

REGION OF WATERLOO

Kitchener Wastewater Treatment Plant Upgrades Municipal Class Environmental Assessment Project File Report

Prepared by:

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Project Number:

60159482

Date:

September 4, 2012

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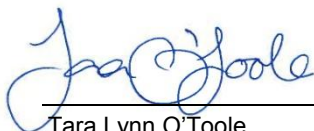
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1	1	Ministry of Environment
1	1	Grand River Conservation Authority

QC Review Log

Revision Log					
Version	Date	Prepared by (Deliverable Lead)	QC Reviewer	QC Review Date	Project Manager or Assistant PM Sign-off
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2	August 2012	Karl Grueneis	John Armistead	August 27, 2012	John Armistead

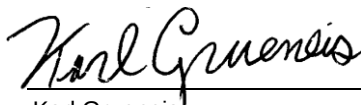
AECOM Signatures

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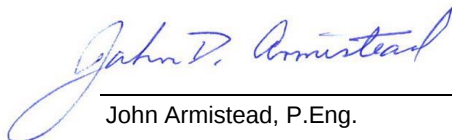
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- Appendix F. Public Consultation
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Acronyms

CEAA	Canadian Environmental Assessment Agency
Cm	Centimetres
C of A	Certificate of Approval
Class EA	Municipal Class Environmental Assessment
DBH	Diameter at Breast Height
DFO	Department of Fisheries and Oceans
EAA	<i>Environmental Assessment Act</i>
ECA	Environmental Compliance Approval
GRCA	Grand River Conservation Authority
Ha	Hectare
HADD	Harmful Alteration, Disruption or Destruction of fish Habitat
HVAC	Heating, Ventilation and Air Conditioning
Km²	Square kilometres
kV	Kilovolts
kW	Kilowatt
LEED	Leadership in Energy and Environmental Design
m	Metre
M²	Square metres
M³/d	Cubic metres per day
M/s	Metres per second
MEA	Municipal Engineer's Association
Mg/L	Milligrams per litre
MLD	Mega (million) Litres per day
MNR	Ministry of Natural Resources
MOE	Ministry of the Environment
MP	Master Plan
MTCS	Ministry of Tourism, Culture and Sport
NHIC	Natural Heritage Information Centre
NWPA	<i>Navigable Waters Protection Act</i>
O&M	Operations and Maintenance
OP	Official Plan
OWRA	<i>Ontario Water Resources Act</i>
PDR	Preliminary Design Report
PIC	Public Information Centre
PPS	Provincial Policy Statement
PT	Project Team

PTTW	Permit To Take Water
PWQO	Provincial Water Quality Objectives
RAS	Return Activated Sludge
Region	Regional Municipality of Waterloo
ROP	Regional Official Plan
SARA	Species at Risk Act
SAR	Species at Risk
SC	Steering Committee
TP	Total Phosphorus
TSSA	Technical Standards and Safety Authority
TSS	Total Suspended Solids
UV	Ultra Violet
VE	Value Engineering
WAS	Waste Activated Sludge
WWTP	Wastewater Treatment Plant

1. Introduction

1.1 Background

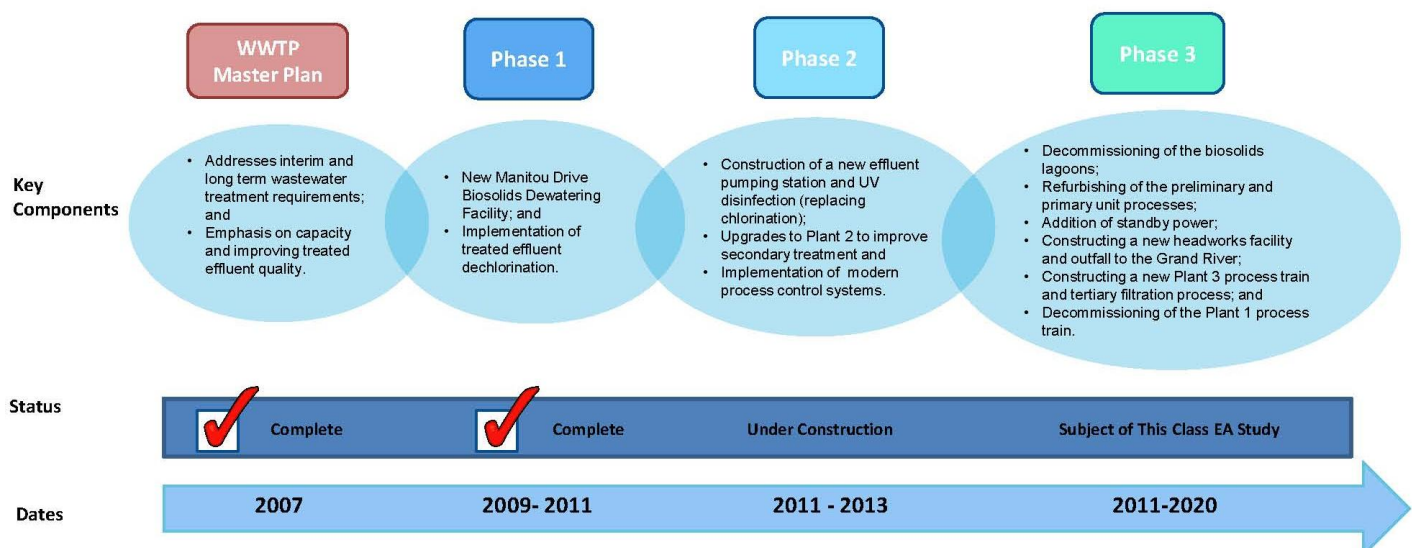
The Regional Municipality of Waterloo (the Region), through their consultant AECOM, has completed a Municipal Class Environmental Assessment (Class EA) study for upgrading the Kitchener Wastewater Treatment Plant (WWTP) located in the City of Kitchener (see figure). The proposed improvements focus on upgrading the WWTP's treatment process, as well as for the provision of standby power to provide security to ensure essential operations will continue in the event of a power failure. The proposed upgrades are part of the last of three WWTP upgrade phases and are intended to improve effluent quality and operational reliability without an increase to the existing WWTP's rated capacity. The proposed works will ensure better effluent quality and odour management, provide reliable, long term operation and performance, decommission existing biosolids storage lagoons and improve process efficiency (replace aging equipment).



1.1.1 Wastewater Treatment Master Plan Strategy

In 2007 the Region completed a Wastewater Treatment Master Plan (MP) that addressed interim and long term wastewater treatment requirements with an emphasis on capacity to service planned growth and improving treated effluent quality in addition to following Phases 1 and 2 of the Municipal Class EA process (see **Section 1.4**). A number of upgrades were approved and are being implemented using a phased approach, as shown below:

Figure 1-1 Wastewater Treatment Master Plan Strategy



The first two phases are currently underway and include new biosolids dewatering facilities at the Manitou Drive transfer station (commissioned March 2012). Plant 2 is currently being upgraded, to improve the ability of the plant to treat centrate from biosolids dewatering, and enhance ammonia removal in the Plant 2 aeration facility. A new Ultra Violet (UV) disinfection and effluent pumping station facility is also being constructed to ensure appropriate levels of disinfection are met and non-acutely toxic effluent is released to the Grand River.

The next phase of upgrades will provide reliable and efficient operation in the long term, address additional Grand River water quality requirements, and include the decommissioning of the biosolids storage lagoons. Phase 3 also involves construction of a new Plant 3 and the decommissioning and demolition of Plant 1, as well as a number of upgrades for plant optimization that will address deficiencies throughout the plant.

1.1.2 Kitchener Wastewater Treatment Site Wide Facility Plan

In 2011 the Region developed a comprehensive Site-Wide Facility Plan¹ to define a program of upgrades for the Kitchener WWTP that can reliably meet performance objectives for an approximate 20-year time frame. The upgrades in phases will provide plant capacity for the design flow, will provide enhanced phosphorus removal and nitrification, optimize existing operations, and will be fully compatible for potential upgrades if required at a later phase to achieve total nitrogen removal. In support of the Site Wide Facility Plan, thirteen Technical Memoranda were prepared addressing the physical condition of the existing facilities, identifying the existing site conditions and constraints, defining the current and future flows and loadings, addressing sustainability and evaluating the process system requirements to meet the anticipated Certificate of Approval (CofA) effluent criteria.

1.2 Study Scope and Location

The purpose of this Class EA is to provide a comprehensive and environmentally sound planning process that collectively considers the impacts of all WWTP upgrade components including operations and is open to public participation. The Kitchener WWTP is located at 368 Mill Park Road and is generally located in the area of Homer Watson Boulevard and Pioneer Drive in the central part of the City of Kitchener in the Region of Waterloo and is generally bounded by the Grand River to the north and east and wooded areas and Mill Park Drive to the west and south. The project study area is illustrated on **Figure 1-2**.

¹ *Kitchener Wastewater Treatment Plant Upgrade Site-Wide Facility Plan Report, AECOM, July 2011*

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LEGEND:

-  Kitchener WWT
-  STUDY AREA

BASE MAPPING PROVIDED BY:
REGION OF WATERLOO, 2011

KITCHENER WWT UPGRADE

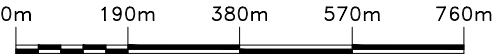
FIGURE
1-2

STUDY AREA



Region of Waterloo

JULY
2012



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1.3 Study Team Organization

This EA study was undertaken between the Region and AECOM with Project Team (PT) and Steering Committee (SC) meetings held at key points throughout the planning process. The PT was responsible for managing the project, advising on the Class EA process, and contributing to key deliberations on recommendations. PT members included representatives from the Region and AECOM as shown below:

Region of Waterloo	
José Bicudo	Senior Project Engineer, Water Services
Jo-Anne Ing	Senior Project Manager, Design and Construction
Trevor Brown	Senior Project Engineer, Water Services
Jorge Cavalcante	Manager of Engineering and Planning, Water Services
AECOM	
John Armistead	Project Manager
Ignatius Ip	Project Engineer
Karl Grueneis	Class EA Lead
Tara Lynn O'Toole	EA Planner
Jill deMan	Terrestrial Ecologist
Kimberly Thomas	EIT

The purpose of the SC was to provide advice and feedback to the PT at key milestone points during the project. The SC members provided representation from the Region, the City of Kitchener, the Ministry of the Environment (MOE) and the Grand River Conservation Authority (GRCA). Through the Class EA planning process the SC met three (3) times and included members of the PT (listed above) and the additional members listed below:

Steering Committee	
Nancy Kodousek - Region of Waterloo, Director of Water Services	Thomas Schmidt – Region of Waterloo, Commissioner of Transportation and Environmental Services
Khalid Mehmood - Region of Waterloo, Manager of Wastewater Engineering and Operation	Lisa Buitenhuis - Region of Waterloo, Manager, Procurement
Jim Wideman – Region of Waterloo, Councillor	Jean Haalboom – Region of Waterloo, Councillor
Brian Runstedler – Ontario Clean Water Agency	Yvonne Fernandes – City of Kitchener, Councillor
John Gazzola – City of Kitchener, Councillor	Janine Oosterveld – City of Kitchener, Manager, Site Development and Customer Service
Mark Anderson – Grand River Conservation Authority (GRCA), Water Quality Engineer	Lisa-Beth Bulford – GRCA, Resource Planner
Hitesh Vaja - Ministry of the Environment (MOE), Senior Water Engineer, Wastewater Approvals	Paul Odom , MOE, Surface Water Team Leader, West Central Region
Barbara Slattery - MOE, Planner, West Central Region	Greta Najcler , MOE, Area Supervisor, Guelph District Office

1.4 Municipal Class Environmental Assessment Process

1.4.1 Overview

All municipalities in Ontario, including the Region, are subject to the provisions of the *Environmental Assessment Act* (EAA) and its requirements to prepare an Environmental Assessment for applicable public works projects. The Ontario Municipal Engineers Association (MEA) “Municipal Class Environmental Assessment” document (October 2000, as amended in 2007 and 2011) provides municipalities with a five-phase planning procedure approved under the EAA to plan and undertake all municipal water, sewage, stormwater management, and transportation projects that occur frequently, are usually limited in scale, and have a predictable range of environmental impacts and applicable mitigation measures.

Five Phases

In Ontario, municipal road projects are subject to the Municipal Class EA process and must follow a series of mandatory steps outlined in the Municipal Class EA document. The Class EA consists of five phases, which include:

Phase 1 – Problem or Opportunity: Identify the problem or opportunity, need and justification;

Phase 2 – Alternative Solutions: Identify alternative solutions to the problem by taking into consideration the existing environment, and establish the preferred solution taking into account public and agency review and input;

Phase 3 – Alternative Design Concepts for Preferred Solution: Examine alternative methods of implementing the preferred solution, based upon the existing environment, public and agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effects;

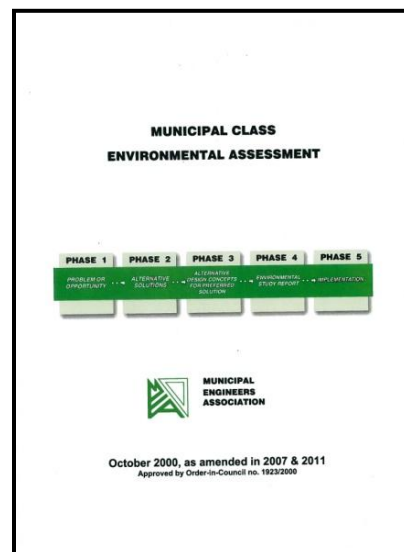
Phase 4 – Environmental Study Report (ESR): Document, in an ESR a summary of the rationale, planning, design and consultation process of the project as established through the above phases and make such documentation available for scrutiny by review agencies and the public; and

Phase 5 – Implementation: Complete contract drawings and documents, and proceed to construction and operation; monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the complete facilities.

The Class EA process ensures that all projects are carried out with effectiveness, efficiently and fairness. This process serves as a mechanism for understanding economic, social and environmental concerns while implementing improvements to municipal infrastructure.

Mandatory Principles

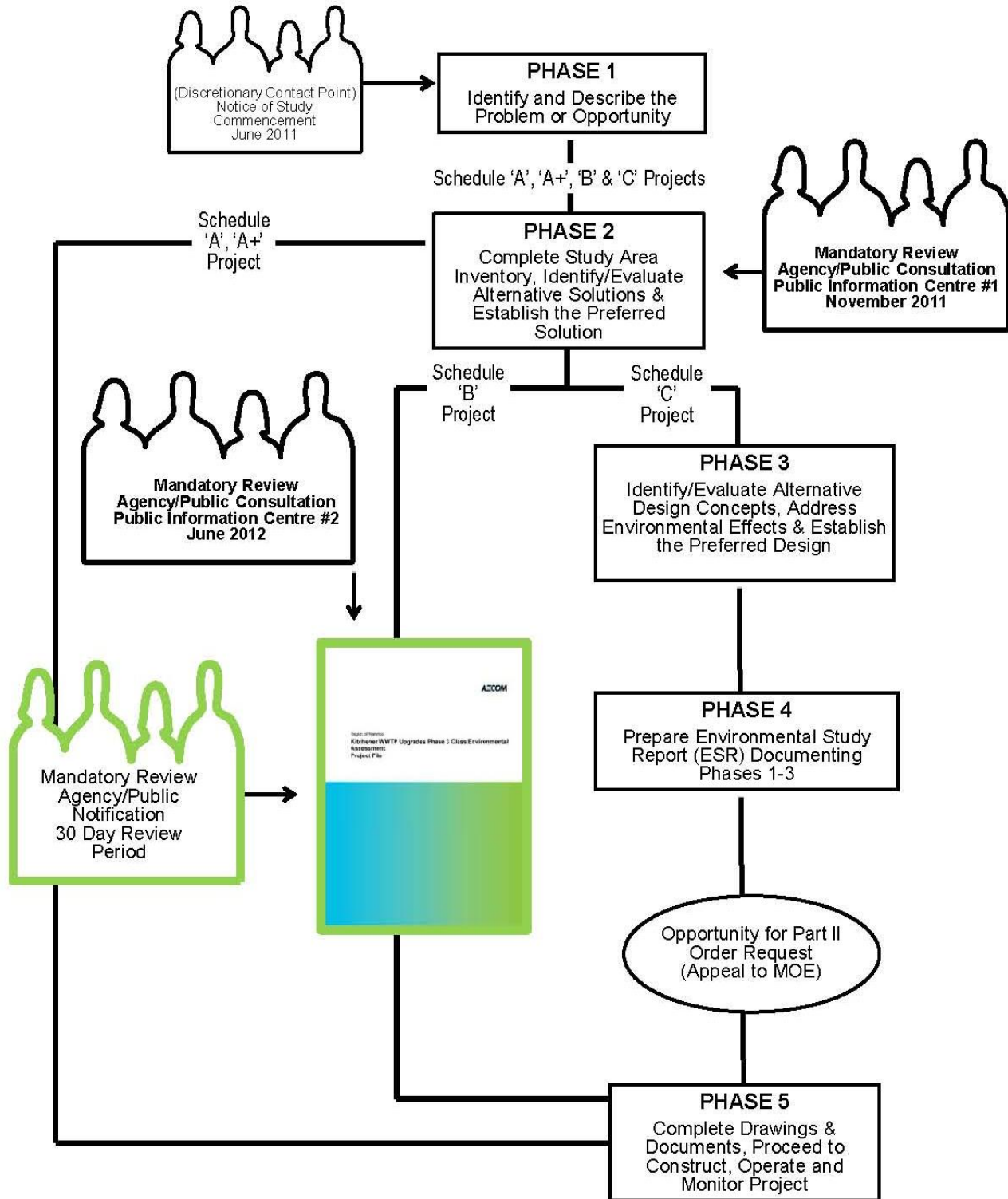
The process followed not only adheres to the guidelines outlined by the Class EA document, but reflects the five mandatory principles of Class EA planning under the EAA:



1. *Consultation with affected parties early on, such that the planning process is a co-operative venture;*
2. *Consideration of a reasonable range of alternatives;*
3. *Identification and consideration of the impacts of each alternative on all aspects of the environment;*
4. *Systematic evaluation of alternatives in terms of their advantages and disadvantages to determine the net environmental effects; and*
5. *Provision of clear and complete documentation of the planning process, to allow “traceability” of decision-making with respect to the project.*

Following these five principles ensures that the Class EA process is devoted to the prevention of problems and damage through thorough planning and decision-making, recognizing that research and evaluation of possible impacts have been taken into account prior to the implementation of the project.

Figure 1-3 illustrates the process followed in the planning and design of projects covered by a Municipal Class EA, including the Kitchener WWTP Upgrades Municipal Class EA study.

Figure 1-3 Municipal Class Environmental Assessment Planning Process

Indicates where the project currently is at in Class EA Process

Project Classes

The Class EA defines four types of projects and the processes required for each (referred to as Schedule A, A+, B, or C). The selection of the appropriate schedule is dependent on the anticipated level of environmental impact, and for some projects, the anticipated construction costs.

Projects are categorized according to their environmental significance and their effects on the surrounding environment. Planning methodologies are described within the Class EA and are different according to Class type, such as the following:

Schedule A: Projects are limited in scale, have minimal adverse environmental effects and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the full Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities where environmental effects of these activities are usually minimal. Examples of Schedule A projects include installation or replacement of standby power equipment where new equipment is located within a new building or structure. As such, these projects are pre-approved and subsequently do not require any further planning and public consultation.

Schedule A+: The purpose of Schedule A+ is to ensure some type of public notification for certain projects that are pre-approved under the Class EA. It is appropriate to inform the public of municipal infrastructure project(s) being constructed or implemented in their area, however there would be no ability for the public to request a Part II Order². If the public has any comments, they should be directed to the municipal council where they would be more appropriately addressed. Examples of Schedule A+ projects include extending or enlarging a sewage collection system including connections, where all such facilities are located within an existing municipal road allowance or utility corridor, or where there are pipe water crossings based on the use of trenchless technology.

Schedule B: These projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process, involving mandatory contact with directly affected public and with relevant government agencies to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Schedule B projects generally include improvements and minor expansions to existing facilities. Examples of Schedule B projects include the expanding a sewage treatment plant, including relocation or replacement of outfall to receiving water body, up to existing rated capacity where new land acquisition is required. As a result, the proponent is required to proceed through a screening process (Phases 1 and 2 of the Municipal Class EA process) including consultation with those who may be affected.

² Part II Order refers to a request to the Minister of the Environment for a project to comply with Part II (addresses Individual Environmental Assessments) of the Environmental Assessment Act. The need for an Individual EA is based on the conclusion that based on predicted project impacts the MEA Class EA planning process is not sufficient and a more comprehensive EA planning process is required. The requirement to prepare an Individual EA involves the preparation of Terms of Reference and EA document that are submitted to the Ministry of the Environment (MOE), other government agencies and the public for review.

At the end of Phase 2, a Project File Report documenting the planning process followed through Phases 1 and 2 shall be finalized and made available for public and agency review. However if the screening process raises a concern which cannot be resolved, the Part II Order may be requested and considered by the Minister of the Environment; alternatively, the proponent may elect voluntarily to plan the project as a Schedule C undertaking.

Schedule C: Such projects have the potential for significant adverse environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA document. Schedule C projects require that an ESR be prepared and filed for review by the public and review agencies. Examples of Schedule C projects include the siting and construction of new wastewater treatment facilities and major expansions (i.e., beyond rated capacity) to existing facilities, such as wastewater treatment plants. If concerns are raised that cannot be resolved, a Part II Order may be requested.

Appendix A further expands on the steps required to complete the Municipal Class EA planning process.

1.4.2 Project Planning Schedule

While all upgrade components (e.g., process train improvements,) are generally Schedule A activities, the Standby Power component itself was planned as a Schedule B activity. Due to the magnitude and scope of work involved the Region elected to subject the entire project under the Municipal Class EA Schedule B planning process in order to properly consider and address potential impacts to the environment and provide sufficient opportunities for public consultation.

1.4.3 Canadian Environmental Assessment Agency Triggers

The *Canadian Environmental Assessment Act (CEAA)* is intended to make sure that projects carried out, funded, permitted or licensed by the federal government are properly scrutinized by authorities and demonstrate a solid commitment to sustainable development and the promotion of a healthy economy and environment. The CEAA is also intended to prevent any projects associated with the federal government from having any adverse environmental effects outside the jurisdictions in which they are undertaken. The *Act* is administered by the Canadian Environmental Assessment Agency, an independent agency that reports to the Minister directly. At this time, the available data/technical studies have confirmed that there are no triggers for a CEAA EA for this project. At the detailed design stage Transport Canada will determine if a CEAA EA is triggered based on recent amendments to its legislation and review of an application for approval of a specific work and detailed design drawings.

1.4.4 Consultation and Communications Program

The MEA Municipal Class EA document outlines specific mandatory public and agency consultation contact points and methods. As part of the Municipal Class EA Schedule B planning process, several steps have been undertaken to inform government agencies, affected landowners, the local community and the general public of the project and to solicit comments. In order to properly communicate the project and to solicit feedback throughout the planning process, the following activities were undertaken:

- Posting project milestones on the Region's website (www.region.waterloo.on.ca/kitchenerwwtp), including Notices of Study Commencement, Public Information Centres (PICs) and Study Completion;

- Holding meetings with the Steering Committee at project milestones;
- Holding meetings with the MOE and GRCA;
- Publication of notices in the local newspaper (The Record) for all project milestones;
- Direct mailing of notices to stakeholders, affected land owners (surrounding the WWTP), general public and review agencies regarding project milestones;
- Holding two (2) PICs to engage and obtain input from the public, review agencies and stakeholders;
- Direct mailing of a project update newsletter to residences that surround the WWTP; and
- Issuing a Notice of Study Completion that was published in The Record. The notice was also mailed to adjacent property owners and general public who requested to be included on the contact list, as well as agencies for notification of the 30 day public review period.

The above communications and consultation program outputs are further described in **Section 7 and 8**.

1.4.5 EA Documentation Filing

The documentation for a Schedule B project consists of a Project File Report, which is presented in this document and filed for review by the public and review agencies. The placement of the Project File Report for public review completes the planning and preliminary design stages of the project.

The Project File Report is available for public review for a minimum thirty (30) calendar day period. A public notice (Notice of Study Completion) is published to announce the commencement of the review period. Copies of the Project File Report and all supporting documentation are available at the following locations:

**Regional Municipality of Waterloo
Clerk's Office**
150 Frederick Street, 2nd Floor
Kitchener ON N2G 4J3

Hours

Monday-Friday 8:30 am to 4:30 pm

Waterloo Region Museum
10 Huron Road,
Kitchener, ON
N2P 2R7

Hours

Monday to Sunday 9:30 am to 5:00 pm

If after reviewing the Project File Report, you have questions or concerns, please contact Mr. José Bicudo at the address below to discuss your questions or concerns:

José Bicudo
Senior Project Engineer, Water Services
Regional Municipality of Waterloo
150 Frederick Street, 7th Floor
Kitchener ON N2G 4J3
Tel: (519) 575-4757 x3416
Fax: (519) 575-4452
Email: jbicudo@regionofwaterloo.ca

Information will be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act*. All comments, with the exception of personal information, will become part of the public record.

2. Existing Conditions

2.1 Existing Kitchener Wastewater Treatment Plant

The existing Kitchener WWTP is a conventional secondary treatment facility, which has a rated capacity of 122,745m³/d, as approved in the current Certificate of Approval (CofA). The plant is comprised of two separate treatment plants served by a common headworks facility and primary clarifier facility. Plant 1 was constructed in the 1960s followed by an expansion (Plant 2) in the mid-1970s. Both plants discharge to a common chlorine contact chamber where chlorination/dechlorination occurs prior to discharge through an outfall to the Grand River.

There are two biosolids storage lagoons that have been used for seasonal storage of biosolids, which will be decommissioned to allow for process replacements and improvements. Finally, the digested/stabilized sludge is pumped to a recently upgraded off-site dewatering/transfer station at Manitou Drive where material is hauled off-site for disposal to agricultural land or landfill. The Site Plan for the Kitchener WWTP is shown below in **Figure 2-1**.

Figure 2-1 Site Plan



2.2 Assimilative Capacity Study

In 2010, the Region completed an Assimilative Capacity Study³ of the Grand River in the vicinity of the WWTP (see **Appendix B**). The study was directed by a Project Team including representatives from the Region, Region's Consultants, the MOE and the GRCA. The study provided recommendations for improving the Kitchener WWTP effluent criteria based on meeting provincial policy requirements and the objectives of improved Grand River quality.

The study was conducted in two main phases. Phase 1 included a review of background information and an assessment of water quality simulation tools. Phase 2 included the characterization of physical and ecological conditions, additional field work, the development/refinement of water quality simulation tools and the application of these tools in modeling the ability of the Middle-Grand River to assimilate wastewater effluent based on a range of scenarios.

The two outcomes of the assimilative capacity study that are of primary importance to this Municipal Class EA are:

- Characterization of the existing Kitchener WWTP outfall; and
- Recommendation of future effluent quality criteria for the Kitchener WWTP.

Modeling of the existing outfall was conducted to assess the suitability for treated effluent dispersion. The modeling indicated that the outfall does not have sufficient capacity for peak flows and the existing diffuser provides poor mixing within the river. The report recommended the construction of a new outfall with a modified diffuser to improve dispersion of the plant's effluent in the Grand River.

Consensus effluent discharge criteria for the upgraded Kitchener WWTP were developed based on model outcomes and the need to comply with MOE Policy objectives (see **Appendix C** for MOE letter re: effluent criteria). These criteria, presented in **Table 2-1** have been used as the basis of design of the Kitchener WWTP Phase 3 Upgrade project.

Table 2-1 Anticipated Certificate of Approval Effluent Requirements

Effluent Parameter	Treatment Objective	Non-Compliance Limits	
	Concentration Objective	Monthly Average Concentration ²	Monthly Average Loading ²
cBOD ₅	10 mg/L	15 mg/L	1,841 kg/d
Total Suspended Solids (TSS)	10 mg/L	15 mg/L	1,841 kg/d
Total Ammonia-Nitrogen Non-freezing Period ¹	2 mg/L	4 mg/L	492 kg/d
Freezing Period ²	5 mg/L	7mg/L	859 kg/d
Total Phosphorus	0.2 mg/L	0.4 mg/L	49 kg/d
pH	6.0 - 8.5	6.0 - 9.5	-
E. Coli ³	100 org./100 mL	200 org./100 mL	-

Note:

1. Defined as when stream temperatures are greater than 5 oC, normally from May 2 to November 30
2. Defined as when stream temperatures are 5 oC or less
3. Measured as monthly geometric mean density

³ Kitchener WWTP Upgrades, Middle-Grand River Assimilative Capacity Study, Stantec, 2008

2.3 Natural Environment

2.3.1 Background Review

A background review of existing information from several available sources was completed to better understand the aquatic and terrestrial environments within the subject lands. This included a search of the Ministry of Natural Resources (MNR) Heritage Information Centre Database – Biodiversity Explorer (www.biodiversityexplorer.mnr.gov.on.ca), the City of Kitchener's Official Plan, the Region of Waterloo's Official Plan, communication with the MNR Guelph District, a search of the Atlas of the Breeding Birds of Ontario and the Grand River Conservation Authority (GRCA). Other information sources included the Surface Water Quality Monitoring Program for the Grand and Nith Rivers⁴ which included benthic sampling upstream and downstream of the WWTP and the previously described assimilative capacity study.

2.3.2 Field Investigations

On site field investigations were completed on October 26th and December 23rd, 2011 and February 10th, 2012 by AECOM ecological staff. The focus of the investigations was to:

- Identify the natural features potentially affected by the proposed upgrades located within and outside of the WWTP fenced limits including the proposed new outfall installation;
- Determine the significance of those features observed;
- Provide input for a preliminary impact assessment; and
- Determine mitigation measures for those features which require protection.

The natural environment background review and field investigations memorandum can be found in **Appendix D**. Additional investigations will be completed in the future spring and summer seasons as part of detailed design, so that a complete three season inventory is compiled. The following describes the aquatic and terrestrial features found within the study area immediately surrounding the WWTP.

2.3.3 Aquatic Habitat

According to the LGL surface water quality monitoring study completed in 2010, the Grand River in the area of the Kitchener WWTP supports a diverse fish community which is described in **Table 2-2**. Benthic Sampling completed upstream and downstream of the Kitchener WWTP indicates the presence of a more diverse and rich (e.g., species) invertebrate community upstream which indicates better water quality compared to downstream. Excerpts from the LGL Report can be found in **Appendix E**.

Aquatic investigations were completed along the bank of the Grand River for 50 m within the vicinity of the Kitchener WWTP outfall. Information collected included:

- Bank stability;

⁴ Surface Water Quality Monitoring Program for the Grand and Nith Rivers, LGL Limited environmental research associates, January 2010

- In-stream habitat located along the shore of the Grand River;
- Channel morphological characteristics;
- Riparian characteristics; and
- Fish and Benthic Invertebrates Communities.

The area of investigations is located along the south bank of the Grand River along the left bank of a meander. The banks of the Grand River at this location were gradual and appeared stable. Riparian vegetation along the stream bank was low and consisted mainly of garlic mustard, reed canary grass and other herbaceous species. The low riparian cover could be due to fluctuating water levels in the Grand River. Canopy cover was comprised of large Manitoba maples which provided some shading over the left bank of the Grand River. Substrates consisted of sand with some silt and areas of cobble and boulders. In-stream shore habitat consisted of overhanging large and small woody debris and cover provided by cobbles and boulders. There was also refuse scattered along the banks including garbage and debris. This habitat was observed throughout the entire area of investigations. The habitat provides some areas of suitable habitat for both fish and mussel species.

2.3.4 Terrestrial Habitat

A tree assessment was conducted along the WWTP's access road as well as along the northern edge of the WWTP noting species, diameter at breast height (DBH) and health. Given the late season field investigation vegetation surveys focused on the identification of woody species making note of identifiable herbaceous species when possible. Please see Table 1 in **Appendix D** which presents the results of the tree assessment.

Natural vegetation communities are mainly concentrated to areas outside of the Kitchener WWTP fenced limits. These communities can be described as deciduous forest to the south associated with Homer Watson Park and deciduous swamp communities to the north associated with the riparian corridor of the Grand River. A small shallow marsh community is present within the Kitchener WWTP fenced lands located south of the current administration buildings. No endangered species were observed during investigations; however this will be confirmed at detailed design and prior to construction.

2.3.5 Species at Risk Screening

In addition to the MNR Biodiversity Explorer, a list of Species at Risk (SAR) known to occur within the Region of Waterloo and their preferred habitat was obtained from the Guelph District MNR office.

To screen for potential SAR, habitat assessments were completed for the subject lands. A total of 41 SAR are known to occur throughout the Waterloo Region through current and historical records. To understand which species may be affected by the KWWTP upgrades, a habitat assessment of each was conducted and is presented in **Appendix D**. Through this assessment, it was determined that only 18 have suitable habitat within the immediate project limits (see **Table 2-2**), which will be further assessed by completing presence/absence surveys as part of detailed design.

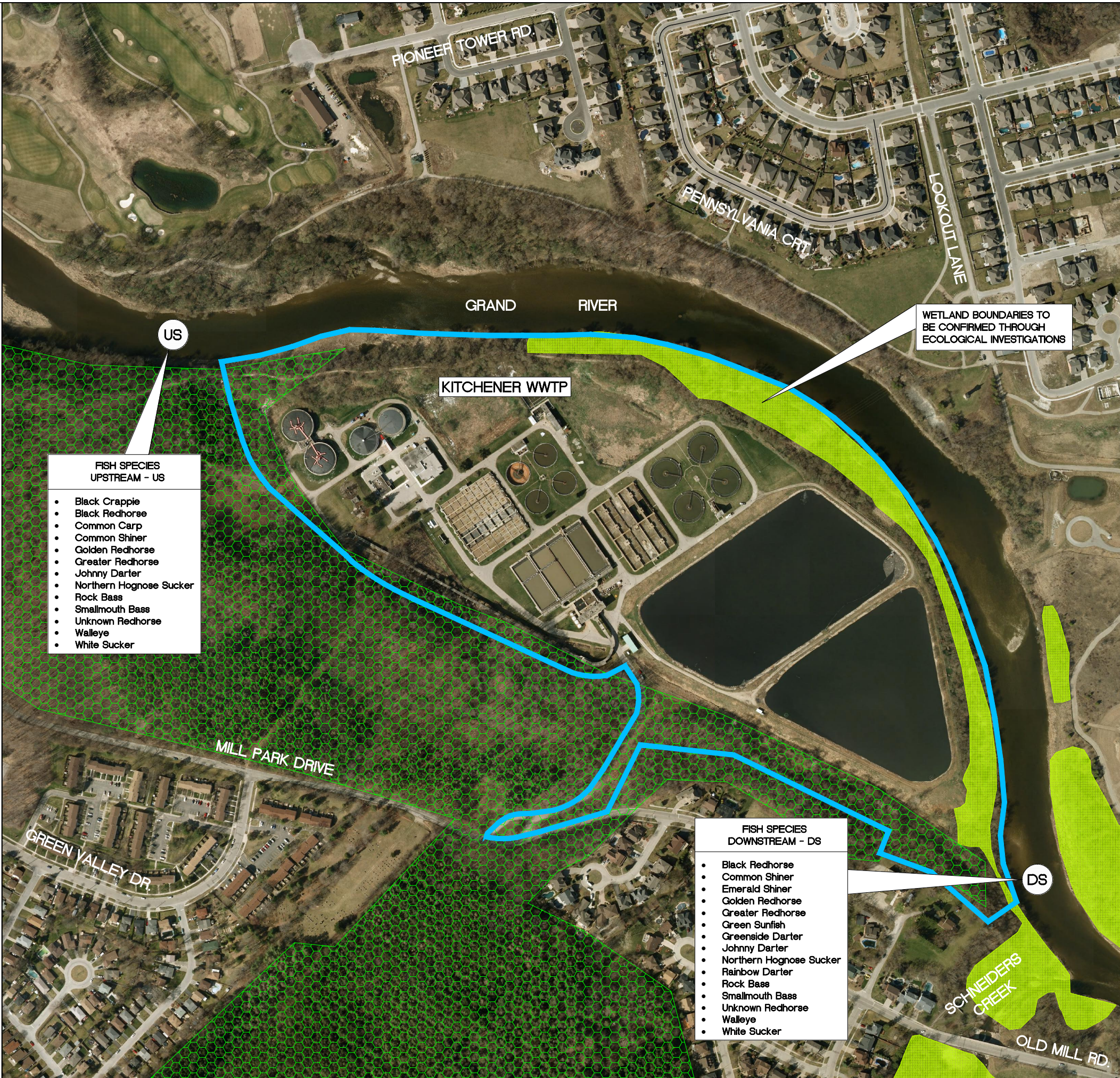
Table 2-2 Species at Risk within the Immediate Project Limits

Species at Risk	
• American Chestnut	• Rainbow Mussel
• Butternut	• Wavy-rayed Lampmussel
• Round Hickorynut	• Bald Eagle
• Round Pigtoe	• Grass Pickerel
• Snuffbox	• Milksnake
• Black Redhorse	• Monarch
• Chimney Swift	• Red-headed Woodpecker
• Queen Snake	• River Redhorse
• Jefferson Salamander	• Silver Shiner

2.3.6 Breeding Birds

Formal breeding bird surveys will be completed as part of detailed design. GRCA has indicated that there is a Bald Eagles nest downstream of the WWTP in the vicinity of the Dune Golf Course. The Atlas of Breeding Birds of Ontario provides a tool where existing breeding bird data for 10 kilometre squares can be obtained. This information will be used as a starting point to target specific species for the area during detailed design.

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- FISH SPECIES
UPSTREAM - US
- Black Crappie
 - Black Redhorse
 - Common Carp
 - Common Shiner
 - Golden Redhorse
 - Greater Redhorse
 - Johnny Darter
 - Northern Hognose Sucker
 - Rock Bass
 - Smallmouth Bass
 - Unknown Redhorse
 - Walleye
 - White Sucker

- FISH SPECIES
DOWNSTREAM - DS
- Black Redhorse
 - Common Shiner
 - Emerald Shiner
 - Golden Redhorse
 - Greater Redhorse
 - Green Sunfish
 - Greenside Darter
 - Johnny Darter
 - Northern Hognose Sucker
 - Rainbow Darter
 - Rock Bass
 - Smallmouth Bass
 - Unknown Redhorse
 - Walleye
 - White Sucker

LEGEND:

-  WETLAND
-  ENVIRONMENTALLY SENSITIVE POLICY AREAS
-  KITCHENER WASTEWATER TREATMENT PLANT

NOTES:

- MAJORITY OF WWTP IS LOCATED WITHIN THE GRCA GRAND RIVER REGULATED FLOODPLAIN. AS SUCH, ALL BUILDINGS / FACILITIES WILL INCLUDE REQUIRED FLOOD PROOFING.
- BLACK REDHORSE AND WAVY RAVED LAMPMUSSELL. (LISTED AS THREATENED SPECIES) MAYBE PRESENT IN THE AREA OF THE WWTP OUTFALL. THEIR LOCATION WILL BE CONFIRMED AS PART OF ECOLOGICAL INVESTIGATIONS.
- SOURCES:
 - SURFACE WATER QUALITY MONITORING PROGRAM FOR THE GRAND AND NITH RIVERS, 1 NOVEMBER 2009.
 - NATURAL RESOURCES MAP 2A, CITY OF KITCHENER, MUNICIPAL PLAN, APRIL 2010.

KITCHENER WWTP UPGRADE

FIGURE
2-2

NATURAL ENVIRONMENTAL
FEATURES

AECOM



Region of Waterloo

JULY
2012



BASE MAPPING PROVIDED BY:
REGION OF WATERLOO, 2011

50m 0 100m

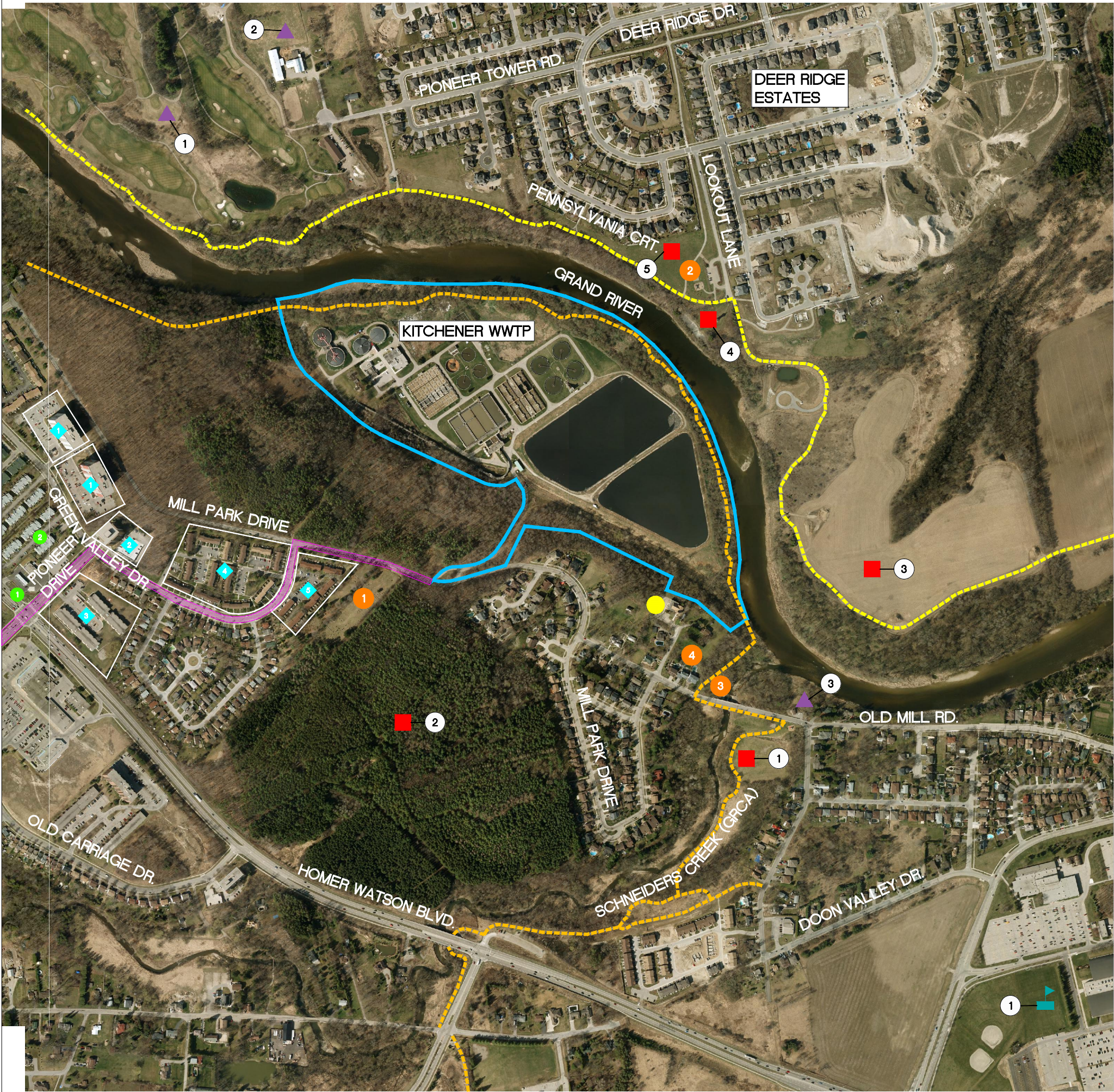
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2.4 Socio-Economic Environment

2.4.1 Existing Land Uses

Within the study area, land uses can be described as mixed-use, consisting of institutional, single family, medium and high density residential and recreational-parkland including several built heritage resources. Specific existing land uses surrounding the Kitchener WWTP are shown on **Figure 2-3** and include:

- Conestoga College – Doon Campus
- Doon Presbyterian Church
- West View Apartments
- Green Valley Manor Town Homes
- Deer Ridge Estates
- Deer Ridge Golf Course
- Pride Stables – Central Ontario Development Riding Program
- Wastewater Pumping Station # 2 – 1810 Old Mill Road
- Grand River Trail
- Willowlake Park
- Homer Watson Park
- Pioneer Tower Natural Area
- Pioneer Memorial Tower Park
- Kuntz Park at Pioneer Tower
- Pioneer Memorial Cemetery
- Waterloo Pioneer Memorial Tower
- Doon Mill 1839
- Homer Watson House and Art Gallery



LEGEND:

- APPROXIMATE KITCHENER WASTEWATER TREATMENT PLANT (WWTP) LIMITS
- WALTER BEAN GRAND RIVER TRAIL
- COMMUNITY TRAIL
- DESIGNATED CONSTRUCTION ACCESS ROUTE
- SCHOOL
1 Conestoga College - Doon Campus
- PARK
1 Willowake Park
2 Homer Watson Park
3 Pioneer Tower Natural Area
4 Pioneer Memorial Tower Park
5 Kuntz Park @ Pioneer Tower
- PLACE OF WORSHIP
1 Doon Presbyterian Church
- COMMUNITY/ RECREATION FACILITY
1 Deer Ridge Golf Course
2 Pride Stables - Central Ontario Development Riding Program
3 Wastewater Pumping Station # 2 - 1810 Old Mill Road
- BUILT HERITAGE RESOURCE
1 Pioneer Memorial Cemetery
2 Waterloo Pioneer Memorial Tower
3 Doon Mill 1839
4 Homer Watson House and Art Gallery
- MEDIUM / HIGH DENSITY RESIDENTIAL
1 The West View Apartments
2 Green Valley Tower Apartments
3 Pioneer Apartments
4 Green Valley Drive Townhomes - Waterloo North Condominium Corporation
5 Green Valley Manor Townhomes
- COMMERCIAL
1 Macs Milk Store / Gas Bar
2 Tall Pines Centre:
 - The Scapping Bug
 - Law Offices of Ronald M. Zboril
 - Tall Pines Dental Centre
 - Dr. Bruce Moss
 - Dr. Martin Shelley
 - Dr. Winnie Shuit
 - La Vita - Hair Salon
 - Speech - Language Pathologist - Charlene VanDerSluis
 - The Clemmer Group Inc.
 - High Performance Solutions Inc.
 - The Canadian Testicular Cancer Association
 - Pathway Community Church

KITCHENER WWTP UPGRADE

FIGURE
2-3

EXISTING LAND USE AND SOCIAL /
CULTURAL FEATURES



Region of Waterloo

JULY
2012



BASE MAPPING PROVIDED BY:
REGION OF WATERLOO, 2011



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2.4.2 Future Land Uses

There are currently no known or planned changes to land uses in the immediate area surrounding the Kitchener WWTP.

2.5 Social-Cultural Environment

2.5.1 Archaeological/Cultural Built Heritage Resources

Given the WWTP's location on the Grand River and known archaeological sites in the area, the outfall component of project has the potential to uncover archaeological resources. Therefore, a combined Stage 1 and 2 Archaeological Assessment will be completed during detailed design to confirm archaeological potential and the possible need for further investigations necessary to obtain archaeological clearance. No cultural built heritage features were observed within the study area that could be negatively impacted by the proposed outfall or improvements to the WWTP.

2.6 Related Planning Studies

2.6.1 Region of Waterloo Official Plan

On June 16th, 2009, the Region adopted its new Regional Official Plan (ROP). Environmental policies in the ROP have been presented in the section entitled 'Greenlands Network'. The Greenlands Network classifies the Region's environmental features and linkages into three levels of protection: Landscape Level Systems, Core Environmental Systems and Supporting Environmental Features. These levels look at the environment from a macro to micro level. Each level is associated with a set of policies specific to maintaining, enhancing or restoring the ecological function of that level within the Greenlands Network. Based on current Greenlands Network mapping in the ROP and GIS available from the Region, the proposed works are located within the vicinity of a Core Environmental Feature: Homer Watson Park – Environmentally Sensitive Policy Area, and Significant Valley Lands.

2.6.2 City of Kitchener Official Plan

According to Map 2a of the City of Kitchener's Official Plan the location of the proposed works fall within the One Zone Flood Plain Policy Area of the Grand River. Section 7.4.2.2 One Zone Flood Plain Policies states "No new development shall be permitted in a One Zone Policy Area designation except those uses which include public and private works that must locate in the floodplain by nature of their use". The Kitchener WWTP upgrades fall under this exception.

2.6.3 City of Kitchener's Strategic Plan for the Environment

Kitchener's Strategic Plan for the Environment's, primary objective is to "ensure an environment that is ecologically sound and supportive of the health, safety and well-being of its residents by identifying and implementing policies and practices which reflect community values and impact positively on the environment".

2.6.4 Grand River Conservation Authority – Watershed Characterization Report

The Grand River Characterization Report is an overview of the current state of the Grand River watershed. The information comes primarily from existing sources, such as studies and data gathered by the conservation authority and the municipalities of the watershed. The report provides information on the watershed's physical characteristics, land use, population and growth, water systems, water sources, water quality, vulnerable areas and other matters.

2.6.5 Provincial Policy Statement

Section 1.6.4.2 of the Provincial Policy Statement (PPS) states that “municipal services are the preferred form of servicing for settlement areas”. The PPS speaks to issues such as the promotion of efficient, cost effective development and land use patterns and the proper consideration of the various resources (e.g., natural heritage and archaeological) of this province, as well as matters dealing with public health and safety.

3. Phase 1: Problem/Opportunity Statement

Phase 1 of the 5 phase Class EA planning process requires the proponent of an undertaking to first document factors leading to the conclusion that the improvement is needed, and develop a clear statement of the problem/opportunity to be investigated. The following lists the key project drivers that were identified early on in the process to ensure a complete problem/opportunity statement was developed:

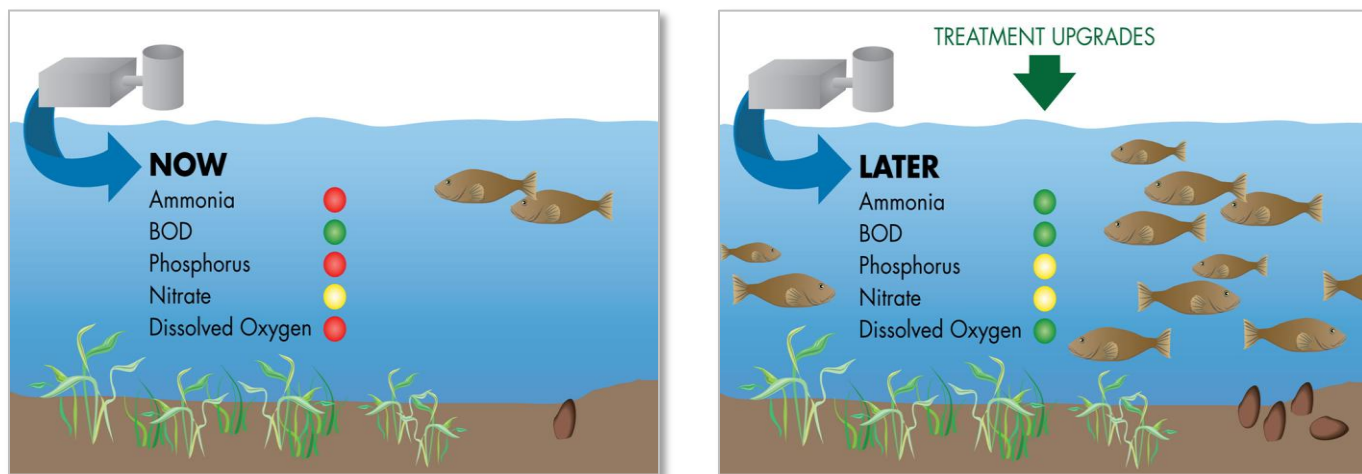
- Provide reliable, long term operation and performance (better effluent quality and odour/management);
- Decommission existing biosolids storage lagoons; and
- Improve process efficiency (replace aging equipment).

As such, the **Problem/Opportunity Statement** is the principle starting point in the undertaking of a Class EA and becomes the central theme and integrating element of the project. It also assists in setting the scope of the project.

3.1 Problem/Opportunity Statement

The problem/opportunity statement for the Kitchener WWTP Upgrades Class EA is defined as follows:

The existing Kitchener WWTP has performed satisfactorily but has experienced issues with respect to odours. Treatment upgrades are required to ensure that better effluent quality is achieved prior to being discharged into the Grand River. By improving effluent quality long term Grand River water quality will be improved having a positive effect on recreational uses and fish communities. In order to address the above problem/opportunity statement, the Region initiated this Class EA planning process in 2011.



4. Phase 2: Alternative Solutions

As previously discussed in **Section 1.4.2**, most of the upgrade components fall under Schedule A and as such would not be subject to the identification and evaluation of alternative solutions. The Wastewater Treatment Plant Master Plan completed in 2007 evaluated broad based alternative planning solutions. With respect to location of proposed works, the siting of upgrade components was guided by the layout of the plant's process trains and immediately adjacent areas within the site's fenced limits. The Site-Wide Facility Plan including Technical Memoranda did involve detailed evaluation of alternative solutions related to all components of the WWTP's liquid train, solids train and standby power considering physical conditions. This work was subject to a series of Peer Reviews/Workshops by a third party group of experts from industry and academia.

5. Project Description

The Phase 3 Upgrades to the Kitchener WWTP will provide reliable and efficient operation in the long term and address additional Grand River water quality requirements through improved effluent quality. The upgrades will include the decommissioning and demolition of the biosolids storage lagoons, construction of a new secondary treatment plant, replacement/refurbishment of selected process facilities, electrical upgrades, new sludge thickening facilities and the decommissioning and demolition of Plant 1, as well as a number of minor upgrades to address deficiencies throughout the plant.

The Preliminary Design of the Phase 3 upgrades builds on the findings/recommendations of the Site Wide Facility Plan, which defined a program of upgrades for the Kitchener WWTP that can reliably meet performance objectives for an approximate 30 year time frame. The final Preliminary Design Report (PDR)⁵ identifies the recommended selection of process treatment alternatives; determines the required sizing of selected equipment/tanks; identifies architectural, structural, electrical, building mechanical, and instrumentation and control requirements; presents the outcomes of the Value Engineering (VE); and documents the expected time frame and costs for the proposed works. The PDR will form the basis of the detailed design and was also made available for public review along with this Project File report.

Due to the magnitude and complexity of this project, the work will be carried out through a number of construction contracts over a period of approximately 10 years. The Phase 3 Upgrades have been grouped into 5 main contracts:

- **Contract 1** – Lagoon Decommissioning and Digested Sludge Transfer Pumping;
- **Contract 2** – Energy Centre and Anaerobic Digestion;
- **Contract 3** – Headworks, Tertiary Treatment, and Outfall;
- **Contract 4** – Plants 3 and 4 Secondary Treatment, Plant 2 return activated sludge/waste activated sludge (RAS/WAS) pumping, and some Miscellaneous Works; and
- **Contract 5** – New administration building, sludge thickening and remaining miscellaneous works.

The following summarizes the major upgrades that are recommended for the Kitchener WWTP. **Figure 5-1** illustrates the contracts planned for the upgrades along with the duration and estimated capital cost including preliminary engineering and Region costs as well as construction contingency.

⁵Kitchener WWTP Phase 3 Upgrades Preliminary Design Report, AECOM, 2012

Figure 5-1 Contract Plans

5.1 Works within Fenced Site

5.1.1 Contract 1 – Lagoon Decommissioning and Biosolids Pumping

Sludge lagoons being decommissioned to address odour concerns and allow for construction of Plant 3 Includes:

- Off-site biosolids/soil disposal as appropriate;
- Off-site disposal of any contaminated materials (if required);
- Transfer of clay material to Lagoon 2 as backfill;
- Prepare site for future construction in Lagoon 1;
- Remove sludge pumping equipment;
- Lagoon 2 regrading with possible temporary/construction stormwater management function; and
- Odour management plan during construction.



Digested sludge will be pumped to the Manitou Drive Dewatering Facility and the new system will include:

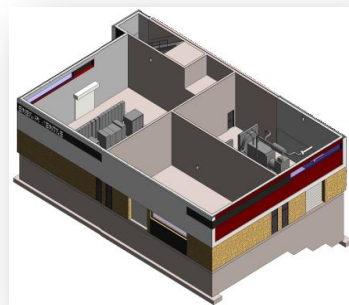
- New digested sludge transfer pumps;
- New suction and discharge piping;
- New surge protection control;
- New forcemain on-site; and
- New electrical service.

5.1.2 Contract 2 – Energy Centre and Digester Upgrades

Energy Centre

The Energy Centre will be constructed concurrently with the anaerobic digester upgrades. The Energy Centre will be the primary point for a 13.8 kV distribution system, which will be cost effective and efficient. The system will include:

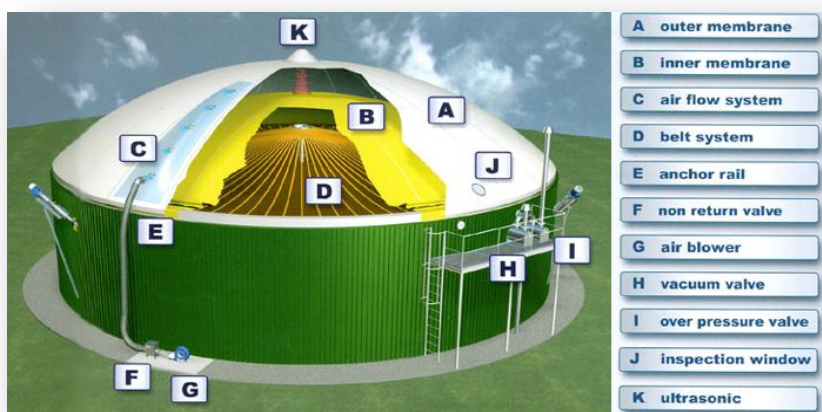
- Indoor switchgear;
- Local transformers;
- Redundant supplies;
- Two (2) 1750 kW standby diesel generators; and
- Meets the Region's & MOE's standby power standards.



Anaerobic Digestion

As part of Contract 2 the existing digesters will be updated to comply with Technical Standards and Safety Authority (TSSA) requirements and the gas code. Upgrades will include new equipment for mixing, heating, gas cover/storage and gas handling

system. A new digester control building will house all equipment in one building and have allowance for future sludge transfer pumps to provide more efficient operation. One of the existing digesters will be equipped with a membrane gas holder cover for biogas storage. By updating the digesters there is the potential for energy recovery including future combined heat and power Co-generation and bio-fuel.

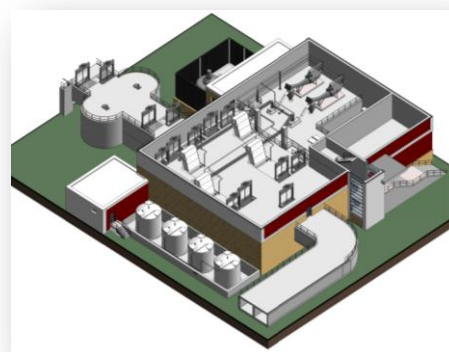


Source: JDV Equipment Corp.

5.1.3 Contract 3A – Headworks

The existing headworks facility will be replaced as it has achieved the end of its useful life. Also, it would be more expensive to retrofit the existing facility and there is limited space to accommodate more and larger new equipment. New headworks will include:

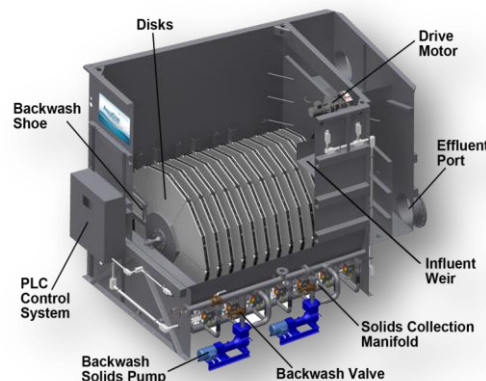
- Enhanced screening and screenings cleaning/dewatering systems;
- Vortex grit separation and grit washing systems;
- Twinning of incoming sewage channels; and
- Odour control – biofilters.



5.1.4 Contract 3B – Tertiary Filtration

As part of this upgrade project, tertiary phosphorus removal will be implemented to meet the established Total Phosphorus (TP) objective and compliance limits of 0.2 mg/L and 0.4 mg/L, respectively. The new tertiary filtration systems include:

- The need to meet stricter Total Suspended Solids (TSS) and TP effluent requirements;
- Preliminary design based on Aqua-Aerobics Aquadisk® disk filters; and
- A pilot study will be conducted to compare other disk filter technologies.



Source: Aqua-Aerobic Systems Inc.

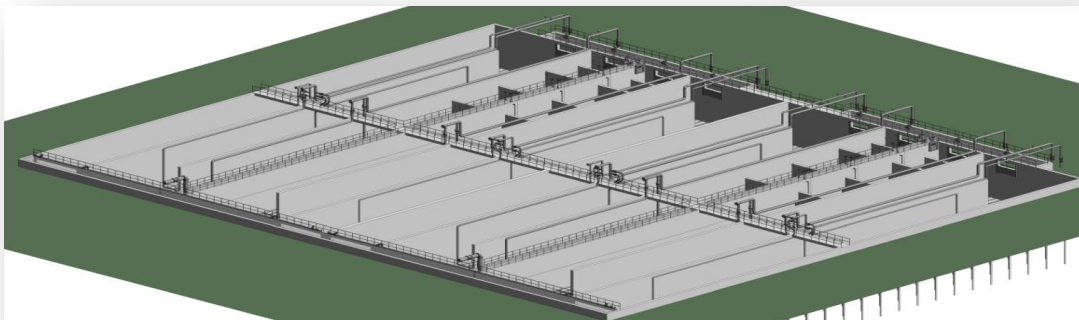
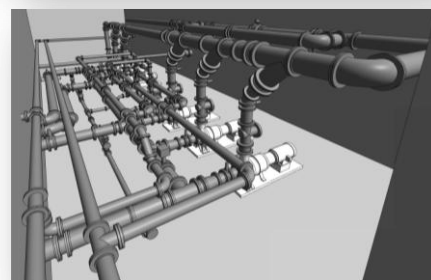
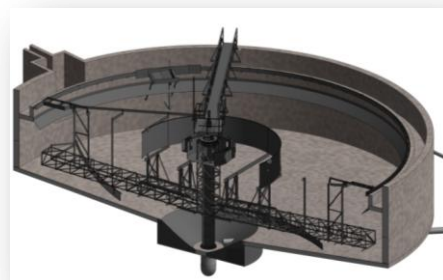
5.1.5 Contract 4 – Plant 3 Secondary Treatment and Plant 2 RAS/WAS Pumping

Plant 3 Secondary Treatment

Secondary treatment at Plant 3 includes the following upgrades:

- Influent flow splitting;
- New Plant 3 Aeration Tanks:
 - Full nitrification;
 - Meet new effluent requirements;
 - Flexibility for future upgrades;
- New Plant 3 secondary clarifiers; and
- Associated pumping stations.

For each group of four final clarifiers, six pumps, four operating and one standby for each set of 2 clarifiers are proposed. Two WAS pumps (1 duty, 1 standby) are proposed for each set of four clarifiers.



Plant 2 RAS/WAS Pumping

In activated sludge plants, once the sewage has received sufficient treatment, excess mixed liquor (a mixture of raw, settled sewage, and activated sludge) is discharged into settling tanks and the treated supernatant is discharged to other units to undergo further treatment before discharge. Part of the settled material, the sludge or return activated sludge (RAS), is returned to the head of the aeration system to re-seed the new sewage entering the tank. Excess sludge which eventually accumulates beyond that returned is defined as waste activated sludge (WAS). This is removed from the treatment process to keep a healthy biomass in the tank.

The existing Plant 2 RAS/WAS pumping station is a two storey enclosed structure which houses three (3) inclined, screw pumps that draw sludge from a RAS/WAS wet well. RAS is returned to the head of the aeration tanks while WAS is wasted to the primary clarifiers, for co-thickening. WAS wasting, is controlled by a manually operated valve on the RAS discharge header.

Based on the overall condition of the building and the fact that almost all the process and Heating, Ventilation and Air Conditioning (HVAC) equipment is past its life expectancy, it is recommended that a new pump station be constructed to replace the existing pump station. The new pumping station will allow better control of RAS and WAS flow from each secondary clarifier to optimize performance. With the Kitchener WWTP upgrades, WAS will be directed to a new thickening facility.

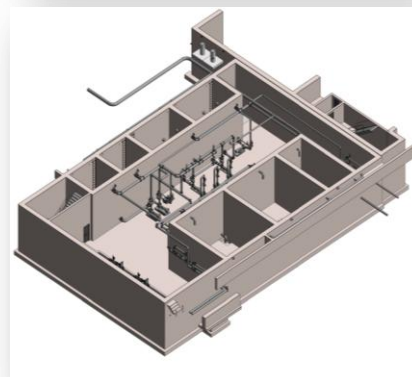
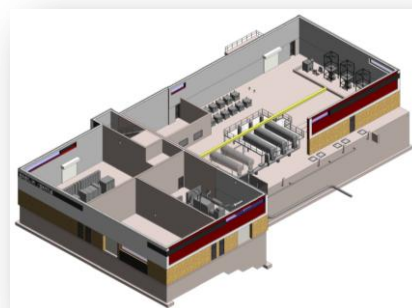
5.1.6 Contract 5 – Sludge Thickening, New Administration Building and Miscellaneous Upgrades

Sludge Thickening

A new sludge thickening facility is recommended as part of the Phase 3 upgrade to provide separate thickening of primary sludge (i.e. sludge removed from the primary clarifiers) and WAS. Several factors led to this recommendation, including improved operability of the primary clarifiers given the elimination of co-thickening, and increased digester capacity given the thickened sludge being fed to the digesters. The proposed thickening facility will be designed to provide capacity for a peak month sludge generation rate of 43,000 kg/d, including 21,000 kg/d of primary sludge and 22,000 kg/d of WAS. Thickened sludge from the facility, at approximately 5-6% solids, will be pumped to the anaerobic digestion facility. The thickening processes will be housed in a new building.

The Sludge Thickening will include the following components:

- Rotary drum thickeners – same technology used at Waterloo and Galt WWTP;
- Intermediate storage/equalization tanks;
- Pumping/mixing systems;



- Improve digestion of biosolids;
 - Better digester performance and increased production of biogas;
- Space provided for future equipment; and
- New odour control system.

New Administration Building

In order to accommodate current and future needs, the new administration building will be located at the front of the property across from the main site entrance. It will be front and centre at the base of the hill as a clear destination to all visitors. Its location will help to control site access and to prevent the need for visitors to travel through the entire site as is currently the norm. The new location will not only make the new administration building more visually and physically accessible but will also locate it in the heart of the planned upgrades to the complex. The new administration building will embody a new standard for the Kitchener WWTP facility, which includes:

- Need for SCADA equipment;
- Centralized Control Room;
- Security concerns;
- Flood protection;
- Additional space required:
 - Increased operations staff;
 - Process laboratory;
 - Training space; and
- Designed to achieve Leadership in Energy and Environmental Design (LEED) Silver:
 - Offices; and
 - Library/Archive room.



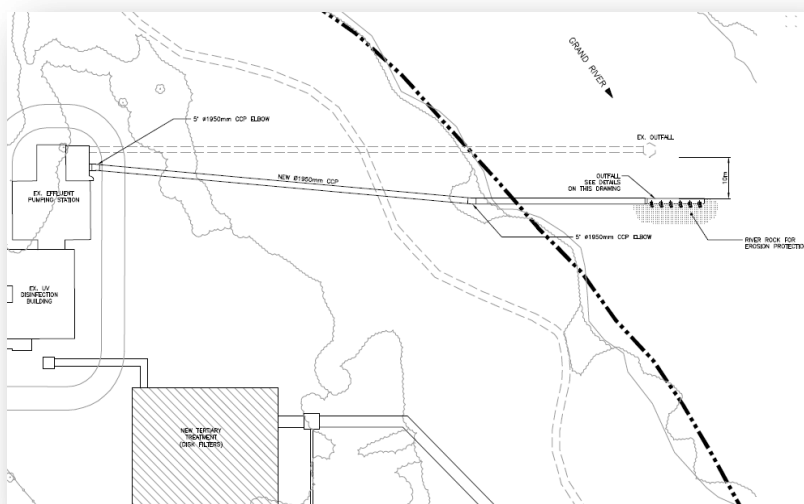
Miscellaneous Upgrades

Plant upgrades and improvements for the following process areas are proposed to be included in the Kitchener WWTP Upgrades project:

- Effluent water reuse system;
- Primary clarifier mechanical equipment;
- Plant 2 Secondary clarifier mechanical equipment;
- Lighting/security/fencing;
- Existing Administration Building – maintenance addition;
- Electrical upgrades;
- Demolition of old process units; and
- WWTP access road improvements including minor widening to better accommodate truck traffic.

5.2 Contract 3B - Outfall

The existing WWTP has a 1,200/900 mm diameter outfall from the existing chlorine contact chamber to a diffuser near the centre of the Grand River, approximately 115 m long. The existing outfall causes significant hydraulic losses at high flows and provides poor mixing within the Grand River. Given the desire to minimize hydraulic losses and impacts on the river, a single outfall would be preferred to twinning the existing outfall. The capital cost difference between the proposed 1500 mm diameter (if the option was to twin the existing outfall) and a 1950 mm diameter (single outfall) outfall would not be significant. Following construction, the existing outfall will be removed, including the existing diffuser and portion of the outfall within the river.



The new outfall will include the following components:

- 1950 mm concrete effluent pipe & 1800 mm diffuser structure;
- Accommodate 430 MLD design peak flow; and
- Address hydraulic loss through the plant.

Outfall construction methodology will be determined at detailed design and may be based on using coffer dams.

The habitat located within the Grand River around the outfall, provides some areas of suitable habitat for both fish and mussel species. The new outfall will achieve a reduction in nutrient loading, which in turn would benefit the

aquatic habitat by improving the benthic invertebrate community thus providing a better food source for the fish and mussel populations.

5.3 Odour Management

The sources of odour at the Kitchener WWTP are primarily due to the biosolids storage lagoons, but primary clarifiers, headworks and mechanical surface aerators also contribute to odour emissions. The Region acknowledges these problems and addressed them by completing several odour studies, which involved identifying immediate improvements and modifications for odour mitigation in the past four years. By developing an Odour Management Plan, the Region has seen a significant reduction in odour complaints.

Phase 3 works will further address odour management by:

- Decommissioning the biosolids lagoons which are no longer required;
- Constructing/installing new Headworks and Sludge Thickening equipped with biofilters for the treatment of odorous compounds;
- Modifying primary clarifier operation; and
- Replacing mechanical surface aerators with diffused air in the existing aeration tanks.

5.4 Project Schedule and Implementation

5.4.1 Implementation Schedule

The following implementation schedule is anticipated:

- Detailed Design – 2012 to 2014;
- Construction – 2013 to 2020; and
- In-service Date – 2018 for all works associated with effluent quality improvements.

5.4.2 Remaining Environmental Approvals

Required approvals to be obtained include:

- Ministry of the Environment (MOE) Permit to Take Water (PTTW)⁶, Environmental Compliance Approvals (ECA's) for sewage and a Certificate of Approval (Air & Noise);
- Transport Canada (Navigable Waters Protection Act) which may also trigger CEAA EA screening⁷;
- Ministry of Tourism and Culture (MTC) (acceptance of Stage 1 and 2 Archaeological Assessment);
- Ministry of Natural Resources (MNR) Endangered Species Act Permit and Work Permit (Crown Land Management);

⁶ The need for a PTTW will be confirmed at detailed design.

⁷ The need for a CEAA EA screening process will be determined at detailed design through Transport Canada's review of an application for approval of a specific work and supporting detailed design drawings.

- Grand River Conservation Authority (GRCA) (Regulation of Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses, regulation O.Reg. 150/06). GRCA will also act on behalf of the Department of Fisheries and Oceans (DFO) for requirements under the federal Fisheries Act which include Species At Risk Act (SARA) Permit and HADD Authorization or Letter of Advice; and
- City of Kitchener building permits and site plan approval including utilities.

6. Environmental Impact Assessment and Mitigation Measures

6.1 Environmental Screening and Mitigation

Considering the previously presented project description, a screening of environmental components within the study area was undertaken to determine which environmental features may be affected by construction or operations. Based on an initial screening the following components were identified for analysis:

- | | |
|---|-------------------------------|
| • Surface Water Quality | • Cultural Heritage Resources |
| • Groundwater Management | • Truck Traffic |
| • Aquatic Habitat and Species | • Noise and Air Quality |
| • Terrestrial Habitat and Species (including Migratory Birds) | • Odours |
| • Species at Risk (SAR) | • Grand River Trail Closure |
| • Navigation | • Visual Impacts |

Potential impacts of constructing the WWTP upgrades are well understood and can be mitigated by following best management practices/construction techniques and controls. Anticipated and/or potential construction related impacts and their associated mitigative measures are summarized in **Table 6-1**. It is recommended that these measures be used to reduce the potential impacts during construction of the proposed works. These measures will be further confirmed and defined during detailed design on a Contract by Contract basis.

Table 6-1 Proposed Mitigation for Works within Fenced WWTP Limits and Outfall Corridor

Component	Potential Impact	Proposed Mitigation
Surface Water Quality	Reduced water quality and clarity due to increased erosion and sedimentation, point or non-point sources of pollution (e.g., discharge of waters, leaks and accidental spills)	- Proper sedimentation/erosion controls (in accordance with Ontario Provincial Standards) for all proposed works will be employed to the satisfaction of all relevant agencies including, MNR, and GRCA. - Provide and maintain sediment control fencing around construction areas and top of bank (and in water) to satisfaction of all applicable agencies. - Proposed erosion and sediment control plan will, at a minimum, be consistent with the recommendations contained within the MOE “Guidelines for Evaluation Activities Impacting Water Resources”. - Ensure proper onsite monitoring of erosion and sediment control (including weather forecasts), especially during in-water works (e.g., outfall). - Any areas disturbed by construction will be restored and stabilized as soon as practically possible. - All construction activities, including maintenance and refuelling procedures, should be controlled to prevent the entry of petroleum products, debris, rubble, concrete or other deleterious substances into the Grand River.
Groundwater Management	Changes in groundwater flow patterns, recharge and levels in aquifers, management of pumped groundwater and yields of wells due to dewatering	- Review current construction dewatering practices. - As part of detail design, hydrogeological investigations will confirm the need for Permit-To-Take-Water (PTTW) and identify proper dewatering techniques and impact mitigation. - Groundwater removed during construction will be channeled or piped through stabilization and sedimentation ponds allowing the sediments to settle out before entering the watercourse, as appropriate.
Aquatic Habitat and Species	- Disruption to fish including spawning periods and physical changes to aquatic habitat - Soil disturbances/sedimentation to the Grand River	- Complete fisheries habitat-assessment as part of Detailed Design. - Complete Environmental Impact Study as part of Detailed Design. - Conduct hydrodynamic modeling and design of the outfall/diffuser. - Engage GRCA and DFO at detailed design to identify and address Harmful Alteration, Disruption or Destruction (HADD) issues related to new outfall. Obtain DFO HADD Authorization or Letter of Advice. Complete/submit GRCA permit application. - Observe timing restrictions to avoid spawning periods. - Implement sediment and erosion controls as per above. - Implement restoration of habitat to natural conditions and include monitoring. Any areas disturbed by construction should be kept to a minimum and will be restored and stabilized as soon as practically possible.
Terrestrial Habitat and Species (including Migratory Birds)	- Physical damage and loss of vegetation/trees - Physical damage and loss of Provincially Significant Wetland (PSW) habitat - Disruption to wild life habitat and migration patterns	- Complete Environmental Impact Study as part of Detailed Design. - Minimize tree/vegetation removal. - Protect mature and mid aged trees along the edge of all working areas. - Restore disturbed areas/habitat using native species. - Avoid and minimize PSW habitat intrusion and removal. - Avoid certain construction activities (e.g., tree removal) during March 15 to July 15 to avoid disruption of nesting birds. - Complete spring and summer (fall season has been captured as part of this study) field investigations, including species inventories, in particular adjacent to areas that maybe disturbed. - During construction discourage the nesting of migrant species to avoid contravening the Migratory Birds Convention Act. - Complete amphibian/reptile and breeding bird’s surveys during the spring and early summer months. Amphibian surveys will include investigating adjacent wetland and woodland communities to assess if there is potential habitat for salamander, toad and frog species. Breeding bird survey will be conducted according to protocols developed by Bird Studies Canada. Night time call surveys will be conducted according to the March Monitoring Program. - Undertake Construction and Post construction monitoring.

Component	Potential Impact	Proposed Mitigation
Species at Risk (SAR)	Loss of Species at Risk due to mortality from physical activities.	- Complete Species at Risk Presence/Absence survey and applicable Permit Applications. - Avoid areas of Species at Risk and significant wildlife habitat to extent possible. - Minimize clearing of vegetation. - Time construction to avoid conflict with species life cycle and keep construction time lines as short as possible.
Navigation	Disruption to Navigation (related to outfall construction and operation)	- Complete a Navigable Waters Permit Application for Transport Canada at Detailed Design. - For outfall construction, maintain navigable passage around in-stream works or provide portage locations.
Cultural and Heritage Resources	Loss or disruption to archaeological resources	As part of Detailed Design, complete Stage 1 and 2 Archaeological Assessment prior to any land-disturbances within the construction area limits and implement recommendations accordingly. If any archaeological and/or historical resources are discovered during the performance of construction work, the performance of the work in the area of the discovery is to be halted. The MTC (Archaeological Unit) will be notified for an assessment of the discovery. Work in the area of the discovery would not resume until cleared to do so by the Ministry.
Truck Traffic	Inconvenience and safety concerns during construction due to an increase in heavy truck traffic along Mill Park Drive	- Notify residents of construction activity and expected road usage and restrict construction operations to the daytime. - Designated construction haul routes and traffic management plan.
Noise and Air Quality	- Potential nuisance impacts to residents during construction - Increase in particulates during construction	- Noise produced during construction phase is temporary and construction operations will be restricted to the day shift (wherever possible). In addition, the contractor will be required to adhere to local noise by-laws. - Dust control by spraying water, road sweeping. - Contractor to sweep haul roads clean at the end of each work day if mud has been tracked on roadway. - Contractor to comply with all applicable by-laws for dust control and emissions.
Odours	Odours due to decommissioning of lagoons and Facility operations	- Continue to implement Odour Mitigation Plan as a monitoring measurement. - Post construction monitoring.
Grand River Trail Closure	Disruption to Trail Users	- Temporary closure of trails. - Signage/fencing and trail detours. - Public and trail user notifications.
Visual Impact	Change in view of the WWTP from the Grand River Trail due to clearing of trees/vegetation for new Grand River outfall	- Minimize tree/vegetation removal. - Trees/vegetation removed will be reinstated following construction. - Approach to restoration will be developed in conjunction with GRCA and new vegetative screening will be included in the landscape design, which will minimize visible changes from the Grand River Trail.

6.2 Monitoring

6.2.1 Construction

Contract tender documents will address mitigative measures in an explicit manner and ensure that compliance is maintained. The provision of an experienced field representative to review construction will ensure that the project follows contract specifications and does not unnecessarily impact vegetation, the community or the aquatic environment.

6.2.2 Post-Construction

A post-construction monitoring program will include inspection of areas that have been restored, including newly planted trees and any other vegetation, and potential erosion areas identified during construction (as required). The effects of the project, the effectiveness of the mitigation approaches and the need for remedial action will be assessed in the program. With respect to WWTP operations as indicated in **Table 6-1**, off-site odour impacts will be monitored through implementation of the Region's Odour Mitigation Plan.

7. Public Consultation

As part of the Municipal Class EA communications and consultation program, efforts have been made to inform government review agencies, key stakeholders and the local community of the nature and scope of the project and to solicit input/comments. These steps included advertising and mailing the Notice of Study Commencement, Notice of Public Information Centres (PICs) and Notice of Study Completion. A newsletter with information on the status of the project was also distributed to surrounding neighbours in March 2012.

Copies of the above mentioned notices and newsletter can be found in **Appendix F**, along with a map of notification limits.

7.1 Public Notification

At the beginning of the study, a Notice of Study Commencement was mailed to the review agencies and public via a Canada Post mail drop to surrounding property owners. The notice presented an overview of the project and how to participate in the study. Notices and respective newspaper publishing dates are shown below.

Table 7-1 Newspaper and Publication Dates of Notices

Notice	Newspaper/Publication Dates
Notice of Study Commencement	The Record – June 3, 2011
Notice of Public Information Centre # 1	The Record - Nov 3 and 15, 2011
Project Update Newsletter	March 2012 (distributed to surrounding residents)
Notice of Public Information Centre # 2	The Record - May 29, 2012 and Jun 5, 2012
Notice of Study Completion	The Record - Aug 21, 2012 and Aug 31, 2012

All notices were also posted on the Region's website along with the Project Update Newsletter that was mailed to surrounding residences. All parties who were previously notified throughout Phases 1 to 2 of the study were notified of the study's completion by mail. The Notice of Study Completion explained that the Class EA Project File has been filed for public review (locations listed in **Section 1.4.5**). Recipients have been asked to provide their written comments within a period of 30 calendar days from the date of the Notice. As per Municipal Class EA requirements, the Notice also indicated that the public has the right to request a Part II Order within the 30-day review period.

7.2 Public Information Centre # 1

The first Public Information Centre (PIC) was held on November 16th, 2011 at Pioneer Park Public School, located at 55 Upper Canada Drive. The PIC was structured as a drop in centre from 5:00 to 7:00 pm where the project information was displayed and representatives from the Region and AECOM were present to address any questions and comments.

The purpose of the meeting was to introduce Phase 3 of the Kitchener WWTP Upgrade project including:

- The need for the project and EA planning process to be followed;
- Work completed to date;
- Existing conditions;
- WWTP upgrade components;
- Approach to odour management; and
- Overview of anticipated impacts from construction and preliminary mitigation measures.



Project information handouts were made available to participants at the meeting as a take away (see **Appendix F**). The attendance record shows that seven (7) people officially signed in at the PIC in addition to representatives from the Region, GRCA and AECOM. Those signing in generally represented adjacent property owners and general public who live in close proximity to the WWTP.

Issues/Concerns Raised at PIC #1

Following PIC # 1, three (3) comment sheets were received. From comments sheets and discussions with PIC attendees, the general consensus was strong support for the project overall. The key issues identified included:

- Confirmation that odour issues would be addressed;
- Confirmation that sufficient capacity would be provided for future growth and in particular, Conestoga College;
- Potential impacts to significant ecological features and aquatic life would be addressed properly;
- Truck traffic; and
- Closure of the Grand River Trail during construction.

The comment sheets and respective responses are provided in **Appendix F**.

7.3 Public Information Centre # 2

A second PIC was held on June 12th, 2012 at the Pioneer Park Public School, located at 55 Upper Canada Drive between 5:00 pm to 7:00 pm. The PIC was held in the form of a drop-in centre to view display boards containing information about the project, and to speak one-on-one with representatives from the Region and AECOM. During PIC #2, potentially affected property owners and other interested stakeholders were provided with the following information:

- Phase 3 WWTP upgrade design and construction methodology;
- Cost Estimates;

- Environmental Work Completed to Date;
- Anticipated impacts from construction and proposed mitigation measures;
- Timeline; and
- Next steps.

Project information handouts were made available to participants at the meeting as a take away (see **Appendix F**). The attendance record shows that two (2) people (members of the general public) officially signed in at the PIC.

Issues/Concerns Raised at PIC #2

Attendees expressed strong support for the proposed upgrades. One (1) comment sheet was received following PIC #2. The comment was regarding the re-alignment of the fencing near the main entrance to the Kitchener WWTP, which closed off access to the Grand River Trail at this location as part of another project being implemented. The comment sheet and respective response can be found in **Appendix F**.

8. Agency and First Nation Consultation

Similar to the notification process used to inform the public, Notices of Study Commencement and PIC # 1, PIC # 2, and Study Completion were sent to commenting review agencies, stakeholder groups and First Nations. The following provides a summary of consultations with responding agencies and First Nations.

8.1 Steering Committee

The Steering Committee (SC) met on June 28th, 2011 to introduce the Kitchener WWTP Upgrades Municipal Class EA study as part of the phased approach outlined in the Wastewater Treatment Master Plan and the Site-Wide Facility Plan. The meeting also provided an overview of work undertaken to date and to obtain feedback for implementation into facility plan/Pre-design of the Kitchener WWTP Upgrades.

The Region met with the SC again on October 14th, 2011. A brief presentation summarizing work completed to date, project timelines and cost estimates, review of PIC # 1 and an overview of environmental activities and schedule for approvals activities. Another meeting was held on April 17th, 2012 where a presentation was given to provide an update of the preliminary design progress including upgrade components, environmental investigation findings and impact assessment, and the next steps to complete the Municipal Class EA and Preliminary Design.

8.2 Review Agency Consultation

8.2.1 Ministry of the Environment

In response to the Notice of Study Commencement the MOE sent a letter to the Region dated July 6th, 2011, that outlined the planning process requirements for the Class EA. The letter provided an overview of what the Project File should cover (i.e., description/inventory of the environment, monitoring) and also provided guidance for contacting First Nations. A copy of the letter can be found in **Appendix G**.

A pre-consultation meeting was held July 13, 2011 at the Kitchener WWTP at which representatives of AECOM and the Region provided an overview of the proposed approach to the Lagoon Decommissioning component of the project to Todd Paylor, Senior Environmental Officer, of the MOE. As a follow-up, the proposed plan was submitted to Vincent Bulman, Hydrogeologist, Water Resources Branch of the MOE for review and comment.

Representatives of AECOM and the Region met with Hitesh Vaja, Senior Water Engineer Wastewater Approvals Unit and Mansoor Mahmood Supervisor Approvals Services Unit 2, at the MOE offices, 2 St. Clair Avenue, Toronto on July 26, 2012. AECOM and the Region provided an overview of the project, work completed to date, the proposed timing and the proposed approach to MOE approvals. The MOE provided input on the proposed approach and expectations, including completion of the Class EA prior to any works being constructed.

8.2.2 Grand River Conservation Authority

In response to the Notice of Study Commencement the Grand River Conservation Authority (GRCA) sent a letter dated August 18th, 2011, which included study area information such as floodplains and wetlands. A copy of the letter can be found in **Appendix G**. As the Kitchener WWTP site falls within GRCA regulated lands, GRCA permits

under *Regulation of Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses*, regulation O.Reg. 150/06, will be required. The Region and AECOM met with GRCA on February 24th, 2012 to present the Kitchener WWTP upgrades components, summarize environmental work completed to date including where further studies are required, and discuss possible approaches to outfall construction, floodplain considerations, approach to stormwater management and preliminary mitigation measures. GRCA will continue to be involved in the detailed design permitting and approvals process including the review of remaining field studies and environmental impact study that will be used to support in part the GRCA, DFO-HADD, MNR and MOE permitting applications.

8.2.3 Ministry of Tourism, Culture and Sport

The Ministry of Tourism, Culture and Sport (MTCS) was notified via letters and notification at all project milestones. To date no responses have been received from the MTCS.

8.2.4 City of Kitchener

The City of Kitchener was notified via letters and notification at all project milestones. The City was also represented on the Steering Committee (SC) by two (2) City Councillors and the Manager of Site Development and Customer Service, who provided advice and feedback at key milestone points during the project.

8.3 First Nations Consultation

Through the Class EA process, the Region/AECOM has had contact with the following First Nations bands in order to explain the project, determine interest and solicit input. Contact was made with the Six Nations of the Grand River Haudenosaunee Confederacy Chiefs Council, Mississaugas of the New Credit and Metis Nation of Ontario.

Consultation with First Nations included all mandatory Class EA contact points (i.e. Notice of Commencement, Public Information Centres and Notice of Completion). To date no comments have been received from any of the First Nations bands. A copy of the letters can be found in **Appendix G**.

9. Summary

The Project File Report covers the process required to ensure that the proposed WWTP upgrades meet the requirements of the *Environmental Assessment Act*. The Class EA planning process requires initial screening for projects of this type, and this initial screening has not identified any significant environmental concerns that cannot be addressed by incorporating established mitigation measures during construction.

The proposed improvements resolve the problem/opportunity statement identified in this report. A preliminary evaluation of potential impacts has been included in the evaluation, which indicates minor and predictable impacts that can be addressed by recommended mitigative measures as presented in Section 6. The proposed mitigation measures will be further developed at detailed design and will form commitments that will be adhered to by the Region. Appropriate public notification and opportunity for comment was provided, and no comments were received that could not be adequately addressed. Subject to receiving EA clearance following the 30-day review period the Region will complete the detailed design and permitting-approvals phase and proceed to construction.