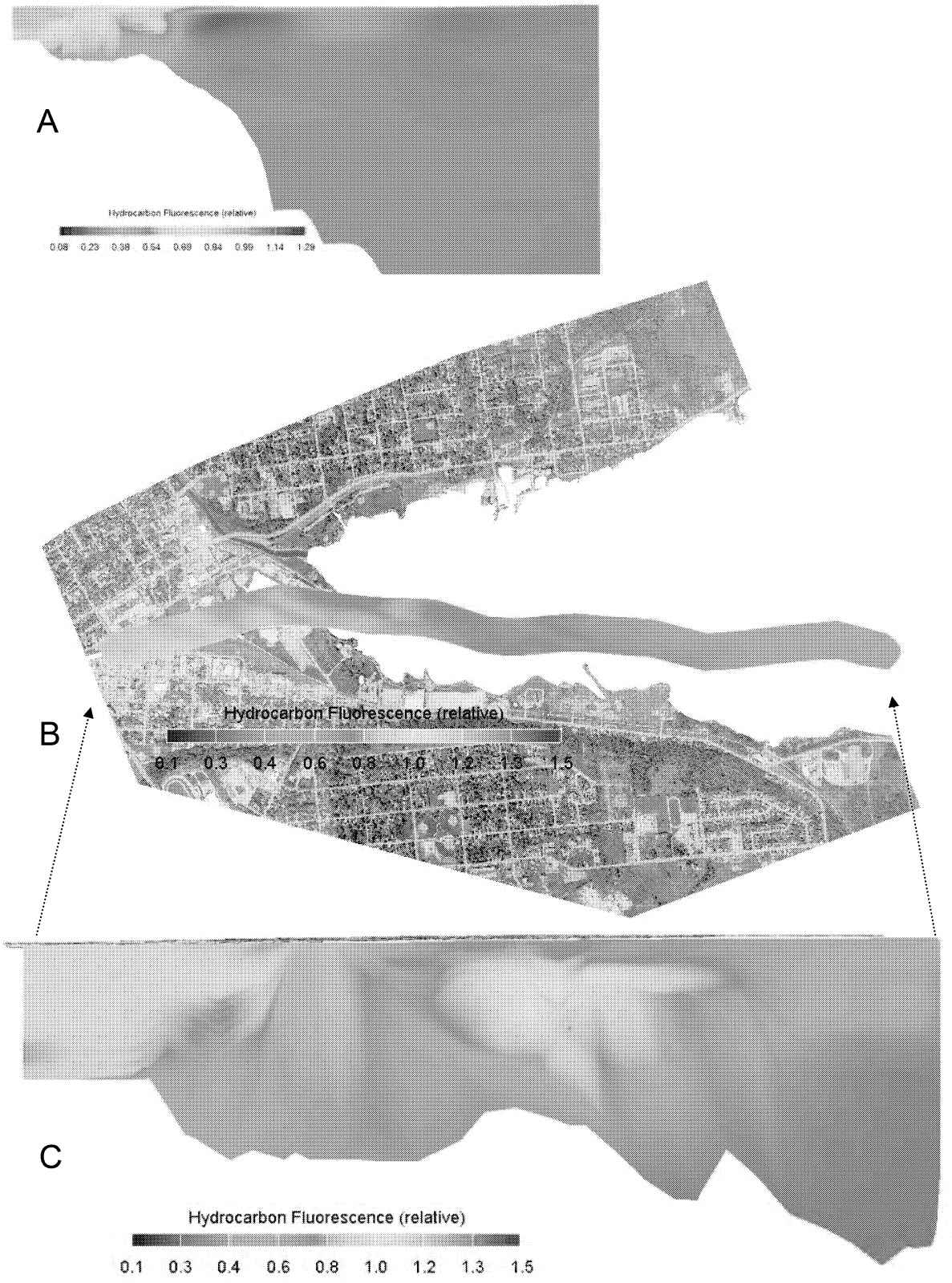

Figure 9: Cross sections through three-dimensional interpolations of hydrocarbon fluorescence in Owen Sound on June 3, 2009 (survey1). Panel A is through the north-south axis of Owen Sound as depicted in Figure 5. The orientation of the section depicted in Panel C is shown in panel B. The area of maximal fluorescence in panel C is in the area of the WWTP outfall.

4.5.2 Owen Sound Water Quality Survey July 7, 2009: Early Summer Conditions

1. Weather Conditions

Prevailing winds on July 7 as measured at Wiarton were from the west south-west, with median wind speed of 12 km/h (**Table 3**). Environment Canada reported 1.8 mm of rainfall on July 6 (1 day prior to survey) and 1.4 mm on July 7 (the day of the survey). Discharge measurements from the Sydenham river ranged between 1.45 m^3/s (July 4) and 1.2 m^3/s (July 7), with a decreasing trend in discharge (**Appendix 6**).

2. Lake Temperatures and Thermal Stratification

Surface temperatures in Owen Sound displayed limited variability, however, the subtle spatial pattern suggested what appeared to be circulation of cooler water from depth towards the surface over parts of the sound (**Figure 10**). Surface temperatures ranged from 15.1 - 17.3 ^oC. Marginally cooler temperatures (15 - 15.9 ^oC) were found on the western side of the sound to the north of Indian Creek compared with the eastern side. The highest temperature was found within the inner harbour near the Sydenham River mouth. Temperature was uniform around the WWTP outfall.

Thermal stratification was evident in Owen Sound during the second survey, with surface temperatures dropping to approximately 6^oC at deepest depths over the study area (**Figure 11**). A slight west to east titling upward of the thermal profile evident in **Figure 11** is consistent with the surface temperature structure.

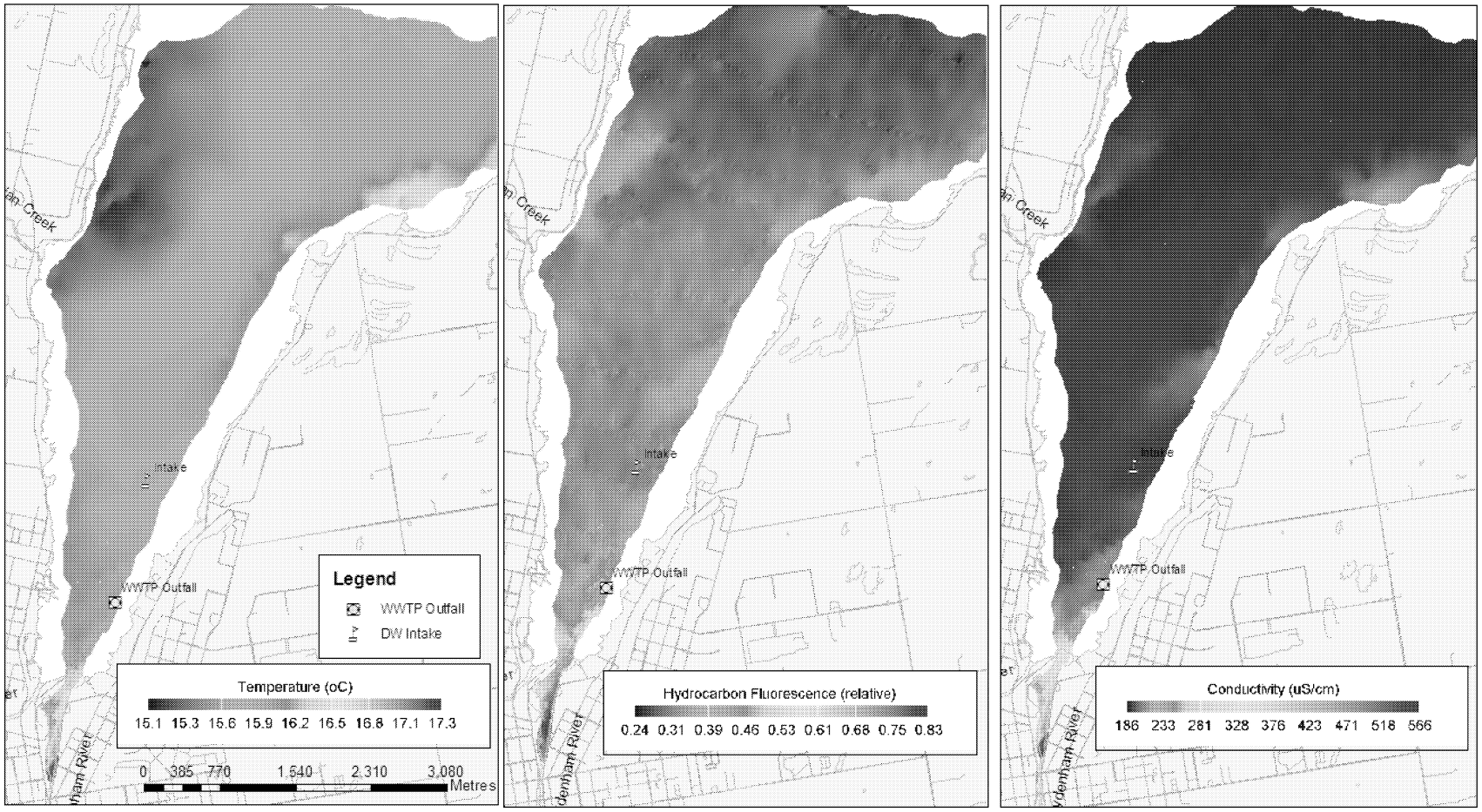

Figure 10: Surface maps of temperature, hydrocarbon fluorescence and conductivity (right to left) on July 7, 2009 (survey 2).

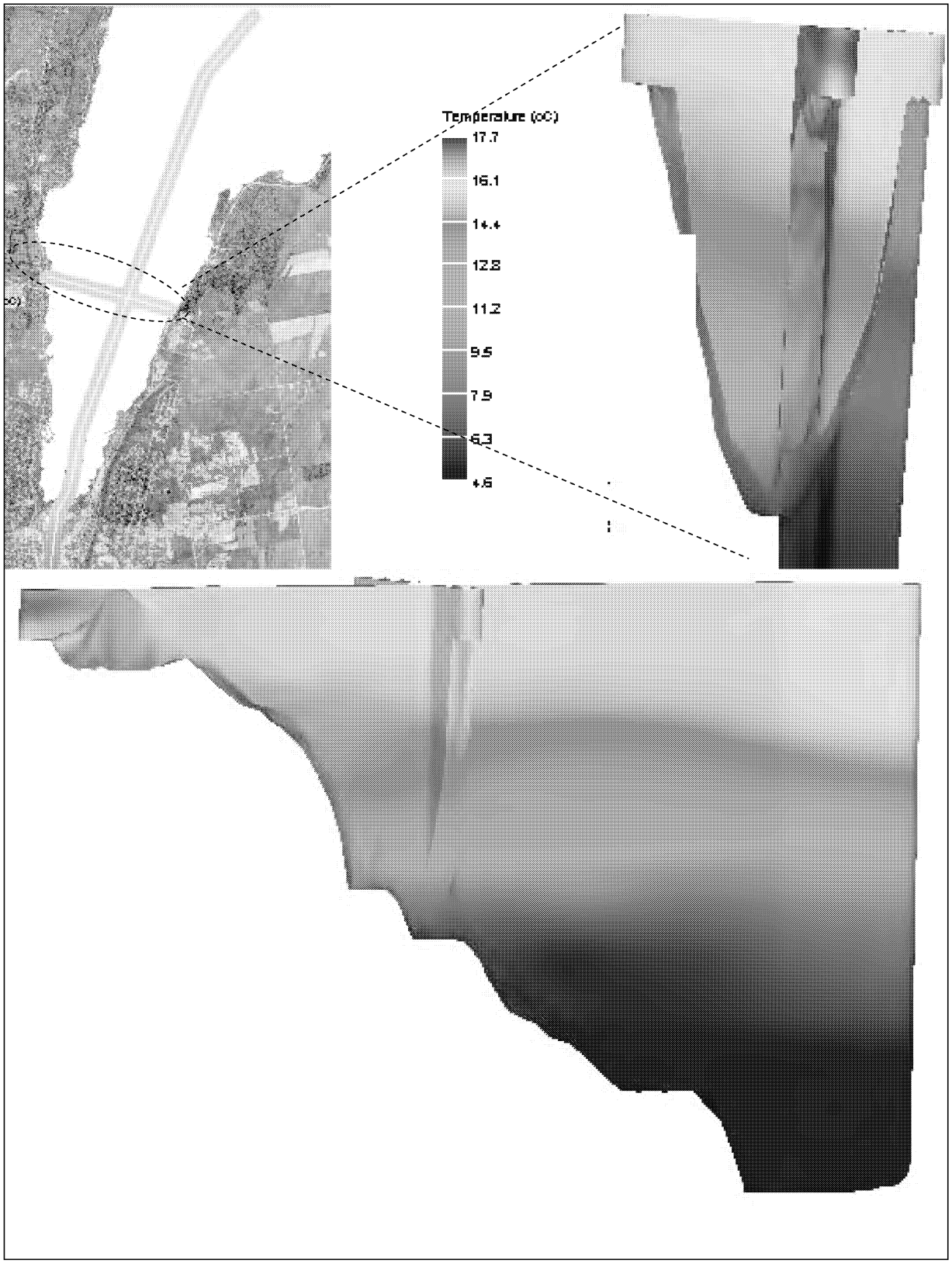

Figure 11: Cross sections through a three-dimensional interpolation of temperature in Owen Sound on July 7, 2009 (Survey 2). The lower panel depicts the long transect through Owen Sound identified in the top left panel.

3. Surface circulation

Interpretation of circulation patterns based on spatial patterns in field measurements during the second survey was equivocal. Surface circulation as inferred from temperatures appeared to be directed northward from the inner harbour to the east side of the inner sound, though there were no obvious mixing areas extending along the NE shoreline as observed during the first survey. The broader pattern of surface temperature hints at a counter clockwise surface circulation along the shores of the sound. As observed with temperature, surface conductivity and hydrocarbon fluorescence patterns suggest circulation from the inner harbour to the inner sound towards the east however the strong reduction in conductivity and hydrocarbon fluorescence levels outside the inner harbour limits interpretation outside the harbour (**Figure 10**). A small pocket of increased surface temperatures was noted in the outer sound along the eastern side of the sound approximately 4.2 km northeast of the drinking water intake (**Figure 10**). The orientation suggests circulation towards the NE. In contrast slight elevation of hydrocarbon approximately midway along the west and east sides of the sound suggest clockwise circulation along the shores of the sound.

A short coming of the present survey approach is that data is collected over hours and there is the possibility that changing winds or broader lake circulation patterns will alter the local circulation over the duration of the data collection.

4. Conductivity and hydrocarbon fluorescence as tracers of external inputs

The highest levels of hydrocarbon fluorescence and conductivity at the surface in the second survey were found near north end of the inner harbour (**Figure 10**). Levels of hydrocarbon fluorescence and conductivity near the WWTP outfall appeared to be only slightly higher than in the rest of the inner and outer sound with no clear separation from the influence of the inner harbour.

Surface hydrocarbon fluorescence in the offshore areas of Owen Sound appeared to show slightly greater heterogeneity in the second survey compared to the first survey (**Figure 10**), with an area of slightly elevated hydrocarbon fluorescence in the western

side of the outer sound north of the Indian Creek; this mixing area appeared to be oriented northward along the western shoreline.

Hydrocarbon fluorescence near the drinking water intake appeared to be similar to levels in the middle of Owen Sound.

The range of conductivity values (186 - 565 µS/cm) was similar to that of the first survey. Limited areas of higher conductivity were noted in the inner harbour and near the eastern and western shorelines of the inner sound south of the WWTP outfall (**Figure 10**).

An area of locally elevated hydrocarbon fluorescence and conductivity was observed approximately 340 m south of the WWTP. However, the broad distribution pattern in the area provided little insight on the likely contributing influences of the inner harbour, the WWTP outfall or a combination of both.

5. Turbidity and Chlorophyll a

Levels of particulate matter in the water column, as inferred from surface turbidity appeared to be lower than in the first survey (**Figure 12**). Low levels of turbidity (<1 FTU) were found over most of the study area, with the exception of the inner harbour and parts of the inner sound. Within the harbour turbidity ranged from 0.5 - 9.6 FTU and was similar to the first survey. The highest turbidity (9.6 FTU) was found in the south end of the inner harbour where there is relatively less dilution of the Sydenham River water by influx of lake water into the inner harbour. Turbidity dissipated quickly approaching the north end of the harbour. There may also have been inputs of turbidity from the Pottowatomi River contributing to the levels in the inner sound just outside the inner harbour.

Areas of slightly increased, though low turbidity (1.6 - 2.5 FTU) were noted in the vicinity of the WWTP outfall; however, the pattern could not be completely discerned from the overall increases near the confluence of the harbour and inner sound. The zone of increased turbidity appeared to extend approximately 500 m north/northeast of the WWTP outfall, and at its widest, appeared to extend approximately 440 m from the shoreline in the vicinity of the WWTP outfall. Areas of slightly increased turbidity were noted along the eastern shoreline beyond the drinking water intake.

Chlorophyll a concentrations in the second survey were generally low, ranging from 0.9 -3.0 µg/L (**Figure 12**), though these levels were higher than in the first survey. The highest concentrations (2 - 3 µg/L) were found within the inner harbour. Variable concentrations were found over the inner and outer sound but with little obvious spatial pattern. In the outer sound, the areas of higher chlorophyll a concentrations appeared to approximately coincide with areas of increased surface temperatures (**Figure 10**).

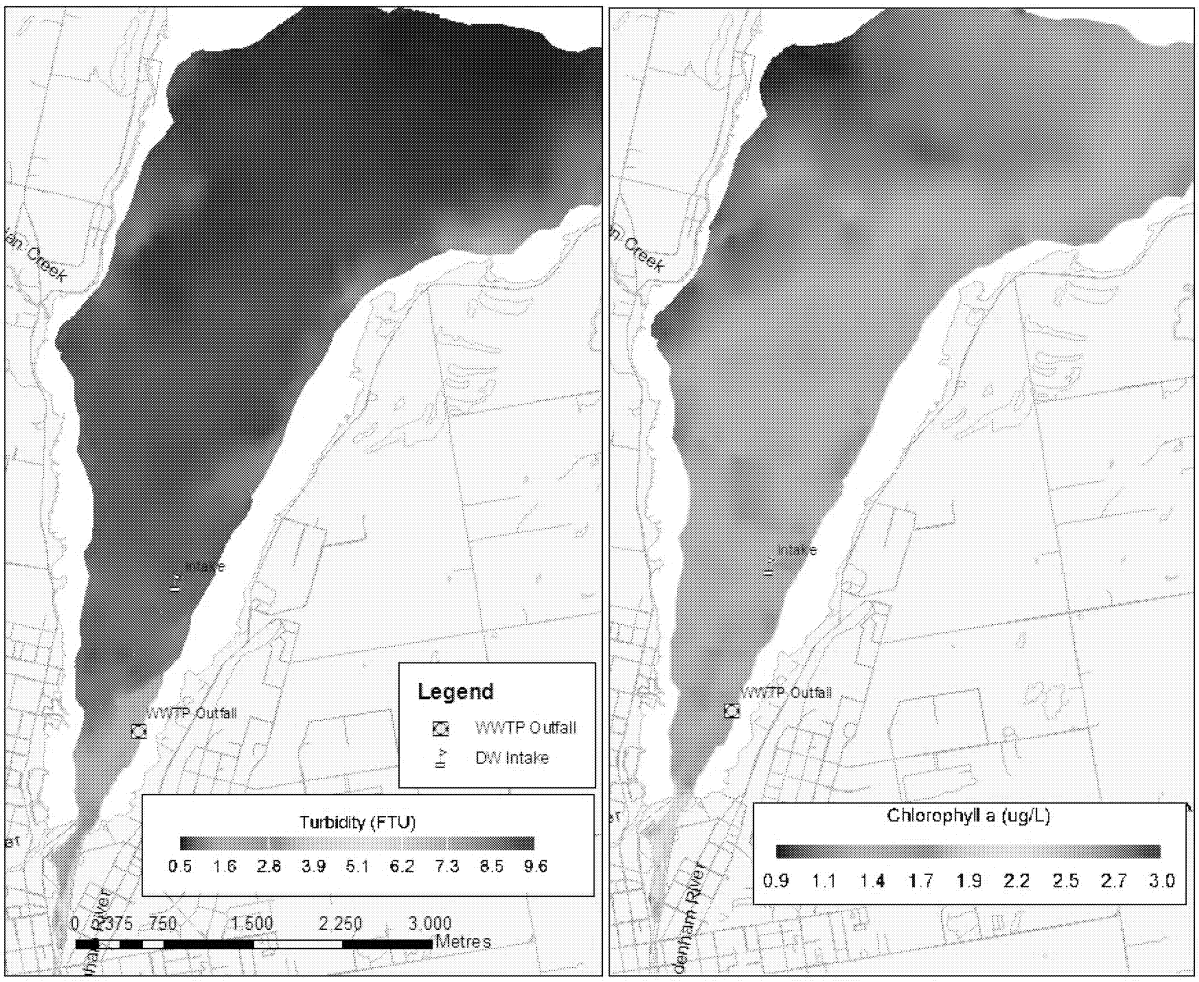

Figure 12: Surface maps of turbidity and chlorophyll a concentrations on July 7, 2009 (survey 2).

Relative productivity levels inferred from surface chlorophyll a concentrations suggested highest productivity within the harbour area (average 2 µg/L), followed by the inner sound (1.5 µg/L) (**Table 6**). The outer sound had lower chlorophyll a concentrations (1.3 µg/L). Levels in the outfall area were indistinguishable from the inner sound. Although some slight geographical variability was evident, overall concentrations were typical of oligotrophic conditions.

Table 6: Summary of chlorophyll a concentrations as an indicator of relative productivity in various parts of Owen Sound (Survey 2, July 7, 2009).

Chlorophyll a (µg/L)	**TOTAL STUDY AREA**	**SEPARATE ZONES**			
		Inner Harbour	**Inner sound**	**Outfall**	**Outer sound**
Mean:	1.39	2.03	1.50	1.56	1.28
Median:	1.37	2.02	1.49	1.55	1.26
Range:	0.88-3.18	1.59-3.18	1.12-2.16	1.39-1.74	0.88-1.86
Variance:	0.067	0.0432	0.0195	0.0061	0.037

Notes: Outfall group includes sampling points distributed within approximately 150 m of the outfall for the wastewater treatment plant; these data are not included in the calculation of values for the Inner sound group.

6. Nutrients

Total phosphorus concentrations in Owen Sound were slightly higher in the second survey, compared to the first survey, but were generally typical of oligotrophic conditions (Wetzel, 1983). Concentrations ranged from 3 - 4 µg/L in outer sound and up to 12 µg/L in the vicinity of the WWTP outfall (**Figure 13**). Concentrations at the south end of the inner harbour reached 23 µg/L but dropped to 9 µg/L at the north end of the inner harbour. The higher phosphorus concentrations were consistent with mixing areas depicted by the turbidity map for the survey.

Nitrate + nitrite concentrations generally increased within areas of input as delineated with conductivity (**Figure 13**), with the highest concentrations (351 - 581 µg/L) observed within the inner harbour where conductivity values were also at their highest. Slightly elevated nitrate + nitrite concentrations were found approximately 290 m south of the WWTP in an area of increased conductivity, however, it is unclear if the sources of the slightly higher nitrate + nitrites is the harbour or the WWTP outfall.

Ammonia + ammonium concentrations in surface waters near the WWTP outfall (100 µg/L) were lower than in the first survey with ranges of values slightly higher than within the harbour area (**Figure 14**). Ammonia + ammonium concentrations in the inner and outer sound were generally lower than in the first survey. Bottom concentrations for ammonia + ammonium were similar in the harbour and near the WWTP outfall (71 µg/L) and were several times higher than in the inner and outer sound area (11 µg/L). Concentrations in bottom samples near the outfall were considerably lower than in the

first survey suggesting only minimal elevation of ammonia + ammonium concentrations near the WWTP outfall at the time of survey.

Average TON concentrations in surface waters in the second survey were generally lower than in the first survey, while concentrations in the bottom waters appeared to be slightly higher in the harbour and near the WWTP outfall.

The highest average chloride concentrations (15 mg/L) and range (10 - 19.3 mg/L) in surface waters were found within the inner harbour (Table 7). Chloride concentrations in the vicinity of the outfall were generally lower than in the first survey (8.4 mg/L), and were lower than within the inner harbour. Bottom chloride concentrations in the inner harbour and near the outfall were similar (10.4 mg/L) and were only slightly higher than in the inner sound and outer sound.

DOC concentrations were within the same range as those in the first survey in both surface and bottom water samples.

E.coli levels were elevated (910 CFU/100mL) in one of two inner harbour samples, suggesting localized input of fecal pollutants into the inner harbour (Table 7). Concentrations within the inner sound area were low (13 cfu/100mL), and background conditions were encountered in the outer sound and in the vicinity of the outfall.

The lower range of values of some water quality features encountered during the second survey, particularly within the inner harbour and the inner sound areas is consistent with the low relative discharge of the Sydenham River leading up to and during the second survey. The second survey had the lowest discharge of the four surveys suggesting dry conditions with reduced inputs from the watershed. Consequently, indicators of movement from the harbour to the inner sound were less substantial that in the first survey, and zones of mixing appeared to be more limited.