BROCKVILLE
CITY OF THE 1000 ISLANDS

# CITY OF BROCKVILLE

## CLASS ENVIRONMENTAL ASSESSMENT REPORT

## BROCKVILLE WATER POLLUTION CONTROL CENTRE UPGRADE

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# Class Environmental Assessment Report: Brockville Water Pollution Control Centre Upgrade

## 1. Introduction

The City of Brockville proposes to upgrade the Brockville Water Pollution Control Centre (WPCC). The principal objective of the upgrade is to address the current issue of non-compliance with respect to an effluent criteria parameter, and to provide the "normal" level of treatment as defined by the Ministry of the Environment (MOE). The "normal" level of treatment is considered as the provision of secondary treatment, or equivalent, processes meeting associated effluent quality requirements. A second objective for the WPCC upgrade is to enhance existing processes, and appropriately address key issues such as effluent disinfection, sludge/biosolids treatment and management, and septage receiving.

The Brockville Water Pollution Control Centre is a primary treatment facility with chemical addition for enhanced settling and phosphorus removal. The WPCC has a rated capacity of 21,800 $m^3$/d and a peak flow rating of 54,500 $m^3$/d.

In 2000, the City became aware that the Water Pollution Control Centre (WPCC) effluent was exceeding the Certificate of Approval compliance criteria for Biochemical Oxygen Demand ($BOD_5$) concentration and loading. Notwithstanding evaluation and optimization measures undertaken to improve the WPCC's treatment performance, the existing facility is unable to achieve compliance with the effluent criteria for $BOD_5$.

The Ministry of Environment (MOE) has issued a Provincial Officer's Order to the City of Brockville to assess alternative solutions following the Municipal Class EA process. Excerpts of the work ordered include:

> *"Within one-hundred-fifty days (150) days of issuance of this order retain the services of a competent and qualified consultant to assess alternative solutions to the problem of non-compliance with the Biochemical Oxygen Demand (5 day) effluent criteria at the Brockville Water Pollution Control Centre, and to complete the planning, public consultation and documentation in accordance with the Municipal Class Environmental Assessment"*
>
> *"Ensure the description of the problem under Phase 1 (Problem or Opportunity Definition) of the Municipal Class Environmental Assessment identifies that the existing Water Pollution Control Centre is in a chronic state of non-compliance with the prescribed Biochemical Oxygen Demand (5 day) effluent criteria, and does not meet the "normal" level of treatment prescribed by the Ministry of Environment. The "normal" level of treatment is secondary or equivalent."*

The Study Team of Simcoe Engineering Group Limited in association with Hydromantis Inc. was retained to undertake and complete a Class Environmental Assessment (Class EA) in accordance with the requirements of the Municipal Class Environmental Assessment, June 2000 (Municipal Engineers Association). Various alternatives to achieve project objectives were reviewed following the provincially approved Municipal Class EA process, and are presented in this study report.

## 2. Class EA Process

Municipalities in Ontario are subject to the provisions of the Environmental Assessment Act and its requirements to prepare an Environmental Assessment for most public works projects. The Class Environmental Assessment planning process is a decision-making process approved under the Ontario Environmental Assessment Act (EA Act) for a group of projects. Projects included in the Class EA may be implemented without further approval under the EA Act provided that the approved Class EA planning process was followed. The main elements of the Class EA planning process involve some or all of the following five phases:

| PHASE 1 | | PHASE 2 | | PHASE 3 | | PHASE 4 | | PHASE 5 |
|---|---|---|---|---|---|---|---|---|
| Problem or opportunity | → | Alternative Solutions | → | Alternative Design Concepts for Preferred Solution | → | Environmental Study Report | → | Implementation |

Please see **Figure 1** on the following page for the complete Class EA Planning and Design Process flowchart. The flowchart illustrates the complete five phases of the planning and design process and associated mandatory and discretionary public contact points.

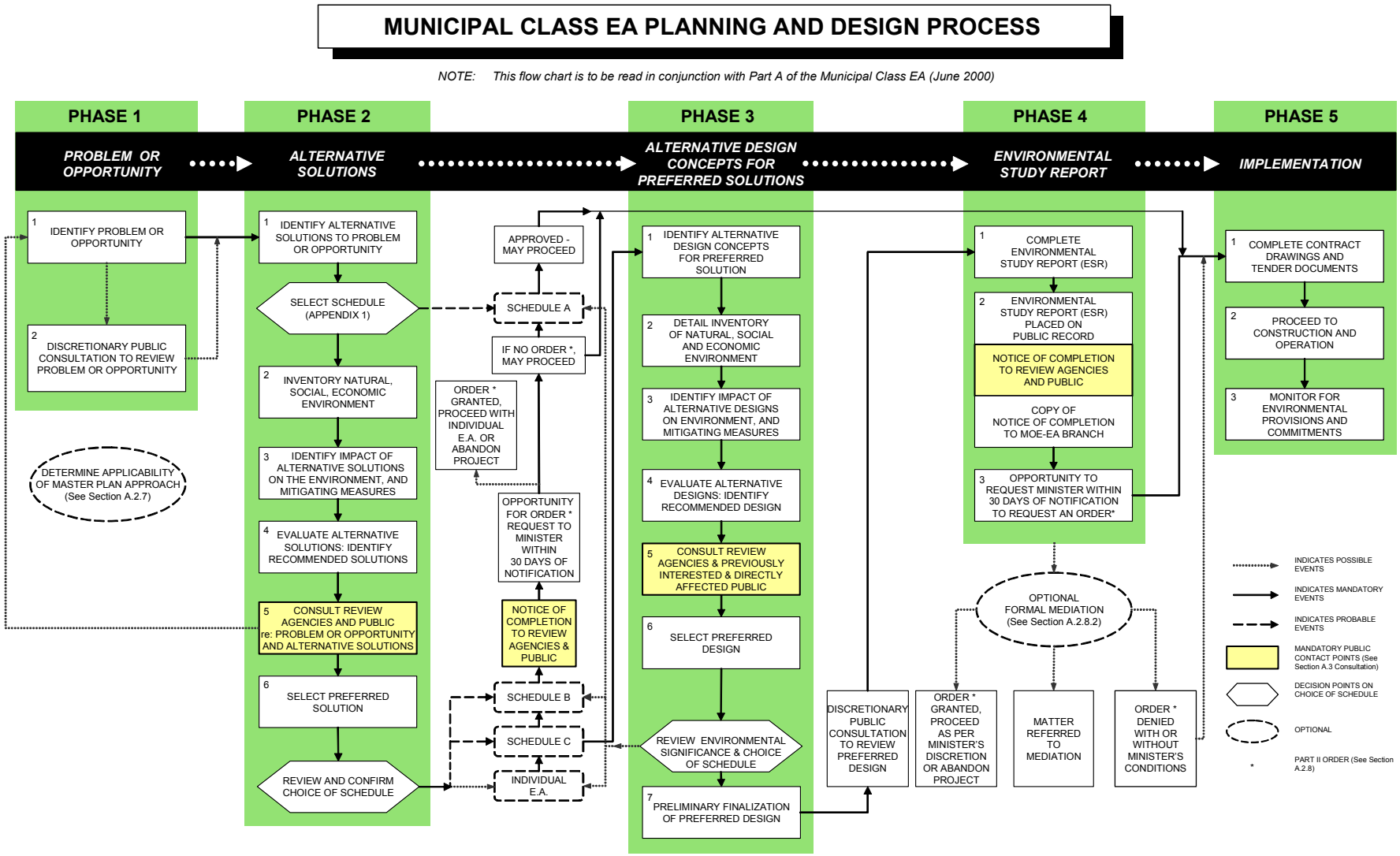


**FIGURE 1:**
**Class EA Process**

Since projects can vary in terms of scope, complexity, and environmental impact, the Class EA identifies three levels of planning activities through separate schedules of projects:

- Schedule A Projects
  - Includes normal or emergency operational and maintenance work
  - the environmental effects of these works are usually minimal, there, these projects are pre-approved and can proceed directly to implementation (Phase 1, initial step of Phase 2 and 5)
- Schedule B Projects
  - Includes improvements and minor expansions to existing facilities
  - there is the potential for some adverse environmental impacts and therefore the proponent is required to proceed through a screening process including consultation with those who may be affected (Phase 1-2 and 5)
- Schedule C Projects
  - Includes the construction of new facilities and capacity expansions to existing facilities
  - the projects proceed through the full environmental assessment planning process in the Class EA (Phase 1-5)

The requirements of the Class EA are:

- Formulation of problem statement.
- Consultation with the general public and agencies potentially affected by the proposed project.
- Consideration of a reasonable variety of alternatives.
- A systematic evaluation of alternatives to determine their advantages and disadvantages and their net environmental effects.
- Documentation of the planning process to allow “traceability” of the decision-making process and consultation activities.

The Brockville WPCC upgrade project is considered to be a Schedule B type project, and is proceeding with the necessary activities to fulfill the Class EA requirements. As indicated in the EA flow chart, Schedule B type projects involve Phase 1 and Phase 2, and then as approved, may proceed directly to implementation (Phase 5).

## 3. Problem Statement

Phase 1 of the Municipal Class Environmental Assessment (Class EA) planning process includes the identification and description of the problem or opportunity. The objective of this phase is to develop a clear statement of the problem or opportunity being addressed.

The City of Brockville initiated the Class EA study for the Brockville WPCC in 2004 to address the issue of non-compliance with respect to Biochemical Oxygen Demand (5 day) effluent parameter criteria, and to provide a "normal" level of treatment as prescribed by the MOE. The "normal" level of treatment is considered to be secondary or equivalent treatment by the MOE, and usually includes a form of biological treatment. The existing Brockville WPCC is a chemically-enhanced primary treatment plant and as such does not incorporate a secondary biological treatment process.

In addition to the above, several other important issues (process upgrades or enhancements) identified in the Problem Statement, and being considered concurrently as part of this Class EA, include:

- Effluent Disinfection Strategies

  Currently the Brockville WPCC disinfects the primary effluent with sodium hypochlorite. This review includes disinfection options for secondary treatment effluent, as well as producing an effluent that is non-toxic. Provincial and Federal initiatives are requiring a non-toxic effluent specifically in regard to chlorine and ammonia, and effluent lethality testing is an expected future requirement.

- Sludge Treatment Needs and Options

  Once secondary treatment is implemented at the WPCC, the amount of sludge and biosolids will increase. To accommodate the change in volume and in characteristics of the sludge/biosolids, an evaluation of sludge treatment needs and options was required.

- Septage Receiving Considerations

  Septage from domestic sources can be handled in a variety of different ways. Historically, septage solids were either discharged to the headworks of a Water Pollution Control Plant or applied directly to land. The new Nutrient Management Act will phase out the practise of land application prior to additional treatment or stabilization. Accordingly there will be an increasing need in the community and surrounding area for septage treatment/disposal facilities.

  Currently the Brockville WPCC does not accept septage waste. This review considers the effects of various septage receiving scenarios on the Brockville WPCC.

The "Problem Statement" was developed based on the above, and is included in **Appendix A**. The above requirements and key issues create the need to upgrade the Brockville WPCC and improve the effluent quality by providing secondary or equivalent treatment. Several leading practical and cost-effective alternatives for a Plant upgrade are to be identified for further development through subsequent preliminary design activities.

## 4. Alternative Solutions

The Class EA process recognizes that there are many ways of addressing a particular problem or opportunity and requires the various alternative solutions be considered.

Under the Class EA planning process, projects must consider the "Do Nothing" alternative. This allows for a base comparison of the advantages and disadvantages of all the project options being considered.

**Table 1** summarizes several general concepts of alternative solutions.

**TABLE 1:**
**Alternative Solution General Concepts**

| Alternative Solution General Concept | Satisfy MOE Order | Comments |
|---|---|---|
| Do Nothing | NO | Not considered a viable alternative |
| Reduce sewage flow and influent loadings | NO | Not considered practical / possible to reduce influent loadings |
| Existing Plant Upgrade | YES | Includes various treatment process options |
| New/Additional Facility | YES | Not necessary/warranted, very high cost |

The "do nothing" alternative is not recommended for the Brockville WPCC as the City would remain in non-compliance with respect to the MOE order to comply, and its associated stipulated timeframes.

The alternative of "existing plant upgrade" is considered to be the most appropriate alternative solution general concept. Upgrading the Plant will address the issue of non-compliance, allow for providing secondary treatment or equivalent processes at the facility, and satisfy the MOE Order. **Figure 2** illustrates the existing Brockville WPCC facility and property limits.

A long list of treatment upgrade alternative solutions, and those short listed for continued review and evaluation are outlined in Technical Memorandum No. 2. TM #2 can be found in **Appendix C**. The short listed treatment process options identified in TM#2 are summarized and generally described below:

- Activated Sludge Process
- Sequencing Batch Reactor
- Rotating Biological Contactor
- Biological Aerated Filter
- and, Hybrid Fixed Film Process (e.g. Moving Bed Biofilm Reactor.)

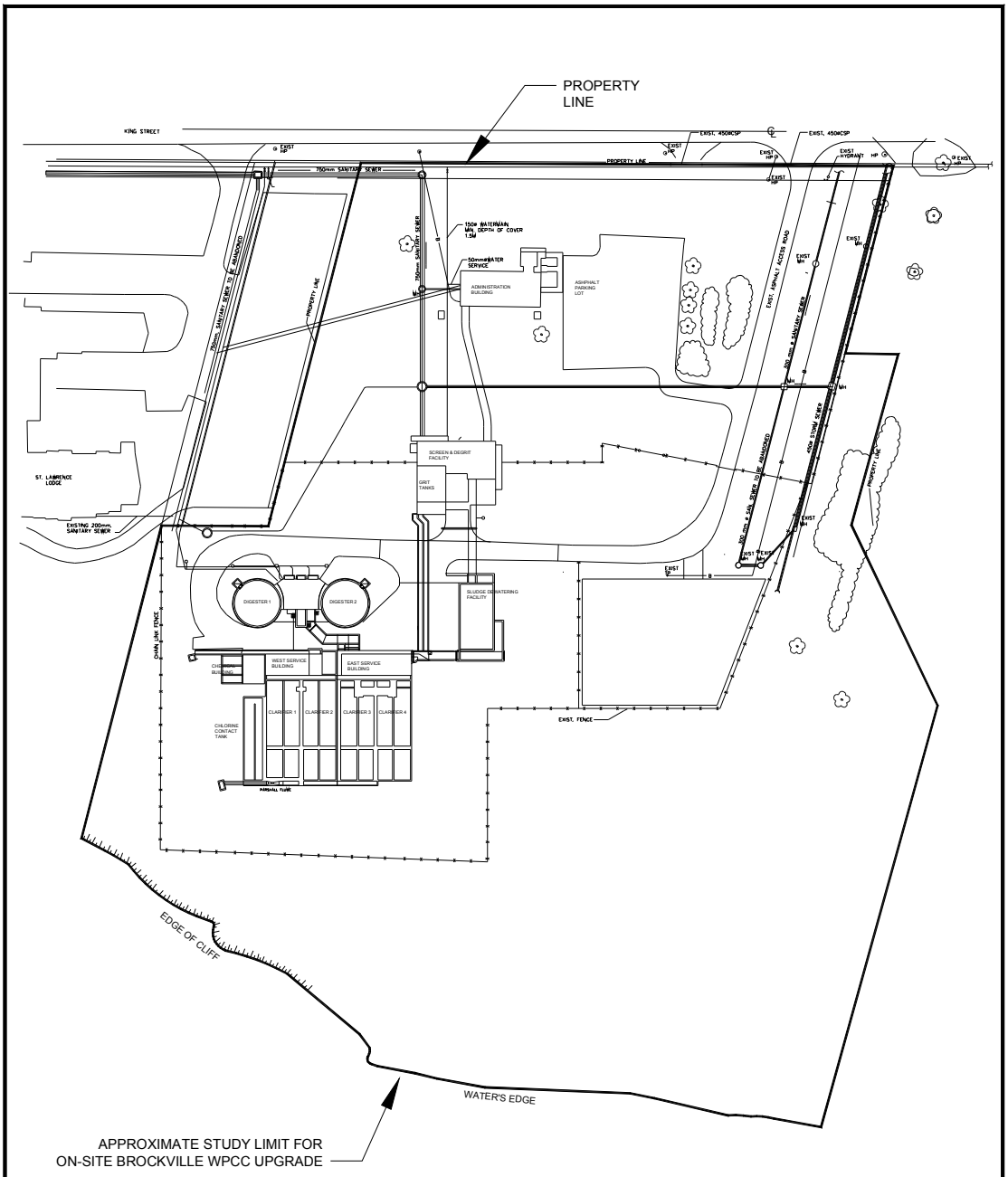


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**FIGURE 2:**

**EXISTING BROCKVILLE WPCC FACILITY**

**Activated Sludge Process**

The Activated Sludge Process (ASP), in its various configurations, is the process in most widespread use for the treatment of municipal wastewaters. It is a suspended growth treatment process that cultivates bacteria and microorganisms to utilize and aid in the biodegradation of wastes in the wastewater.

Usually primary clarifiers are used to remove readily settleable material ahead of the aeration tank or basin. The wastewater or primary effluent enters an aeration tank and is mixed with return activated sludge (which contains 'active' microorganisms) and air (oxygen supply). The microorganisms (i.e. biomass) start to break down and utilize/consume the organic wastes in the wastewater.

From the aeration tank the waste flows into a clarifier where biomass solids are settled out of the flow. The clarified liquid at the top of the tank is drawn off, disinfected and discharged as treated effluent. The settled biomass is removed from the bottom of the clarifier and is either redirected back to the aeration tank as return activated sludge, or sent on to be further processed prior to off-site beneficial use or disposal.

**Sequencing Batch Reactor**

The Sequencing Batch Reactor (SBR) system is a suspended growth treatment process and is a variation of the Activated Sludge Process. Unlike the ASP where the processes are carried out at the same time in individual tanks, the SBR process is accomplished in one tank, based on a fill and draw sequence. This eliminates the need for additional tanks for settling and clarification, and does not require the conventional return sludge handling facilities.

SBRs usually require some form of primary treatment of the wastewater to ensure proper treatment. In a SBR basin, the treatment sequence is typically a 5-phase process consisting of: fill/feed, react (aeration), settle, decant (withdrawal of clarified effluent) and idle phases. Multiple cells or basins are used to accommodate continuous wastewater flow.

From the SBR basin, the decanted effluent is disinfected and discharged as plant effluent. Waste activated sludge is removed from the SBR basin to be further processed prior to offsite beneficial use or disposal.

**Rotating Biological Contactor**

Rotating Biological Contactors (RBCs) use a fixed film process where bacteria and microorganisms form a slime layer on rotating disks or drums. The RBC process typically involves a once-through flow arrangement past a number of rotating biological contactors.

Usually primary treatment of the wastewater precedes the RBC process. Primary effluent enters the RBC unit and flows through a series of partially submerged drums. In operation, biological slime (microorganisms) attach and grow on the surfaces of the media within the drums and form a layer over the media. The rotation of the drums allows the slime layer to repetitively come in contact with the organic material in the wastewater and then with oxygen in the air.

As the drums are rotated, excess slime (solids) are sloughed from the RBC units and are carried to the secondary clarifier. The settled solids are returned to the RBC unit or sent to be further processed prior to offsite beneficial use or disposal.

**Biological Aerated Filter**

The Biological Aerated Filter (BAF) uses an attached growth biological treatment process. Biofiltration is a multi-purpose process that combines biological purification with solids filtration. This is achieved using attached growth biomass on an inert granular or floating media bed submerged in a single compact aerated reactor. Multiple reactors are used to provide continuous wastewater treatment.

Usually primary clarifiers are used to remove readily settleable material, and then fine screens are used ahead of the BAF reactor. Wastewater enters the BAF reactor and flows through (upflow and downflow variations) the filter media. While flowing through the filter, the wastewater comes in contact with microorganisms attached to the filter media and begins decomposition, consuming the organic wastes in the wastewater. The BAF reactor is aerated to provide the microorganisms with oxygen. Filter effluent is collected, disinfected and discharged as plant effluent.

Periodically the BAF reactor is cleaned by forcing filter effluent back through the reactor. The ‘backwash’ is collected and receives further treatment. Solids are further processed prior to offsite beneficial use or disposal, and decanted backwash water is returned to the plant.

**Moving Bed Biofilm Reactor**

The Moving Bed Biofilm Reactor (MBBR) is a hybrid fixed film (attached growth) process where bacteria and microorganisms form a biofilm on small synthetic carrier media moving within the reactor.

Primary treatment or fine screening usually precedes the MBBR process. The primary effluent enters the MBBR basin, and flows over and through the carrier bed. Within the reactor the carrier media are kept in suspension and constant movement by aeration and/or mixing. The reactor influent comes into intimate contact with the moving bed as it travels from the reactor inlet to the outlet. Screens are used at the inlet and the outlet to

retain the media. Reactor effluent is clarified, and there may or may not be a return of activated sludge or biomass. Wasted solids are further processed prior to offsite beneficial use or disposal.

The review and evaluation of these five (5) short listed alternatives is outlined in Technical Memoranda No. 3. TM#3 is included in **Appendix D**.

## 5. Treatment Upgrade Design Basis Considerations

Planning and design basis information is presented in Technical Memorandum No. 1. TM #1 is included in **Appendix B**.

The design basis plant flow and influent characteristic information is summarized in **Tables 2** and **3** below:

**TABLE 2:**
**Current and Projected Future Flows**

| | Average Day Flow ($m^3$/d) | Maximum Daily Peak Flow ($m^3$/d) |
|---|---|---|
| Current | 17,800 | 40,180 |
| 10 Year Period (2014) | 18,660 | 46,625 |
| 25 Year Period (2029) | 20,050 | 50,125 |
| Existing Design & Rated Capacity | **21,800** | **54,500** |
| 1. Design Peak Factor (PF) = 2.5 | | |

**TABLE 3:**
**Historical and Projected Future Influent Characteristics and Loadings**

| | $BOD_5$ mg/L | TSS mg/L | TP mg/L | TKN mg/L |
|---|---|---|---|---|
| Period 2001-3 Average | 112 | 143 | 3 | 12.4(1) |
| Suggested Design Values @ Average Day Flow (21,800 $m^3$/day) | 120 | 160 | 4 | 15 |
| Suggested Maximum Month Design Values | 160 | 200 | 4 | 18 |
| 1) No septage receiving during this period.<br>2) BOD – biochemical oxygen demand (5-day), TSS – total suspended solids, TP – total phosphorus, TKN – total Kjeldahl nitrogen | | | | |

## 6. Environmental Considerations

### 6.1 General

The Brockville WPCC is located along the north shore of the St. Lawrence River, immediately east of the City of Brockville, within the municipality of the Township of Elizabethtown-Kitley.

Four general components in the broad definition of the environment, as considered by the EA are Natural Environment, Social/Cultural, Economic/Financial, and Technical. As the secondary treatment process upgrade alternatives would all involve similar types of proposed works on the existing Brockville WPCC site, considerations with respect to the potential effects of upgrade alternatives with respect to the four environmental components are considered similar. **Table 4** summarizes considerations and comments of potential effects to environment components.

**TABLE 4:**
**Summary Environment Considerations of Proposed Plant Upgrade Alternatives**

| Natural Environment | Social / Cultural | Economic / Financial | Technical |
|---|---|---|---|
| • Improved plant effluent quality<br>• Potential natural environment effects associated with plant upgrade can be minimized or eliminated by following the Class EA process, using appropriated mitigation measures, and following a monitoring program during and after construction | • Potential social / cultural effects associated with plant upgrade can be minimized or eliminated by following the Class EA process, using appropriated mitigation measures, and following a monitoring program during and after construction | • Significant capital / implementation costs<br>• No third party funding support commitment at this time<br>• Sewer rate / tax base considerations | • Increased utility / energy requirements |

Note:
See **Table 5** for summary of potential environmental effects and mitigation measures.

All of the secondary treatment process upgrade alternatives are expected to be accommodated on the existing property within municipal setback requirements. It is noted that the existing and future property line separation distances, do not meet current MOE minimum separation distance (buffer zone) requirements. Accordingly, it is recognized that all of the process upgrade alternatives will need to consider a combination of separation distance and the implementation of noise and odour mitigation measures as an alternative to providing minimum stipulated separation distances.

## 6.2 Archaeological Assessment

A Stage 1 Archaeological Assessment was carried out to identify known archaeological resources within the study area. The Archaeological Assessment Report can be found in **Appendix I**.

The investigation included review of relevant archaeological and historical documents and literature regarding to the study area, and review of historic plans, land registry records and aerial photographs. A field visit to the site property was completed on September 15th, 2004.

The investigation concluded that there are no known archaeological sites on the subject property. However, due to the study area's proximity to the St. Lawrence River and association with the historic County Road 2 corridor, the site has a moderate to high potential for precontact (prehistoric) and historic archaeological resources.

The investigation provided the basis for the following recommendations:

1) That a Stage 2 archaeological assessment be undertaken of those areas affected by the proposed changes to the WPCC;

2) That should deeply buried remains be found on the property during site works, applicable agencies are to be notified; and

3) In the event that human remains are found during excavation work, applicable agencies are to be notified.

### 6.3 Natural Environment

Potential effects to the natural environment occurring as a result of proposed upgrade works were considered in the evaluation process. The natural environment includes the air, land, water and flora and fauna of the region.

The Brockville WPCC project area falls within a developed area that is relatively flat (sloping towards the St. Lawrence River) with a tree and shrub cover of less than 25% of the total area. The property extents are generally a maintained urban landscape and by observation do not appear to harbour any unique characteristics from the general surrounding lands.

All works proposed are expected to occur in presently maintained urban landscape areas and therefore will have little effect on terrestrial vegetation and wildlife.

All works proposed are being implemented on land within the existing site and therefore, will have little or no effect on the surrounding aquatic habitats.

### 6.4 Summary of Potential Environmental Effects and Mitigation Measures for Plant Upgrades

**Table 5** outlines possible effects on the natural environment caused by the proposed upgrade works. Also outlined are mitigating measures required to offset any potential impacts to the environment.

**TABLE 5:**
**Summary of Potential Environmental Effects and Mitigation Measures for Plant Upgrades**

| POTENTIAL EFFECTS | PROBABILITY | | MITIGATION MEASURES | NET EFFECTS |
|---|---|---|---|---|
| | No | Yes | | |
| **Aesthetics**<br>• Removal/damage of vegetation/landscape<br>• Compatibility with landscape<br>• Residents, non-residents exposed to new view | | *<br>*<br>* | New landscaped berm and plantings to improve site screening and minimize adverse effects | New landscaping provides better scenery for pedestrian and water course traffic |
| **Climatic Effects**<br>• Change in air quality | | * | Exhaust air from main odour producing areas captured and treated | Odour level mitigated to acceptable level |
| **Ground Water**<br>• Change in quantity<br>• Effects during construction | * | * | Erosion control and spill containment measures implemented to minimize | Ground water protected through design and construction techniques |
| **Heritage Resources**<br>• Disruption and/or destruction of sites, cultural heritage landscapes and structures | | * | Avoid where possible, Stage 2 Archeological Assessment to be carried out during Preliminary design phase | Minimized by implementing recommendations identified through the Stage 2 Archeological Assessment |
| **Noise and Vibration**<br>• Changes in existing noise and vibration levels<br>• Effects during construction | | *<br>* | Noise reduction measures identified during design phase<br>Noise reduction methods implemented during construction | Minimized and mitigated to acceptable level |
| **Recreation**<br>• Effects on quality of user experience due to environmental damage | * | | Compensate by temporary relocation, noise and dust control measures implemented | Minimized and mitigated to acceptable levels |
| **Residential, Commercial, Industrial, Institutional**<br>• Temporary disruption during construction | | * | Apply noise, dust and vibration control measures, blend structures in with | Minimized and mitigated to |

| | | | | |
|---|---|---|---|---|
| • Safety and movement patterns of pedestrian traffic<br>• Change in property value<br>• Nuisance odours | *<br>*<br> | <br><br>* | adjacent building forms, maintain continuity of pedestrian walkway system. Implement odour control and treatment mitigation measures | acceptable levels |
| **Soils Geology**<br>• Erosion or compaction during construction<br>• Deposition of sediment on adjacent properties<br>• Contamination of soils<br>• Mixing of topsoil with subsoil<br>• Scarring of unique landforms | <br><br><br><br><br>* | *<br><br>*<br><br>*<br>* | Erosion and sediment control measures to be implemented, restoration planting, spill containment and control measures implemented | Minimized and mitigated to acceptable levels |
| **Surface Drainage**<br>• Contamination of surface watercourse<br>• Sedimentation and turbidity of adjacent water bodies due to construction activities | | *<br><br>* | Erosion and sediment control measures to be implemented to mitigate potential impacts; spill containment and control measures in effect | Minimized and mitigated to acceptable levels |
| **Terrestrial Vegetation and Wildlife**<br>• Mortality/stress of vegetation due to sediment deposition, construction equipment movement or changes in soil moisture<br>• Conditions resulting in reduction and/or deterioration of wildlife habitat and breeding | <br><br><br><br><br>* | * | Vegetation to be protected during construction, includes sediment and erosion control. Protective fencing to be installed where required | Minimized and mitigated to acceptable levels |

## 7. Public Consultation Activities

Several consultation activities were undertaken in completing the Class EA to provide the public and applicable agencies with project information and opportunities to provide input into the decision making process. Consultation activities are summarized below.

- The Notice of Study Commencement was published on the City of Brockville's website July 8th, 2004.

- Project Website: The City of Brockville provides project related information updates and notices on their website at www.brockville.com.

- A Notice of Study was forwarded to review agencies October 13th, 2004 and to surrounding property locations.

- Public Information Centre: A Public Information Centre (PIC) was held Nov. 4th, 2004 seeking public input and concerns. The PIC was advertised in the Brockville Recorder and Times on October 26th, 2004, and a letter of notification was forwarded to various interested agencies, City personnel, and others with possible interest in the study on October 29th, 2004.

Copies of the newspaper ad, the letter and the mailing list are included in **Appendix H**.

Comments were received from several interested citizens through email and mail, as well as at the Public Information Centre. Comments were varied and mainly included concerns on the "need" for secondary treatment and associated capital costs of such an upgrade. Copies of comments received and respective responses, as well as PIC handout information are included in **Appendix H**. During the course of the PIC and through correspondence it was clarified that there are very few primary-only treatment plants remaining in Ontario and these do not meet the regulatory authority's requirements for the "normal" level of treatment, and that the Brockville WPCC is in a state of non-compliance with respect to the prescribed $BOD_5$ effluent criteria. These factors have led to the MOE issuing a Provincial Officer's Order to the City of Brockville to complete an assessment of alternate solutions in accordance with the Municipal Class Environmental Assessment process.

## 8. Conclusions

### 8.1 Preferred Alternatives

Although all secondary treatment processes outlined in Technical Memorandum No. 2 could be implemented at the Brockville plant, a short list of treatment process alternatives to provide required secondary treatment at the WPCC was identified in Technical Memorandum No. 2.

Further evaluation of the short listed treatment processes was completed as presented in Technical Memorandum No. 3 (included in **Appendix D**). The treatment options were evaluated based on project specific developed criteria including: economic, treatment performance, functional / operational considerations, future process expansion capability, and various other factors. The weighted evaluation criteria combined with individual factor scoring for the treatment process alternatives produced total weighted scores for each treatment option. Based on this, the preferred treatment process alternatives are as follows:

1) ASP (Activated Sludge Process)
2) BAF (Biological Aerated Filter)
3) MBBR (Moving Bed Biofilm Reactor)

Overall the three processes of high rate ASP, BAF and MBBR scored effectively the same. It is recommended that these three secondary processes be considered as preferred alternatives for the Brockville WPCC secondary treatment upgrade, and that further evaluation be undertaken as a component of the preliminary design activities of the Brockville WPCC Upgrade project.

## 8.2 Project Description

### 8.2.1 Project Components

#### A. Secondary Treatment Process and Associated Upgrades

Although each of the preferred alternative treatment processes involve variations to project works, general components include:

- Site Works, Civil Works, and Yard Piping
- Biological Process Tankage and Equipment
- Settling Basins
- Waste/Return Pumping
- Chemical Systems
- Effluent Disinfection
- Sludge/Biosolids Treatment and Handling
- Electrical Supply and Standby Power
- Instrumentation & Control, and Supervisory Control and Data Acquisition (SCADA)
- Mitigation Measures (odour control, etc.)

**B. Effluent Disinfection Strategies**

Currently the Brockville WPCC disinfects the plant effluent with sodium hypochlorite (chlorine disinfection).

Technical Memorandum No. 6 considers disinfection strategy options available for the Brockville WPCC. TM #6 is found in **Appendix G**. The preferred disinfection strategy options were identified as chlorination/de-chlorination and ultraviolet (UV) radiation. It is recommended that both of these options be carried forward to the preliminary design phase of the upgrade project.

**C. Sludge Treatment Needs and Options**

Currently the Brockville WPCC practices centrifuge dewatering and landfill disposal, and on a limited basis, with liquid biosolids land application.

Secondary treatment will increase the amount of sludge and biosolids production at the Brockville WPCC. To accommodate the change in volume and in characteristics of the sludge/biosolids, sludge treatment needs and options were evaluated. Technical Memorandum No. 5 evaluates the sludge treatment needs and options for a secondary treatment process upgrade at the Brockville WPCC. TM #5 can be found in **Appendix F**.

Some of the preferred alternative treatment processes require secondary sludge thickening and all process could be provided with separate mechanical thickening.

The existing anaerobic digester capacity, should be adequate (with optimization measures) for the addition of secondary sludge, although digester loadings will slightly exceed MOE design guidelines. The provision of a third digester is recommended to improve operations and process flexibility for dewatering and liquid biosolids management programs.

Either centrifuge or filter press dewatering can be used for a dewatering and disposal solely, or in combination with a liquid biosolids application program. The existing centrifuge dewatering facility is expected to be more economically retrofitted for either an expanded or replaced centrifuge operation as opposed to installing filter presses. As such centrifuge dewatering with continued liquid biosolids application as much as possible is recommended. This dual-solids handling program has the advantage of being economical and having increased reliability, as it provides two means of handling the biosolids from the plant.

**D. Septage Receiving Considerations**

Technical Memorandum No. 4 outlines septage receiving considerations for the Brockville WPCC. TM #4 can be found in **Appendix E**.

The identified preferred secondary treatment alternatives are suitable to co-treat septage with associated design basis considerations. To accommodate one of the septage receiving scenarios, the preliminary design activities of the upgrade works should account for associated:

- Current and future influent characteristics
- Septage receiving facilities
- Increased treatment processes loadings
- Additional sludge and biosolids production

### 8.2.2 Opinion of Probable Costs

Total project budget costs and allowances for the Brockville WPCC Upgrade are estimated as $31.5 to $40.5 million. This budget cost range is summarized as:

| | | |
|---|---|---|
| Secondary Treatment Upgrade | | $ 15 to $ 20 million |
| Secondary Treatment Process | | |
| Site Work, Utilities, Concrete | | |
| Mechanical | | |
| Electrical | | |
| Instrumentation & Control | | |
| Other Upgrade Work Allowances | | $ 10 to $ 12 million |
| Septage Receiving | | |
| Headworks Upgrades | | |
| Primary Clarifier Upgrades | | |
| Digesters Upgrades | | |
| New Digester | | |
| Sludge/Biosolids Treatment | | |
| Odour Mitigation | | |
| Standby Power | | |
| Disinfection | | |
| Allowance For Unforeseen Items | | $ 3 to $ 4 million |
| Engineering | | $ 3.5 to $ 4.5 million |
| | Total (2004) | $ 31.5 to $ 40.5 million |

## 8.3 Next Steps

The Class EA process Phase 2 has been completed for the Brockville WPCC Upgrade project and will be advertised for the required 30-day comment period. Upon the EA being

considered “approved”, the project may be developed as proposed and proceed to Phase 5 - Implementation.

Phase 5 includes preliminary and final design, and construction of upgrade works. Following the preliminary design phase, the project can proceed to final design and construction for the preferred treatment process alternative and further developed upgrade works.

As no third-party funding support commitments have been received to date, financial viability can significantly affect implementation timelines. The City of Brockville is pursuing potential grant or funding assistance program opportunities.