

**CREG QUAY,  
WESTLEY'S POINT AND AREA**

**Sewage Disposal  
Environmental Study Report**

**Prepared for the  
Township of South Glengarry**

**Prepared by  
The Thompson Rosemount Group.**

**February 15, 1999**

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1 INTRODUCTION.....</b>	<b>1</b>
<b>2 PUBLIC CONSULTATION .....</b>	<b>3</b>
2.1 Environmental Assessment Process.....	3
2.2 Initial Public Consultation.....	5
2.3 Phase 2/3 Public Consultation .....	6
2.3.1 Notification .....	6
2.3.2 Public Meeting.....	6
2.3.3 Mandatory Contacts and Agencies .....	7
2.4 Bump-Up Rights.....	7
<b>3 EXISTING CONDITIONS .....</b>	<b>9</b>
3.1 Westley's Point .....	9
3.1.1 Water Supply .....	9
3.1.2 Sewage Disposal .....	10
3.1.3 Surface Water Conditions .....	10
3.1.4 Other Issues.....	10
3.1.5 Natural Environment.....	10
3.2 Creg Quay.....	11
3.2.1 Water Supply .....	11
3.2.2 Sewage Disposal System .....	12
3.2.3 Natural Environment.....	12
3.3 Nadeau's Point.....	13
3.3.1 Water Supply and Sewage Disposal .....	13
3.3.2 Surface Water Conditions .....	13
3.3.3 Other Issues.....	13
3.3.4 Natural Environment.....	14
3.4 Amandale Bay.....	15
3.4.1 Water Supply and Sewage Disposal .....	15
3.4.2 Surface Water Conditions .....	15
3.4.3 Other Issues.....	15
3.4.4 Natural Environment.....	15
3.5 Recommended Alternative Solution .....	16
3.5.1 Sewage Disposal Partnership.....	16
3.5.2 Class EA Schedule.....	16
<b>4 PRELIMINARY DESIGN CRITERIA.....</b>	<b>18</b>
4.1 Proposed Service Area.....	18
4.2 Design Population Estimate.....	18

4.3	Design Sewage Flow Rate .....	19
4.4	Existing Certificate of Approval .....	20
4.5	Receiving Stream Impact Assessment .....	21
4.6	Summary of Design Criteria .....	22
<b>5</b>	<b>EVALUATION OF DESIGN ALTERNATIVES .....</b>	<b>23</b>
5.1	Description of Alternatives .....	23
5.1.1	Alternative 1 (The Preferred Alternative) .....	23
5.1.2	Alternative 2 .....	23
5.1.3	Alternative 3 .....	24
5.1.4	Alternative 4 .....	24
5.1.5	Alternative 5 .....	25
5.1.6	Alternative 6 .....	25
5.2	Natural Environment Issues .....	25
5.2.1	Collection System Corridors .....	25
5.2.2	Sewage Treatment Facility Site .....	26
5.2.3	Effluent Outfall .....	26
5.3	Social Environment Issues .....	27
5.4	Economic Environment Issues .....	27
5.5	Assessment of Costs .....	27
5.5.1	Capital Costs .....	27
5.5.2	Annual Operating Costs .....	28
5.6	Comparative Evaluation of Alternatives .....	29
<b>6</b>	<b>RECOMMENDED ALTERNATIVE DESIGN .....</b>	<b>30</b>
6.1	Preliminary Design .....	30
6.1.1	Sewage Collection System .....	30
6.1.2	Sewage Pumping Station and Forcemain .....	30
6.1.3	Sewage Treatment System .....	31
6.2	Project Costs .....	31
6.3	Ownership .....	32
6.4	Natural Environment Impacts and Mitigation .....	32
6.5	Class EA Schedule .....	34
6.6	Bump-Up Provisions .....	34

## LIST OF TABLES

Table 4.1	Design Population Estimate .....	18
Table 4.2	Design Sewage Flow Estimate.....	19
Table 4.3	Treatment Quality Criteria .....	20
Table 4.4	Summary of Design Criteria .....	21
Table 5.1	Summary of Alternative Costs.....	22
Table 5.2	Alternative 1 Cost Apportionment.....	27
Table 5.3	Environmental Impacts Comparison .....	28

## LIST OF FIGURES

Figure A	Class EA Process Flow Chart .....	4
Figure 1	General Area Plan .....	2
Figure 2	Aerial Photographs of the Area .....	3
Figure 3	Proposed Sewage Treatment Facility Configuration .....	29

## LIST OF APPENDICES

Creg Quay Limited Certificates of Approval.....	Appendix A
Creg Quay Master Plan .....	Appendix B
Public Consultation Documentation .....	Appendix C
Receiving Stream Impact Assessment .....	Appendix D
Preliminary Design – Sanitary Sewer System .....	Appendix E

## LIST OF DRAWINGS

Drawing No. 01 Alternative 1 .....	29 and Pocket
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## EXECUTIVE SUMMARY

In November 1995, Creg Quay Limited (CQL), a waterfront lifestyle community located on Lake St. Francis (St. Lawrence River) near Bainsville, received an amending Certificate of Approval (C of A), from the Ontario Ministry of the Environment to modify the existing sewage treatment facility, and thereby accommodate the planned ultimate development of the community. The C of A provides for the phased expansion of the existing semi-annual discharge facultative lagoon treatment facility from 1.6 ha to 8.8 ha surface area on land owned by CQL. A copy of the C of A (3-1634-95-006) is provided in Appendix A. The proposed lagoon expansion will be limited to a capacity of 140,000 m<sup>3</sup>, which is equivalent to an average daily flow (ADF) of approximately 767 m<sup>3</sup>/day for spring/fall discharge.

Westley's Point is a neighbouring development to the west consisting of 75 seasonal and permanent dwellings some dating back to the 1940s. A sewage disposal problem exists at Westley's Point relating to the small lots, high water table, failing septic systems and holding tanks. Westley's Point property owners have been seeking a solution to the problem for many years, however, an affordable solution had not been previously identified.

In 1998, the Township of South Glengarry completed an Environmental Study Report for Water and Wastewater Systems in the Greater Lancaster Area (GLA). A component of the GLA study examined connecting Westley's Point to the (upgraded) Lancaster sewage treatment facility, however, this alternative solution was not pursued by the Westley's Point residents because the estimated costs were excessive. Late in 1998, Creg Quay Limited proposed to the Township and the residents of Westley's Point that an area scheme be considered for sewage disposal utilising the existing Creg Quay sewage treatment facilities to the benefit of the immediate area. The Township commissioned this study consistent with the provisions of the Class EA process to evaluate the alternative solution of an area wastewater collection and treatment scheme for Creg Quay, Westley's Point, Nadeau's Point, and Amandale Bay. The cost of the study was shared by the MOE, Creg Quay Limited, Westley's Point residents, and the Township.

The recommended solution is an area municipal sewage collection and treatment system to accommodate Creg Quay, Westley's Point, Nadeau's Point and Amandale Bay as follows:

- local sewage collection systems in Westley's Point, Nadeau's Point, and Amandale Bay,
- trunk sanitary sewers interconnecting the proposed local sewers in Westley's Point, Nadeau's Point, and Amandale Bay, and interconnecting the existing local sanitary sewers in Creg Quay to a central pumping station,
- a central pumping station and forcemain connecting to the existing Creg Quay forcemain, Service Road and Highway 401 crossing, and lagoon treatment facility,
- enhancements to the existing Creg Quay treatment facility to provide improved treatment for the proposed additional flow and proposed continuous discharge to the existing Creg Quay effluent line. The ultimate treatment facility will require an additional cell for a total area of approximately 2.2 ha, however, initially the existing cells will be utilised to meet the projected design flow. The process will include addition of aeration capacity, continuous alum dosing, and wastewater flow measurement.

## 1 INTRODUCTION

Creg Quay is a lifestyle community located on the north shore of the St. Lawrence River approximately 8 km west of the Ontario-Quebec border and 7 km east of Lancaster. Established in 1981, the development currently comprises 100 detached dwellings in Phase 1 (Glengarry Courts), a 166 seat restaurant and pub, and a 125 boat-slip marina. The development is private and as such all services including local roadway maintenance, water supply and sewage disposal, are provided by Creg Quay Limited and funded by the residents and owners.

The water supply is provided from groundwater wells, a treatment facility that provides disinfection, and a distribution system with high lift pumps. The sewage disposal system includes a gravity sewage collection system, a main pumping station, a forcemain, a sewage treatment facility comprising seasonal discharge facultative lagoons, and an effluent line that discharges to the St. Lawrence River. The communal water supply and sewage disposal systems are operated by certified operators (Reg. 435/93) under current Certificates of Approval (Ontario Ministry of the Environment). The systems adequately meet the current demand and are capable of expansion to accommodate the planned future development phases.

Westley's Point is a rural community located on the north shore of the St. Lawrence River less than 1 km west of Creg Quay at County Road 26. Developed initially between 1940 and 1970 as a seasonal cottage community, today there are over 74 detached dwellings of which more than 50% have been converted for year round occupancy. Private roads on narrow rights-of-way provide access to the properties. Individual private wells and septic systems and holding tanks provide for water supply and sewage disposal. Problems associated water supply, sewage disposal, and surface water drainage, have been evolving for many years, and more recently, have prompted the property owners to enlist the support of the Township and the Raisin Region Conservation Authority (RRCA) to find a solution.

Two other small rural developments are situated between Creg Quay and Westley's Point, namely Nadeau's Point and Amandale Bay. Problems associated with water supply or sewage disposal have not been documented nor have any investigations been conducted for those two areas, however the physical setting is similar to Westley's Point. Aerial photographs illustrating the area including Creg Quay, Westley's Point, Nadeau's Point, and Amandale Bay are provided in Figure 2. The existing Creg Quay sewage lagoons are visible in the background.

The principle roadway access to Creg Quay, Westley's Point and the numerous other points and development areas along this stretch of the St. Lawrence River is the South Service Road which parallels Highway 401. Adjacent Highway 401 interchanges are located at Lancaster and Curry Hill. Figure 1 illustrates the general area relative to Lancaster.

In 1998, the Township of South Glengarry concluded a Class Environmental Assessment Environmental Study Report (ESR)<sup>1</sup> for the Greater Lancaster Area (GLA). The purpose was to determine a preferred alternative solution for the water supply and sewage disposal problems in the GLA including Westley's Point and other lands along the St. Lawrence River between Lancaster and Westley's Point. The GLA study recommended in Phase 1 improvements to and expansion of the existing water supply and sewage disposal systems in the community of Lancaster to provide a solution for the community of Lancaster and immediately adjacent lands.

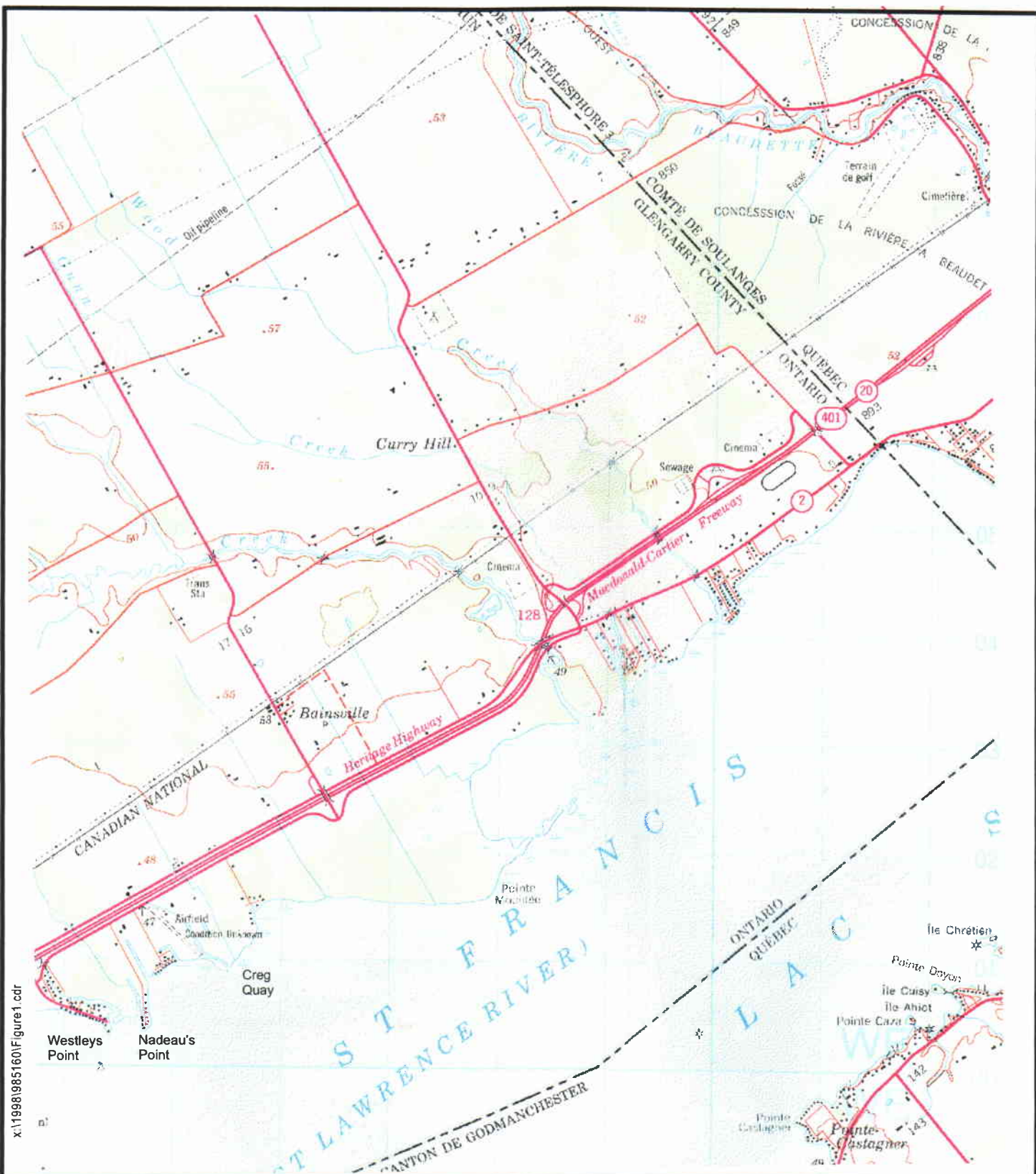
Westley's Point would not benefit from the implementation of the GLA Phase 1 recommendations. The ESR examined the alternative of extending the Lancaster sewage collection system to Westley's Point by constructing a local sewage collection system, pumping stations, and a forcemain. This alternative was rejected because of the excessive capital cost.

This ESR examines an alternative solution for Westley's Point and therefore is considered an addendum to the Greater Lancaster Area ESR.

**The alternative solution that is the subject of this ESR (addendum) involves a partnership between the Township of South Glengarry, Creg Quay Limited, Westley's Point, Nadeau's Point, and Amandale Bay to enable the sharing of the Creg Quay sewage treatment facilities. This ESR documents the evaluation of the alternative solution and its environmental impacts consistent with the Class Environmental Assessment Process.**

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*1 Greater Lancaster Area Water and Wastewater Systems Class Environmental Assessment Environmental Study Report, April 1998, by Totten Sims Hubicki Associates for the Township of South Glengarry*



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M.S. THOMPSON & ASSOCIATES LTD.  
consulting engineers  
CORNWALL KINGSTON

# CREG QUAY - WESTLEY'S POINT ENVIRONMENTAL STUDY REPORT

scale 1:50,000

date FEB 1999

drawn DWP

job no. 985160

drawing no.

**FIGURE I**



KEY PLAN



## 2 PUBLIC CONSULTATION

### 2.1 Environmental Assessment Process

In Ontario, municipal water and wastewater projects are subject to the provisions of the Class Environmental Assessment (document) for Municipal Water and Wastewater Projects, June 1993. The Class Environmental Assessment (Class EA) is an approved planning document which describes the process which proponents must follow in order to meet the requirements of the Environmental Assessment Act of Ontario. By following the Class EA, the municipality (proponent) does not have to apply for an individual environmental assessment under the act. The Class EA approach allows for the evaluation of the environmental effects of carrying out a project and alternative methods of carrying out a project, includes mandatory requirements for public input, and expedites the environmental assessment of smaller recurring projects.

The Class EA planning process was developed to ensure that the potential social, economic and natural environmental effects are considered in planning water, stormwater and sewage projects. Class EAs are a method of dealing with projects which display the following important common characteristics:

- recurring,
- usually small in nature,
- usually limited in scale,
- predictable range of environmental effects, and
- responsive to mitigating measures.

Projects which do not display these characteristics would not be able to use the planning process of this Class EA and must undergo an individual environmental assessment. The Class EA planning process represents an alternative for Ontario municipalities to carrying out individual environmental assessments for most municipal sewage, stormwater management, and water projects.

Since sewage, stormwater management and water projects undertaken by municipalities under the Class EA planning process vary in their environmental impact, such projects are classified in terms of schedules.

- **Schedule A** projects are limited in scale, have minimal adverse effects and include the majority of municipal sewage, stormwater management and water operations and maintenance activities. These projects are approved and may proceed to implementation without any further requirements under the provisions of the Class EA planning process.
- **Schedule B** 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. If, however,



Creg Quay and Amandale Bay with Lagoons in Background



Westley's Point and Nadeau's Point with MacIntosh Creek and Westley's Creek

**FIGURE 2**

the screening process raises a concern which cannot be resolved, then the "bump-up" procedure may be invoked; alternatively, the proponent may elect voluntarily to plan the project as a Schedule C undertaking. Typically, Schedule B projects involve extensions to existing municipal infrastructure such as sewage collection systems and water distribution systems.

- **Schedule C** projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA process. Schedule C projects require that an Environmental Study Report be prepared and submitted for review by the public. If concerns are raised that cannot be resolved, the "bump-up" procedure may be invoked, which may result in the requirement to complete a full environmental assessment. Refer to Section 3.5 for further discussion of the "bump-up" procedure. Typically, these projects involve the construction of municipal infrastructure such as wastewater treatment facilities, new sewage collection and water distribution systems, and water treatment facilities.

The attached Figure A presents a flow chart which illustrates the Planning and Design Process for Municipal Water and Wastewater Projects. The precise path to be followed in the process is dependent on the nature of the project and more particularly the schedule in which the project falls. As the proponent proceeds through the planning process beginning with Phase 1 (Problem Definition) and advances towards the end of Phase 2 (Evaluation of Alternative Solutions), the preferred alternative solution is determined. Having determined the preferred alternative solution, the appropriate project schedule and process to be followed for the completion of the project is also determined.

For example, constructing a new sewage treatment facility is a Schedule C activity. Expanding an existing sewage treatment plant including outfall works up to its approved rated capacity is a Schedule B activity. Establishing, extending or enlarging a sewage collection system and all works necessary to connect the system to an existing sewage outlet where such facilities are not shown on an approved development plan nor are in an existing road allowance is also a Schedule B activity. For these projects, the planning process is set out in the Class EA document.

**Phase 1** defines the nature and extent of the problem. Often a discretionary public meeting is held to inform interested parties of the EA planning process and to discuss the problem.

**Phase 2** involves the identification of the preferred alternative solution. Also included are an inventory of the natural, social, and economic environment; the identification of the impacts of alternative solutions on the environment; the identification of mitigating measures; an evaluation of alternative solutions; consultation with review agencies and the public regarding the identified problem and alternative solutions; the identification of the recommended alternative solution; and confirmation of the path or schedule to follow for the balance of the Class EA process. Public consultation is mandatory at this phase and includes review agencies and the affected public.

**Phase 3** involves the identification of alternative designs for the selected alternative solution. Also included are a detailed inventory of the natural, social, and economic environment relating to the selected alternative solution; the identification of the impacts of alternative



designs on the environment; the identification of mitigating measures; an evaluation of alternative designs; consultation with review agencies and the public regarding the alternative designs; the identification of the recommended alternative design; and confirmation of the path or schedule to follow for the balance of the Class EA process. Public consultation is mandatory at this phase and includes review agencies and the affected public.

**Phase 4** represents the culmination of the planning and design process as set out in the Class EA. Phase 4 involves the completion of the documentation including the Environmental Study Report (ESR) if required and the Notice of Completion. The ESR documents all the activities undertaken through Phases 1, 2 and 3 including the Public Consultation. The ESR is filed with the Clerk of the municipality and placed on the public record for at least 30 days to allow for public review. The public and mandatory agencies are notified through the Notice of Completion, which also discloses the "bump-up" provisions.

**Phase 5** is the implementation phase of the Class EA process, and includes final design, construction plans and specifications, tender documents, and construction and operation. It also includes monitoring for environmental provisions and commitments as defined in the ESR.

This report documents the project with respect to the Class EA process and is presented along with the Notice of Completion for the 30-day review by the public and review agencies consistent with the requirements of the Class EA process. A draft of this report was presented to the Township of South Glengarry Council on January 31, 1999. Comments received at that meeting are incorporated into this report.

## **2.2 Initial Public Consultation**

As indicated previously, public consultation including notification of review agencies was completed as part of the Class EA process for the Greater Lancaster Area (GLA) Water and Wastewater ESR. With respect to Westley's Point, the GLA ESR recommended that a local sewage collection system be constructed and that sewage be conveyed to the upgraded Lancaster sewage treatment facility through pumping stations and a forcemain. This alternative was not pursued because of the excessive cost of implementation. Public consultation is repeated for this addendum to the GLA ESR.

- On November 16, 1998, a meeting was held at Creg Quay to discuss the concept of a partnership to address area sewage disposal issues. In attendance were representatives of the Westley's Point Ratepayers Association, the Township of South Glengarry, the Creg Quay Homeowners Association, Creg Quay Limited, and the M.S. Thompson & Associates Ltd. A copy of the meeting record is included in Appendix C.
- A letter was issued in November 1998 to inform the residents in the Westley's Point area of the alternative solution for sewage disposal involving a partnership with Creg Quay Ltd. A copy of the letter is included in Appendix C.
- On December 10, 1998, a public meeting was held at the Township of South Glengarry offices in Lancaster. All Westley's Point residents were invited to attend. Creg Quay

residents were also invited. The purpose of the meeting was to discuss the concept of a partnership that would result in sharing the existing Creg Quay sewage treatment facility with Westley's Point and perhaps other intermediate lands such as Nadeau's Point and Amandale Bay. The Consultant presented background information pertaining to the Creg Quay facilities and the implications of a shared project. It was also indicated that the Township and the MOE had approved a study under the provisions of the Class EA process to examine the alternative in detail including costs, and to report back to the Township and affected property owners before the end of January 1999. A representative from the Raisin Region Conservation Authority also attended and provided background information. A copy of the meeting record and the attendance record are included in Appendix C.

At this stage of the process, there was widespread support for the proposal to undertake a Study that would examine this sewage disposal alternative in detail including the development of a preliminary design concept and cost estimate. The Study information would be presented to the residents for discussion at a meeting to be scheduled in January 1999.

### **2.3 Phase 2/3 Public Consultation**

As noted, the Township of South Glengarry had conducted a Class EA for the Greater Lancaster Area and produced an ESR consistent with the Class EA process including the requisite public consultation. This ESR is an addendum to that ESR and as such begins at Phase 3.

The Township of South Glengarry and M.S. Thompson & Associates Ltd. conducted the Phase 3 activities for this ESR. The mandatory Class EA Phase 3 public consultation consisted of a public meeting and a direct mailing to mandatory contacts and other agencies.

#### **2.3.1 Notification**

Notification for the meeting was accomplished through a letter of invitation that was issued to approximately 250 property owners and residents in Creg Quay, Westley's Point, Nadeau's Point, and Amandale Bay. A notice of meeting was also published in the local newspaper. The mailing list was prepared by the Township. A copy of the mailing list, the letter of invitation, and the notice of meeting is included in Appendix C.

#### **2.3.2 Public Meeting**

The Public Meeting was held January 27, 1999 at the Township offices in Lancaster. The format consisted of a presentation by M.S. Thompson & Associates Ltd. followed by a question and answer period involving the public.

The two-hour meeting was attended by about 45 persons. The presentation, which was conducted in English, included:

- the project history;
- the findings of the receiving stream impact assessment;

- wastewater treatment implications;
- the Class EA process including bump-up provisions;
- a detailed discussion of the alternative solution that was being evaluated, namely a sewage collection system in Westley's Point or alternatively in Nadeau's Point and Amandale Bay with an upgraded sewage treatment facility to be shared with Creg Quay,
- the environmental impacts (social, natural, economic) of the alternative;
- a summary of the estimated cost impacts on various property categories; and
- the schedule for completion of the Class EA document.

Findings of the work to date, as detailed in this report, were presented to the attendees with the aid of a computer-generated large screen slide presentation. A copy of the presentation material is available upon request. As participants arrived, they were asked to sign an attendance record sheet and were given a handout that summarized the information to be presented. A copy of the attendance record and the handout is included in Appendix C.

The meeting record was prepared by M.S. Thompson & Associates Ltd. and reviewed by the Township. A copy of the meeting record is presented in Appendix C. The most significant issues raised by the public were as follows:

- expedite the construction of the preferred solution so that the sewage disposal problems will be corrected as soon as possible,
- minimise the costs to the residents both in terms of capital and annual operating costs,
- minimize environmental impacts,
- adequacy of wastewater treatment associated with continuous discharge,
- noise resulting from the pumping station and aeration equipment at the lagoon site,
- roadway restoration during construction of sewers,
- Township (public) ownership of the infrastructure including road allowances and sewer easements.

### 2.3.3 Mandatory Contacts and Agencies

Mandatory contacts and other agencies were also provided with an invitation to the public meeting and a letter that summarised the project. The mandatory contacts and other agencies included the MOE, the Raisin Region Conservation Authority (RRCA), the Ministry of Natural Resources (MNR), the Department of Fisheries and Oceans (DFO), Creg Quay Limited (CQL), Creg Quay Residents Association, Westley's Point Ratepayers Association, and others. The summary that was provided to the mandatory contacts and other agencies, described the problem, indicated the alternative solution that was being evaluated, and indicated that further information would be provided at the completion of the ESR. Only mandatory contacts and others that specifically requested further information will be provided with a copy of this document. For a copy of the letter and a listing of mandatory contacts and other agencies, refer to Appendix C.

### 2.4 Bump-Up Rights

As previously stated, projects subject to a Class EA are recurring, usually small in nature, usually limited in scale, have a predictable range of environmental effects, and are



responsive to mitigating measures. Hence the Class EA process is streamlined and typically less onerous to complete compared to an Individual EA.

An Individual EA involves a more complex procedure incorporating similar stages and public/agency consultation. Individual EAs are more expensive and time consuming and typically involve projects that are more unique, larger and wider ranging, have uncommon or unpredictable environmental effects, and may not be responsive to mitigative measures.

Examination of Figure A reveals that there is an opportunity for any interested parties to request that the project be bumped up from a Class Environmental Assessment to an Individual Environmental Assessment. The "bump-up" opportunity exists at the Notice of Completion stage and must be filed with the Minister of Environment within thirty (30) days of the notice date. The Notice of Completion occurs at the end of Phase 2 for Schedule B projects and at the end of Phase 4 for Schedule C projects. It signifies that the Class EA process has been completed for the project and that the resulting document has been placed on the public record.

For projects subject to the provisions of the Class Environmental Assessment Process, a person or agency with a significant concern must communicate the concern to the proponent any time between Phases 2 and 4. If the concern cannot be resolved between the party and the proponent, then that person or agency can request the proponent to "bump-up" the process to an Individual EA. If this request is denied then the concerned party may write to the Minister of the Environment and Energy with the same request. This must be done within thirty calendar days during the public review period after the Notice of Completion has been issued.

The Environmental Assessment Branch of the Ministry of the Environment then has forty-five days to prepare a report to the Minister, who then has twenty-one days to make a decision. The Minister may deny the request, deny the request with conditions, refer to the Environmental Assessment Advisory Committee, or comply with the request. Obviously since the bump-up procedure is arduous, an individual or agency with a significant and legitimate concern is wise to engage in an early and meaningful dialogue with the proponent.

The bump-up process was specifically addressed during the public meeting presentation and referenced in the hand out.



### 3 EXISTING CONDITIONS

The alternative solution that is being examined in this ESR involves a partnership between the Township of South Glengarry and Creg Quay Limited (CQL). To achieve the solution, the existing CQL treatment facilities and related infrastructure will have to be transferred to the municipality. New sewage collection infrastructure, a pumping station, and sewage treatment upgrades will be required to achieve the area municipal sewage disposal system that will benefit Creg Quay Limited, Creg Quay existing development, Westley's Point, Nadeau's Point, and Amandale Bay. The transfer of existing CQL facilities will be achieved through an agreement between the Township and CQL.

#### 3.1 Westley's Point

The Problem Definition is a Phase 1 activity as prescribed in the Class EA process and is detailed in the following section of this study.

In August 1994, the Raisin Region Conservation Authority (RRCA) conducted an investigation of issues in the Westley's Point area<sup>2</sup>. Westley's Point borders Lake St. Francis, a fluvial lake of the St. Lawrence River, and is located approximately 6 km east of Lancaster and 9 km west of the Ontario-Quebec border. Originally developed as a cottage community, the area now accommodates 74 dwellings with at least 38 having been converted to permanent residences. Parcels of land ranging in size from 460 m<sup>2</sup> to 930 m<sup>2</sup> were created by severance between 1940 and 1970. Access is provided on private roads located on common rights-of-way approximately 6.1 m wide. Maintenance costs are borne by the property owners in the area.

##### 3.1.1 Water Supply

Water supply is from individual and shared drilled wells. Groundwater sampling was conducted twice during a four-week interval in July and August 1994 by the RRCA. Sixty-one groundwater samples were obtained during the first sampling period and thirty-nine samples were obtained during the second sampling period. The samples were analysed for bacterial contamination as well as for chemical parameters including iron (Fe), chloride (Cl), conductivity, ammonia, nitrite, and nitrate.

Eleven samples showed coliform levels greater than zero and as high as 7,000 counts per 100 mL. Three of these samples continued to show contamination during the second sampling period with an additional two wells reporting contamination. A review of the groundwater analyses also indicated that high iron and sulphur were a concern in three of the wells. All of the wells had acceptable clearance from septic systems.

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<sup>2</sup> *Westley's Point Issues Investigation*, August 1994, by Andy Code, Lands Coordinator, Raisin Region Conservation Authority

### 3.1.2 Sewage Disposal

Sewage disposal systems include a variety of on-site subsurface disposal systems including septic systems and holding tanks. A review of the RRCA data for sewage disposal at Westley's Point confirmed that 30 of the properties had Class IV systems installed (40%), 26 properties were serviced by holding tanks (35%), and 18 were unknown (24%). The RRCA noted that, due to the soil characteristics and high water table in the area, new septic systems would have to be built with raised tile beds. Their survey also noted that only 10 of the existing septic systems were of this latter design. At least thirty-five (46%) of the sewage systems were constructed more than 20 years ago.

### 3.1.3 Surface Water Conditions

The investigation by the RRCA also included analyses of surface water samples taken throughout the area. Surface water courses adjacent to Westley's Point include Lake St. Francis, MacIntosh Creek and Westley's Creek. Samples taken at three different locations in MacIntosh Creek five times throughout the summer of 1994 showed consistent elevated phosphorus concentrations. *E.coli* counts were exceeded at each location at least once during the sampling program. The presence of both phosphorus and *E.coli* could be an indication that faulty septic systems are contributing to the degradation of surface water quality in MacIntosh Creek and consequently the St. Lawrence River.

### 3.1.4 Other Issues

Flooding and drainage problems are of major concern in this area. The RRCA concluded that the altered surface drainage patterns and flooding were resulting in seasonal inundation of septic systems, were restricting access to properties, and were contributing to shoreline erosion.

### 3.1.5 Natural Environment

#### Topography

The area is low lying although typically above the 1:100 year regional floodline of 47.3 m ASL with the exception of the southern tip of the point. Poor surface drainage has been exacerbated by the development of buildings over the years and the related poor lot grading. Drawing No. 1 illustrates topographic contouring. Westley's Point is bordered on the west by the St. Lawrence River, and on the south and east by a wetland and delta.

#### Surficial Geology

The surficial geology in the Study Area is described by the Geologic Survey of Canada 1965 as follows:

- the soils of the wetlands are described as peat, muck, poorly drained supporting fen, swamp, and marsh vegetation,
- the soils of the lowlands are described as Malone clay and silt, fossiliferous, poorly drained, and overlain with Fort Covington till, compact including bouldery washed till on slopes and hills. The lower Malone till is compact.

Recent work by St. Lawrence Testing and Inspection Co. Ltd. in the Creg Quay Phase 2 area noted topsoil varying to 440 mm, overlying silty, sandy till, moist and compact, with gravel and cobbles at depths to 15 m. Below the till, grey, very wet, silty soft clay may be encountered at depths greater than 3.0 m. Bedrock is below 20 m.

#### Bathymetry

The near shore region is typified by shallow water up to 2.0 m in depth at 100 m offshore. A silty, clay bottom deposit which promotes weed growth predominates. Shoreline erosion is persistent which is accentuated by the large fetch (up to 15 km).

#### Vegetation

Vegetation in Westley's Point is limited to landscaping associated with residential land development. Ornamental trees and manicured lawns prevail.

#### Land Use

According to the Township of Lancaster official plan 1994, the land-use designation for Westley's Point is Limited Services Residential. Permitted uses are limited to single residential dwellings on private water supply and sewage disposal systems. The setting is one of a compact rural subdivision.

#### Wetland

Westley's Point is bordered on the east by MacIntosh Creek. Further to the east is Westley's Creek. The confluence of these two creeks with the St. Lawrence River has produced a significant wetland that is designated in the Official Plan of the municipality. The wetland area provides habitat for waterfowl, marsh creatures, and typical wetland vegetation.

#### Archeology

No known features of archeological significance have been reported in Westley's Point.

### **3.2 Creg Quay**

The existing development at Creg Quay consists of 85 single dwellings in Phase 1 (Glengarry Courts), an administration centre, a restaurant, a marina basin that accommodates 125 boats, recreational facilities, and commercial facilities to service the residents and boaters. Many of the boaters are seasonal (not transient) and avail themselves of the facilities at Creg Quay for the entire boating season from May to September. The associated infrastructure is described below. Future phases of Creg Quay will include 520 housing units (Phases 2 and 3), Marina Condominium (100 units), accommodation for 315 additional boats, and a Marina Inn with 30 units.

#### **3.2.1 Water Supply**

The existing water supply system consists of groundwater wells and a treatment system that supply water to the distribution system for Phase 1 and other existing facilities. The system is approved by the Ministry of the Environment (C of A 7-1104-95-006, dated November 20, 1995), and is operated in accordance with Ontario Reg. 435/93 by TRG Canada Inc. The water supply is capable of meeting the demand that is estimated for the ultimate

development at Creg Quay. The rated capacity of the water treatment facility is 175 L/min average day, 481 L/min peak day, and 723 L/min peak day.

### 3.2.2 Sewage Disposal System

The existing sewage disposal system consists of a sewage collection system for Phase 1 (Glengarry Courts) and other existing facilities including the restaurant and marina basin. Sewage is pumped from pumping station no. 1 (PS1) through a 150-mm diameter forcemain that extends to the treatment facility north of Highway 401 on the east half of Lot 23, Conc. 1. Treatment consists of a 2-cell (1.6 ha) semi-annual discharge facultative lagoon system. The system is approved by the Ministry of the Environment (C of A 3-0511-81-007 dated August 12, 1981) and is operated in accordance with Ontario Reg. 435/93 by TRG Canada Inc. The rated capacity of the existing treatment facility is 62.7 m<sup>3</sup>/day with a total volume of 23,000 m<sup>3</sup> and a HRT of 180 days. The 200-mm diameter treated effluent line extends from the treatment facility to the St. Lawrence River and discharges through an outfall structure located approximately 60 m offshore. The facility currently has surplus capacity.

### 3.2.3 Natural Environment

#### Topography

The area is low lying although typically above the 1:100 year regional floodline of 47.3 m ASL. Man made canals extend through the development on the east and west sides of Phase 1 thereby providing boating access for the residents.

#### Surficial Geology

The surficial geology in the Study Area is described by the Geologic Survey of Canada (1965) as follows:

- the soils of the wetlands are described as peat, muck, poorly drained supporting fen, swamp, and marsh vegetation,
- the soils of the lowlands are described as Malone clay and silt, fossiliferous, poorly drained, and overlain with Fort Covington till, compact including bouldery washed till on slopes and hills. The lower Malone till is very compact.

Recent work by St. Lawrence Testing and Inspection Co. Ltd. in the Creg Quay Phase 2 area noted topsoil varying to 440 mm, overlying silty, sandy till, moist and compact, with gravel and cobbles at depths to 15 m. Below the till, grey, very wet, silty soft clay may be encountered at depths greater than 3.0 m. Bedrock is below 20 m.

#### Bathymetry

The near shore region is typified by shallow water up to 2.0 m in depth at 100 m offshore. A silty, clay bottom deposit which promotes weed growth predominates. Shoreline erosion is controlled through man made erosion protection including riprap and the marina embankments.

### Vegetation

Vegetation in Creg Quay is predominantly landscaping associated with the land development. Ornamental trees, landscaped areas and manicured lawns prevail. Wild vegetation exists in the undeveloped areas.

### Land Use

According to the Township of Lancaster official plan 1994, the land-use designation for Craig Quay is Shoreline Residential and Tourist Commercial. Permitted uses include multi-residential, marina, commercial, restaurant, and related uses.

### Archeology

No known features of archeological significance have been reported in Creg Quay.

## **3.3 Nadeau's Point**

### **3.3.1 Water Supply and Sewage Disposal**

Water supply is from individual drilled wells. Sewage disposal is provided by private individual systems. No investigation of the existing wells, well water quality, or sewage systems was undertaken as part of this study, nor previously by the RRCA. Given the nature and history of the area, it is reasonable to predict that systems are old and in need of attention. Many of the residences have been converted from seasonal to permanent over the years.

### **3.3.2 Surface Water Conditions**

Nadeau's Point is east of Westley's Creek and the MacIntosh Creek – Westley's Creek wetland. The investigation by the RRCA included surface water sampling throughout the area. Surface watercourses adjacent to Nadeau's Point include Lake St. Francis, MacIntosh Creek and Westley's Creek. Samples taken at three different locations in MacIntosh Creek five times throughout the summer of 1994 showed consistent elevated phosphorus concentrations. *E.coli* counts were exceeded at each location at least once during the sampling program. The presence of both phosphorus and *E.coli* could be an indication that faulty septic systems are contributing to the degradation of surface water quality in MacIntosh Creek and consequently the St. Lawrence River.

### **3.3.3 Other Issues**

Flooding and drainage problems are of concern in this area. While the RRCA did not specifically study Nadeau's Point, it is clearly evident from observations made during the course of the study that the altered surface drainage patterns and flooding would result in seasonal inundation of septic systems and would restrict access to properties.

### 3.3.4 Natural Environment

#### Topography

The area is low lying although typically above the 1:100 year regional floodline of 47.3 m ASL. Poor surface drainage has been exacerbated by the development of buildings over the years and the related lot grading. Drawing No. 1 illustrates topographic contouring. Nadeau's Point is bordered on the west by the wetland and Westley's Creek and on the south and east by the St. Lawrence River.

#### Surficial Geology

The surficial geology in the Study Area is described by the Geologic Survey of Canada 1965 as follows:

- the soils of the wetlands are described as peat, muck, poorly drained supporting fen, swamp, and marsh vegetation,
- the soils of the lowlands are described as Malone clay and silt, fossiliferous, poorly drained, and overlain with Fort Covington till, compact including bouldery washed till on slopes and hills, Malone till (lower) very compact.

Recent work by St. Lawrence Testing and Inspection Co. Ltd. in the Creg Quay Phase 2 area noted topsoil varying to 440 mm, overlying silty, sandy till, moist and compact, with gravel and cobbles at depths to 15 m. Below the till, grey, very wet, silty soft clay may be encountered at depths greater than 3.0 m. Bedrock is below 20 m.

#### Bathymetry

The near shore region is typified by shallow water varying between 0.0 and 2.0 m in depth at 100 m offshore. A silty, clay bottom deposit which promotes weed growth predominates. Shoreline erosion is persistent.

#### Vegetation

Vegetation in Nadeau's Point is limited to landscaping associated with residential land development. Ornamental trees and manicured lawns prevail.

#### Land Use

According to the Township of Lancaster official plan 1994, the land-use designation for Nadeau's Point is Limited Services Residential. Permitted uses are limited to single residential dwellings on private water supply and sewage disposal systems. The setting is one of a compact rural subdivision. Approximately 50% of the dwellings are seasonal.

#### Wetland

Nadeau's Point is bordered on the west by Westley's Creek and the wetland. The wetland area provides habitat for waterfowl, marsh creatures, and typical wetland vegetation.

#### Archeology

No known features of archeological significance have been reported in Nadeau's Point.

### 3.4 Amandale Bay

#### 3.4.1 Water Supply and Sewage Disposal

Water supply is from individual drilled wells. Sewage disposal is provided by private individual systems. No investigation of the existing wells, well water quality, or sewage systems was undertaken as part of this study, nor previously by the RRCA. Given the nature and history of the area, it is reasonable to predict that systems are old and in need of attention. Many of the residences have been converted from seasonal to permanent over the years.

#### 3.4.2 Surface Water Conditions

Amandale Bay lies between Nadeau's Point and the Creg Quay Marina, and immediately adjacent to proposed Creg Quay Phase 2.

#### 3.4.3 Other Issues

Flooding and drainage problems are of concern in this area. While the RRCA did not specifically study Nadeau's Point, it is clearly evident from observations during the course of the study that the altered surface drainage patterns and flooding would result in seasonal inundation of septic systems, and would restrict access to properties.

#### 3.4.4 Natural Environment

##### Topography

The area is low lying although typically above the 1:100 year regional floodline of 47.3 m ASL. Poor surface drainage has been exacerbated by the development of buildings over the years and the related lot grading. Drawing No. 1 illustrates topographic contouring. Amandale Bay is bordered on the west by a man made canal extending from Nadeau's Point, the St. Lawrence River on the south, and Creg Quay to the north and east.

##### Surficial Geology

The surficial geology in the Study Area is described by the Geologic Survey of Canada 1965 as follows:

- the soils of the wetlands are described as peat, muck, poorly drained supporting fen, swamp, and marsh vegetation,
- the soils of the lowlands are described as Malone clay and silt, fossiliferous, poorly drained, and overlain with Fort Covington till, compact including bouldery washed till on slopes and hills, Malone till (lower) very compact.

Recent work by St. Lawrence Testing and Inspection Co. Ltd. in the Creg Quay Phase 2 area noted topsoil varying to 440 mm, overlying silty, sandy till, moist and compact, with gravel and cobbles at depths to 15 m. Below the till, grey, very wet, silty soft clay may be encountered at depths greater than 3.0 m. Bedrock is below 20 m.

### Bathymetry

The near shore region is typified by shallow water varying between 0.0 and 2.0 m in depth at 100 m offshore. A silty, clay bottom deposit which promotes weed growth predominates. Shoreline erosion is moderate due to the protected nature of the bay.

### Vegetation

Vegetation in Amandale Bay is limited to landscaping associated with residential land development. Ornamental trees and manicured lawns prevail.

### Land Use

According to the Township of Lancaster official plan 1994, the land-use designation for Nadeau's Point is Limited Services Residential. Permitted uses are limited to single residential dwellings on private water supply and sewage disposal systems. The setting is one of a compact rural subdivision. Approximately 50% of the dwellings are seasonal.

### Archeology

No known features of archeological significance have been reported in Nadeau's Point.

## **3.5 Recommended Alternative Solution**

### **3.5.1 Sewage Disposal Partnership**

The existing Creg Quay sewage treatment facility is strategically located equidistant from the Creg Quay development and the Westley's Point development. With modifications to and an expansion of the Creg Quay sewage treatment facility, accommodation can be made to include sewage disposal for Westley's Point, Nadeaus Point and Amandale Bay. Reference is made to Drawing No. 01.

A partnership involving Creg Quay Limited, Westley's Point and the Township of South Glengarry will be required to affect the implementation of this alternative solution. It is anticipated that the existing sewage collection and treatment facilities in Creg Quay will be conveyed to the municipality and that any new facilities will be under the ownership of South Glengarry. A transfer agreement between the Township and CQL will have to be executed.

Preliminary design details, design alternatives, cost estimates, cost sharing, environmental impacts, and other relevant issues are discussed in the following sections of the ESR.

### **3.5.2 Class EA Schedule**

An expansion to an existing sewage treatment facility or existing sewage treatment lagoons beyond the existing (approved) rated capacity is a Schedule C activity as defined in the Class Environmental Assessment for Municipal Water and Wastewater Projects, June 1993. Schedule C activities are subject to the provisions of the Class Environmental Assessment process including Phase 3 and Phase 4 as well as the completion of an Environmental Study Report.



This report, which is considered an amendment to the Greater Lancaster Area Class EA, fulfills the requirements of the Class EA Process. It presents a solution that has the potential to resolve the existing and future sewage disposal problems at Westley's Point, Nadeau's Point, and Amandale Bay, while at the same time accommodating the existing and future requirements of Creg Quay.

## **4 PRELIMINARY DESIGN CRITERIA**

### **4.1 Proposed Service Area**

The Proposed Service Area (PSA) is illustrated on Drawing No. 01 and includes Creg Quay, Westley's Point, Nadeau's Point and Amandale Bay. Only the following land uses are included in the PSA; Tourist Commercial (Creg Quay), Shoreline Residential (Creg Quay), and Limited Services Residential (Westley's Point, Nadeau's Point, and Amandale Bay). Rural Area and Wetland Area designated areas are not included in the PSA, although they are shown on Drawing No. 1. The only exception is the land directly fronting on the east side of 69<sup>th</sup> Avenue in Westley's Point. The construction of a local sanitary sewer is proposed for 69<sup>th</sup> Avenue to service the existing dwellings on the west side, therefore it is appropriate to include in the service area land fronting on the east side of 69<sup>th</sup> Avenue.

### **4.2 Design Population Estimate**

The ultimate population of the Proposed Service Area is 2,344 persons exclusive of the equivalent population associated with the seasonal marina and commercial uses at Creg Quay. Existing population includes Creg Quay Phase 1, Westley's Point, Nadeaus Point, and Amandale Bay as noted in Table 4.1. The design population includes existing population along with infill in CQ Phase 1. Also included in the design population is infill in Westley's Point, Nadeaus Point, and Amandale Bay in the areas designated as Limited Service Residential. Allowance has been made in the design population to include new development in Creg Quay in Phase 2, the Marina Basin (East and South Landings) and the Marina Inn.

The ultimate population includes additional new development in Creg Quay as defined in the Creg Quay Master Plan (see Appendix B) including Phase 3 residential and Marina condominiums.

Creg Quay Phase 1 was developed as a retirement lifestyle community and currently comprises 103 detached dwelling lots. Approximately 85 lots are developed and the estimated population is 162 based on 1.9 persons per unit (ppu). Future residential phases will include detached housing, townhouses, and marina condominiums with densities ranging from 2.3 to 2.8 ppu. Population in Westley's Point, Nadeaus Point and Amandale Bay are estimated based on 2.8 ppu. Seasonal population associated with the marina basin (boats) and the marina inn are not included in the population numbers in Table 4.1, however, the associated sewage flow is estimated in Table 4.2 for design purposes.

Creg Quay is not expected to develop to the ultimate level as defined in the master plan in the immediate future and probably not within the next 20 years. On that basis, it is not practical to design and develop many of the components of the sewage system infrastructure for the ultimate flows, therefore a design flow has been determined as noted below and in Table 4.2.

**TABLE 4.1 DESIGN POPULATION ESTIMATE**

	Creg Quay	Westley's Point	Nadeau's Point	Amandale Bay	Total
Existing	162	208	59	62	491
Infill CQ Phase 1	34				34
Infill Other	0	72	39	22	133
Proposed CQ Phase 2	798				798
Design Population	994	280	98	84	1456
Proposed CQ Marina Condo	230				230
Proposed CQ Phase 3	658				658
Ultimate Population	1,882				2,344

Note: Does not include equivalent population of seasonal marina/commercial uses at Creg Quay.

### 4.3 Design Sewage Flow Rate

Actual water consumption data or sewage flow data in the study area is not available other than at Creg Quay. At Creg Quay, water consumption in Phase 1 has been estimated at 350 to 400 L/c/d including seasonal water uses such as lawn watering and system losses. Hence sewage flows are estimated to be approximately 320 L/c/d. The Ontario Ministry of Environment, in their Guidelines for the Design of Sanitary Sewage Works recommends that average daily flows in the range of 225 to 450 L/capita/day should be used for the design of sewage collection systems and related appurtenances. Infiltration rates in the range of 90 L/c/d (average) and 227 L/c/d (peak) are recommended for the design of sewage collection systems and pumping stations. Therefore, the sewage design flow for Creg Quay and area is based on 320 L/c/d for residential uses and other recommended design values for non-residential uses as noted in the tables.

The largest component of the projected sewage flow comes from the residential uses. Phase 1 at Creg Quay will have 103 residential units and Phase 2 will have 285 residential units. A total of 165 units in Westley's Point, Nadeau's Point and Amandale Bay will contribute to the design average daily flow (ADF) rate. Commercial uses at Creg Quay associated with the development, a restaurant, season docking facilities, and a Marina Inn will also contribute to the design ADF.

Table 4.2 indicates that the design average daily flow (ADF) rate will be approximately 682.3 m<sup>3</sup>/day and that the design peak flow rate will be 27.84 L/sec. The ultimate ADF rate will be approximately 1046.6 m<sup>3</sup>/day and the peak flow rate for ultimate development will be 42.04 L/sec. The design sewage flow rate is a reasonable compromise between the existing conditions and the ultimate sewage flow rate. It will be used for determining the size of some of the components of the sewage disposal system including the treatment facility and the pumps in the pumping station(s). Other components such as the collection system sewers, the forcemain, the effluent line, and pumping station wet well will be sized for the ultimate sewage flow.

**TABLE 4.2 DESIGN SEWAGE FLOW ESTIMATE**

	Units	ADF m <sup>3</sup> /day	Peak L/sec
Creg Quay (1)			
Existing Phase 1 Residential	103 units	80.4	3.14
Proposed Phase 2 Residential	285 units	327.2	12.77
Existing Restaurant	165 seats	27.4	1.27
Existing Commercial	2,323 m <sup>2</sup>	9.3	0.32
Existing/Proposed Marina Landings	125/315 boats	41.8	1.94
Proposed Marina Inn	30 beds	6.8	0.35
Westley's Point	100 units	114.8	5.06
Nadeau's Point	35 units	40.2	1.61
Amandale Bay	30 units	34.4	1.38
<b>Design Flow</b>		<b>682.3</b>	<b>27.84</b>
Creg Quay (1)			
Creg Quay Phase 3 Residential	235 units	270	10.52
Creg Quay Marina Condominium	100 units	94.3	3.68
<b>Ultimate Flow</b>		<b>1046.6</b>	<b>42.04</b>

(1) Taken from the Creg Quay Ltd. Report on the Long Range Plan to Develop Sewage Facilities, March 1994, R.J. Burnside & Associates Ltd.

#### 4.4 Existing Certificate of Approval

The existing treatment facility consists of a 2-cell semi-annual discharge facultative lagoon system with a total of approximately 1.6 ha. The rated capacity of the facility is 62.7 m<sup>3</sup>/day with an active volume of 23,000 m<sup>3</sup>. Effluent criteria as prescribed in the C of A are listed in Table 4.3. Although the existing facilities could accommodate some additional development flow, CQL sought and obtained an amended C of A (3-1634-95-006 dated November 28, 1995), which is reprinted in Appendix A, to accommodate the estimated ultimate flows in accordance with the Master Plan. The ultimate sewage flow for Creg Quay was estimated to be 856.7 m<sup>3</sup>/day, which, of course, did not include Westley's Point, Nadeau's Point and Amandale Bay.

The approval of the proposed expansion of the sewage treatment lagoons required an Ontario Municipal Board (OMB) hearing relating to a Township of Lancaster Official Plan Amendment (OPA) in 1995. The MOE eventually approved the following:

- the 2-cell treatment facility would be limited to a total 146,000 m<sup>3</sup> of active storage volume at an operating depth of 1.8 m and a sludge storage depth of 0.5 m,
- an annual average daily flow of 800 m<sup>3</sup>/day (computed from the volume),
- semi-annual discharge in the spring and fall over a period of not less than 30 days each into the effluent line that discharges to the St. Lawrence River,
- compliance criteria include BOD<sub>5</sub> 30 mg/L, TSS 40 mg/L, and TP 1.0 mg/L. Loading limits are also cited,
- monitoring and reporting requirements are stipulated.

The proposed (approved) sewage treatment facility included a 2-cell semi-annual discharge facultative lagoon system totaling 8.8 ha in area. The existing 200-mm diameter effluent line is suitable. The construction of the sewage treatment works would be phased including the lagoon cells and the replacement of pumping station No. 1 (PS1), as development progresses through Phase 2 and subsequent phases.

#### 4.5 Receiving Stream Impact Assessment

The recommended treatment alternative proposes to:

- increase the ultimate sewage ADF from 767 m<sup>3</sup>/day to 1046.6 m<sup>3</sup>/day with an interim design flow of 682.3 m<sup>3</sup>/day,
- change the storage capacity from 140,000 m<sup>3</sup> (8.8 ha) having a hydraulic retention time (HRT) of 180 days to 23,000 m<sup>3</sup> (1.6 ha) having a HRT of not less than 30 days,
- change the method of treatment from facultative semi-annual discharge to aerated-facultative continuous discharge with additional post-aeration.

To achieve a continuous discharge operation using the existing lagoon cells, the treatment process will have to be substantially upgraded, and as such the initial stage in the design process was to determine the required treatment criteria. The treatment upgrades include: mechanical pre-aeration, continuous alum addition, wind aerator post-aeration, and inlet flow measuring. The existing lagoon cells will be desludged and the banks will be trimmed and stabilised as required.

A Receiving Stream Impact Assessment was conducted to determine the assimilative capacity of the receiving body of water, the St. Lawrence River (Appendix D). The preliminary design of the treatment facility is based on the treated effluent criteria determined by the receiving stream impact assessment. As part of the process, field measurements were taken at the existing outfall during the fall discharge of the Creg Quay lagoons to ascertain the effectiveness of effluent dispersion in the mixing zone.

The Cormix Model was used to model the hydrodynamic mixing of the discharge for various flow conditions from which it was concluded that the existing outfall is adequate and that the proposed treatment criteria are as indicated in Table 4.3. Appendix D provides the Receiving Stream Impact Assessment and outfall modeling results.

**TABLE 4.3 TREATMENT QUALITY CRITERIA (mg/L)**

Parameter	Existing C of A	Proposed Compliance	Proposed Design	Treatment Process
BOD <sub>5</sub>	30	30	25+	Aeration
TSS	40	40	30+	Sedimentation
TP	1.0	<1.0	<1.0	Precipitation
H <sub>2</sub> S	Na	Non Detectable	Non Detectable	Post Aeration

The proposed quality compliance limits will be promulgated in an amended Certificate of Approval from the MOE including the rated capacity and operating conditions. They are based on the analysis of the receiving stream impact assessment and the Provincial Water Quality Objectives (PWQO) relative to the proposed treatment facility. The more stringent proposed design criteria provide a margin of safety from the compliance criteria to accommodate fluctuations in influent quality and treatment performance. Treatment processes will be designed to achieve the prescribed criteria.

#### 4.6 Summary of Design Criteria

The following Table 4.4 summarises the design criteria for the proposed treatment facility. It should be noted that the interim facility will be configured within the existing lagoon cells and that only as Creg Quay approaches the ultimate stage of development will additional storage capacity be required. An additional cell is proposed to meet the ultimate requirement, however, at the time of ultimate development other options may be available including increasing the height of the existing cells or modifying the treatment process with a new technology.

**TABLE 4.4 SUMMARY OF DESIGN CRITERIA**

	Approved		Proposed	
	Existing Facility	Expanded Facility	Interim Facility	Ultimate Facility
C of A	3-0511-81-007 Aug, 12, 1981 as amended Feb 14, 1999	3-1634-95-006 Nov. 28, 1995	na	na
Ownership	Creg Quay Ltd.	Creg Quay Ltd.	Township of South Glengarry	Township of South Glengarry
Treatment Process	Facultative Lagoon, semi- annual discharge	Facultative Lagoon, semi-annual discharge	Aerated facultative lagoon, continuous discharge	Aerated facultative lagoon, continuous discharge
Compliance Criteria	30 BOD, 40 TSS, 1.0 TP	30 BOD, 40 TSS, 1.0 TP	30 BOD, 40 TSS, 1.0 TP, nd H <sub>2</sub> S	30 BOD, 40 TSS, 1.0 TP, nd H <sub>2</sub> S
Configuration	2 cells	2 cells	2 cells	3 cells
Surface Area	1.6 ha	8.8 ha	1.6 ha	2.2 ha
Operating Volume	23,000 m <sup>3</sup>	140,000 m <sup>3</sup>	23,000 m <sup>3</sup>	32,000 m <sup>3</sup>
Capacity (ADF)	126 m <sup>3</sup> /day	767 m <sup>3</sup> /day	760 m <sup>3</sup> /day	1,047 m <sup>3</sup> /day

## 5 EVALUATION OF DESIGN ALTERNATIVES

### 5.1 Description of Alternatives

It was noted at the beginning of this document that the purpose of this study is to examine the preferred alternative of an area sewage collection and treatment system. The area system would utilise and enhance the existing Creg Quay treatment facilities and provide new sewage collection systems in Westley's Point, Nadeau's Point, and Amandale Bay which would allow the elimination of existing septic systems and holding tanks. To provide a basis for comparison, two other alternatives to the undertaking are examined; Alternative 6 which involves a connection to the GLA sewage treatment facility, and Alternative 5 which involves a new facultative lagoon treatment facility exclusively for Westley's Point. The remainder of the Alternatives involves design variations to the preferred alternative which is detailed in 5.1.1 below. Reference is made to Table 5.1 – Summary of Alternative Costs.

#### 5.1.1 Alternative 1 (The Preferred Alternative)

Drawing No. 01 illustrates Alternative 1 and the Study Area. Alternative 1 proposes an area municipal sewage collection and treatment system to accommodate Creg Quay, Westley's Point, Nadeau's Point and Amandale Bay. Components of the system include:

- local sewage collection systems in Westley's Point, Nadeau's Point, and Amandale Bay,
- trunk sanitary sewers interconnecting the proposed local sewers in Westley's Point, Nadeau's Point, and Amandale Bay, and interconnecting the existing local sanitary sewers in Creg Quay to a central pumping station,
- a central pumping station and forcemain connecting to the existing Creg Quay forcemain, highway crossing, and lagoon treatment facility,
- enhancements to the existing Creg Quay treatment facility to provide improved treatment for the proposed additional flow and proposed continuous discharge to the existing Creg Quay effluent line. The ultimate treatment facility will require an additional cell for a total area of approximately 2.2 ha however initially the existing cells will be utilised to meet the projected design flow.

The estimated capital cost is \$4,985 per household based on 165 properties after Provincial funding assistance of 66.7% and a capital contribution (share) from Creg Quay Ltd. of \$320,445. The annual operating cost is projected at \$244 per household based on 215 existing equivalent households and the marina and commercial areas at Creg Quay.

#### 5.1.2 Alternative 2

Alternative 2 is a variation on Alternative 1 however involving two pumping stations; one at Westley's Point and one at Nadeau's Point. The wastewater from Westley's Point would be pumped (instead of gravity) by forcemain to the central pumping station PS3 at Nadeau's Point. Creg Quay and Amandale Bay would be connected by a gravity collector sewer to PS3. The other components are the same as Alternative 1 and include:

- local sewage collection systems in Westley's Point, Nadeau's Point, and Amandale Bay,

**TABLE 5.1: SUMMARY OF ALTERNATIVE COSTS**

	<b>Creg Quay</b>	<b>Westley's Point</b>	<b>Nadeau's Point</b>	<b>Amandale Bay</b>	<b>Total</b>
Existing Households	85	75	21	22	203
Design Households	388	100	35	30	553
Design ADF m <sup>3</sup> /day	492.7	114.8	40.2	34.4	682.1
<b>ALTERNATIVE 1 - One Central Pumping Station at Nadeau's Point, Enhanced CQ Treatment</b>					
Net Capital Cost	\$320,445	\$481,586	\$181,325	\$159,615	\$1,142,971
Household Net Capital Cost		\$4,985	\$4,985	\$4,985	\$4,985
Household Annual Operating Cost	\$244	\$244	\$244	\$244	\$244
<b>ALTERNATIVE 2 - 2 Pumping Stations (Westley's and Nadeau's), Enhanced CQ Treatment</b>					
Net Capital Cost	\$320,445	\$555,535	\$149,858	\$132,687	\$1,158,525
Household Net Capital Cost		\$5,079	\$5,079	\$5,079	\$5,079
Household Annual Operating Cost	\$293	\$293	\$293	\$293	\$293
<b>ALTERNATIVE 3 - 2 Pumping Stations (Westley's and Creg Quay), Enhanced CQ Treatment</b>					
Net Capital Cost	\$302,588	\$543,846	\$146,053	\$129,431	\$1,121,918
Household Net Capital Cost		\$4,966	\$4,966	\$4,966	\$4,966
Household Annual Operating Cost	\$293	\$293	\$293	\$293	\$293
<b>ALTERNATIVE 4 - 2 Pumping Stations (Westley's and Creg Quay), Enhanced CQ Treatment. NP and AB excluded.</b>					
Net Capital Cost	\$322,903	\$655,425	\$0	\$0	\$978,328
Household Net Capital Cost		\$6,554	\$0	\$0	\$6,554
Household Annual Operating Cost	\$300	\$300			\$300
<b>ALTERNATIVE 5 - Westley's Point to New Treatment, Outfall</b>					
Net Capital Cost	\$528,103	\$850,414	\$0	\$0	\$1,378,517
Household Net Capital Cost		\$8,504	\$0	\$0	\$8,504
Household Annual Operating Cost	\$500	\$500			\$500
<b>ALTERNATIVE 6 - Connect Westley's Point to Lancaster</b>					
Net Capital Cost	\$528,103	\$1,423,451	\$0	\$0	\$1,951,554
Household Net Capital Cost		\$14,235	\$0	\$0	\$14,235
Household Annual Operating Cost	\$500	\$370			\$370

Cost per household is an average and is not based on an assessment formula.

Net Capital Cost estimate includes Provincial funding at 66.7% for eligible items.

Operating Cost estimate does not include capital replacement allowance.



- a central pumping station PS3 and forcemain connecting to the existing Creg Quay forcemain, highway crossing, and lagoon treatment facility,
- enhancements to the existing Creg Quay treatment facility to provide improved treatment for the proposed additional flow and proposed continuous discharge to the existing Creg Quay effluent line. The ultimate treatment facility will require an additional cell for a total area of approximately 2.2 ha however initially the existing cells will be utilised to meet the projected design flow.

The estimated net capital cost is almost the same as Alternative 1 at \$5,079 per household based on 165 properties after Provincial funding assistance of 66.7% and a capital contribution (share) from Creg Quay Ltd. of \$320,445. However, the projected annual operating cost is significantly higher at \$293 per household due to the additional pumping station.

### 5.1.3 Alternative 3

Alternative 3 is a variation on Alternative 2 involving two pumping stations; one at Westley's Point and one at Creg Quay. The wastewater from Westley's Point would be pumped (instead of gravity) by forcemain to the collector sewer at Nadeau's Point, and then flow by gravity through Amandale Bay to Creg Quay. The other components are the same as Alternative 2 and include:

- local sewage collection systems in Westley's Point, Nadeau's Point, and Amandale Bay,
- a main pumping station PS3 in Creg Quay connecting to the existing Creg Quay forcemain, highway crossing, and lagoon treatment facility,
- enhancements to the existing Creg Quay treatment facility to provide improved treatment for the proposed additional flow and proposed continuous discharge to the existing Creg Quay effluent line. The ultimate treatment facility will require an additional cell for a total area of approximately 2.2 ha however initially the existing cells will be utilized to meet the projected design flow.

The estimated net capital cost is almost the same as Alternative 1 at \$4,966 per household based on 165 properties after Provincial funding assistance of 66.7% and a capital contribution (share) from Creg Quay Ltd. of \$320,445. However, the projected annual operating cost is significantly higher at \$293 per household due to the additional pumping station.

### 5.1.4 Alternative 4

Alternative 4 provides a solution for Westley's Point only with no provision for Nadeau's Point and Amandale Bay. A pumping station in Westley's Point would discharge wastewater through a forcemain extending along the South Service Road to the existing Creg Quay forcemain and Highway 410 crossing. This alternative involves two pumping stations; one at Westley's Point and one at Creg Quay. The wastewater from Westley's Point would be pumped as it is now through the existing forcemain to the treatment facility. Other components include:

- a local sewage collection system in Westley's Point, and

- enhancements to the existing Creg Quay treatment facility to provide improved treatment for the proposed additional flow and proposed continuous discharge to the existing Creg Quay effluent line. The ultimate treatment facility will require an additional cell for a total area of approximately 2.2 ha however initially the existing cells will be utilized to meet the projected design flow.

The estimated net capital cost for Alternative 4 is \$6,554 per household based on 100 properties after Provincial funding assistance of 66.7% and a capital contribution (share) from Creg Quay Ltd. of \$322,903. However, the projected annual operating cost is significantly higher at \$300 per household due to the additional pumping station and fewer benefiting properties. No allowance is made for capital replacement.

Disadvantages of this alternative include increased capital and operating costs, two pumping stations to operate and maintain, and no provision for Nadeau's Point and Amandale Bay to connect to the system except by a additional pumping stations and forcemains in the future.

#### 5.1.5 Alternative 5

Alternative 5 involves the development of a new seasonal discharge facultative lagoon treatment facility on land to be purchased near Westley's Point. The ability to achieve this alternative is dependent on successfully acquiring and rezoning land for the purposes of waste (sewage) disposal, which has environmental implications. The estimated capital cost per household is \$8,504 after subsidy and the annual operating cost is estimated at \$500 per household.

#### 5.1.6 Alternative 6

To achieve Alternative 6, a pumping station with backup power supply will be required at Westley's Point. A forcemain extending approximately 4,400 m from Westley's Point to Lancaster will also be required. The existing sewage treatment facilities in Lancaster will have to be upgraded in accordance with the Greater Lancaster Area Water and Wastewater Class EA Document dated April 1998. The contribution to the GLA sewage treatment facility upgrade is cited in the report at \$3,221 per household after Provincial contribution at 70%. The total cost per household is estimated at \$14, 235, with an annual operating cost of \$370 per household.

### 5.2 Natural Environment Issues

Following is a description and evaluation of the natural, social and economic environment impacts associated with the recommended alternative.

#### 5.2.1 Collection System Corridors

The collection system typically will be located within existing/proposed road allowances and easements. The only significant easement requirement is the crossing of the Rural Area between Westley's Point and Nadeau's Point. As noted herein, the area surficial geology is characterized as follows:

- the soils of the wetlands are described as peat, muck, poorly drained supporting fen, swamp, and marsh vegetation,
- the soils of the lowlands are described as Malone clay and silt, fossiliferous, poorly drained, and overlain with Fort Covington till, compact including bouldery washed till on slopes and hills, Malone till (lower) very compact.

Recent work by St. Lawrence Testing and Inspection Co. Ltd. in the Creg Quay Phase 2 area noted topsoil varying to 440 mm, overlying silty, sandy till, moist and compact, with gravel and cobbles at depths to 15 m. Below the till, grey, very wet, silty soft clay may be encountered at depths greater than 3.0 m. Bedrock is below 20 m.

Construction methods should comply with Ontario Provincial Standards and the Ontario Environmental Construction Guidelines for Municipal Road, Sewage and Water Projects (1987). Consequently, no lasting adverse impacts relative to the construction of the sewage collection system are anticipated.

#### 5.2.2 Sewage Treatment Facility Site

Other than the receiving Stream Impact Assessment, no special natural environment studies were conducted relative to the proposed treatment facility. The proposed treatment works including aeration equipment, piping, chemical addition, and related components will be confined to the existing lagoon cells for the initial design stage. The proposed site works including power supply, building, alum storage, and lighting will be confined to the existing site.

There are no special environmental features in the immediate area of the treatment facility that would preclude the project as designed or require extraordinary environmental accommodation or mitigation. The semi-annual discharge facultative lagoon treatment facility, if constructed as previously approved (1995), would 8.8 ha of lagoon surface area. The proposed configuration will be confined to 1.6 ha (existing cells) initially and 2.2 ha ultimately. The approved setbacks of 3.5 m from the east property line and 60 m from the south property line will be increased to the benefit of the neighbouring properties.

Noise from the proposed aerators is a concern of one of the neighbouring residents. We have selected aspirating aerators due to their inherent low noise levels. Data provided by Aeration Industries, suppliers of the Aire-O<sub>2</sub> Aerator, one model being considered, indicates that noise levels of 47 dB were measured at 30 m (100 ft) from the unit compared to an ambient background level of 43 dB. The 7.5 kW motor driven aerators will be located at least 50 m from the property line and hidden by the lagoon cell berms, hence the noise will not be discernable at the property line. Background noise in the area is undoubtedly higher than the reference 43 dB given the proximity of the Highway 401 and the CNR mainline.

#### 5.2.3 Effluent Outfall

The existing 200 mm diameter effluent line extends approximately 60 m off the end of the lighthouse point at the Creg Quay Marina Basin. Based on the Receiving Stream Impact Assessment, the effluent line does not have to be extended to satisfy the mixing

characteristics at the outfall and meet the stipulated effluent quality criteria within the near-field mixing zone (min. 20:1 dilution).

### 5.3 Social Environment Issues

Social issues are somewhat less tangible than natural environment issues, however, two such issues were identified during the public consultation process.

- The current deterioration of the natural environment resulting from odour from septic and holding systems diminishes the quality of life and enjoyment of property;
- The current deterioration of the natural environment resulting from odour from septic and holding systems diminishes reduces market values and the ability to resell;
- Well water quality has been affected in some wells because of inadequate sewage disposal systems which affects drinking and bathing activities,
- Raw sewage in ditches and surface water potentially impacts health.

### 5.4 Economic Environment Issues

Most residents who have attended the public meetings (2) or have contacted the Township or the Engineer, support the concept of a municipal sewage collection and treatment system and support the recommended alternative. The principal concern is affordability. Even for those who object to the project, the principal concern is the cost. Most municipal infrastructure projects in Ontario are financed by the users (ratepayers) with varying degrees of assistance from the Province of Ontario through a MOE Program. For relatively small rural projects such as this project, financial assistance is essential to achieve affordability.

The annual operating costs will be an on going municipal responsibility and from that perspective, the ratepayers are concerned with affordability and least cost. The estimated operating cost of the recommended alternative is \$244 per household per year exclusive of capital replacement allowance. The municipality should establish a rate structure to ensure sustainability.

### 5.5 Assessment of Costs

#### 5.5.1 Capital Costs

The total capital cost of the recommended alternative is \$4,296,494 as detailed in the following Table 5.2, and is comprised of the following components:

- existing infrastructure at \$1,506,000,
- the Provincial funding assistance at \$1,647,523,
- Creg Quay Limited contribution at \$320,445, and,
- the Westley's Point, Nadeau's Point and Amandale Bay share at \$822,526.

A schedule of assessment will be developed by the municipality for the Westley's Point, Nadeau's Point and Amandale Bay share when the project funding level is confirmed and the final design and related cost estimate is completed. The estimated average capital cost

assessment per household is \$4,985 based on the assumptions noted. The final assessment schedule may include frontage, assessed value and area components. The cost of service lateral connections on private property is not included and is the direct responsibility of the property owner.

**TABLE 5.2 ALTERNATIVE 1 COST APPORTIONMENT**

ALTERNATIVE 1		Total	Creg Quay	Westley's Point Nadeau's Point Amandale Bay
<b>Design Criteria</b>				
Service Area (ha)		62.68	39.9	22.78
Existing Population		492	162	330
Existing Households		203	85	118
Design Population		1584	1124	460
Design Households		553	388	165
Design ADF (m <sup>3</sup> /d) includes non-residential		682.1	492.7	189.4
Ratio (Based on ADF)		1	0.7223	0.2777
<b>Capital Cost</b>				
Existing Systems - Sewage Treatment	Ratio	\$1,506,000	\$1,087,847	\$418,153
Proposed Systems - Sewage Treatment	Ratio	\$528,104	\$381,472	\$146,632
<b>Proposed Systems - Sewage Collection</b>				
Local Sanitary Sewers		\$1,062,045		\$1,062,045
Pumping Station PS3	Ratio	\$494,401	\$357,127	\$137,274
PS3 Forcemain		\$102,588		\$102,588
Collector Sewer from Creg Quay/Amandale		\$158,134		\$158,134
Collector Sewer from Westley's Point		\$445,222		\$445,222
<b>TOTAL CAPITAL COST</b>		<b>\$4,296,494</b>	<b>\$1,826,445</b>	<b>\$2,470,049</b>
Creg Quay Asset Contribution			\$1,506,000	
Provincial MOE Contribution	66.7%			\$1,647,523
Net Capital Cost		\$1,142,971	\$320,445	\$822,526
Average Household Net Capital Cost	165			\$4,985
<b>Average Household Costs</b>				
Debenture Cost (15 year) per Household	8%			\$539
Annual Operating Cost (No Capital)				\$244
Building Connection Cost				Varies

### 5.5.2 Annual Operating Costs

The estimated annual operating cost per household is provided in Table 5.2. The estimated annual operating cost of \$244 per household is based on 215 equivalent households including the Creg Quay Limited restaurant, marina basin and commercial uses, existing households in Creg Quay Phase 1 (85), and existing households in Westley's Point (75),

Nadeau's Point (21), and Amandale Bay (22). The estimated annual operating cost is marginally less than the estimated annual operating cost of sewage collection and treatment in Creg Quay Phase 1. Currently, the residents in Phase 1 pay an annual maintenance fee for all services. The estimated annual operating cost does not include an allowance for capital replacement. As additional development takes place particularly in Creg Quay, the annual operating cost may decrease.

## 5.6 Comparative Evaluation of Alternatives

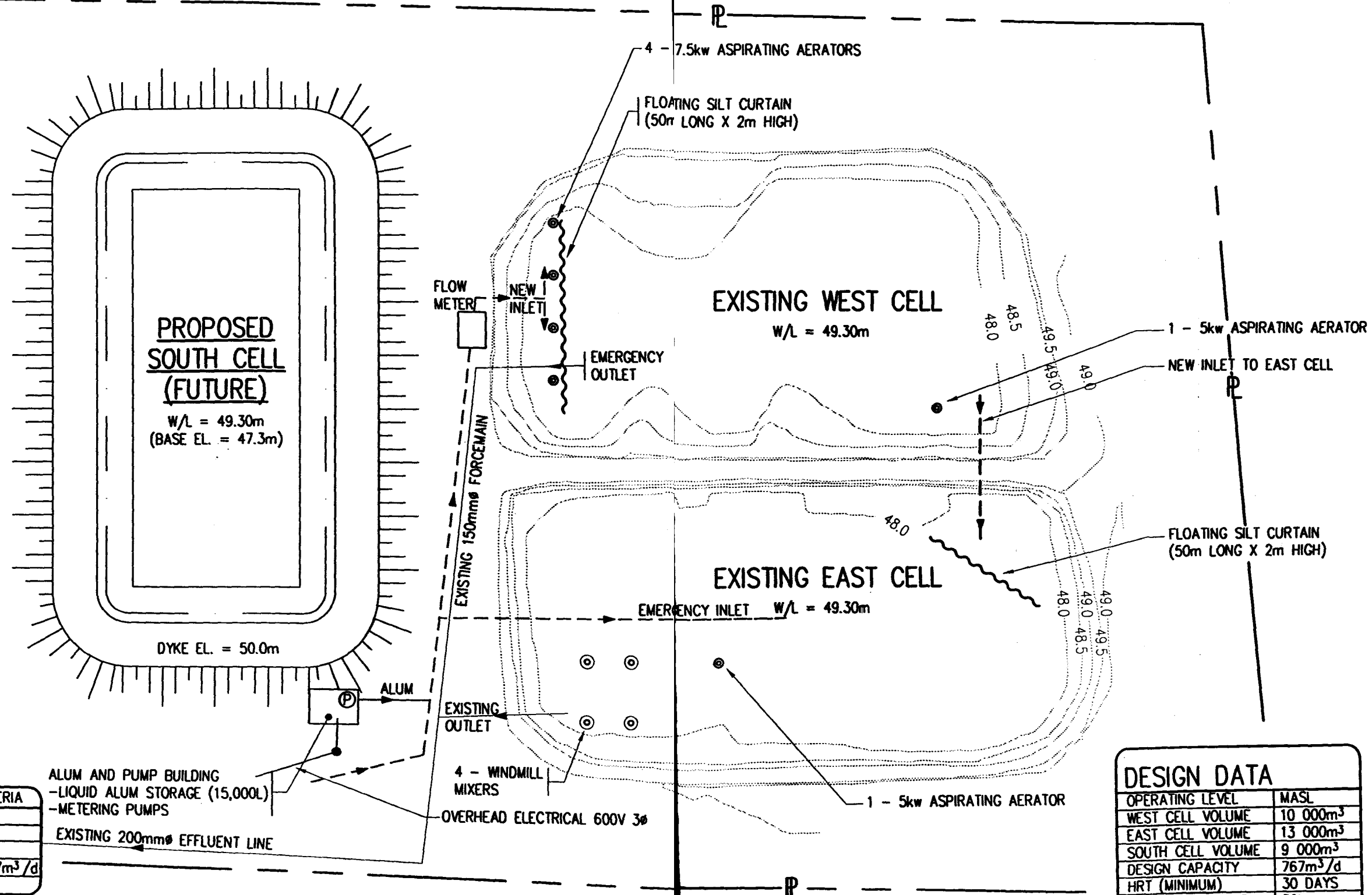
**TABLE 5.3 ENVIRONMENTAL IMPACTS COMPARISON**

Environment			ALTERNATIVE					
			1	2	3	4	5	6
Natural Environment	Fish Habitat	Outfall	○	○	○	○	●	●
	Water Quality	Discharge	○	○	○	○	○	○
	Vegetation	Construction	○	○	○	●	●	●
		Treatment Site	○	○	○	○	●	●
	Wildlife	Construction	○	○	○	●	●	○
	Noise	Treatment Operation	○	○	○	○	●	●
		Pumping	○	●	●	●	●	●
Social Environment	Odour		○	○	○	○	○	○
	Property Values		○	○	○	○	○	○
Economic Environment	Capital Cost		○	○	○	●	●	●
	Operating Cost		○	●	●	●	●	●

- Relatively minor readily mitigated impacts
- Relatively moderate readily mitigated impacts
- Requiring more significant mitigation

The preceding Table 5.3 summarizes the impacts on the natural, social and economic environment as identified during the ESR activities. Many of the impacts are associated with construction and can be completely mitigated.

m:\1998\985160\85160c3b 2-23-99 4:02:13 pm EST



EFFLUENT OPERATING CRITERIA	
BOD <sub>5</sub>	25
SS	30
TP	1
FLOW	767m <sup>3</sup> /d
CONTINUOUS DISCHARGE	

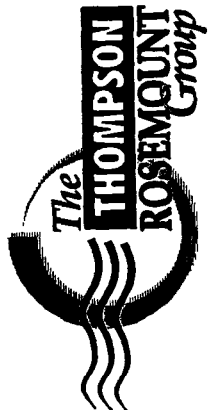
ALUM AND PUMP BUILDING  
- LIQUID ALUM STORAGE (15,000L)  
- METERING PUMPS  
EXISTING 200mm $\varnothing$  EFFLUENT LINE

#### DESIGN DATA

OPERATING LEVEL	MASL
WEST CELL VOLUME	10 000m <sup>3</sup>
EAST CELL VOLUME	13 000m <sup>3</sup>
SOUTH CELL VOLUME	9 000m <sup>3</sup>
DESIGN CAPACITY	767m <sup>3</sup> /d
HRT (MINIMUM)	30 DAYS
AERATION CAPACITY	30kw
MECHANICAL AERATION VOLUME	1 000m <sup>3</sup>

M.S. THOMPSON & ASSOCIATES LTD.  
consulting engineers  
CORNWALL

KINGSTON



CREG QUAY, WESTLEY'S POINT  
SEWAGE PROJECT

PROPOSED SEWAGE TREATMENT  
LAGOON UPGRADES

scale 1:1000

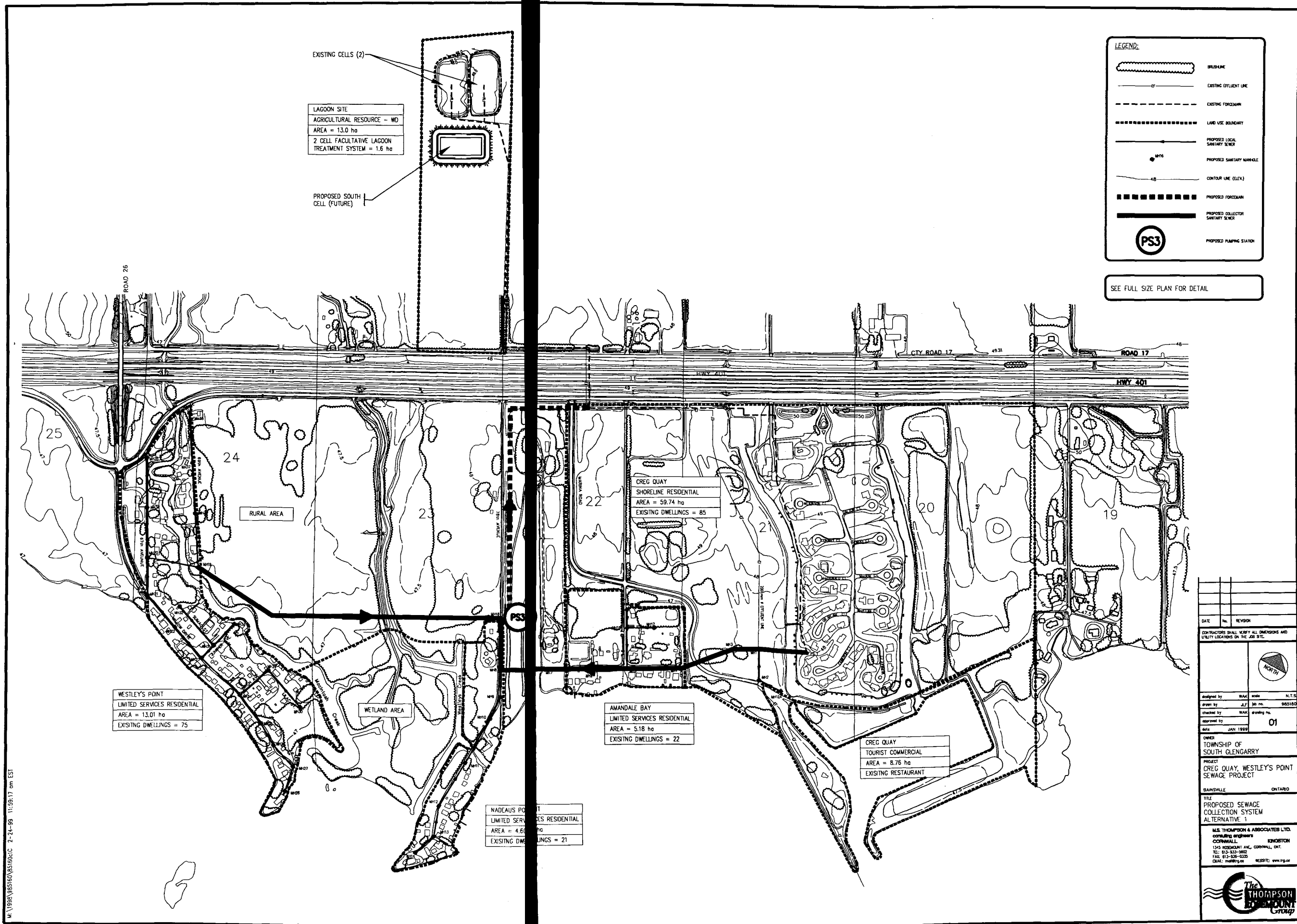
date FEB., 1999

drawn G.A.D.

job no. 985160

drawing no.

FIG.3





## 6 RECOMMENDED ALTERNATIVE DESIGN

### 6.1 Preliminary Design

The recommended alternative design involves a municipal sewage collection and treatment system as described below and as illustrated on Drawing No. 1.

#### 6.1.1 Sewage Collection System

The sewage collection system will include a network of local and collector sanitary sewers in the Proposed Service Area (PSA). The proposed sewage collection system is illustrated on Drawing No. 1. The preliminary sanitary sewer design data is provided in Appendix E.

A local sewage collection system will be constructed in Westley's Point and connected by a gravity collector sewer to the proposed central pumping station (PS3) at the north limit of Nadeau's Point on 78<sup>th</sup> Avenue. Similarly, proposed local sanitary sewers in Nadeau's Point and Amandale Bay will be connected to the proposed gravity collector sewer that connects to PS3. Properties in Nadeau's Point and Amandale Bay that front on the collector sewer will be directly connected. Other properties will be connected to the local sewers. The proposed collector sewer will also extend from the existing pumping station (PS1) in Creg Quay Phase 1 directing Phase 1 sewage to the proposed central pumping station PS3. The commercial use, restaurant and marina basin sewage collection system will also be connected to the proposed collector sewer. In the future, Creg Quay Phase 2 local sewers will be connected to the proposed collector sewer.

Collection system components include:

- 1375 m of collector sewer 250 mm diameter,
- 2535 m of local sanitary sewer 200 mm diameter,
- 150 vertical (v) m of manholes,
- 2 creek and 3 canal crossings,
- 770 m of service laterals to property line,

Surface drainage, foundation drainage, roof drainage and other extraneous flow sources will not be permitted in the sanitary sewer system. Municipal Sewer Construction and Sewer Use Bylaws will be required. Reference is made to Drawing No. 1 for the preliminary design of the sewage collection system.

#### 6.1.2 Sewage Pumping Station and Forcemain

The proposed collector sewer will direct sewage from the PSA local sewers to the central pumping station PS3 to be located on 78<sup>th</sup> Avenue near the north limit of the Nadeau's Point Limited Services Residential designation. PS3 will discharge to 620 m of proposed 200 mm diameter forcemain that will be constructed on 78<sup>th</sup> Avenue northerly to the South Service Road and then easterly, connecting into the existing Creg Quay forcemain. Sewage will flow from this interconnection point northerly through the existing forcemain to the existing Creg

Quay treatment facility located on part of Lot 23 Concession 1 approximately 550 m north of Highway 401 and the North Service Road.

PS3 will have an initial capacity of approximately 1.25 times the peak design flow of 27.84 L/sec. The wet well, header system and forcemain will be sized to accommodate the ultimate sewage flow of 1046.6 m<sup>3</sup>/day. A back-up power supply consisting of a diesel generator and power regulator is included in the pumping station configuration.

### 6.1.3 Sewage Treatment System

The existing Creg Quay sewage treatment facility will be modified to accommodate the proposed design flow (682.3 m<sup>3</sup>/day) and the proposed treatment quality criteria as set out in Table 4.3. The existing treatment facility consists of a 2-cell semi-annual discharge facultative lagoon system totaling approximately 1.6 ha in area having a volume of 23,000 m<sup>3</sup>. The proposed aerated facultative post-aeration treatment process will be configured within the existing cells to minimise the initial capital cost.

Treatment components include:

- existing lagoon cells (de-sludging and embankment shaping/stabilising are proposed),
- 3 aspirating aerators each rated at 7.5 kW located in the West Cell for aeration,
- a silt curtain to minimise short-circuiting and promote dispersion in the West Cell,
- wind driven mixers in the East Cell to maintain open water near the outlet during icing conditions and promote venting of H<sub>2</sub>S,
- 1 aspirating aerator in the East Cell near the outlet to promote venting of H<sub>2</sub>S,
- modifications to head works to accommodate directing flow to either cell during maintenance activities,
- a small building to accommodate electrical panels, chemical storage (alum), the chemical feed system (alum), the flow monitoring equipment, and sampling ports,
- site works including improvements to the access road, fencing, and lighting, along with planting some screening trees,
- extending the electrical service from the North Service Road to the lagoon site for the electrical equipment.

A back-up power supply at the lagoon site is not included.

The ultimate sewage flow of 1046.6 m<sup>3</sup>/day will require the construction of an additional cell with a capacity of approximately 9,000 m<sup>3</sup>. The initial design and ultimate design treatment configurations are illustrated on Figure 3.

## 6.2 Project Costs

The estimated project costs are summarised as follows:

Value of Existing Infrastructure (shared)	\$1,506,000
MOE Funding Assistance (66.7% of eligible components)	\$1,647,523
Creg Quay Ltd. Contribution (new infrastructure)	\$320,445
Net Capital Cost to Westley's, Nadeau's, Amandale	\$822,526
Total Value of Infrastructure (new and existing)	\$4,296,494

The estimates include 23.6% allowance for engineering, contingencies, and net GST.

While the value of the project infrastructure is estimated at \$4,296,494, this amount includes the value of the existing Creg Quay infrastructure that will be shared between Creg Quay and others (Westley's Point, Nadeau's Point and Amandale Bay). The value of new construction is estimated at \$2,790,494. The net capital cost after Provincial funding assistance at 66.7% is \$4,985 per household based on 165 households in Westley's Point, Nadeau's Point and Amandale Bay. The annual operating cost per household based on 215 existing households including Creg Quay is \$244.

Capital costs are apportioned as detailed in Table 5.2.

### **6.3 Ownership**

Currently, significant portions of the sewage disposal system are owned by Creg Quay Limited. This project proposal is predicated upon a transfer of existing related infrastructure to the Township of South Glengarry. New infrastructure will be owned by the municipality and the project will be a municipal undertaking. Creg Quay Limited initially conceived this project partnership as a means of solving an area problem while at the same time advancing its development. An agreement will have to be executed between the Township of South Glengarry and Creg Quay Limited with respect to the transfer of infrastructure and the sharing of costs as proposed in this report. Similarly, private roadway rights of way and easements will have to be transferred from owners in Westley's Point, Nadeau's Point and Amandale Bay to the municipality for dedication as public road allowances.

Associated with future development in Creg Quay, there is an understanding that eventually the infrastructure in Creg Quay (roadways, water supply and sewage disposal systems) would be transferred to the municipality along with the maintenance obligations. Municipal taxes would be adjusted accordingly. This project will accelerate that transfer.

### **6.4 Natural Environment Impacts and Mitigation**

The construction of the proposed sewage collection system will be confined to road allowances and easements and as such the impacts to the natural environment will be those typically associated with construction methods. There should be no lasting negative environmental impacts; social, economic or natural. The sewage collection system will be unobtrusive after construction except for manholes. There is an existing pumping station that will be replaced in a new location and the existing treatment lagoons will be upgraded and utilised in the new treatment facility.

Positive environmental impacts include:

- The elimination of the principle source of surface and groundwater contamination in Westley's Point, Nadeau's Point, and Amandale Bay.
- The provision of a cost effective sewage disposal alternative to holding tanks.

- The provision of a cost effective sewage disposal alternative to new raised bed septic systems particularly where lots are too small.
- The elimination of the need to expand the existing lagoons to 8.8 ha.
- A more cost effective utilisation of municipal infrastructure through a partnership involving more users,
- Planned future development will be accommodated on municipal infrastructure.

Areas requiring special attention during final design and construction in terms of mitigation are:

- The sanitary sewer construction crossing the Rural Area between Westley's Point and Nadeau's Point where natural vegetation and bush exists will require control to minimise damage and to affect restoration. The Wetland Area should be avoided.
- Similarly, the area adjacent to the spruce tree plantation on 78<sup>th</sup> Avenue will have to be protected during construction.
- The pumping station PS3 will require noise attenuation relating to the diesel generator. Noise from the electric pumps is not expected to emanate beyond the walls of the building.
- Noise associated with the aspirating aerators will be attenuated by the lagoon berms and will dissipate below MOE design criteria at the property boundary. Trees screening will be planted on the east and west limits of the lagoon site. To the south is dense bush which will not be removed with this proposed treatment alternative. When the future cell is constructed, existing trees will remain on the perimeter to provide screening and noise attenuation.
- No major roadway crossings are required with this alternative. Portions of the existing forcemain and all of the existing effluent line will be utilised in this alternative hence new crossings of Highway 401, the North Service Road and the South Service Road will not be required.
- During construction, some disruption to local traffic and access to property will be unavoidable. Construction practices and effective communications with the residents will minimise the impact.

The municipality, the Engineer and the project manager should insure that the environmental construction impacts are minimized and mitigated through the final design and construction administration phases. An inventory of natural environment features along the final alignment should be completed during the final design stage. Methods that will be employed during construction to minimize the impacts and post-construction to mitigate the impacts should be defined in the construction specifications.

Typical mitigating measures are described in the Ontario Class Environmental Assessment (document) for Municipal Water and Wastewater Projects as approved by the Ministry of Environment June 1993. Further information is provided in the Ontario Environmental Construction Guidelines for Municipal Road, Sewage and Water Projects (1987).

## **6.5 Class EA Schedule**

The proposed project is a Schedule C project as defined by the Class Environmental Assessment (document) for Municipal Water and Wastewater Projects, June 1993. The project involves an expansion/modifications to an existing sewage treatment facility beyond its rated capacity. This document and the planning and public consultation processes have been completed consistent with the requirements of the Class EA.

This document will be placed on the public record for the prescribed 30 days following a Notice of Completion.

## **6.6 Bump-Up Provisions**

The public is encouraged to ask questions and provide input to the recommendations before the expiry of the 30 day review period by contacting:

The Township of South Glengarry  
6 Oak Street  
Lancaster, Ontario  
K0C 1J0  
Attention: Michael Samson, Clerk

M.S. Thompson & Associates Ltd.  
1345 Rosemount Avenue  
Cornwall, Ontario  
K6J 3E5  
William A. Knight, P. Eng., Senior Project Engineer

Failing a satisfactory resolution of the concern, the public may file in writing a request for Bump-up by contacting:

The Minister of the Environment  
135 St. Clair Avenue West  
Toronto, ON  
M4V 1P5

## **Appendix A**

### **Creg Quay Limited Certificates of Approval**



Ontario

Ministry of  
Environment  
and EnergyMinistère de  
l'Environnement  
et de l'Énergie

AMENDMENT TO CERTIFICATE OF APPROVAL

SEWAGE

NUMBER 3-0511-81-007

Page 1 of 12

MINISTRY OF ENVIRONMENT

FEB 21 1994

NOTICE

LT-01-CQ-CJA  
NEW

Creg Quay Limited  
P.O. Box 362, Creg Quay  
Township of Lancaster  
Bainsville, Ontario  
K0C 1E0

*You are hereby notified that the approval issued under Certificate of Approval No. 3-0511-81-007, dated August 12, 1981, is hereby amended to revoke Condition No. 1 which has been complied with, to approve construction of the effluent discharge works, and to incorporate additional Terms and Conditions as follows:*

**EFFLUENT DISCHARGE WORKS**

- construction of approx. 2650m of 200mm dia. effluent discharge piping from the existing sewage lagoon outlets to a submerged effluent outfall in Lake St. Francis, including a two-chamber, concrete lagoon outlet control structure, capped swabbing ports, offshore effluent outfall structure submerged in not less than 1.83m (6 feet) of water, and associated appurtenances and modifications as required;

all in accordance with the application for amendment of the existing certificate, final plans, specifications, design brief and supplementary data and letters dated December 8, 1993 and February 3, 1994, all as prepared by R. J. Burnside & Associates Ltd., Engineers, Planners and Hydrogeologists.

**Reason for Amendment**

The reason for amending this Certificate of Approval is to document compliance with Condition No. 1 of Certificate of Approval No. 3-0511-81-007, dated August 12, 1981. The submission of final plans, specifications and engineer's report have been reviewed and found to satisfy this Ministry's requirements. This Notice shall serve to indicate compliance with Condition No. 1 of the above noted Certificate of Approval and construction may now proceed for the effluent discharge works as described above. Condition No. 2 of the original certificate is hereby deleted and replaced partly in the above described Effluent Discharge Works and partly in Condition No. 16 (1) of this Notice.

**AMENDMENT TO CERTIFICATE OF APPROVAL**  
**SEWAGE**  
**NUMBER 3-0511-81-007**  
**Page 2 of 12**

**TERMS AND CONDITIONS**

**1. For the purpose of this Certificate of Approval:**

- a. "Ministry" means the Ministry of Environment and Energy;
- b. "Director" means any Ministry employee appointed by the Minister pursuant to Section 5 of the Ontario Water Resources Act;
- c. "Regional Director" means the Regional Director of the Southeast Region of the Ministry;
- d. "District Manager" means the District Manager of the Cornwall District Office of the Ministry;
- e. "Owner" and "Operating Authority" means Creg Quay Limited and includes its successors and assignees;
- f. "works" means the facility described in the Owner's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate;
- g. "Certificate" means a Certificate of Approval issued in accordance with Section 53 of the Ontario Water Resources Act;
- h. "mg/L" means milligram(s) per litre;
- i. "L/s" means litre(s) per second;
- j. "m<sup>3</sup>/d" means cubic metre(s) per day;
- k. "BOD<sub>5</sub>" means five-day total carbonaceous biochemical oxygen demand;
- l. "grab sample" means an individual sample of at least 1000 millilitres collected at a randomly selected time over a period of time not exceeding 15 minutes;
- m. "composite sample" means a volume of sample made up of four or more distinct samples, each taken at least two hours apart;
- n. "average daily flow" means the total sewage flow to or from the sewage works during the specified period of operation, divided by the number of days in the period;
- o. "average concentration" is the arithmetic mean concentration of all consecutive samples taken within the specified period of operation;
- p. "average loading" is the average concentration multiplied by the total flow over the same period of operation, divided by the number of days in the period;



## AMENDMENT TO CERTIFICATE OF APPROVAL

SEWAGE

NUMBER 3-0511-81-007

Page 3 of 12

q. "maximum daily concentration" is the concentration of any sample of a contaminant discharged in the period.

2. The requirements of this Certificate of Approval are imposed pursuant to Section 53 of the Ontario Water Resources Act. The issuance of this Certificate in no way abrogates the Owner's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislations and regulations.

3. The approval granted by this Certificate is based upon a review of the proposed works in the context of its effect on the environment, its process performance and principles of sanitary engineering.

The review did not include a consideration of the architectural, mechanical, structural, electrical or instrumentational components of the works except to the extent necessary to review the works as set out in the above paragraph.

4. The Owner shall notify the District Manager in writing of any of the following changes within thirty (30) days of the change occurring:

a. change of Owner or operating authority or both;

b. change of address of Owner or Operating Authority or address of the new Owner or operating authority;

5. In the event of any change in ownership of the works, the Owner shall notify in writing the succeeding Owner of the existence of this Certificate and a copy of such Notice shall be forwarded to the District Manager.

6. The Owner shall ensure that all communications made pursuant to this condition will refer to this Certificate of Approval.

7. The Owner must ensure compliance with all the terms and conditions of this Certificate. Non-compliance constitutes a violation of the Ontario Water Resources Act and is grounds for enforcement.

8. The Owner shall, forthwith upon the request of the Director, Regional Director, District Manager, or any of them, furnish any information requested concerning compliance with this Certificate, including any records required to be kept by this Certificate.

9. The Owner shall take all reasonable steps to minimize any adverse impact on surface or ground waters resulting from non-compliance with the effluent requirements specified in this certificate, including, but not limited to, such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge in non-compliance.

**AMENDMENT TO CERTIFICATE OF APPROVAL****SEWAGE****NUMBER 3-0511-81-007****Page 4 of 12**

10. This Certificate is conditional upon the Owner making all necessary investigations, taking all necessary steps and obtaining all necessary approvals so as to ensure that the physical structure, siting and operations of the sewage works do not constitute a safety or health hazard to the general public.
11. (1) The Owner shall prepare and make available for inspection by Ministry personnel upon request, a complete set of drawings within one (1) year of substantial completion of the sewage works which drawings shall show the sewage works as constructed at that time.
- (2) A complete set of the "as constructed" drawings, incorporating any amendments made from time to time, shall be kept by the Owner at the administration building of the sewage works as long as the sewage works are kept in operation.

**Operation and Maintenance**

12. In order to assure continuous compliance with the effluent criteria set out in Condition No. 15, and generally all other conditions of this Certificate, the Owner shall ensure compliance with the following conditions:
- (1) The Owner shall ensure that at all times, the works and all additional equipment and appurtenances installed or used to achieve compliance with the terms and conditions of this Certificate are properly operated and maintained. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing, and training and process controls.
- (2) The Owner shall ensure that contingency plans and procedures are established and adequate equipment and material are available for dealing with emergency and upset conditions and equipment breakdowns at the sewage works, flooding, overflows of raw and partly treated sewage, and spills of sludge or chemicals into or out of the sewage works in order to prevent or minimize any unacceptable liquid discharges and gas and odour emissions into the natural environment.
- (3) The Owner shall establish notification procedures to be used to contact the Regional Director, and other authorities that may be concerned, in case of an emergency situation and the measures taken to deal with it.
- (4) The Owner shall prepare an operation manual prior to the commencement of regular operation of the sewage works and keep it up to date and upon request shall make the manual available for inspection by the Ministry personnel and shall upon request furnish a copy to the Ministry.

## AMENDMENT TO CERTIFICATE OF APPROVAL

## SEWAGE

NUMBER 3-0511-81-007

Page 5 of 12

- (5) The Owner shall establish complaint procedures for receiving and responding to compliance including reporting system which records, what steps were taken to determine the cause of complaint and corrective measures to alleviate the cause and prevent its reoccurrence.

**Performance**

13. (1) The sewage works have been designed and approved to treat sewage at an average daily flow of 94.5 m<sup>3</sup>/d for spring and fall discharges.
- (2) For the purpose of this Certificate and Subsection 107(3) of the Ontario Water Resources Act, the introduction of sewage into the sewage works in excess of these average daily flows for any season (from the last day of any seasonal discharge to the last day of the following discharge) is not approved under this certificate.
- (3) The Owner shall install, maintain and operate a sufficient number of flow measuring devices, calibrated at regular intervals not exceeding one year to ensure their accuracy to within plus or minus 15 percent of the actual sewage flow rate for the entire design range of the devices, in order to measure the total quantity of sewage influent to and discharged from the works.
14. (1) Any diversion of sewage flow from any portion of the sewage works (bypass) is prohibited, except:
- (a) where it is indispensable in preventing loss of life, danger to the public health, personal injury or severe property damage or
- (b) where it is necessary for the purpose of essential maintenance of the sewage works to assure their efficient operation, provided that the effluent requirements set out in Condition No. 15 will not be exceeded and the District Manager has given a prior written approval for the bypass, or
- (c) where the Regional Director has specifically approved it in writing.
- (2) The Owner shall notify the District Manager of:
- all anticipated bypasses, at least (10) days prior to the date of the bypass or otherwise on the earliest date possible, and
  - all unanticipated bypasses, forthwith, and
- the notice in either case shall include information with respect to the anticipated adverse effects on the natural environment and the duration of the bypass.

## AMENDMENT TO CERTIFICATE OF APPROVAL

## SEWAGE

NUMBER 3-0511-81-007

Page 6 of 12

- (3) The Owner shall record the time, location, duration and estimated quantity of each bypass event along with the reasons for the event.

15. (1) Effluent Objectives

The Owner shall use best efforts to design, construct and operate the works with the objective that the average concentrations and total loadings of the materials named below as effluent parameters are not exceeded in the effluent from the works.

<u>Effluent Parameters</u>	<u>Concentration in Effluent</u>	<u>Total Loading from Effluent</u>
BOD <sub>5</sub>	25.0 mg/L	28.1 kg/d
Suspended Solids	30.0 mg/L	33.72 kg/d

(2) Effluent Requirements

Notwithstanding Subsection (1) of this condition, the Owner shall design, construct and operate the works such that the concentrations and total loadings of the materials named below as effluent parameters are not exceeded in the effluent from the works, as determined in accordance with Subsection (3) of this condition:

<u>Effluent Parameters</u>	<u>Concentration in Effluent</u>	<u>Total Loading from Effluent</u>
BOD <sub>5</sub>	30.0 mg/L	33.72 kg/d
Suspended Solids	40.0 mg/L	44.96 kg/d

Note: The waste loading limits are based on 1124 m<sup>3</sup>/d (13.0 L/s) maximum rate of discharge of the waste stabilization pond content.

- (3) For the purposes of determining compliance with and enforcing this condition:
- (a) Non-compliance with respect to concentrations of BOD<sub>5</sub> and Suspended Solids in the effluent is deemed to have occurred when the average concentration of any of the parameters, as defined in this Certificate, based on any three (3) consecutive grab samples taken during the discharge period in accordance with Condition No. 17, supplemented by the Ministry's staff as necessary, exceeds the corresponding concentration set out in Subsection(2).

AMENDMENT TO CERTIFICATE OF APPROVAL  
SEWAGE  
NUMBER 3-0511-81-007  
Page 7 of 12

- (b) Non-compliance with respect to total loadings, of BOD<sub>5</sub>, and Suspended Solids is deemed to have occurred when the average concentration of either of these materials, multiplied by the average daily flow over the period when three (3) consecutive grab samples were taken exceeds the corresponding concentration set out in Subsection (2).

16. Notwithstanding Condition No. 15, the Owner shall ensure that the discharge will not contain any oil or other substance in amounts sufficient to create a visible film or sheen on the surface of the receiving waters and shall be essentially free of any floating material.

- (1) The sewage works shall be operated on a semi annual discharge basis with the effluent discharge commencing not earlier than April 1 or terminating not later than May 1st in spring and commencing not earlier than November 1 or terminating not later than November 30 in fall.
- (2) <sup>5 NB</sup> The District Manager may, in writing, agree to or direct that the rate and period of discharge be altered within the physical capability of the sewage works to allow the discharge to coincide with the period of peak flow and maximum dilution in the receiving watercourse.
- (3) The operating authority shall notify the District Manager at least twenty-four (24) hours prior to the commencement of the sewage works effluent discharge.

Monitoring and Reporting

17. The operating authority shall ensure that the following monitoring program is carried out:

- (1) Sampling locations shall be established to the satisfaction of the District Manager prior to the commencement of operation of the works. Any of these sampling locations may only be changed or abandoned and new locations may be added following commencement of operation if, in the opinion of the District Manager it is necessary to do so to ensure representative samples are being collected.
- (2) Subject to Subsection (1), grab samples shall be collected from the effluent discharge and from the receiving stream (both downstream and upstream of the waste stabilization pond).

## AMENDMENT TO CERTIFICATE OF APPROVAL

SEWAGE

NUMBER 3-0511-81-007

Page 8 of 12

- (3) The collection of samples noted in Subsection (2) shall take place as follow:
- (a) A grab sample is to be taken on the first and last day of the discharge periods as well as every 0.5 metre of draw down of the lagoon cells.
  - (b) At least one litre of sample from each sampling location, shall be sent as soon as practicable to a reputable laboratory acceptable to the District Manager.
- (4) The samples collected pursuant to Subsection (2) shall be analyzed for:
- pH, temperature, BOD<sub>5</sub>, suspended solids, total Phosphorus, Total Kjeldahl Nitrogen, Ammonia plus Ammonium Nitrogen, Faecal coliform, and Hydrogen Sulphide.
- In addition to the above effluent quality sampling program during the discharge periods, the influent sewage should be composite sampled at least once a month and analyzed for:
- BOD<sub>5</sub>, suspended solids and Total Kjeldahl Nitrogen.
- (5) The sampling and analysis required by Subsection (4) of this condition shall be performed in accordance with the Ministry's Policy No. 08-06; "Guide to Collection and Submission of Samples for Laboratory Analysis", Ministry of the Environment, 1985; "Handbook of Analytical Methods for Environmental Samples", Ministry of the Environment, 1983; or as described in "Standard Methods for Examination of Water and Wastewater", 18th Edition, 1992, as amended from time to time by more recently published editions.
- (6) The Owner shall, for the purpose of providing data for the calculation of total waste loadings in effluent, in accordance with Condition 15(2), measure, estimate or calculate and record, in the effluent discharge from the lagoon system:
- (a) the flow rate at the time sampling is undertaken pursuant to Subsection (3)
  - (b) the total volume of effluent discharged on that sampling day;  
with an accuracy to within plus or minus 15 percent of the actual flow rate at the sampling point for the effluent discharge stream.
- (7) The data generated in accordance with Subsection (6) shall be deemed to be conclusive of the minimum flow rates of the effluent discharge, for the purpose of determining compliance with an enforcing this Certificate.

AMENDMENT TO CERTIFICATE OF APPROVAL  
SEWAGE  
NUMBER 3-0511-81-007  
Page 9 of 12

- (8) If the Owner monitors any of the effluent parameter required by Subsection (1) of this condition, at locations designated for this purpose by the District Manager and in accordance with Subsection (2), more frequently than it is required by this condition, the analytical results of all such samples, both required and additional, shall be included in calculating and reporting of the values required by this certificate, and the increased frequency, or all dates of sampling, shall also be specified in the reports.
18. (1) The Owner shall report all analytical results obtained pursuant to Condition No. 17 to the District Manager within 90 days of sample collection or within such longer period of time as the District Manager may agree upon.
- (2) Following review of any of the analytical results or any of the reports required by Condition No. 19 of this Certificate, the Regional Director may alter the frequencies and locations of sampling and parameters for analysis required by this Condition if he/she considers it necessary for proper assessment of the quality of the effluent or if he/she is requested to do so by the Owner and considers it acceptable by the evidence of information submitted in support of the request.
19. (1) The Owner shall submit to the Regional Director annual reports on performance of the sewage works, in accordance with Subsections (2) and (3) of this condition.
- (2) The first annual report shall cover the period from the commencement of operation of the sewage works modified in accordance with this Notice to the end of the calendar year and shall be submitted within 90 days following the end of such reporting period. Each subsequent annual report shall be submitted within 90 days following the end of the calendar year being reported upon.
- (3) Each annual report shall contain at least the following information:
- (a) executive summary;
  - (b) tabulation of all sample results obtained during the reporting period, including sampling location and date, and type of sample;
  - (c) a tabulation of discharge volume, including influent and effluent daily flows for periods in accordance with Condition No. 13 (1), (2), (3) and Condition No. 17 (6);

**AMENDMENT TO CERTIFICATE OF APPROVAL**  
**SEWAGE**  
**NUMBER 3-0511-81-007**  
**Page 10 of 12**

- (d) tabulation and description of all bypass, emergency and upset conditions events that took place during the reporting period;
- (e) description and evaluation of adequacy of calibration and maintenance procedures used to ensure accuracy of collected data.

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

1. Condition no. 1 is included to define terms used in this Certificate of Approval.
2. Condition no. 2 is included to emphasize that the issuance of the Certificate does not diminish any other statutory and regulatory obligation to which the Owner is subject in the construction, maintenance and operation of the works.
3. Condition no. 3 is included to make the Owner, subsequent owners, successors, assignees and any third parties relying upon the Certificate, aware that the review conducted by this Ministry and the approval granted as a result, is limited in scope and should not be relied upon as an approval of the stipulated design aspects of the works.
4. Condition nos. 4, 5, 6 and 11 are included to ensure that the Ministry's records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of this Certificate and continue to operate the works in compliance with this Certificate.
5. Condition no. 7 is included to emphasize that the Owner is under a statutory obligation to ensure compliance with the certificate.
6. Condition no. 8 is included to ensure that Ministry personnel, when acting in the course of their duties, will be given unobstructed access to the facilities, information and records related to the works which are the subject of this certificate, to enable the Ministry to be assured of the Owner's compliance with the terms and conditions of this certificate.
7. Condition no. 9 is included to emphasize that the Owner has an ongoing duty to mitigate any adverse impacts resulting from non-compliance with the Certificate.
8. Condition no. 10 is imposed because it is not in the public interest for the Director to approve facilities which, by reason of potential health and safety hazards do not generally comply with legal standards or approval requirements falling outside the purview of this Ministry.



**AMENDMENT TO CERTIFICATE OF APPROVAL**  
**SEWAGE**  
**NUMBER 3-0511-81-007**  
**Page 11 of 12**

9. Condition no. 12 is included to ensure that the works will be operated, maintained, funded, staffed and equipped in a manner enabling compliance with the terms and conditions of this Certificate, such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented.
10. Condition no. 13 is included to ensure that the average daily flow and the peak flow rate of sewage through the works are within the approved treatment capacity of the works.
11. Condition no. 14 is included to indicate that bypasses of untreated sewage to the receiving watercourse is prohibited, save in certain limited circumstances where the failure to bypass could result in greater injury to the public interest than the bypass itself, where a bypass will not violate the approved effluent requirements, or where the bypass can be limited or otherwise mitigated by handling it in accordance with an approved contingency plan. The notification and documentation requirements allow the Ministry to take timely abatement and enforcement action in an informed manner and will allow the Owner to be aware of the extent and frequency of bypass events.
12. Condition no. 15, Subsection (1) is included to set out non-enforceable effluent quality objectives which the Owner is obligated to use best efforts to strive towards on an ongoing basis. It is the Ministry's experience that setting of such objectives coupled with the bona fide efforts of the operating authority to achieve them tends to assist the operating authority in complying with the generally less stringent effluent requirements specified in Subsection (2) of the same condition, thereby serving the environmental goals set out in the reason for the latter.
13. Condition no. 16, and Subsection (2) of Condition No. 15 are imposed to set out the maximum concentrations and related loadings of materials which are allowed in the discharge of effluent from the works to Lake St. Francis. These limits are established to minimize the environmental impact to the receiver and to protect water quality, fish and other aquatic life in the receiving watercourse. They are based on the Ministry's publication entitled "Water Management Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment - November 1978, Revised May 1984", and recommendations of the International Joint Commission on the Great Lakes.

Specifically, the effluent criteria related to concentrations and loadings of BOD<sub>5</sub> and Suspended Solids are being imposed to minimize adverse effects of oxygen demanding material on dissolved oxygen concentration in the receiving waters.

14. Condition nos. 17 through 19, are imposed to ensure that all pertinent information is available for the evaluation of the performance of the sewage works.

**AMENDMENT TO CERTIFICATE OF APPROVAL  
SEWAGE  
NUMBER 3-0511-81-007  
Page 12 of 12**

**This Notice shall constitute part of the approval issued under Certificate of Approval No. 3-0511-81-007 dated August 12, 1981.**

*You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter O.40, provides that the Notice requiring the hearing shall state:*

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

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the sewage works are located;

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

*This Notice must be served upon:*

The Secretary,  
Environmental Appeal Board,  
112 St. Clair Avenue West,  
Suite 502,  
Toronto, Ontario.  
M4V 1N3

AND

The Director,  
Section 53, Ontario Water Resources Act,  
Ministry of Environment and Energy,  
250 Davisville Avenue, 3rd Floor,  
Toronto, Ontario.  
M4S 1H2

*The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.*

**DATED AT TORONTO this      9th      day of      February,      1994.**

THIS IS A TRUE COPY OF  
THE ORIGINAL CERTIFICATE  
SIGNED BY  
W. GREGSON, P. ENG.

MAILED ON FEB 14 1994

BY WJ

HS/nk

cc: -Mr. M. J. Samson, Clerk, Twp. of Lancaster  
-District Manager - MOEE, Cornwall ✓  
-Mr. J. Firth, P. Eng., R. J. Burnside & Associates Ltd.  
-Mr. T. Ho, MOEE, Water Resources Branch



Ministry of  
Environment  
and Energy

Ministère de  
l'Environnement  
et de l'Énergie

CERTIFICATE OF APPROVAL  
SEWAGE  
NUMBER 3-1634-95-006  
Page 1 of 13

SEWAGE

NOV '95

Creg Quay Limited  
Box 362, Creg Quay  
Bainville, Ontario  
K0C 1E0

*You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:*

expansion of the existing sanitary sewage collection, treatment and disposal system serving the Creg Quay Development, located on parts of Lots 20, 21 and 22, Concession 1 in the Township of Lancaster, currently approved under the Certificate of Approval No. 3-0511-81-007, issued to you on August 12, 1981, as amended by Notices dated July 30, 1993, February 9, 1994, and November 24, 1995, as follows:

**Sanitary Sewers**

- construction of sanitary sewers and appurtenances, as follows:

<u>STREET</u>	<u>FROM</u>	<u>TO</u>
Street "A"	Approx. 60 m north of Street "D"	Marina Road
Street "D"	Approx. 20 m north of Marina Road	Street "A"
Street "C"	Street "A"	cul-de-sac
Street "B"	Street "A"	cul-de-sac
Marina Road	Street "A"	Approx. 50 m east of Street "A" (existing sewer from Marina Island)
Easement (eastern extension of Street "B" and crossing of "West Canal")	Street "A"	East bank of "West Canal" (approx. 15 m west of Sewage P.S.#1)

including service connections from the main sewer to the street line,

**Forcemains**

- construction of sanitary sewage forcemains and appurtenances, as follows:

<u>STREET</u>	<u>FROM</u>	<u>TO</u>
Easement (eastern extension of Street "B")	Approx. 15 m east of Street "A" (Sewage P.S.#2)	approx. 45 m east of Street "A" (existing forcemain crossing "West Canal" to Sewage P.S.#1)

<u>STREET</u>	<u>FROM</u>	<u>TO</u>
Easement (eastern extension of Street "B")	Approx. 15 m east of Street "A" (Sewage P.S. #2)	Street "A" (plugged for future use)

- decommissioning and plugging of the existing sanitary sewage forcemains, as follows:

<u>STREET</u>	<u>FROM</u>	<u>TO</u>
Easement along west bank of "West Canal"	Marina Road (Marina Sewage P.S.)	approx. 90 m north of Marina Road (forcemain crossing "West Canal")

#### Sewage Pumping Stations

- construction of a sanitary sewage pumping station (Sewage P.S.#2) located in an easement between Street "A" and the "West Canal" across from Street "B", consisting of a 3000 mm diameter precast concrete wet well equipped with two (2) submersible sewage pumps, each rated at 21.3 L/s at a TDH of 30.0 m, including float level regulators, electrical equipment and controls, and discharge piping and appurtenances connected to the above-described forcemains (as noted), including an emergency station by-pass forcemain connection;
- decommissioning and dismantling of the existing temporary sewage pumping station serving the Marina Restaurant (Marina Sewage P.S.) located on the west bank of the "West Canal" at Marina Road, including plugging of all associated sewer and forcemain connections.

#### Sewage Treatment Facilities

- staged expansion of the existing sewage treatment facilities, located approximately 500 m north of Hwy. 401's North Service Road in lot 23, Concession 1, Township of Lancaster, currently consisting of a two-cell seasonal discharge facultative sewage lagoon rated at an average sewage flow of 62.7 m<sup>3</sup>/d, each cell having a surface area of 1.2 ha and a storage capacity of approximately 11,450 m<sup>3</sup>, operated on an alternating basis [throughout each six-month operating period, one cell receives sewage while the other holds sewage received during the previous operating period; during any individual discharge season, effluent is only discharged from that cell which have not been receiving sewage during the current operating period], with effluent discharge to Lake St. Francis (St. Lawrence River) via a municipal drainage ditch (interim arrangement), as follows:

18"   
 Stage 1 construction of an approximately 2650 m long 200 mm diameter effluent sewer and outfall to Lake St. Francis (approved under Notice amending Certificate No. 3-0511-81-007, dated February 9, 1994), and change of the operating procedures of the existing lagoon involving parallel operation of both cells of the lagoon with discharge of effluent from both cells during each discharge season, and batch application of alum or other coagulant into the lagoon cells (manual spreading from a boat) prior to each seasonal discharge for phosphorus precipitation;

Stage 2/3 reconstruction and enlargement of the existing two-cell lagoon into a new two-cell clay lined lagoon, each cell having a liquid surface area of 1.65 ha and an active storage capacity of 24,300 m<sup>3</sup> at a design maximum operating depth of 2.3 m, including a 0.5 m deep sludge storage zone, with berms having the inside slopes of 4:1 and a total height of 2.9 m, including new influent, effluent and emergency overflow facilities, operated in accordance with the operating procedures introduced in the above-described Stage 1 expansion; ,

Stage 4 expansion of the lagoon constructed in the above-described Stage 2/3 expansion, involving:

- construction of a new clay lined lagoon cell (South Cell), having a liquid surface area of 4.7 ha and an active storage capacity of 73,000 m<sup>3</sup> at the ultimate design maximum operating depth of 2.3 m (the Stage 4 design maximum operating depth being 1.45 m, with an active storage capacity of 35,000 m<sup>3</sup>), including a 0.5 m deep sludge storage zone, with berms having the inside slopes of 4:1 and a total height of 2.9 m, including influent, effluent and emergency overflow facilities; and
- reconstruction and enlargement of the two-cell lagoon constructed in the above-described Stage 2/3 expansion into a single clay lined lagoon cell (North Cell), having a liquid surface area of 4.7 ha and an active storage capacity of 73,000 m<sup>3</sup> at the ultimate design maximum operating depth of 2.3 m (the Stage 4 design maximum operating depth being 1.45 m, with an active storage capacity of 35,000 m<sup>3</sup>), including a 0.5 m deep sludge storage zone, with berms having the inside slopes of 4:1 and a total height of 2.9 m, including new influent, effluent and emergency overflow facilities,

operated in accordance with the operating procedures introduced in the above-described Stage 1 expansion;

all in accordance with the application for approval dated February 28, 1995 and supporting documentation prepared by R.J. Burnside & Associates Ltd. Consulting Engineers.

*For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:*

**DEFINITIONS**

- (1) "certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the Ontario Water Resources Act, and includes any schedules;
- (2) "Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the Ontario Water Resources Act;
- (3) "Ministry" means the Ontario Ministry of Environment and Energy;
- (4) "Regional Director" means the Regional Director of the Eastern Region of the Ministry;
- (5) "District Manager" means the District Manager of the Cornwall District Office of the Ministry's Eastern Region;
- (6) "Owner" and "Operating Authority" mean Creg Quay Limited;
- (7) "the works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate;
- (8) "sewage treatment facilities" means the entire sewage treatment and discharge facility;
- (9) "operating period" means the period of time beginning on completion of one seasonal discharge of the lagoon and ending on completion of the following seasonal discharge;
- (10) "grab sample" means an individual sample of at least 1000 millilitres collected in the appropriate container at a randomly selected time over a period of time not exceeding 15 minutes;
- (11) "composite sample" means a sample made up of four or more distinct samples equal in volume, taken during a single 24-hour period at a time interval of at least two hours;
- (12) "daily concentration" means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required;
- (13) "average concentration" means the arithmetic mean of all daily concentrations of a contaminant in the effluent sampled or measured, or both, during a single discharge season (spring or fall);
- (14) "average loading" means the value obtained by multiplying the average concentration of a contaminant by the average daily effluent discharge over the same discharge season;

- (15) "average daily sewage flow" means the total sewage flow to the sewage works over twelve (12) consecutive calendar months divided by the number of days during the same period of time;
- (16) "average daily effluent discharge" means the total volume of effluent discharged from the sewage works over a single discharge season divided by the number of days over which the seasonal discharge was completed;
- (17) "BOD<sub>5</sub>" means five day carbonaceous biochemical oxygen demand measured in an unfiltered sample;
- (18) "E. Coli" refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius.

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

**TERMS AND CONDITIONS**

**1. PERFORMANCE**

- 1.1 The Owner shall ensure that the flow of sewage into the sewage treatment facilities does not exceed the design average daily sewage flow applicable to the currently complete and operational stage of the approved staged expansion of the facilities for any period of time greater than twelve (12) consecutive calendar months, as follows:

Stage 1 - 125.5 m<sup>3</sup>/d  
Stage 2/3 - 266.3 m<sup>3</sup>/d  
Stage 4 - 383.6 m<sup>3</sup>/d

- 1.2 The Owner shall ensure that the sewage treatment facilities are operated on a semi annual discharge basis with the effluent discharge in spring and fall as follows:

- / spring: discharge commencing not earlier than after the liquid surface in the lagoon has become free of ice cover, terminating within 45 days of the liquid surface in the lagoon becoming free of ice cover, and continuing for not less than 30 days, and
- / fall: discharge commencing not earlier than October 15 and terminating not later than November 30, and continuing for not less than 30 days.

1.3 Any diversion of sewage flow from any portion of the sewage works, and discharge of effluent from the sewage treatment facilities other than in accordance with Condition 1.2 above is prohibited, except:

- (a) where it is unavoidable in preventing loss of life, danger to public health, personal injury or severe property damage; or
- (b) where it is necessary for the purpose of essential maintenance of the sewage works to assure their efficient operation, provided that the effluent quality requirements set out in Condition 1.4 will not be exceeded and the District Manager has given a prior written approval for the bypass or effluent discharge; or
- (c) where the Regional Director has specifically approved it in writing.

1.4 The Owner shall design, construct and operate the sewage treatment facilities such that the concentrations and loadings of the materials named below as effluent parameters are not exceeded in the effluent from the plant, as determined in accordance with Condition 1.5:

Effluent Parameters	Concentration [mg/L]	Loading [kg/d]		
		Stage 1	Stage 2/3	Stage 4
BOD <sub>5</sub>	30.0	22.9	48.6	70.0
Suspended Solids	40.0	30.5	64.8	93.3
Total Phosphorus	1.0	0.8	1.6	2.3

1.5 For the purpose of determining compliance with and enforcing Condition 1.4:

- (a) Non-compliance with respect to concentrations of BOD<sub>5</sub>, Suspended Solids and Total Phosphorus in the effluent is deemed to have occurred when the seasonal average concentration of any of the parameters, as defined in this certificate, based on all composite samples taken in accordance with Condition 2.1, supplemented by spot sampling by the Ministry's staff as necessary, during any single discharge season, exceeds its corresponding concentration in effluent specified above in Condition 1.4.
- (b) Non-compliance with respect to loadings of BOD<sub>5</sub>, Suspended Solids, and Total Phosphorus is deemed to have occurred when the seasonal average loading of any of the parameters, as defined in this certificate, based on all composite samples taken in accordance with Condition 2.1, supplemented by spot sampling by the Ministry's staff as necessary, during any single discharge season, exceeds its corresponding loading from effluent specified above in Condition 1.4.



- (c) Data generated in accordance with the monitoring program and the flow measurement requirements outlined in Condition 2.1 and utilized in accordance with clauses (a) and (b) above shall be deemed to be conclusive of the minimum actual concentrations of the contaminants in the effluent from the works and minimum loadings of the contaminants to the receiving waters from the effluent.

## 2. MONITORING AND RECORDING

2.1 The Owner shall ensure that the following monitoring program is carried out upon commencement of operation of the works:

- (a) A sufficient number of flow measuring devices, calibrated at regular intervals not exceeding one year to ensure their accuracy to within plus or minus 15% of actual rate of flow within the full scale reading of the measuring devices, shall be installed, maintained and operated in order to measure and record the quantity of sewage being conveyed to the sewage treatment facilities.
- (b) The following lagoon effluent discharge parameters shall be measured, estimated or calculated and recorded:
  - (i) lagoon effluent discharge rate at the time of sampling undertaken pursuant to clause (d),
  - (ii) total volume of effluent discharged on the sampling day, and
  - (iii) total volume of effluent discharged over each discharge season.
- (c) The data generated in accordance with clauses (a) and (b) above shall be deemed to be conclusive of the minimum flow rates for the purposes of determining compliance with and enforcing this certificate.
- (d) Samples of raw sewage and final effluent from the sewage treatment facilities shall be collected at designated locations and analyzed for at least the following parameters at the indicated minimum frequencies:

<u>Raw Sewage Parameter</u>	<u>Type of Sample</u>	<u>Minimum Frequency</u>
BOD <sub>5</sub>	composite	monthly
Suspended Solids	composite	monthly
Total Phosphorus	composite	monthly
Total Kjeldahl Nitrogen	composite	monthly

<u>Final Effluent Parameter</u>	<u>Type of Sample</u>	<u>Minimum Frequency</u>
BOD <sub>5</sub>	grab	5 per discharge*
Suspended Solids	grab	5 per discharge*
Total Phosphorus	grab	5 per discharge*
Ammonia + Ammonium Nitrogen	grab	5 per discharge*

\* Samples of final effluent from the sewage treatment facilities shall be collected from the lagoon outlet structure at least five times during each seasonal discharge, namely, at the beginning of the discharge, at 25%, 50% and 75% drawdown in the lagoon, and at the end of the discharge.

In addition to the above routine sampling program, prior to each seasonal discharge, the lagoon contents shall be grab sampled and analyzed for Total Phosphorus, Hydrogen Sulphide and E. Coli.

- (e) Sampling locations may only be changed or abandoned and new locations may be added following commencement of operation if, in the opinion of the District Manager, it is necessary to do so to ensure representative samples are being collected.
- (f) The sampling and analyses required by clause (d) above shall be performed in accordance with the Ministry's Policy No. 08-06; "Protocol for the Sampling and Analysis of Industrial - Municipal Wastewater", Ministry of Environment, July 1993; or as described in "Standard Methods for Examination of Water and Wastewater", 17th Edition, 1990, as amended from time to time by more recently published editions.

- 2.2 If the Owner monitors any of the effluent parameters required by Condition 2.1, at the designated locations and in accordance with Condition 2.1, more frequently than it is required by that condition, the analytical results of all such samples, both required and additional, shall be included in the calculating and reporting of the values required by this certificate, and the increased frequency, or all dates of sampling, shall also be specified in the reports.
- 2.3 The Owner shall retain for a minimum of three years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this certificate.
- 2.4 The Owner shall record the time, location, duration and estimated quantity of each bypass event along with the reasons for the occurrence.

3. OPERATION AND MAINTENANCE

- 3.1 In order to ensure continuous compliance with the performance criteria stipulated in Conditions 1.1 through 1.5 the Owner shall use best effort to operate the sewage treatment facilities with the objective that the concentrations and total loadings of the materials named below as effluent parameters are not exceeded in the effluent from the plant, as determined in accordance with Condition 1.5:

Effluent Parameters	Concentration	Loading [kg/d]		
	[mg/L]	Stage 1	Stage 2/3	Stage 4
BOD <sub>5</sub>	25.0	19.1	40.5	58.3
Suspended Solids	30.0	22.9	48.6	70.0
Total Phosphorus	1.0	0.8	1.6	2.3

- 3.2 The Owner shall endeavour to operate the sewage treatment facilities such that the effluent will not contain any oil or other substance in amounts sufficient to create a visible film or sheen on the surface of the receiving waters and shall be essentially free of any floating material.
- 3.3 Based on the operational objectives stipulated above in Conditions 3.1 and 3.2, the Owner shall prepare an operations manual within six (6) months of the issuance of this Certificate and keep it up to date. Upon request, the Owner shall make the manual available for inspection by the Ministry personnel and furnish a copy to the Ministry.
- 3.4 The Owner shall prepare and make available for inspection by Ministry personnel upon request, a complete set of drawings within one (1) year of substantial completion of the sewage works. The drawings shall show the sewage works as constructed at that time.
- 3.5 A complete set of the record drawings, incorporating any amendments made from time to time, shall be kept by the Owner at the administration building of the sewage works as long as the sewage works is kept in operation.
- 3.6 In order to prevent or minimize any unacceptable liquid discharges and gas and odour emissions into the natural environment, the Owner shall ensure that contingency plans and procedures are established and adequate equipment and material are available for dealing with: emergency and upset conditions including equipment breakdowns at the sewage works, flooding; overflows of raw and partly treated sewage and spills of sludge or chemicals into or out of the sewage works. The Owner shall establish notification procedures to be used to contact the District Manager and other relevant authorities in the case of an emergency and upset conditions.

- 3.7 The Owner shall establish procedures for receiving and responding to complaints including a reporting system which records what steps were taken to determine the cause of complaint and the corrective measures taken to alleviate the cause and prevent its reoccurrence.
- 3.8 The Owner shall provide for the overall operation of the sewage treatment facilities with an operator who holds a licence that is applicable to that type of facility and that is of the same class as or higher than the class of the facility in accordance with Ontario Regulation 435/93.

#### 4. REPORTING

- 4.1 One week prior to the start up of the operation of each stage of the proposed staged expansion of the works, the Owner shall notify the District Manager (in writing) of the pending start up date.
- 4.2 The Owner shall report to the District Manager any loading, concentration or other result that exceeds an effluent limit specified in Conditions 1.1 through 1.5 orally, as soon as is reasonably possible, and in writing within seven (7) days of the exceedance.
- 4.3 The Owner shall notify the District Manager:
  - (a) of anticipated bypasses at least (10) days prior to the date of the bypass or otherwise on the earliest date possible;
  - (b) of unanticipated bypasses forthwith; and
  - (c) the notice in either case shall include information with respect to the anticipated adverse effects on the natural environment and the duration of the bypass.
- 4.4 The Owner shall prepare and submit a performance report to the District Manager on an annual basis, and the submission shall be made no later than 90 days following the end of each calendar year. The first such report shall cover the period from the commencement of operation of the works until the end of the first calendar year in which the works is operated. The reports shall contain the following information:
  - (a) a summary of all monitoring data including an overview of the success and adequacy of the sewage treatment program;
  - (b) a comprehensive interpretation of all monitoring data and analytical data collected relative to the works during the reporting period and a comparison to the effluent quality and quantity criteria described in condition 1;
  - (c) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

96

March

- (d) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming a part of the works;
- (e) a description of any operating problems encountered and corrective actions taken during the reporting period;
- (f) a summary of any proposed alteration, extension or replacement in the process or operation of the works to be completed over the next reporting period which may require approval under the Ontario Water Resources Act.

## 5. STAGED EXPANSION SCHEDULE

5.1 The Owner shall ensure that no portion of the works associated with Stage 4 of the approved staged expansion of the facilities, as described in the preamble of the Certificate, is constructed unless the Township of Lancaster has amended the Official Plan to change the current designation of the parcel of land proposed to be utilised for the said Stage 4 expansion (i.e., "Agricultural Resource") to a designation with which the proposed use is compatible.

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

- 1.1 Conditions 1.1 and 1.2 are included to ensure that the average daily flow of sewage to the works is within the approved treatment capacity of the works, and that the effluent discharge periods and rates are compatible with other uses of the receiver.
- 1.2 Condition 1.3 is included to indicate that bypasses of untreated sewage to the receiving watercourse is prohibited, save in certain limited circumstances where the failure to bypass could result in greater injury to the public interest than the bypass itself, where a bypass will not violate the approved effluent requirements, or where the bypass can be limited or otherwise mitigated by handling it in accordance with an approved contingency plan. The notification and documentation requirements allow the Ministry to take timely abatement and enforcement action in an informed manner and will allow the Owner to be aware of the extent and frequency of bypass events.
- 1.3 Conditions 1.4 and 1.5 are imposed to set out the maximum concentrations and related loadings of materials which are allowed in the discharge of effluent from the works to the receiving water body. These limits are established to minimize the environmental impact to the receiver and to protect water quality, fish and other aquatic life in the receiving water body. They are based on the Ministry's publication entitled "Water Management, Policies, Guidelines Provincial Water Quality Objectives of the Ministry of the Environment and Energy - July 1994", and recommendations of the International Joint Commission on the Great Lakes.

- 2.1 Conditions 2.1 through 2.5 relating to monitoring and recording of the quality and quantity of raw sewage the effluent from the sewage treatment facilities on a continual basis are required to enable the Owner to evaluate the performance of the works and to ensure that it is operated and maintained at a level which is consistent with the design objectives and other requirements of this certificate.
- 3.1 Conditions 3.1 and 3.2, are included to set out non-enforceable effluent quality objectives which the Owner is obligated to use best efforts to strive towards on an ongoing basis. It is the Ministry's experience that setting of such objectives coupled with the bona fide efforts of the operating authority to achieve them tends to assist the operating authority in complying with the generally less stringent effluent requirements specified in Condition No. 1.4 thereby serving the environmental goals set out in the reason for the latter.
- 3.2 Conditions 3.3 through 3.8 are included to ensure that the works will be operated, maintained, funded, staffed and equipped in a manner enabling compliance with the terms and conditions of this certificate, such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented.
- 4.1 Conditions 4.1 thorough 4.4 are included to ensure that all pertinent information is available for the evaluation of the performance of the sewage works and that disposal of sludge generated at the sewage works is in accordance with the Provincial Sludge Utilization Guidelines and consistent with requirements of Part V of the *Environmental Protection Act*.
- 5.1 Condition 5.1 is included to ensure that the issuance of this Certificate does not prejudice the Township's decision regarding the proposed change in the Official Plan designation of the parcel of land proposed to be utilized for the Stage 4 expansion.

This Certificate should be read in conjunction with Certificate of Approval No. 3-0511-81-007, dated August 12, 1981, as amended by Notices dated July 30, 1993, February 9, 1994, and November 24, 1995.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter O.40, as amended, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 101 of the Ontario Water Resources Act, provides that the Notice requiring the hearing shall state:*

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

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the sewage works are located;

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

*This Notice must be served upon:*

The Secretary,  
Environmental Appeal Board,  
112 St. Clair Avenue West,  
Suite 502,  
Toronto, Ontario.  
M4V 1N3

AND


The Director,  
Section 53, Ontario Water Resources Act,  
Ministry of Environment and Energy,  
250 Davisville Avenue, 3rd Floor,  
Toronto, Ontario.  
M4S 1H2

*The above noted works are approved under Section 53 of the Ontario Water Resources Act*

**DATED AT TORONTO this 28th day of November, 1995**

THIS IS A TRUE COPY OF  
THE ORIGINAL CERTIFICATE  
SIGNED BY  
D.F. CARR, P. ENG.

MAILED ON **NOV 28 1995**

BY 

MT/fn

cc: -M.J. Samson, Clerk, Township of Lancaster  
-District Manager, Cornwall District Office  
-J. Firth, P. Eng., R.J. Burnside & Associates Ltd. ✓  
-T. Ho, Plant Optimization Section, MOEE Science & Technology Branch

## **Appendix B**

### **Creg Quay Master Plan**





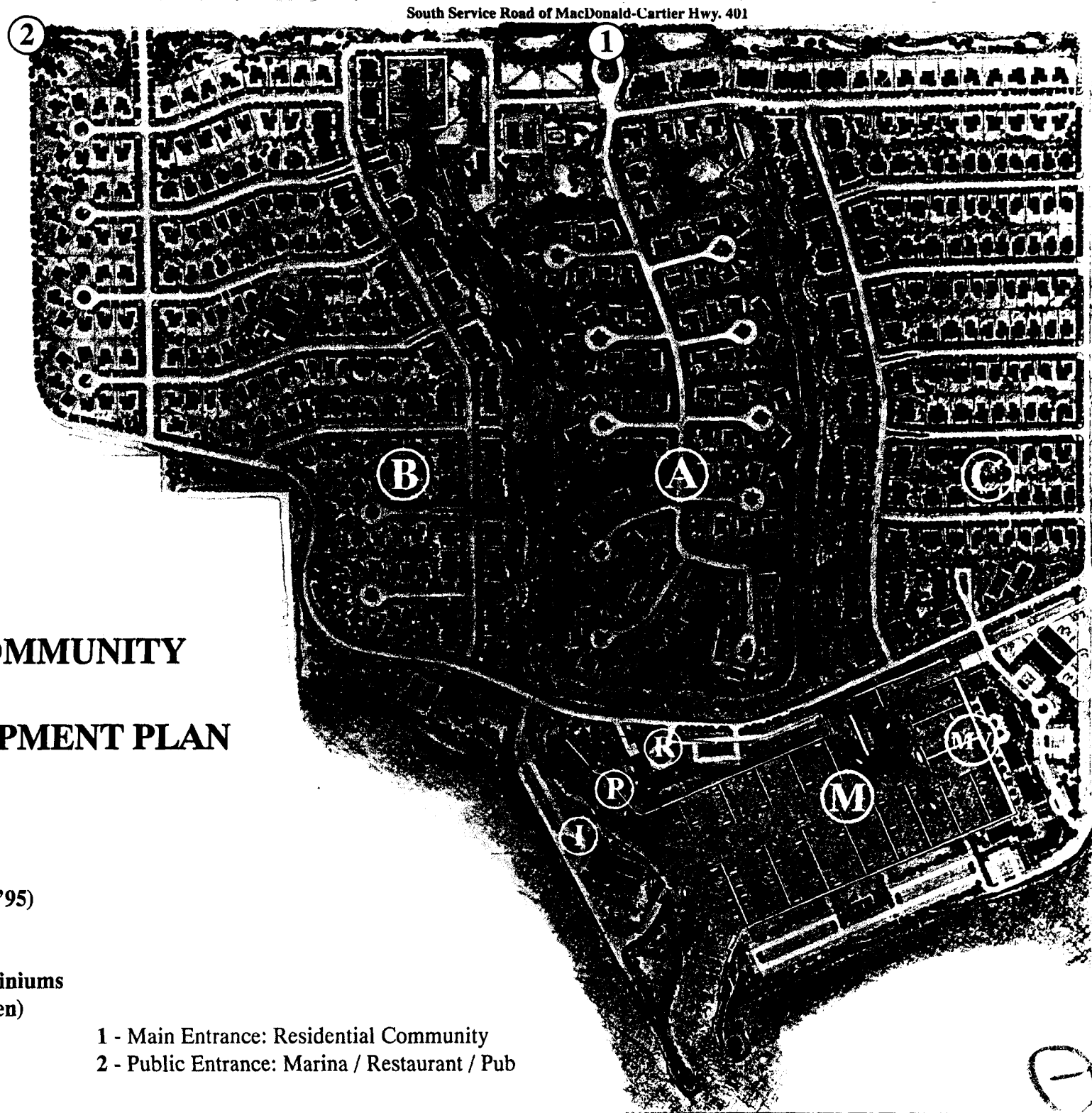
On Lake St. Francis,  
East of Lancaster, Ontario  
Tel.: (613) 347-2416  
1-800-545-9753  
Fax: (613) 347-7514

## CREG QUAY COMMUNITY and MASTER DEVELOPMENT PLAN

### LEGEND

- A - Glengarry Courts (open)
- B - Lancaster Lanes (Spring '95)
- C - St. Francis Mews
- M - Marina (open)
- MV - Marina Village / Condominiums
- R - Landings Restaurant (open)
- P - Mariner's Pub (open)
- I - Country Inn / Spa

- 1 - Main Entrance: Residential Community
- 2 - Public Entrance: Marina / Restaurant / Pub



## **Appendix C**

### **Public Consultation Documentation**



**M.S. Thompson & Associates Ltd.**

1345 Rosemount Avenue  
Cornwall, ON, Canada K6J 3E5  
Telephone: 613-933-5602  
Fax: 613-936-0335

Internet: mail@trg.ca Website: www.trg.ca

## MEETING RECORD

**Project:** Creg Quay and Westley's Point Sewage Project  
**Project No:** 985160  
**Meeting:** No. 2  
**Date:** December 10 1998  
**Location:** Township of South Glengarry Municipal Office  
**Present:** Bill Major, Westley's Point Ratepayers Association  
Bill Knight, P. Eng., M.S. Thompson & Associates Ltd.  
Andy Code, Raisin Region Conservation Authority

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**PURPOSE:** The meeting was arranged by Bill Major, Westley's Point Ratepayers Association, primarily for the benefit of the residents of Westley's Point. The purpose was to discuss the support for and conditions relating to a study regarding the development of a communal sewage system for Westley's Point utilising the Creg Quay Sewage Treatment Facility.

1. Introductions by Bill Major.
2. Bill Knight reviewed the background associated with Creg Quay infrastructure in particular the sewage collection and treatment system. TRG Canada Inc. was retained by Creg Quay to operate and optimise the existing sewage and water systems and M.S. Thompson & Associates Ltd was retained to plan and design the improvements required to accommodate future development. Based on the work by M.S. Thompson & Associates Ltd., it became evident that the sewage treatment system at Creg Quay could be modified and/or expanded to include Westley's Point and hence Creg Quay Limited has initiated these discussions regarding a partnership. The Township Council at their meeting of October 13, 1998 endorsed the concept and authorised staff to enter into discussions with the interested parties. It was evident that the proposed Greater Lancaster Area (GLA) scheme for water supply and sewage disposal was not going to provide an immediate or affordable solution for Westley's Point.

In order to examine the possibility of such an alternative, a study under the provisions of the Class EA process must be undertaken as was done in Lancaster. The Township was successful in obtaining funding at 75% from the MOE for the study which is estimated to cost \$50,000 and that time retained TRG complete the study. Other partners in the study are the Township at \$4500, Creg Quay at \$4000 and hopefully Westley's Point \$4000.

The CQ-WP study would determine the treatment process, the capacity, the collection

system, and costs. Public input is mandatory.

3. The following points are made in response to questions and comments from those in attendance:
- Ammandale Bay and Nadeaus Point are not being asked to contribute to the study but if the project goes forward to construction and there is a benefit to those property owners then they will be assessed. They will be invited to the next meeting.
  - The method of treatment will have to be modified from the current facultative seasonal discharge lagoon system with approximately 6 months storage capacity to continuous discharge with approximately 30 days retention time. Other modifications will be required including the addition of an alum feed system for flocculation and perhaps a disinfection system. TRG will be determining the configuration and costs. Ultimately MOE will have to approve.
  - The Ontario Municipal Board (OMB) has already dealt with and approved the expansion of the CQ lagoons. CQ can proceed now with expansion of the lagoon system to accommodate Phase 2 development.
  - The study will recommend a solution that will probably involve some or all of the following: a sewage collection system, pumping station, forcemain, upgrades to the sewage treatment facility, and related infrastructure. Capital funding assistance may be available for the Westley's Point portion – not for Creg Quay if the recommended solution is a municipal project. Hence the existing CQ treatment facility will have to be transferred to the Township. CQ unequivocally must protect its investment particularly as it relates to future development.
  - Similarly public road allowances (or easements) will be required to accommodate the sanitary sewers in Westley's Point to qualify as a municipal project. The proposed sewage project may therefore provide an opportunity to address the private roadway issue. Discussions regarding cost sharing will be required.
  - South Glengarry received approval for funding assistance at 90% for water works in Lancaster Village and 75% for sewage system improvements in South Lancaster.
  - Other issues such as erosion, weeds in MacIntosh Creek, drainage, water quality in MacIntosh Creek may be addressed by the RRCA through a Great Lakes 2000 project. Andy Code will investigate.
  - Participating in the study does not commit to a construction project. Completing the study will provide the residents with information such as feasibility and costs from which they can determine their support for the project. Completing the study will also permit the municipality to apply for capital funding assistance which will further determine the cost of the project for the residents. Ultimately the Council of the municipality determines whether or not the project proceeds based on input from the residents.
  - Project costs may be assessed against property owners as a one time fee or a debenture over a period of years (10 is common).
  - It is expected that the study will be completed before the end of January 1999. A public meeting will be held around the middle of January. Notice will be provided.

A copy of the sign-in sheet is attached.

X:\1998\985160\Admin\MR2.doc

# SIGN-IN

Name	Address	Phone #
Roger Langer	121 Water St W. Cornwall	933 1089
Chris Peasbeck	Westley Post Box 1302 Lennox	347-2808
Yvonne Faubert	Westley's P.E. Box 1376 Lennox	347-3203-210, 84
Donat Boissoneau	187 Bishop St. S. Alexandria	525-5561
Dan Duchesneau	930 ADOLPHUS ST	933-8150
Shirley Macdonald	PO BOX 1303, DANCING	347-3718
Ruth Thompson	69th Ave	347-1366
KARL EHRENFELD	6231-67th Ave	347-1761
Gilles Tessier	Westley's Pt Box 1312	347-3470
BILL MAJOR	WESTLEY'S PT BOX 1369	347-7750
STUART SCHARF	" " " 1304	347-2521
Jeanette Gibeau	Westley Pt. 6299	347-3522
Robert Schauder	6250 62nd Ave	347-2253
SAM FORREST	85 NIKIASA CT. C.Q.	347-1531

BILL KNIGHT  
ANDY CODE

985160 - public

## TOWNSHIP OF SOUTH GLENGARRY

Creg Quay - Westley's Point - Nadeau's Point - Amandale Bay

Sewage Collection and Treatment Project

### PUBLIC MEETING

WEDNESDAY, JANUARY 27, 1999

7 p.m., Township Hall

6 Oak Street, Lancaster Ontario

Any questions, make suggestions,  
and register your views.

In accordance with the approved procedures contained in the Class Environmental Assessment (EA) for Municipal Water and Sewage Projects, notice is hereby given that a Study is underway and a Phase 3 Report is being prepared for the above noted project.

The Phase 3 Report will recommend providing a sewage collection system in Westley's Point, Nadeau's Point and Amandale Bay as the preferred alternative. The new sewage collection systems will be connected to the existing Creg Quay sewage treatment facility (lagoons). The Creg Quay sewage treatment facility will be modified to accommodate increased flow and to improve effluent quality for continuous discharge to the St. Lawrence River. The improved treatment process will produce effluent that meets or exceeds the Provincial Water Quality Objectives as determined through the receiving stream assessment that was conducted as part of this study. This project is a municipal undertaking and is estimated to cost \$2,865,000.

A preliminary evaluation of alternatives and their respective costs has been completed consistent with the Class EA Process and will be presented at the public meeting. This Public Meeting will serve to inform the residents, businesses, property owners, and review agencies of the study objectives, findings, and recommendations. For further information, please contact the municipal office or the engineer as listed below. In the meantime, you are invited to attend the Public Meeting and register your input.

Marcel Lapierre  
Chief Administrative Officer  
Township of South Lancaster  
6 Oak Street  
Lancaster, Ontario, K0C 1N0  
613-347-1166

William A. Knight, P.Eng.  
Senior Project Engineer  
M.S. Thompson & Associates Ltd.  
1345 Rosemount Avenue  
Cornwall, Ontario, K6J 3E5  
613-933-5602

Notice Issued January 20, 1999



**M.S. Thompson & Associates Ltd.**

1345 Rosemount Avenue  
Cornwall, ON, Canada K6J 3E5  
Telephone: 613-933-5602  
Fax: 613-936-0335

Internet: mail@trg.ca Website: www.trg.ca

## MEETING RECORD

**Project:** Creg Quay, Westley's Point, and Area Sewage Project  
**Project No:** 985160  
**Meeting:** Public Meeting  
**Date:** January 27, 1999  
**Location:** Township of South Glengarry Municipal Office

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**Attended by:** Reeve Charles Sangster  
Councillor Janette Abbey  
Councillor Jim McDonell  
Councillor Ian McLeod  
Marcel Lapierre, Administrator  
Michael Samson, Clerk  
Bill Knight, P. Eng., Senior Project Manager, MSTA  
John St. Marseille, p. Eng., Senior Environmental Engineer, MSTA  
Jason Fitzpatrick, P. Eng., Design Engineer, MSTA  
Over 40 members of the public (see Sign-In Sheet)

As people arrived, they were asked to sign in and were provided with a copy of the hand out which was a reproduction of some of the slides that were shown during the presentation. The sign-in sheets and hand out are attached. A full copy of the presentation material is available for viewing at the offices of M.S. Thompson & Associates Ltd.

After introductions by Marcel Lapierre, the presentation was given by Bill Knight. Existing conditions were reviewed with respect to sewage disposal problems in Westley's Point. Creg Quay development plans were reviewed and the plan to modify and expand the Creg Quay sewage treatment facility was discussed. It was noted that these circumstances led to the proposal to develop an area sewage collection and treatment system for Creg Quay, Westley's Point, Nadeau's Point and Amandale Bay; the subject of this study being conducted under the Class EA process.

### Questions and Answers

1. If a 12 ha lagoon with semi-annual discharge is required for Creg Quay, how can we have only 1.6 ha (existing) lagoon for this proposal? *The proposal includes modifying and enhancing the treatment process to allow continuous discharge therefore not requiring 180 days of storage. The existing cells will provide a minimum of 30 days retention under the design flow condition.*
2. Will the treatment level be adequate? Can you drink the effluent? *The level of treatment is*

determined on the basis of the Receiving Stream Impact Assessment and the Provincial Water Quality Objectives. Eventually the MOE will have to review and approve the treatment system before implementation. The effluent will not be suitable for drinking nor is untreated water from the St. Lawrence River. The enhanced treatment process will include aeration, sedimentation, chemical addition for P removal and post-aeration.

3. Is the east side of Wesley's Point included? Yes all of Wesley's Point including 67<sup>th</sup> Avenue, and 69<sup>th</sup> Avenue. All of the area designated in the Township OP as Limited Services Residential in Westley's Point, Nadeau's Point, and Amandale Bay is included in the Proposed Service Area (PSA). In addition, an allowance along the east side of 69<sup>th</sup> Avenue is made for residential infill given that a sanitary sewer will be constructed on 69<sup>th</sup> Avenue. Except at Creg Quay, limited allowance is provided for infill development.
4. What about the wetland area? Construction of sewers or other project related infrastructure will not take place in the Wetland Area as define in the Township OP.
5. Describe the location of the proposed pumping station. How loud is the proposed pumping station? The pumping station will probably be located on the east side of 78<sup>th</sup> Avenue near the south limit of the spruce tree plantation to avoid the plantation. Noise from the operation of the proposed Nadeau's Point central pumping station (PS3) will not be discernible. The exception is during the weekly maintenance operation of the diesel generator and periodically during power outages. Noise levels will be controlled through exhaust muffler and building panels to approved levels. Siting details and noise control measures will be determined during the final design stage.
6. What about the existing pumping station in Creg Quay? It will be decommissioned.
7. What kind of aerators are proposed and is there noise from the aerators? The final selection of equipment will be made during the final design stage. At this time we are proposing to use floating aspirating aerators which are essentially electric motor driven pumps that pump air into the wastewater. Four aerators at 7.5 kw each are proposed initially and at design flows, a total of six aerators will be required. The noise level is moderate and not likely noticeable at the property boundary however we will address specific noise abatement issues in the final ESR document.
8. Existing roads are narrow. Expropriation of land will be expensive and will involve 4 owners in Westley's Point alone. The Township will be negotiating with land owners with respect to the existing private roadways in order to secure municipal road allowances. The residents have been trying to get the Township to assume the private roads in this area for many years and this project provides further impetus for a deal. The proposed sewers must be located on public road allowances or easements. Expropriation is a last resort but may necessary to reach an agreement for the benefit of the project. The land acquisition and easement costs are part of the overall project costs and will be shared accordingly.
9. Where is the existing forcemain? The existing forcemain is located on the east side of the west canal in Creg Quay Phase 1, and it extends along the South Service Road to the Highway 401 crossing, then along the North Service Road before extending northerly to the lagoon site on the east half of Lot 23 Concession 1.
10. Will taxes increase to pay for this project? The estimated cost of \$4,985 or \$539 per household per year for 15 years represents the net cost after Provincial funding assistance and the Creg Quay Limited share of \$320,445. The net project cost is assessed against the benefiting properties in the area - not the general tax base.
11. Where are connections to the sewer made? The project includes sanitary service laterals to the property line. The property line has yet to be defined given that the roads are presently private. However we have included in the estimate the cost of a service lateral at each property.
12. What about the risk of gas fires and fumes in the lagoon? Creg Quay currently operates the Marina and lagoon facility and has had no problems to date. Pump out facilities for sewage holding tanks for the boats in the marina basin are provided and maintained by Creg Quay.



Gasoline dispensing is also provided by Creg Quay at the Marina but separate from the pump out. The risk is minimal. A small amount of gasoline in the lagoon would be less serious than gasoline entering the sewer system or pumping station. CQL presently insures that facilities and eventually the municipality will insure the facilities. The costs are borne by the users.

13. How is sludge handled? What about metals? The existing lagoon cells have not been desludged yet. Typically every 20 years sludge should be removed and disposed of (on agricultural lands subject to a license). We have included an allowance in the cost estimate for desludging the existing cells. Heavy metals are not typically associated with municipal wastewater. Before a land application is approved, the sludge is tested and analysed for various elements and contaminants that are stipulated under the guidelines for application on agricultural lands.
14. If Creg Quay Limited goes bankrupt do the taxpayers pay the bill? Creg Quay Limited will have to enter into an agreement with the Township regarding the transfer of facilities and the sharing of costs. That agreement has not been developed yet. Creg Quay is reviewing this proposal as are the residents here this evening. The Township will own the facilities before the project goes forward and will secure financial guarantees for the CQL share. Homeowners in Creg Quay will share in the cost of operating the new systems, as they do with existing systems. Bankruptcy should not be an issue.
15. Why should the taxpayers pay for Creg Quay development? Creg Quay Limited owns the existing treatment facilities and, whether or not this area project proceeds, will be developing more phases and expanding the infrastructure accordingly. CQL intends to move into Phase 2 in 1999 including an expansion of the existing lagoons. They will also be required eventually to convey the existing infrastructure to the municipality. This is an opportunity to develop an area system that will solve a problem in Westley's Point and accommodate new development in Creg Quay – a win/win situation. Creg Quay will pay the largest share of the estimated costs based on average daily flow. The ratio is approximately 72% CQL and 28% others.
16. Will the existing systems be inspected before turnover to the Township? The Township has not yet formalised an agreement with CQL with respect to the transfer of infrastructure. Preliminary discussions have indicated to CQL that condition inspections of sewers, watermains, roads, sewage treatment and water supply systems will be required and deficiencies will have to be rectified.
17. Will the new lagoons be larger or closer to the property lines? CQL has a Certificate of Approval which was issued by the MOE after the Ontario Municipal Board (OMB) hearing decision that allows the expansion of the existing lagoons to a volume 143,000 m<sup>3</sup> and a surface area of approximately 12 ha (30 ac). The existing cells are 23,000 m<sup>3</sup> and 1.6 ha in area. The expanded lagoons will be significantly larger. We are proposing an alternative treatment method that will be accommodated initially within the existing lagoon cells at 1.6 ha plus some minor site works including a building. The approved setbacks of 3.5 m from the east property line and 60 m from the south property line will continue to apply. The existing cells are well hidden in the bush except along the east line and some tree planting can further sight and noise concerns.
18. Who will pay for the cost of operating the new systems? We have estimated the operating costs for the new treatment facility at \$244 per household per year exclusive an allowance for capital replacement. This is based on equivalent 215 existing households in Creg Quay, Westley's Point, Nadeau's Point and Amandale Bay, as well as the existing commercial, restaurant and marina basin at Creg Quay. As additional households connect, the operating costs will likely decline. The existing operating cost in Creg Quay is estimated at \$277 per household per year.
19. This is a RAP area and as such something must be done to address failing septic systems that pollute ground water and the River. Algae clogs the River in this area. It is expected that this project will improve the environment by treating wastewater that otherwise seep into the creeks and Lake St. Francis through ineffective sewage systems.
20. When will the project proceed? This meeting fulfils one of the requirements for public

*consultation during the Class EA process. The Report (ESR) will be completed next and placed on the public record for 30 days towards the end of February with the concurrence of Council. Council ultimately determines whether or not the project proceeds. As long as the requirements of the Class EA process are satisfied then there is nothing to prevent the project from proceeding. Council has indicated that an application for funding assistance will be submitted and depending on the level of funding, Council will decide if the project is affordable. The estimated cost per household of \$4,985 is an average based on 165 properties being assessed, a funding level of 66.7% and an agreement with CQL involving a contribution (share) of \$320,445. Eventually the cost estimate will be refined and an assessment schedule based on actual construction costs will be determined by Council. Bump-up requests should be submitted to the MOE.*

X:\1998\985160\Public\PubMeetMR.doc

# Handout for Public Meeting

The Corporation of the  
**Township of South Glengarry**

**Class EA for a Sewage Treatment  
Project in the Creg Quay Area**

Presented by  
Bill Haight, P. Eng.  
John D. Macmillan, P. Eng.



## Study Background



- Creg Quay Ltd. is considering modifications to existing treatment to increase capacity for Phase 2
- South Glengarry Council authorised this study - an addendum to the GLA ESR
- The GLA solution considered not affordable
- Study funding assistance from MOE, Creg Quay Ltd., Westley's Point residents, and the Township
- This Study examines partnership options using the Creg Quay sewage treatment facility
- Other options are also examined for comparison
- Study area includes CQ, Westley's, Nadeau's, Amandale

Creg Quay and Area Sewage Treatment Project

## Design Criteria Summary



- BOD<sub>5</sub> 30 mg/L
- TSS 40 mg/L
- TP 1.0 mg/L
- NH<sub>3</sub>-N 8.0 summer and 10.0 winter
- H<sub>2</sub>S ND
- Treatment design flow of 682 m<sup>3</sup>/day ADF
- Continuous discharge with not less than 30 day HRT

Creg Quay and Area Sewage Treatment Project

## Summary of Option Costs



	Creg Quay	Westley's Point	Nadeau's Point	Amandale Bay	Total
Existing Households	85	75	21	22	203
Design Households	268	100	35	30	433
Design ADF m <sup>3</sup> /day	482.7	114.8	40.2	34.4	682.1
<b>OPTION 1 - One Central Pumping Station at Nadeau's Point, Enhanced CQ Treatment</b>					
Net Capital Cost	\$320,445	\$481,888	\$181,325	\$150,015	\$1,142,871
Household Net Capital Cost		\$4,985	\$4,985	\$4,985	\$4,985
Household Annual Operating Cost	\$244	\$244	\$244	\$244	\$244
<b>OPTION 2 - 2 Pumping Stations (Westley's and Nadeau's), Enhanced CQ Treatment</b>					
Net Capital Cost	\$320,445	\$595,535	\$140,858	\$132,087	\$1,198,525
Household Net Capital Cost		\$5,079	\$5,079	\$5,079	\$5,079
Household Annual Operating Cost	\$293	\$293	\$293	\$293	\$293
<b>OPTION 3 - 2 Pumping Stations (Westley's and Creg Quay), Enhanced CQ Treatment</b>					
Net Capital Cost	\$303,588	\$543,848	\$148,053	\$128,431	\$1,121,918
Household Net Capital Cost		\$4,985	\$4,985	\$4,985	\$4,985
Household Annual Operating Cost	\$293	\$293	\$293	\$293	\$293
<b>OPTION 4 - 2 Pumping Stations (Westley's and Creg Quay), Enhanced CQ Treatment, NP and AB excluded.</b>					
Net Capital Cost	\$322,903	\$655,425	\$0	\$0	\$978,328
Household Net Capital Cost		\$8,554	\$0	\$0	\$8,554
Household Annual Operating Cost	\$300	\$300	\$0	\$0	\$300
<b>OPTION 5 - Westley's Point to New Treatment, Outfall</b>					
Net Capital Cost	\$528,103	\$850,414	\$0	\$0	\$1,378,517
Household Net Capital Cost		\$8,504	\$0	\$0	\$8,504
Household Annual Operating Cost	\$500	\$500	\$0	\$0	\$500
<b>OPTION 6 - Connect Westley's Point to Lancaster</b>					
Net Capital Cost	\$528,103	\$1,423,451	\$0	\$0	\$1,951,554
Household Net Capital Cost		\$14,235	\$0	\$0	\$14,235
Household Annual Operating Cost	\$500	\$370	\$0	\$0	\$370

Creg Quay and Area Sewage Treatment Project

## Option 1 Features



- Shared facility for the area owned/operated by municipality
- Provides lowest capital and operating costs
- Improves quality of treated effluent
- Accommodates limited development in WP, NP and AB
- Accommodates Creg Quay development in Phase 2 and Marina basin
- Operating costs will decline with new development
- Eliminates replacement cost for septic systems at \$10,000 to \$15,000 each where possible. Eliminates holding tanks
- Roadway improvements will result

Creg Quay and Area Sewage Treatment Project

## Option 1 Costs



OPTION 1		Total	Creg Quay	Westley's Point Nadeau's Point Amandale Bay
<b>Capital Cost</b>				
Existing Systems - Sewage Treatment		\$1,508,000		
Proposed Systems - Sewage Treatment		\$528,104		
Proposed Systems - Sewage Collection				
Local Sanitary Sewers		\$1,082,045		
Pumping Station PSS		\$484,401		
PSS Foreman		\$102,588		
Connect Creg Quay Greully		\$158,134		
Connect Westley's Point Greully		\$445,222		
<b>TOTAL CAPITAL COST</b>		<b>\$4,298,484</b>	<b>\$1,828,445</b>	<b>\$2,470,040</b>
Creg Quay Asset Contribution			\$1,508,000	
Provincial MOE Contribution	88.7%			\$1,647,523
<b>Net Capital Cost</b>		<b>\$1,142,971</b>	<b>\$320,445</b>	<b>\$822,526</b>
Average Household Net Capital Cost	165			\$4,985
<b>Average Household Costs</b>				
Debt Service Cost (15 yr) per Household	8%			\$539
Annual Operating Cost (No Capital)				\$244
Connection Cost				Varies

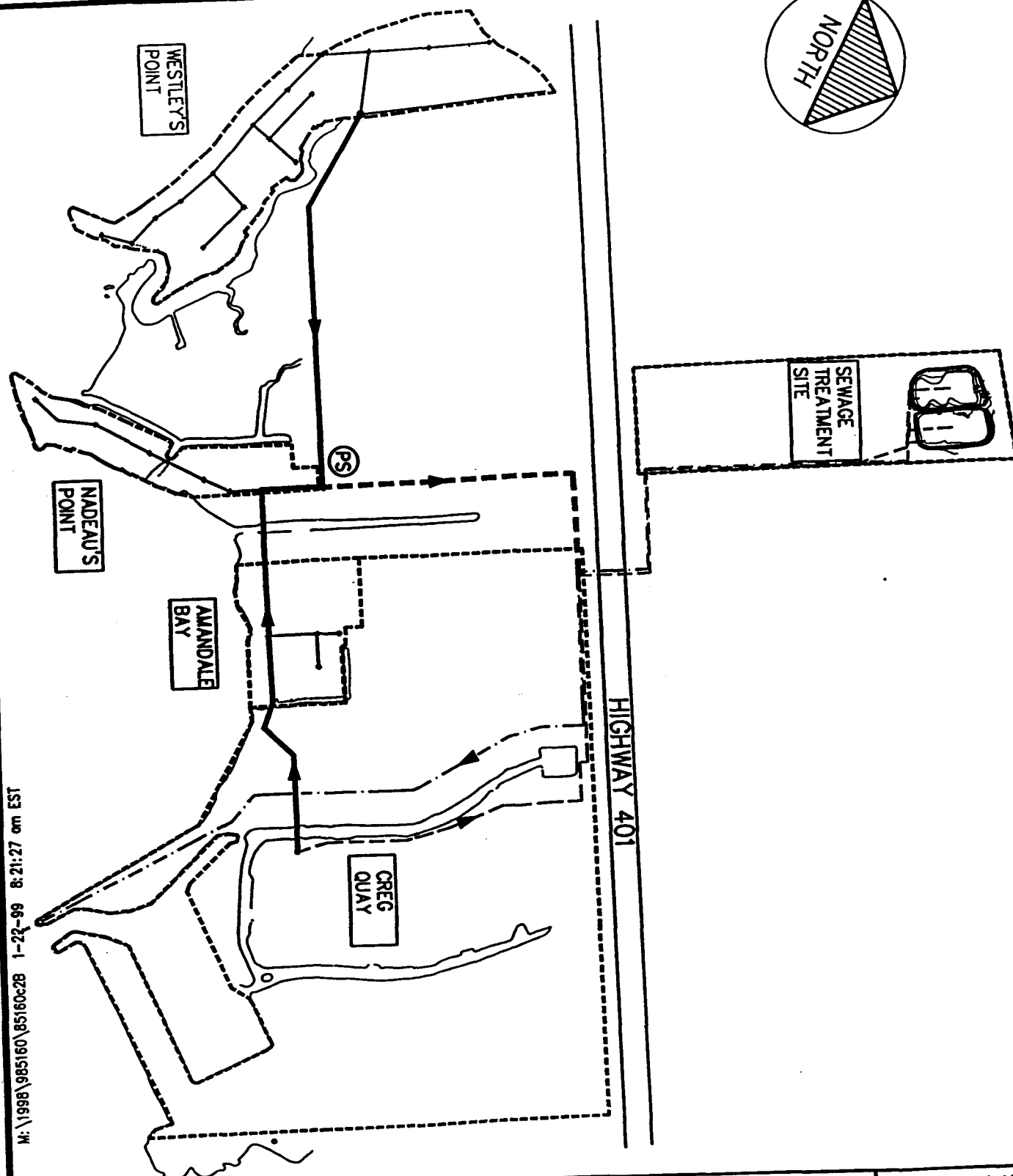
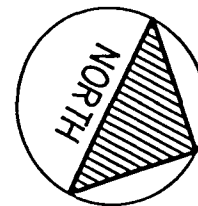
Creg Quay and Area Sewage Treatment Project

## **Next Phase**



- **Complete the Class EA Process (ESR)**
  - Complete ESR and Council resolution by Feb 15, 1999
  - Notice of Completion Feb 16, 1999
  - ESR on Public Record for 30 days
  - Respond to Bump-up requests if necessary
  - Complete PWPF Application for funding assistance, Council resolution, and submit to MOE by Mar 31, 1999
  
- **Bump-up Requests**
  - Submit to Council
  - Submit to Office of the Minister of the Environment during the 30 day review period

**Creg Quay and Area Sewage Treatment Project**



EST 2008-01-22 8:21:27 am EST  
 985160\85160-2B 1-22-99 8:21:27 am EST

MS. THOMPSON & ASSOCIATES LTD.  
 consulting engineers  
 CORNWALL KINGSTON



# CREG QUAY, WESTLEY'S POINT, NADEAU'S POINT AND AMANDALE BAY SEWAGE PROJECT

PROPOSED SEWAGE COLLECTION  
 SYSTEM SCHEMATIC

scale 1:10000  
 date JAN., 1999  
 drawn G.A.D.  
 job no. 985160  
 drawing no.

**FIG. 2**

# SIGN-IN SHEET

## PUBLIC INFORMATION MEETING PHASE 3 CLASS EA CREG QUAY & AREA SEWAGE TREATMENT PROJECT

### TOWNSHIP OF SOUTH GLENGARRY



NAME	ADDRESS	TEL #
Raymond WALSH	6279 SUMAC	347-7750
Shila Mancary	6272 Willow	347-3718
Anne Willmott	6282 Willow	347-1398
Stuart Schanz	6278 Willow Dr.	347-2821
Barbara	6309 78th	347-2919
Helene Fauriol (Ch. L. Poir.)	Bush + Lilac. North Pt.	247-3205
Alfred	51 MacDonald, Creg Quay	347-7721
John Tupper	6294 WESTLEY'S Point	347-3470
D. McCulloch	6323 Nadeau	347-2273
R. Pizio	6321 Nadeau	347-2702
W. Ritchie	20370 Old Hill Rd	347-3488
Frederick	Moreau Creek	538-2855
Paul Chiffle	6231-67, AVE LANCASTER	347-1761
B. Samson	RRH1-21145 OUTLINE Y2	347-3150
DENEE MARY	Nadeau's Point	347-3543
John F. Macdonald	6319-78TH AVE Nadeau's Point	525-2236
RENE BAZINET	6251 THOMAS COURT Creg Quay	347-1746
HOWARD CAMERON	6146 LANCASTER AVE	347-3169
Dallen Ogden	6165 Burswick AVE	347-2298



# SIGN-IN SHEET

PUBLIC INFORMATION MEETING  
PHASE 3 CLASS EA  
CREG QUAY & AREA SEWAGE TREATMENT PROJECT

TOWNSHIP OF SOUTH GLENGARRY



NAME	ADDRESS	TEL #
Leo Paul Vane	R.R. 1 Bearsville	347-3791
Michelle Vane	R.R. 1 Bainsville	
Donnette Marleau	Westley's Point	347-7486
Donald Marleau	6296 Westley's Pt	347-7486
Eugene Forward	6282 Wilbur Westley's P.	347-1398
DIANA STIMP	S. Lancaster	
Dorothy Bodge	S. Lancaster	
Donna Worton	S. Lancaster	
John Maher	Cornwall	
Andy Code	R.R. 1	938-3611
Bud Bathgate	47 Cameron Cr. Glengarry Cts.	347-3408
Percy Lecker	70 Mackean Court	347-1538
BILL MAJOR	6279 SUMAC ST. WESLEY'S	347-7750
Core Regan	Westley's Pt Box 1302 Lancaster	347-2808
Margaret Leasbeck	Westley's Pt. Lancaster	347-2808
Ed. Goss	Creg Quay	347-1674
Robert Lecker	6250-6254	347-2983
Allyn Mitchell	6249 Westley's Pt.	347-7481

Mailing List Phase 3 Notice

Company	Address 1	Address 2	City, Province	Postal Code	Title	First Name	Last Name	Position
Ministry of Agriculture, Food and Rural Affairs	Land Use Planning Branch	801 Bay St.-8th Floor	Toronto, Ontario	M7A 2B2	Ms.	Janet	Anderson	District Manager, Eastern & Northern Ontario
Ministry of Citizenship, Culture and Recreation	Eastern Region	10 Rideau St.-Ste. 400	Ottawa, Ontario	K1N 9J1	Ms.	J.	LeGal	Director
Eastern Ontario Health Unit	Cornwall Office	1000 Pitt Street	Cornwall, Ontario	K6J 3S5	Dr.	Robert	Bourdeau	Medical Officer of Health
Ministry of Transportation	District Office	539 Tremblay Road	Ottawa, Ontario	K1G 0E4	Mr.	B.	Tarini	District Engineer
Ministry of Municipal Affairs	Eastern Regional Office	752 King St. W.	Kingston, Ontario	K7L 5S3	Mr.	P.	Ross	Manager
Min. of Economic Development, Trade & Tourism	1 Nicholas Street	Suite 612	Ottawa, Ontario	K1N 7B7	Mr.	Guy	Desjardin	Regional Manager
Ontario Hydro	Transmission Projects-Grid Division	700 University Avenue	Toronto, Ontario	M5G 1X6	Mr.	Brian	McCormick	Environmental Services and Approvals
Ministry of Natural Resources	P.O. Box 2002	Provincial Gov't Bldg., Conc. Rd.	Kemptville, Ontario		Mr.	Les	Pataky	Regional Engineer
Hon. Noble A. Villeneuve	P.O. Box 238	Labrosse Street	Moose Creek, Ontario	K0C 1W0	Mr.	Noble	Villeneuve	MPP, S.D.&G. & East Grenville
Ministry of the Environment		250 Davisville Ave., 5th Floor	Toronto, Ontario	M4S 1H2	Mr.	George	Zagarac	Director, EA Branch
Ministry of Municipal Affairs	Eastern Regional Office	8 Estate Lane	Kingston, Ontario	K7M 9A8	Mr.	Yves	Drouin	Municipal Advisor
Ministry of Natural Resources	P.O. Box 7000	300 Water Street	Peterborough, Ontario	K9J 8M5	Mr.	Rob	Parry	(Acting) Coordinator
Ministry of Agriculture, Food and Rural Affairs	P.O. Box 97		Avonmore, Ontario	K0C 1C0	Mr.	Yves	Lavietoire	Agriculture and Rural Rep.

January 19, 1999

Attn:

Dear

M.S. Thompson and Associates Ltd. (MSTA), a member of the Thompson Rosemount Group, has been retained by the Township of South Glengarry to complete an addendum to Class Environmental Assessment that was completed for the Greater Lancaster Area for Water and Wastewater Systems (April 1998). This addendum deals specifically with sewage collection and treatment systems in the Creg Quay, Westley's Point, Nadeaus Point, and Amandale Bay area of the Greater Lancaster Area. The GLA Environmental Study Report (ESR) considered only the alternative of directing wastewater from the Creg Quay, Westley's Point, Nadeaus Point, and Amandale Bay area to the GLA treatment facility. This addendum evaluates the alternative of upgrading the existing Creg Quay sewage treatment facility (lagoons) to accommodate increased sewage flow from this Proposed Service Area (PSA).

MSTA has completed the Phase 3 activities as defined by the Class EA process and is soliciting public input. The preferred alternative includes constructing local sewage collection systems in Westley's Point, Nadeaus Point, and Amandale Bay, a trunk sewer, a connection to Creg Quay, a pumping station, and a forcemain. Sewage from this Proposed Service Area (PSA) would be directed to the Creg Quay sewage treatment facility which is currently a facultative lagoon system with semi-annual discharge to the St. Lawrence River (Lake St. Francis). The Creg Quay sewage treatment facility will be modified to accommodate increased flow and to improve effluent quality for continuous discharge to the St. Lawrence River. The improved treatment process will produce effluent that meets or exceeds the Provincial Water Quality Objectives as determined through the receiving stream assessment that was conducted as part of this study. The existing forcemain and effluent line will be used including the crossing of Highway 401 and the outfall to the St. Lawrence River. This project is a municipal undertaking and is estimated to cost \$2,865,000.

The purpose of this letter is to notify you of the project status, and to request your comments. Please contact the undersigned at (613) 933-5603 ext. 270, or by e-mail at bknight@trg.ca. Please find attached a copy of the notice of the Public Meeting. Please advise if you require further notification as the project advances. It is planned to finalise the ESR in February 1999.

Sincerely,

M.S. Thompson & Associates Ltd.

William Knight, P.Eng.

WK/cl

X:\1998\985160\Merge\NoticeletterA.doc

attach.

Company	Address 1	Address 2	City, Province	Postal Code	Title	First Name	Last Name	Position
Ministry of the Environment (ESR)	133 Dalton Street	P.O. Box 820	Kingston, Ontario	K7L 4X6	Mr.	Brian	Ward	Director
Ministry of Agriculture, Food and Rural Affairs	Land Use Planning Branch	801 Bay St.-8th Floor	Toronto, Ontario	M7A 2B2	Ms.	Janet	Anderson	District Manager, Eastern & Northern Ontario
Ministry of Citizenship, Culture and Recreation	Eastern Region	10 Rideau St.-Ste. 400	Ottawa, Ontario	K1N 9J1	Ms.	J.	LeGal	Director
Eastern Ontario Health Unit	Corwall Office	1000 Pitt Street	Corwall, Ontario	K6J 3S5	Dr.	Robert	Bourdeau	Medical Officer of Health
Ministry of Transportation	District Office	539 Tremblay Road	Ottawa, Ontario	K1G 0E4	Mr.	B.	Tarini	District Engineer
Ministry of Municipal Affairs	Eastern Regional Office	752 King St. W.	Kingston, Ontario	K7L 5S3	Mr.	P.	Ross	Manager
Min. of Economic Development, Trade & Tourism	1 Nicholas Street	Suite 612	Ottawa, Ontario	K1N 7B7	Mr.	Guy	Desjardin	Regional Manager
Ontario Hydro	Transmission Projects-Grid Division	700 University Avenue	Toronto, Ontario	M5G 1X6	Mr.	Brian	McCormick	Environmental Services and Approvals
Ministry of Natural Resources	P.O. Box 2002	Provincial Gov't Bldg., Conc. Rd.	Kemptville, Ontario		Mr.	Les	Pataky	Regional Engineer
Raisin Region Conservation Authority (ESR)	P.O. Box 429		Corwall, Ontario	K6H 5T2	Mr.	Andy	Code	Lands Co-ordinator
Hon. Noble A. Villeneuve	P.O. Box 238	Labrosse Street	Moose Creek, Ontario	K0C 1W0	Mr.	Noble	Villeneuve	MPP, S.D.&G. & East Grenville
Ministry of the Environment (ESR)		113 Amelia Street. - 2nd Floor	Corwall, Ontario	K6H 3F1	Mr.	Ron	Robertson	District Officer
Ministry of the Environment		250 Davisville Ave., 5th Floor	Toronto, Ontario	M4S 1H2	Mr.	George	Zagarac	Director, EA Branch
Ministry of Municipal Affairs	Eastern Regional Office	8 Estate Lane	Kingston, Ontario	K7M 9A8	Mr.	Yves	Drouin	Municipal Advisor
Ministry of Natural Resources	P.O. Box 7000	300 Water Street	Peterborough, Ontario	K9J 8M5	Mr.	Rob	Parry	(Acting) Coordinator
Ministry of Agriculture, Food and Rural Affairs	P.O. Box 97		Avonmore, Ontario	K0C 1C0	Mr.	Yves	Lavietoire	Agriculture and Rural Rep.
Township of South Glengarry (ESR)	6 Oak Street	P.O. Box 220	Lancaster, Ontario	K0C 1N0	Mr.	Marcel	Lapierre	CAO
Creg Quay Ltd. (ESR)	21957 South Services Road		Bainsville, Ontario	K0C 1E0	Mr.	Rene	Bazinet	General Manager

**Township of South Glengarry  
CLASS ENVIRONMENTAL ASSESSMENT  
Creg Quay, Westley's Point and Area  
Sewage Collection and Treatment System**

## **Notice of Completion of an Environmental Study Report**

To address inadequate private sewage systems in Westley's Point, Nadeau's Point and Amandale Bay, the Township of South Glengarry has completed an Environmental Study Report (ESR) consistent with the provisions of the Class Environmental Assessment Process for Municipal Water and Wastewater Projects. The ESR recommends the utilisation of the existing Creg Quay sewage treatment lagoons and associated infrastructure for the basis of a municipal sewage collection and treatment system for the area. The following describes the design criteria for sewage collection and treatment:

- hydraulic capacity to meet existing development and infill at Westley's Point, Nadeau's Point and Amandale Bay,
- hydraulic capacity to meet existing development and proposed development at Creg Quay including Phase 1, Phase 2, and the Marina Basin and restaurant,
- meet effluent quality criteria as determined in the Receiving Stream Impact Assessment associated with the St. Lawrence River and consistent with the Provincial Water Quality Objectives of the Ministry of Environment.

The project includes the following infrastructure:

- modifications to the existing semi-annual discharge facultative sewage treatment process to convert to an aerated-facultative continuous discharge post-aeration treatment process within the existing lagoon cells,
- local sewage collection sewers in Westley's Point, Nadeau's Point, and Amandale Bay,
- a collector sewer connecting Westley's Point, Nadeau's Point, Amandale Bay, and Creg Quay to a new pumping station and forcemain to be located on 78<sup>th</sup> Avenue near Nadeau's Point.

The existing facilities (currently owned by Creg Quay Limited) and proposed facilities will be owned and operated by the municipality. The project capital cost is estimate at \$4,296,494 including GST. An application for funding assistance will be made to the Ontario Ministry of Environment and the schedule for construction will be contingent on receiving suitable funding assistance. The ESR Document is available for review at the following location:

Township Office,  
Township of South Glengarry  
6 Oak Street  
Lancaster, ON  
K0C 1N0  
Monday to Friday: 8:30 am-- 4:00 pm  
Telephone: (613)-347-1166

Further information may be obtained from the Township's consultants, The Thompson Rosemount Group, 1345 Rosemount Avenue, Cornwall, Ontario, K6J 3E5. Telephone: (613)-933-5602. Attention: Mr. William Knight, P.Eng. Senior Project Manager.

Please provide written comment to the Township within thirty (30) days from the date of this Notice. If concerns regarding this project cannot be resolved in discussion with the Municipality, a person may request that the Minister of Environment "bump-up" the project to an individual environmental assessment. "Bump-up" requests must be received by the Minister at the address below by March 28, 1999. A copy of the "bump-up" request shall be sent to the Township of South Glengarry. If there is no "bump-up" request received by March 28, 1999, the Project will proceed as outlined in the ESR.

Minister of the Environment and Energy  
135 St. Clair Avenue West,  
15th Floor, Toronto, Ontario  
M4V 1P5

This notice issued February 24, 1998  
Michael Samson, Clerk, Township of South Glengarry

# Sharing could be solution to South Glengarry sewage woes

BY SUE HARRINGTON  
News correspondent

A sharing of facilities could be the answer to two waterfront communities experiencing sewage problems.

Senior Municipal Engineer, Bill Knight, of the Thompson Rosemount Group (TRG), told South Glengarry Council that his firm was retained by Creg Quay Limited to provide water and sewage system operations service.

"As we were doing work on their lagoon, it became apparent that there might be a solution to Westley's Point sewage problems as well," Knight said.

In the Lancaster Water and Sewage Proposal Study currently being considered, it was deemed too expensive to convey the sewage from Westley's

Point to a new (or upgraded) facility in Lancaster.

Under the study, improvements to the Westley's Point area were scheduled to be in the long term, i.e. Phase III.

Knight suggested that a viable alternative would be for the residents of Westley's Point to use the Creg Quay sewage treatment facility.

"Improvements to the Creg Quay facility will be required, however this alternative will probably be more affordable and certainly more readily achievable," said Knight.

He said that the management at Creg Quay would be willing to discuss a partnership with South Glengarry that would achieve a solution for the Westley's Point sewage disposal problem.

"Creg Quay has an investment in the existing facilities and is continuing to invest in modifications and improvements to support the expanding development."

At the moment Creg Quay is on a seasonal discharge (stored up for six months and then discharged from lagoons north of the 401 through a gravity effluent line to the St. Lawrence River).

However, Knight said they would be moving to a constant discharge, which will require modifications to the treatment process.

The first step in the proposed sharing of facilities is for Council to endorse the concept in principle, so that discussions can be initiated. There will also have to be an examination of the Westley's Point effluent quality and quantity to judge the effect of it on the Creg Quay facilities.

Knight said that pursuing the option for Westley's Point will not affect the current Lancaster study.

"It's a winning situation all around," he said, adding that funding might be available.

Township Clerk Mike Samson said a letter would be sent to the Westley's Point Association to inform them of the proposal.

# FAX

**Date** February 22, 1999**To:** TRG**Attn:** Wm Knight**Re:** Creg Quay & Westley's**Fax Phone:** 936-0335**From** Michel J. Samson, Clerk  
Twsp of South Glengarry  
6 Oak St., P. O. Box 220  
Lancaster, Ont.  
K0C 1N0**Telephone** 613-347-1166**Fax Phone** 613-347-3411**No. of pages including cover page** 2**REMARKS:**☐ Urgent☐ For your info.☐ Reply ASAP☐ Please Comment

Certified true copy of resolution as per your request.



## CORPORATION OF THE TOWNSHIP OF SOUTH GLENGARRY

Moved by Jim McDonellNo. 70-99Seconded by Frank PrevostDate February 15 1999

Be It Resolved That


The Council of the Corporation of the Township of South Glengarry adopts the recommendations contained in the Creg Quay, Westley's Point and Area Sewage Disposal Environmental Study Report dated February 15, 1999, and

Further that Council directs that the Notice of Completion be issued and that the Report be placed on the public record for the prescribed 30 days, and

Further that an application for capital funding assistance under the Provincial Water Protection Fund be submitted to the Ministry of the Environment, and

Further that Council enter into negotiations with Creg Quay Limited regarding the transfer of facilities and infrastructure relating to this project.

CERTIFIED A TRUE COPY

.....

Carried

(IF DIVISION SEE BACK)

Reeve Charles Sangster

## **Appendix D**

### **Receiving Stream Impact Assessment**



**M.S. Thompson & Associates Ltd.**

1345 Rosemount Avenue  
Cornwall, ON, Canada K6J 3E5  
Telephone: 613-933-5602  
Fax: 613-936-0335

Internet: mail@trg.ca Website: www.trg.ca

## MEMORANDUM

**To:** Bill Knight  
**Date:** February 22, 1999  
**From:** John St. Marseille  
**Subject:** Receiving Stream Assessment and Unit Process Treatment Upgrades – Creg Quay Lagoons

### Introduction

The effluent quality criteria and the corresponding unit treatment operations for the proposed upgrades were established based on a review the existing CofA conditions, MOE Policy requirements, and the receiving stream's assimilative capacity.

The existing facility is capable of treating wastewater flows of 126 m<sup>3</sup>/day, but the approved expansion allows for the construction of larger facultative lagoons having a combined capacity of 140,000 m<sup>3</sup>. These lagoons would be discharged semi-annually. The approved capacity of the expanded (Stage 4) facility is 767 m<sup>3</sup>/day. The flow associated with the ultimate development scenario is 1,047 m<sup>3</sup>/day (about 35 % more). The treated effluent, under the expanded facility configuration, would be discharged twice annually to Lake St. Francis according to the conditions listed below.

Condition		Stage 4	
		Concentration (mg/L)	Loading (767 m <sup>3</sup> /day or 280,000 m <sup>3</sup> /year)
			kg/day kg/year
BOD <sub>5</sub>		30 (mg/L)	70.0 8,400
SS		40 (mg/L)	93.3 11,200
TP		1.0 (mg/L)	2.3 280
Discharge Window	Spring	For a min. 30 days and max. 45 days after ice free	
	Fall	For a min. 30 days between Oct 15 and Nov 30	

### Description of Existing Facilities and Receiver Waters

The existing receiver for Creg Quay's treated wastewater is Lake St. Francis. A 60 m outfall conveys the treated wastewater into Lake St. Francis. Lake St. Francis is a shallow, fluvial lake of the St.

Lawrence River. The river flow measured at Cornwall averages about 7,500 m<sup>3</sup>/s. The channel is about 500 m wide at this location. Although Lake St. Francis is 5 km wide, about 95% of the flow is conveyed through the main channel which is located about 3 km southeast of the existing outfall. The water level on the lake is closely regulated for hydro generation and shipping using upstream and downstream dams. The Moses-Saunders Dam is located about 30 km upstream at Cornwall. The Beauharnois Dam is located about 30 km downstream.

The St. Lawrence River is a Policy 2 Receiver as defined according to MOE criteria (MOE 1994) since the total phosphorus (TP) ranges from 0.005 to 0.035 mg/L (St. Lawrence RAP 1997). Accordingly, the water quality should not be further degraded and all practical measures should be undertaken to upgrade the water quality to the objectives (MOE July 1994). The implication of a Policy 2 discharge is that any expansion of an existing discharge will only be permitted if the concentration and total load of the Policy 2 contaminant to the receiving stream is not increased.

### *Creg Quay*

The existing wastewater treatment system consists of 2 facultative lagoons operated in parallel. Their total surface area is 1.6 ha and they have a combined operating volume of 23,000 m<sup>3</sup>. The lagoons are batch dosed with aluminum sulfate (alum) semi-annually to precipitate phosphorus and suspended solids. The semi-annual discharge from the sewage lagoons to Lake St. Francis, under the conditions stipulated above, is via a submerged, single outfall extending 60 m from the Creg Quay west pier) at water depth of 3 m as shown on the attached Figure.

The lagoons were configured to provide a minimum 6 months hydraulic retention (semi-annual discharge) and facultative organic treatment. The surface area of the lagoons must be sufficiently large to provide the necessary air exchange (oxygen diffusion) for oxidative metabolism to treat organic compounds. The limiting factor in the sizing of the lagoons was the organic loading rate which cannot exceed 22 kgBOD/ha•day and therefore dictates the minimum size of the lagoons.

### *Westley's Point, Nadeau's Point, and Amandale Bay (WNA)*

Ineffective sewage disposal systems in the Westley's Point area have been documented as contributing to water quality impairments (St. Lawrence RAP 1997, RRCA 1994, TSH 1998). Similar problems likely exist at Nadeau's Point, and Amandale Bay although they have not been specifically documented. The proposed sewage collection and treatment system will eliminate these contaminant sources.

There are currently a total of 117 residences in Westley's Point, Nadeau's Point, and Amandale Bay (WNA) based on a population of 329 persons and 2.8 persons-per-unit (ppu). It is conservatively estimated that more than 50% (58) of the sewage systems are not effective (half of the existing systems are more than 20 years old and half are in-ground class IV systems). Based on the RRCA survey, the typical residence size is 3 bedrooms thus the average sewage flow is 1,600 L/day (MOE 1984, OBC 1998). Conservatively using a sewage effluent TP concentration of 1 mg/L (incompletely treated or untreated sewage) the equivalent TP loading from these residences is 33.8 kg/yr. This assumes that there are no direct surface water discharges and that the holding tank systems are regularly serviced. The treatment implications associated with this TP loading are discussed in the following section.

## Effluent Quality Criteria

It is proposed to discharge treated effluent on a continuous basis in the upgraded Creg Quay treatment lagoons rather than hold the contents for a 6 month period for semi-annual discharge. Continuous discharge reduces the size of the lagoons since only 30 days hydraulic retention is necessary provided that air (oxygen) transfer is augmented. The lagoon size, and its commensurate property line setback was one the contentious issues with the C of A request that necessitated an OMB Hearing.

To address the organic loading issue, it is proposed to add mechanical aeration. The HRT will be a minimum of 30 days to provide equivalent secondary level treatment and in turn negate the need for disinfection. This duration of hydraulic retention, according to MOE guidelines (1984) provides the equivalent of secondary treatment including disinfection.

The proposed effluent quality criteria were established based on review of existing C of A conditions, MOE Policy concurrence, and a review of existing receiving stream information augmented by field measurements. MOE Policy 08-01 *Levels of Treatment For Municipal and Private Sewage Treatment Works Discharging To Surface Waters* (MOE 1994) indicates that the normal level of treatment for sewage works is secondary treatment or equivalent. The existing C of A criteria reflect this requirement (BOD 30 mg/L; SS 40 mg/L; and TP 1 mg/L).

In the Great Lakes (including St. Lawrence River), discharge from sewage works must provide a minimum nearfield (initial) *mixing zone* dilution of 20:1. In an unstratified mixing regime (i.e. where a temperature gradient exists), the near field mixing zone constitutes that part of the receiving water where the initial wastewater plume dilution occurs (plume bottom attachment or surface water impingement). The near field mixing is controlled by initial plume characteristics including: momentum flux; buoyancy flux, and outfall geometry (Doneker and Jirka, 1991).

The *mixing zone* is defined as an area of water contiguous to a point source where the water quality does not comply with one or more PWQOs (MOE 1994). Other stipulations are that the mixing zone should be as small as possible and conditions within the zone should not result in irreversible environmental damage, risk to ecosystem integrity or human health. A wastewater dilution of 20:1 must be provided in this zone.

Although the *proposed* effluent quality criteria are the same as the existing criteria, this impact assessment considered the additional receiving stream impact of the proposed continuous discharge including ammonia and hydrogen sulfide toxicity as well as phosphorus loading. The hydrodynamic mixing zone was simulated using the USEPA's Cormix model (Cornell Mixing Zone Expert System). A dye study was used to verify the modeling results.

### *Cormix Modeling*

The Cormix model simulates the hydrodynamic mixing of a wastewater plume in receiving waters. The model utilizes ambient receiving water data (depth, velocity, temperature, wind speed); outfall geometry (depth, diameter, number of nozzles, as well as vertical and horizontal orientation); and wastewater discharge characteristics (flow, temperature) for the simulation.

Although continuous discharge is proposed, the summer discharge period was deemed most significant in terms of receiving stream impact since the wastewater discharge and receiving temperature are highest. As well, this corresponds to eutrophication period where phosphorus can

cause excessive algae growth. The physical characteristics of the receiving water was measured and used for the model inputs as follows :

Discharge depth (measured)	3 m
Ambient velocity (measured)	0.05 m/s
Wind Speed	2 m/s (7.2 km/hr)
Surface (and bottom) temperature (measured)	19 °C
Discharge temperature (measured)	24 °C
Distance to nearest bank (measured)	100 m
Port diameter	0.25 m
Discharge flowrate	0.0088 m <sup>3</sup> /s (760 m <sup>3</sup> /day) and 0.012 m <sup>3</sup> /s (1,047 m <sup>3</sup> /day)

The two discharge flowrates (760 and 1,047 m<sup>3</sup>/day) correspond to the interim and ultimate design scenarios respectively. The Cormix model output for these are attached. The nearfield dilution calculated for these scenarios was 30.3 and 21.9 respectively. Each of these scenarios satisfies the minimum 20:1 dilution stipulated by MOE Policy 08-01. The mixing zone was 1.5 m wide and 8.1 m long (downstream) for 760 m<sup>3</sup>/day as shown on the attached Figure. Complete mixing occurred 342 m downstream. For the 1,047 m<sup>3</sup>/day, the mixing zone discharge was 2.1 m wide and 5.5 m long (downstream). The implications for each of the target treatment parameters is discussed in the following sections.

#### *Ammonia*

The PWQO limit for unionized ammonia (NH<sub>3U</sub>) is 0.02 mg/L. An equilibrium is established between the ionized (NH<sub>4</sub><sup>+</sup>) and unionized ammonia species. The equilibrium constant (pK<sub>a</sub>) is calculated by pH and temperature according to the following (MOEE 1994):

$$NH_{3U} = \frac{NH_3}{10^{pK_a - pH} + 1}, \quad pK_a = 0.09018 + \frac{2,729.92}{T}, \quad T = ^\circ C + 273.16$$

Knowing the total ammonia concentration (NH<sub>3</sub>), pH, and temperature, the unionized ammonia (NH<sub>3U</sub>) can be calculated.

The effluent quality criteria for ammonia was back-calculated (MOE 1994) using the above formula accounting for the seasonal change in water temperature and the near field dilution determined using CORMIX modeling. pH was conservatively maintained at 8.0 accounting for summertime photosynthetic consumption of CO<sub>2</sub> by algae.

An unionized ammonia concentration of 0.02 mg/L corresponds to a total ammonia of 1.76 mg/L at 19°C and pH 8. To ensure that the discharge does not exceed the PWQO of 0.02 mg/L beyond the nearfield zone (accounting for dilution), the total ammonia of discharge must not exceed 1.76 x 30.3 = 53 mg/L at 760 m<sup>3</sup>/day and 1.76 x 21.9 = 38.5 mg/L at 1,047 m<sup>3</sup>/day. Since these concentrations of ammonia are about equal to the ammonia in raw wastewater (MOE 1982), no ammonia removal (nitrification) is required for either the interim or ultimate scenario. The proposed mechanical aeration will provide some nitrification hence the assessment of impact is conservative. To more

completely nitrify the ammonia would require an extended aeration process and return activated sludge recycle.

### *Hydrogen Sulfide*

Hydrogen sulfide is created under highly reducing conditions in the presence of a reducing agent (organic carbon). Sulfate reducing bacteria use sulfate ( $\text{SO}_4$ ) as a terminal electron receptor to oxidize organic carbon. The strong reducing condition necessary for this to occur exists when organic carbon is oxidized in an anaerobic environment - for example when ice inhibits oxygen transfer. The dissociation of hydrogen sulfide ( $\text{H}_2\text{S}$  into  $\text{HS}^-$  and  $\text{S}^{2-}$ ), like ammonia, is temperature and pH dependant. The first dissociation constant ( $\text{pK}_{a1}$ ) is 7.1 ( $\text{H}_2\text{S}$  to  $\text{HS}^-$ ) and the second is  $\text{pK}_{a2}$  is 14 ( $\text{HS}^-$  to  $\text{S}^{2-}$ ). Since the pH is much less than 14, the  $\text{H}_2\text{S}$ - $\text{HS}^-$  equilibrium dominates. In sewage lagoons, the release of odorous hydrogen sulfide occurs in the spring after the ice cover comes off. Without algae growth through the winter, the lagoon is near neutral pH (7). Based on a temperature of  $5^\circ\text{C}$ , about 65 % of the total hydrogen sulfide would be volatile (as  $\text{H}_2\text{S}$ ).

Simple methods to prevent the accumulation and release of hydrogen sulfide include improved aeration and control of ice formation. The process modifications that are proposed to control hydrogen sulfide include: mechanical aeration (pre and post-aeration), and sparging. Pre-aeration is used to more completely oxidize organics (maximizing aerobic processes to inhibit anaerobic processes). Post-aeration, that is aeration prior to wastewater discharge, is used to sparge any remaining hydrogen sulfide. While sparging can be completed using mechanical aerators, a simpler method is to use wind operated mixers. Wind operated mixers slowly mix lagoon contents bringing sufficient warm water from the bottom of the cell to the surface to maintain some ice-free sections. The open water provides a path to vent hydrogen sulfide.

### *Phosphorus*

It is proposed to maintain the same effluent concentration of phosphorus (1.0 mg/L) but distribute the loading to the receiver year-round rather than only in the spring and fall. The load limit for TP under the existing CofA is 280 kg/year. On a continuous discharge basis, using the TP limit of 1.0 mg/L, the equivalent flow is  $767 \text{ m}^3/\text{day}$  which exceeds the interim discharge limit of  $756 \text{ m}^3/\text{day}$ .

However, for the ultimate development flow ( $1,047 \text{ m}^3/\text{day}$ ), an additional 102 kg of TP would be conveyed to the receiver. As discussed above, there is potential to eliminate 33.8 kg/year of TP associated with the ineffective sewage systems. Therefore, the net additional contribution of TP would be 68.2 kg/yr. Accordingly, for the ultimate flow scenario, consideration may have to be given to effluent polishing (e.g. wetlands or sand filter treatment).

For the interim discharge, it is proposed to provide continuous chemical (alum) addition to precipitate phosphorus and solids. For a TP concentration of 1.0, the mixing zone concentration would be  $1/30.3 = 0.03 \text{ mg/L}$ . Therefore, the mixing zone is capable of assimilating phosphorus to the PWQO of 0.03 mg/L.

### *Unit Operations*

The maximum flow that could be accommodated by retrofitting the existing lagoons was assessed based on the provision of a minimum 30 day (HRT). At the existing volume of  $23,000 \text{ m}^3$ , the average flow cannot exceed  $756 \text{ m}^3/\text{day}$ . Since the organic loading rate would be exceeded (if the lagoon surface area is not enlarged), aerators were configured in the design.

The aeration capacity was determined based on kinetic rate constant for oxidative metabolism of carbon (carbonaceous oxygen demand). MOE Guidelines (MOE 1994) require that a minimum HRT of 15 hours be provided in the aeration cells to meet this requirement. The range of mechanical aeration power requirements is 16 to 25 kW/1000 m<sup>3</sup> (MOE 1994). It is proposed to provide 1,000 m<sup>3</sup> of aeration volume (31 hours of HRT). The mixing requirement is 25 kW. Based on the oxygen transfer efficiency of aspirating aerators (0.6 kg O<sub>2</sub>/kW•hr), the air transfer is 360 kgO<sub>2</sub>/day. Aspirating aerators are recommended because of their higher air transfer efficiency and low operating noise. Using a BOD load of 75 g/cap•day (MOE 1994), and an equivalent population of 1,843 persons (410 L/cap•day), the carbonaceous loading is 138 kg. An allowance for nitrification results in an additional 35 kg/day of oxygen demand (4.6 x NH<sub>3</sub> concentration taken to be 10 mg/L) for a total of 173 kg/day. It is proposed to add four 7.5 kW aspirators (30 kW total) for this interim wastewater facility expansion (installed air transfer of 432 kg/day). The ultimate facility will require two additional 7.5 kW aspirators.

Based on a design average daily flow of 756 m<sup>3</sup>/day and continuous discharge, the unit operation upgrades for an aerated facultative lagoon (shown in Figure 2) include:

- Inlet Flow Metering
- Aeration Cell
  - 30 hrs HRT
  - aeration volume = 950 m<sup>3</sup>, 470 m<sup>2</sup> footprint
  - 30 kW aspirating mixers (4 @ 7.5 kW each, complete mix)
  - silt curtain segregation
- Alum addition
  - duplex chemical feed pumps (up to 90 L alum/day, 4.5 mL.alum/hr per m<sup>3</sup>/day sewage)
  - liquid alum storage (15,000 L = 160 days operating storage)
  - building (alum storage and dosing pumps, flow meter, motor controls)
- Aerated Facultative Lagoon
  - dual inlet header
  - silt curtain segregation (50 lineal m x 2 m high) in each cell
  - 30 day HRT = 2 cells @ 11,500 m<sup>3</sup> ea (includes 1.25 days aeration HRT)
  - Series operation – crossover pipe from west to east cell
  - Re-locate east cell outlet to northeast corner
- Post Aeration
  - 4 windmill mixers (east cell)



- Treatment Parameters (mg/L)

	<i>Effluent (Operating)</i>	<i>Compliance</i>
BOD <sub>5</sub>	25	30
SS	30	40
TP	1	1
H <sub>2</sub> S	nd	nd

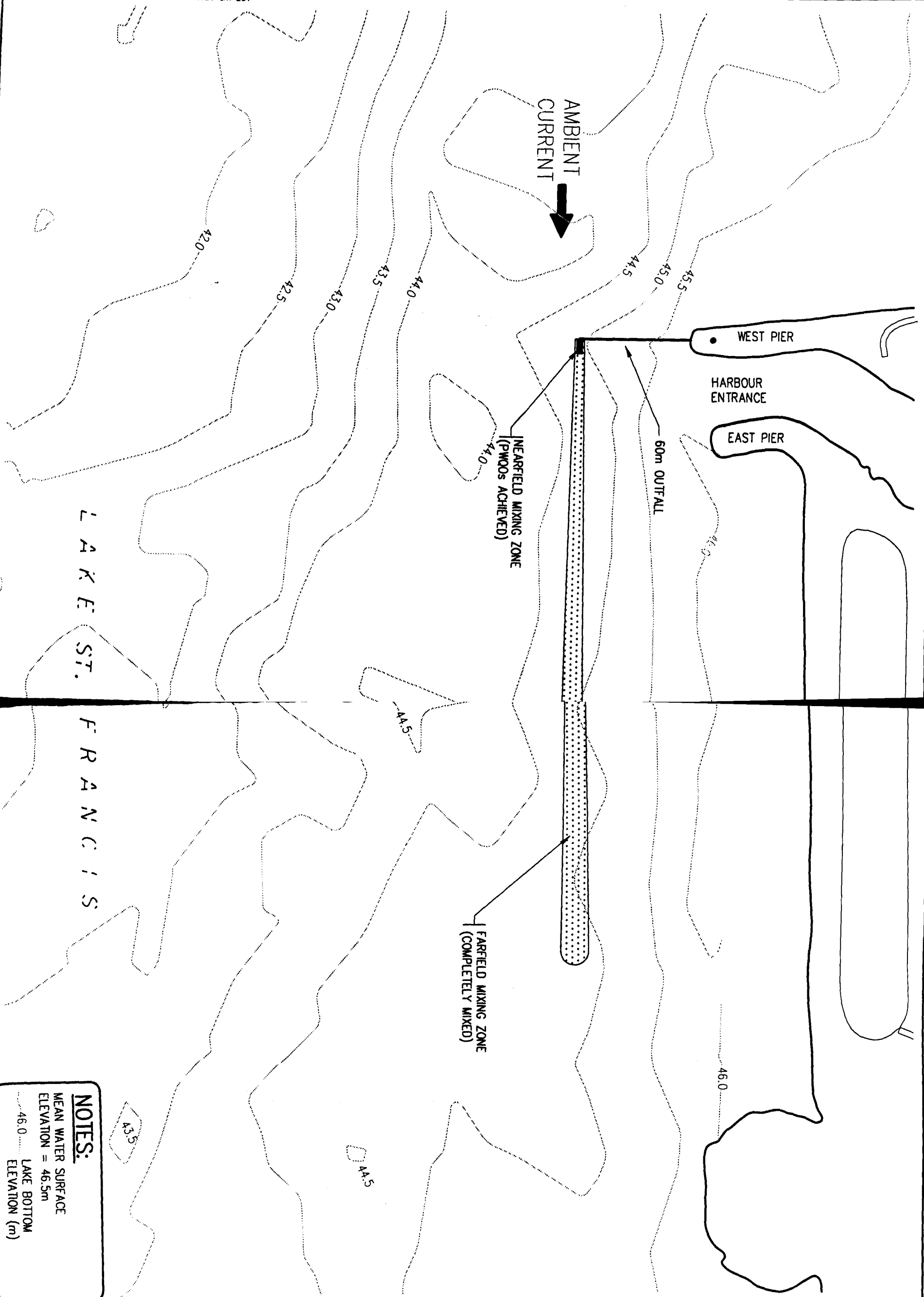
- Future consideration for effluent polishing (nitrification and filtering) may be necessary for the ultimate design configuration.

Sincerely,

M.S. Thompson & Associates Ltd.

John St. Marseille, M.Sc., P.Eng.  
Senior Environmental Engineer

\\CNWLSERVER\FILES\1998\985160\Report\eff-crit\rsa-unitops2.doc



**NOTES:**

MEAN WATER SURFACE  
ELEVATION = 46.5m  
LAKE BOTTOM  
ELEVATION (m)

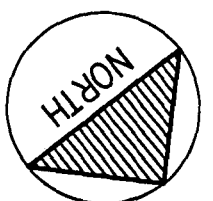
M.S. THOMPSON & ASSOCIATES LTD.  
consulting engineers  
CORNWALL KINGSTON



**CREG QUAY, WESTLEY'S POINT  
SEWAGE PROJECT**

**OUTFALL AND MIXING ZONE  
CONFIGURATION**

scale	1:2000
date	FEB. 1999
drawn	G.A.D.
job no.	985160
drawing no.	



## **Cormix Model Output and Dye Study Photos**

## CORMIX SESSION REPORT:

XX

CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM

CORMIX v.3.20

September 1996

SITE NAME/LABEL: CQ  
 ORIGINAL design case: JUNE-18C-pH8-760m3  
 ORIGINAL file name: JU188760  
 Start of main session: 01/22/99--11:08:03

DESIGN ITERATION number: 1  
 NEW DESIGN CASE: JUNE18CpH8760m3DEPTH3mVEL.05m  
 NEW FILE NAME: JUNEV1  
 Using subsystem CORMIX1: Submerged Single Port Discharges  
 Start of iteration session: 02/19/99--09:18:15

\*\*\*\*\*

## SUMMARY OF INPUT DATA:

-----  
 AMBIENT PARAMETERS:

Cross-section		=	unbounded
Average depth	HA	=	4 m
Depth at discharge	HD	=	0.05 m
Ambient velocity	UA	=	.05 m/s
Darcy-Weisbach friction factor	F	=	0.0445
Calculated from Manning's n		=	.03
Wind velocity	UW	=	2 m/s
Stratification Type	STRCND	=	U
Surface temperature		=	15 degC
Bottom temperature		=	15 degC
Calculated FRESH-WATER DENSITY values:			
Surface density	RHOAS	=	999.1010 kg/m <sup>3</sup>
Bottom density	RHOAB	=	999.1010 kg/m <sup>3</sup>

-----  
 DISCHARGE PARAMETERS:

Submerged Single Port Discharge

Nearest bank		=	left
Distance to bank	DISTB	=	100 m
Port diameter	D0	=	.254 m
Port cross-sectional area	A0	=	0.0506 m <sup>2</sup>
Discharge velocity	U0	=	0.17 m/s
Discharge flowrate	Q0	=	.0088 m <sup>3</sup> /s
Discharge port height	H0	=	.3 m
Vertical discharge angle	THETA	=	0 deg
Horizontal discharge angle	SIGMA	=	270 deg
Discharge temperature (freshwater)		=	18 degC
Corresponding density	RHO0	=	998.5966 kg/m <sup>3</sup>
Density difference	DRHO	=	0.5043 kg/m <sup>3</sup>
Buoyant acceleration	GP0	=	.0050 m/s <sup>2</sup>
Discharge concentration	C0	=	752 PPB
Surface heat exchange coeff.	KS	=	0 m/s
Coefficient of decay	KD	=	0 /s

-----  
 DISCHARGE/ENVIRONMENT LENGTH SCALES:

LQ =	0.22 m	Lm =	0.78 m	Lb =	0.34 m
LM =	1.17 m	Lm' =	99999.0 m	Lb' =	99999.0 m

-----  
 NON-DIMENSIONAL PARAMETERS:

Port densimetric Froude number	FR0	=	4.89
Velocity ratio	R	=	3.47

-----  
 MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:

Toxic discharge	=	no
-----------------	---	----

Water quality standard specified = yes  
Water quality standard CSTD = 752 PPB  
Regulatory mixing zone = no  
Region of interest = 2000.00 m downstream

\*\*\*\*\*

#### HYDRODYNAMIC CLASSIFICATION:

\*-----\*  
| FLOW CLASS = H2 |  
\*-----\*

This flow configuration applies to a layer corresponding to the full water depth at the discharge site.

Applicable layer depth = water depth = 3 m

\*\*\*\*\*

#### MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

##### X-Y-Z Coordinate system:

Origin is located at the bottom below the port center:  
100 m from the left bank/shore.

Number of display steps NSTEP = 20 per module.

##### NEAR-FIELD REGION (NFR) CONDITIONS :

Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.

Pollutant concentration at edge of NFR = 24.7503 PPB

Dilution at edge of NFR = 30.3

NFR Location: x = 8.06 m

(centerline coordinates) y = -1.53 m

z = 3.00 m

NFR plume dimensions: half-width = 1.63 m

thickness = 1.63 m

##### Buoyancy assessment:

The effluent density is less than the surrounding ambient water density at the discharge level.

Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards the surface.

##### FAR-FIELD MIXING SUMMARY:

Plume becomes vertically fully mixed at 342.89 m downstream.

##### \*\*\*\*\* TOXIC DILUTION ZONE SUMMARY \*\*\*\*\*

No TDZ was specified for this simulation.

##### \*\*\*\*\* REGULATORY MIXING ZONE SUMMARY \*\*\*\*\*

No RMZ has been specified.

However:

The ambient water quality standard was encountered within a control volume describing a portion of the discharge plume.

Therefore, the following plume conditions are a conservative estimate (with lower concentrations or with larger dimensions) for the region at whose boundary the standard is met:

Local boundary concentration = 752.0000 PPB

Corresponding dilution = 1.0

Water quality standard = 752 PPB

Corresponding dilution = 1

Plume location: x = .00 m

(centerline coordinates) y = .00 m

z = .30 m

Plume dimensions: half-width = .12 m

thickness = .12 m

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.

Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about  $\pm 50\%$  (standard deviation).

As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

\*\*\*\*\*

DESIGN CASE: JUNE18CpH8760m3DEPTH3mVEL.05m

FILE NAME: JUNEV1

Subsystem CORMIX1: Submerged Single Port Discharges

END OF SESSION/ITERATION: 02/19/99--09:24:00

[illegible]

# CORMIX SESSION REPORT:

XX

CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM

CORMIX v.3.20 September 1996

SITE NAME/LABEL: CQ  
 ORIGINAL design case: JUNE18CpH8760m3DEPTH3mVEL.05m  
 ORIGINAL file name: JUNEV1  
 Start of main session: 02/19/99--09:18:15

DESIGN ITERATION number: 2  
 NEW DESIGN CASE: AUGUST24CpH81047m3DEPTH3mVELO0.05m  
 NEW FILE NAME: AU10473m  
 Using subsystem CORMIX1: Submerged Single Port Discharges  
 Start of iteration session: 02/22/99--16:08:14

\*\*\*\*\*

## SUMMARY OF INPUT DATA:

### AMBIENT PARAMETERS:

Cross-section		=	unbounded
Average depth	HA	=	4 m
Depth at discharge	HD	=	3 m
Ambient velocity	UA	=	0.05 m/s
Darcy-Weisbach friction factor	F	=	0.0445
Calculated from Manning's n		=	0.03
Wind velocity	UW	=	2 m/s
Stratification Type	STRCND	=	U
Surface temperature		=	19 degC
Bottom temperature		=	19 degC
Calculated FRESH-WATER DENSITY values:			
Surface density	RHOAS	=	998.4062 kg/m <sup>3</sup>
Bottom density	RHOAB	=	998.4062 kg/m <sup>3</sup>

### DISCHARGE PARAMETERS:

Submerged Single Port Discharge

Nearest bank		=	left
Distance to bank	DISTB	=	100 m
Port diameter	D0	=	.254 m
Port cross-sectional area	A0	=	0.0506 m <sup>2</sup>
Discharge velocity	U0	=	0.23 m/s
Discharge flowrate	Q0	=	.012 m <sup>3</sup> /s
Discharge port height	H0	=	.3 m
Vertical discharge angle	THETA	=	0 deg
Horizontal discharge angle	SIGMA	=	270 deg
Discharge temperature (freshwater)		=	24 degC
Corresponding density	RHO0	=	997.2973 kg/m <sup>3</sup>
Density difference	DRHO	=	1.1089 kg/m <sup>3</sup>
Buoyant acceleration	GP0	=	.0109 m/s <sup>2</sup>
Discharge concentration	C0	=	563 PPB
Surface heat exchange coeff.	KS	=	0 m/s
Coefficient of decay	KD	=	0 /s

### DISCHARGE/ENVIRONMENT LENGTH SCALES:

LQ =	0.22 m	Lm =	1.06 m	Lb =	1.04 m
LM =	1.07 m	Lm' =	99999.0 m	Lb' =	99999.0 m

### NON-DIMENSIONAL PARAMETERS:

Port densimetric Froude number	FR0	=	4.50
Velocity ratio	R	=	4.73

### MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:

Toxic discharge = no

Water quality standard specified = yes  
Water quality standard CSTD = 752 PPB  
Regulatory mixing zone = no  
Region of interest = 2000.00 m downstream  
\*\*\*\*\*

HYDRODYNAMIC CLASSIFICATION:

\*-----\*  
| FLOW CLASS = H2 |  
\*-----\*

This flow configuration applies to a layer corresponding to the full water depth at the discharge site.

Applicable layer depth = water depth = 3 m

\*\*\*\*\*  
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):  
-----

X-Y-Z Coordinate system:

Origin is located at the bottom below the port center:  
100 m from the left bank/shore.

Number of display steps NSTEP = 20 per module.  
-----

NEAR-FIELD REGION (NFR) CONDITIONS :

Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.

Pollutant concentration at edge of NFR = 25.5976 PPB

Dilution at edge of NFR = 21.9

NFR Location: x = 5.50 m

(centerline coordinates) y = -2.13 m

z = 3.00 m

NFR plume dimensions: half-width = 1.62 m

thickness = 1.62 m  
-----

Buoyancy assessment:

The effluent density is less than the surrounding ambient water density at the discharge level.

Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards the surface.  
-----

FAR-FIELD MIXING SUMMARY:

Plume becomes vertically fully mixed at 528.36 m downstream.

\*\*\*\*\* TOXIC DILUTION ZONE SUMMARY \*\*\*\*\*

No TDZ was specified for this simulation.

\*\*\*\*\* REGULATORY MIXING ZONE SUMMARY \*\*\*\*\*

No RMZ has been specified.

However:

The ambient water quality standard was encountered within a control volume describing a portion of the discharge plume.

Therefore, the following plume conditions are a conservative estimate (with lower concentrations or with larger dimensions) for the region at whose boundary the standard is met:

Local boundary concentration = 563.0000 PPB

Corresponding dilution = 1.0

Water quality standard = 752 PPB

Corresponding dilution = 0.7

Plume location: x = .00 m

(centerline coordinates) y = .00 m

z = .30 m

Plume dimensions: half-width = .12 m

thickness = .12 m



[illegible]



Creg Quay – Wastewater Lagoon Outfall Dye Study  
Nov. 24, 1998

Wind: NW 15-20 km/hr  
Air Temp.: 9°C  
Water Temp.: 6.4°C

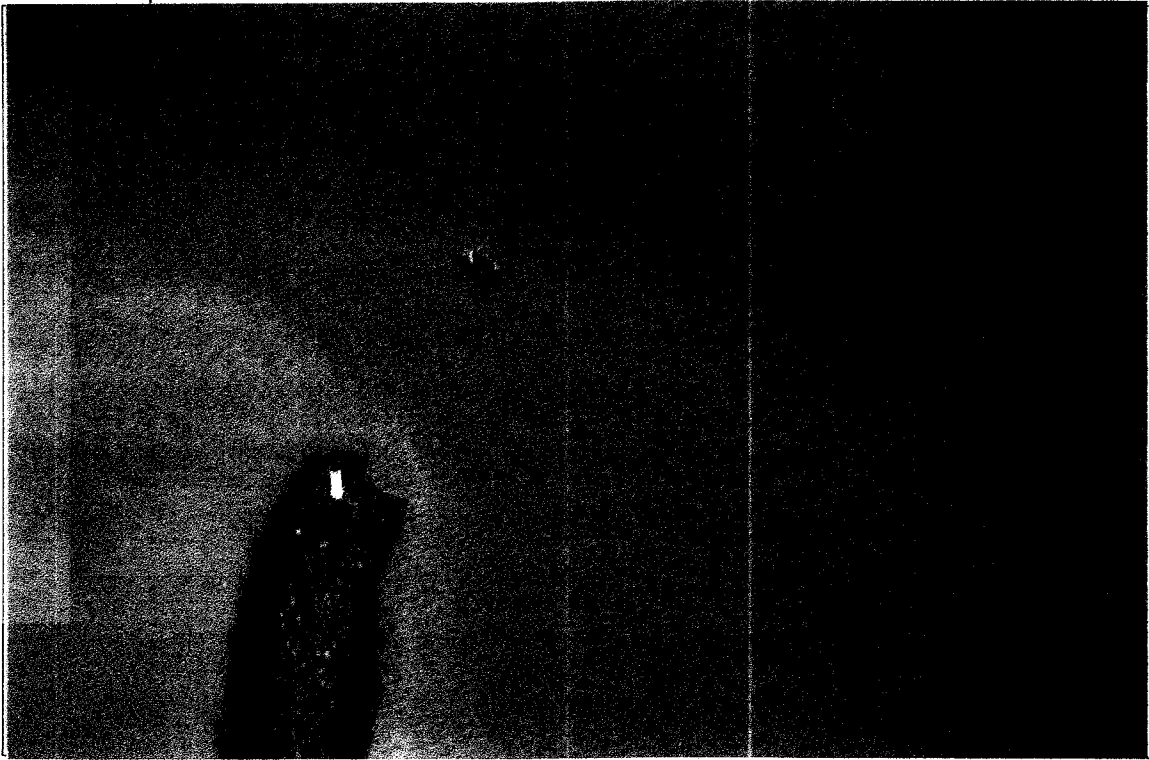


Plate 1 – Plume Buoyant ( $t = 0$ )



Plate 2 – Plume Advecting ( $t = 4$  mins.) (Near field zone about 10 m)

Creg Quay – Wastewater Lagoon Outfall Dye Study  
Nov. 24, 1998

Wind: NW 15-20 km/hr  
Air Temp.: 9°C  
Water Temp.: 6.4°C



Plate 3 – Plume Diffusing (t = 12 mins.)



Plate 4 – Plume Fully Mixed (t = 20 mins.) (Plume about 100 m downstream)

## **Appendix E**

### **Preliminary Design -- Sanitary Sewer System**

PROJECT NO: 985160  
 LOCATION CREG QUAY, WESLEY POINT  
 CONSULTANT M.S. THOMPSON & ASSOCIATES LTD.  
 DATE: Jan 13, 99

n = 0.013

ppu = 2.8

## SANITARY SEWER DESIGN CHART

LOCATION	FROM	TO	AREA (Ha)	P Total Design Population	SUM P(1000)	Peaking Factor M	Peak Base Domestic Flow PqM/86.4 (l/s)	SUM AREA (ha)	IA (Peak) (l/s)	Q (Avg) (l/s)	Q (Peak) (l/s)	DIA (mm)	CAP (l/s)	LENGTH (m)	U/S	D/S
<b>CREG QUAY</b>																
	PHASE 1	1									3.140	250	61.4	105.0	44.500	43.380
	2	1									3.880	250	37.6	66.0	43.674	43.402
	MH15	1									12.770	250	37.6	81.0	43.645	43.321
	1	3									19.790	250	37.6	58.0	43.370	43.138
	3	4									19.790	250	37.6	120.0	43.108	42.628
<b>AMANDALE BAY</b>																
	4	5	1.15	28	0.028	3.98	0.39	1.15	0.074	0.126	20.251	250	37.6	120.0	42.598	42.118
	17	15	1.14	17	0.017	3.98	0.23	1.14	0.044	0.076	0.276	200	20.7	60.0	45.200	44.960
	16	15	1.47	8	0.008	3.98	0.12	1.47	0.022	0.038	0.138	200	20.7	40.0	45.070	44.910
	15	5			0.025	3.98	0.35	2.61	0.066	0.114	0.414	200	20.7	90.0	44.900	44.540
	5	6	1.42	31	0.056	3.98	0.77	5.50	0.147	0.253	21.172	250	37.6	90.0	42.108	41.748
	6	7									21.172	250	37.6	90.0	41.738	41.378
	7	8									21.172	250	37.6	85.0	41.368	41.028
<b>NADEAU'S POINT</b>																
	14	13	0.70	22	0.022	3.98	0.31	0.70	0.059	0.101	0.368	200	20.7	55.0	45.700	45.480
	13	12	0.51	14	0.036	3.98	0.50	1.21	0.096	0.164	0.599	200	20.7	66.0	45.470	45.196
	12	11	0.92	25	0.062	3.98	0.85	2.13	0.162	0.278	1.013	200	20.7	110.0	45.186	44.746
	11	10	1.00	20	0.081	3.98	1.12	3.13	0.213	0.367	1.335	200	20.7	110.0	44.738	44.296
	10	9	0.40	6	0.087	3.98	1.20	3.53	0.226	0.392	1.428	200	20.7	53.0	44.288	44.076
	9	8	0.38	6	0.092	3.98	1.28	3.91	0.243	0.417	1.520	200	20.7	60.0	44.066	43.826
	8	18	0.69	6	0.098	3.98	1.35	0.69	0.257	0.442	22.783	250	37.6	110.0	40.968	40.528
	18	PS3									27.849	250	37.6	10.0	40.337	40.297
<b>WESTLEY'S POINT</b>																
<b>WILLOW DRIVE</b>																
	28	27	0.39	8	0.008	3.98	0.12	0.39	0.022	0.038	0.138	200	20.7	55.0	45.700	45.480
	27	26	0.43	17	0.025	3.98	0.35	0.82	0.066	0.114	0.414	200	20.7	63.0	45.470	45.218
	26	25	0.52	17	0.042	3.98	0.58	1.34	0.110	0.190	0.691	200	20.7	60.0	45.208	44.968
	25	24	0.42	22	0.064	3.98	0.89	1.76	0.169	0.291	1.059	200	20.7	78.0	44.958	44.646
	24	23	0.86	45	0.160	3.98	2.21	4.69	0.419	0.720	2.625	200	20.7	115.0	44.636	44.176
	23	22	0.55	20	0.202	3.98	2.79	6.47	0.530	0.910	3.316	200	20.7	92.0	44.166	43.796
	22	21	0.64	25	0.227	3.98	3.13	7.11	0.596	1.024	3.730	200	20.7	92.0	43.788	43.420
	21	20	0.79	14	0.241	3.98	3.33	7.90	0.633	1.087	3.960	200	20.7	90.0	43.410	43.050

PROJECT NO: 985160  
 LOCATION: CREG QUAY, WESLEY POINT  
 CONSULTANT: M.S. THOMPSON & ASSOCIATES LTD.  
 DATE: Jan 13, 99

n = 0.013

ppu = 2.8

# SANITARY SEWER DESIGN CHART

LOCATION	FROM	TO	AREA (Ha)	P Total Design Population	SUM P(1000)	Peaking Factor M	Peak Base Domestic Flow PqM/86.4 (l/s)	SUM AREA (ha)	IA (Peak) (l/s)	Q (Avg) (l/s)	Q (Peak) (l/s)	DIA (mm)	CAP (l/s)	LENGTH (m)	U/S	D/S
	35	34	1.37	17	0.017	3.98	0.23	1.37	0.044	0.076	0.276	200	20.7	110.0	46.200	45.760
	34	20	1.12	22	0.039	3.98	0.54	2.49	0.103	0.177	0.645	200	20.7	110.0	45.750	45.310
SUMAC STREET	33	31	0.61	14	0.014	3.98	0.19	0.61	0.037	0.063	0.230	200	20.7	110.0	45.700	45.260
JUNIPER STREET	32	31	0.62	8	0.022	3.98	0.31	0.62	0.059	0.101	0.368	200	20.7	65.0	45.470	45.210
	31	23			0.022	3.98	0.31	1.23	0.059	0.101	0.368	200	20.7	38.0	45.200	45.048
LILAC STREET	30	29	1.60	36	0.036	3.98	0.50	1.60	0.096	0.164	0.599	200	20.7	85.0	45.424	45.064
BIRCH AVENUE	29	24	0.47	14	0.050	3.98	0.70	2.07	0.132	0.228	0.829	200	20.7	82.0	45.024	44.696
69TH AVENUE	20	19			0.280	3.98	3.87	10.39	0.736	1.264	4.605	200	20.7	115.0	42.990	42.530
	38	37	0.49	11	0.011	3.98	0.15	0.49	0.029	0.051	0.184	200	20.7	110.0	46.200	45.760
	37	36	1.76	11	0.022	3.98	0.31	2.25	0.059	0.101	0.368	200	20.7	110.0	45.750	45.310
	36	19	0.37	6	0.028	3.98	0.39	2.62	0.074	0.126	0.461	200	20.7	117.0	45.300	44.832
	19	18			0.308	3.98	4.26	13.01	0.809	1.390	5.066	250	32.6	691.0	42.470	40.397