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O'CONNOR RESERVOIR AND PUMPING STATION

CLASS ENVIRONMENTAL ASSESSMENT
SCHEDULE 'B' PROJECT FILE

July 3, 2008

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APPENDICES

1.0 EXECUTIVE SUMMARY

The Master Plan for Water Supply for the City of Kingston Urban Area and the Class Environmental Assessment (Completed to End of Phase 1 and Phase 2) completed in June of 2007 identified several upgrades to both the water treatment and distribution system in the City of Kingston. One component of the necessary upgrades is the construction of a treated water storage Reservoir and Pumping Station to be located on vacant land on O'Connor Drive in the City's west end. The reservoir would draw water from Pressure Zone 1 of the distribution system and provide it to Pressure Zone 2 (pressure zone boundaries are shown in both figures in Appendix H). The Master Plan identified preliminary estimates for the size and pumping capacity of the Reservoir and Pumping Station, which were further refined during the Schedule B Municipal Class Environmental Assessment (Class EA) process hydraulic modeling effort. To provide adequate storage and pumping capacity, the reservoir will need a capacity of approximately 6 000 000 Litres (6 ML) now, and a total capacity of 10.5 ML by the year 2026. The pumping station is to be sized for 26 ML/d (million litres per day) of pumping from the reservoir and 8.6 ML/d of pumping directly from Zone 1 into Zone 2. The estimated cost of the O'Connor Reservoir and Pumping Station is anticipated to be in the order of $5 775 000 to $6 655 000.

As part of the Class EA process, an Archeological Assessment, an Ecological Site Assessment, a Geotechnical Survey, and a review of the planning context were undertaken to ensure that the anticipated Reservoir and Pumping Station will allow for the protection, conservation, and wise management of Ontario's environment, as defined in the Ontario Environmental Assessment Act. Based on these studies, no issues have been identified that would prevent the implementation of the Reservoir and Pumping Station.

Governmental agencies and local businesses and individuals have been contacted about the project, via mailings as well as Public Information Centers, both during the 2006/2007 Master Plan phase, as well as during the recent Class EA phase. To date, no party has presented any objections to the proposed development.

This project file contains a summary of the work done through the Master Plan and the Class EA process. The various reports, memoranda, and other documents describing the project are included as appendices at the end of the project file. Although many aspects of the project are not yet defined in full detail, and will not be defined until the preliminary and final design phases, sufficient detail is included to permit a full understanding of the potential impacts this project will have on the environment and measures to mitigate any impacts.

2.0 INTRODUCTION

Utilities Kingston retained J. L. Richards & Associates Limited, in association with CH2M HILL Canada Limited, to complete a Schedule B Class Environmental Assessment (EA) for implementation of a water storage Reservoir and Pumping Station to be located on a vacant lot on O'Connor Drive. This work is one of the recommendations of the Master Plan for Water Supply for the City of Kingston Urban Area (completed June 2007). The purpose of the Master Plan was to begin to answer a Problem Statement (see Section 3.1) relating to the water treatment and supply infrastructure in the City of Kingston. The Class EA involves incorporating recommendations from the Master Plan as well as additional investigations and public consultation to ensure that the proposed works conform to the requirements of the Environmental Assessment Act. The O'Connor Reservoir and Pumping Station will be located as shown in Figure 1.

Figure 1 – Map of the O'Connor Reservoir Site

The purpose of an Environmental Assessment is to ensure the "betterment of the people of Ontario by providing for the protection, conservation, and wise management of Ontario's environment." (Ontario Environmental Assessment Act, section 2). A Class EA is a project-specific environmental assessment process that is often followed for common types of projects to ensure that the project meets the requirements of the Environmental Assessment Act. It involves detailed site-specific information gathering and studies as well as consultation with the public. Because the O'Connor Reservoir and Pumping Station is considered a Schedule B Class EA, a Project File containing all of the background information and decision making rationales must be provided for public review. This report serves as a summary to this body of information. The information itself is contained in the appendices attached at the end of the report.

The purpose of this Project File is to document the steps taken while completing Phases 1 and 2 of the Class EA process for the O'Connor Reservoir and Pumping Station, satisfying the requirements of a Schedule B undertaking. The information is presented chronologically to provide a summary of the activities undertaken in arriving at the conclusion that a new treated Reservoir and Pumping Station is required.

This project file consists of the following documents:

- 2007 Master Plan for Water Supply for the City of Kingston Urban Area (Appendix A)
- City of Kingston Urban Growth Strategy (Appendix B)
- Phase 1 Archaeological Assessment of the Proposed O'Connor Drive Reservoir and Letter of Concurrence from the Ministry of Culture (Appendix C)
- Preliminary and Final Ecological Site Assessments (Appendix D)
- Copies of communications with the public (Appendix E)
- Review of Local Planning Context, Proposed Kingston Treated Water Reservoir and Booster Pumping Station(O'Connor Drive) (Appendix F)
- Preliminary Geotechnical Investigation, Proposed O'Connor Water Reservoir, O'Connor Drive, Kingston, Ontario (Appendix G)
- Western Water Distribution System and Alternative 2 (Figure 5.2) from the Master Plan (Appendix H)

The project file also contains information regarding hydraulic modeling undertaken by Utilities Kingston, with assistance from both J.L. Richards & Associates Limited and CH2M HILL Canada Limited. A preliminary Opinion of Probable Cost has also been included to compare the various

storage technologies and options that will be evaluated further during the preliminary design of the Reservoir and Pumping Station.

3.0 MASTER PLAN

Utilities Kingston commissioned a Master Plan to gain a better understanding of the state of the water treatment and distribution system in Kingston, as well as what future upgrades may be required. The Master Plan for the Water Supply for the Urban Area of the City of Kingston was completed in June of 2007. One of the recommendations of this report was the construction of a new treated water Reservoir and Pumping Station on O'Connor Drive. The Master Plan followed Phases 1 and 2 of the Municipal Class Environmental Assessment (Class EA) process in order to ensure that subsequent decisions and construction would represent the best interests of residents of the City of Kingston. The Master Plan is included in Appendix A.

3.1 Problem Statement

The problem statement for the Master Plan is reproduced here:

> *"Utilities Kingston has determined the need to develop a Master Plan for the urban area of the City of Kingston's drinking water supply and distribution systems to accommodate the current (2006) drinking water demands for the urban area of the City of Kingston (Central, West and East) and to plan (in an orderly manner) for additional infrastructure (watermains, reservoirs and the associated water pumping stations and drinking water supply facilities) requirements to satisfy the considered short-term (2011), mid-term (2016) and long-term (2026) drinking water requirements for the urban area of the City of Kingston.*
>
> *The existing City of Kingston water supply and distribution systems incorporates the City of Kingston (Kingston Central), the former Kingston Township (Kingston West) and the former Pittsburgh Township (Kingston East, supplied by Kingston Central). Utilities Kingston considers Kingston Central and East, and Kingston West as two drinking water supply and distribution systems.*
>
> *In order to provide an assured drinking water supply to the entire urban area of the City of Kingston from the two existing water treatment plants (the Central Water Purification Plant and the West Water Treatment Plant [now the Point*

Pleasant Water Treatment Plant]), it would appear that Kingston Central should be interconnected with Kingston West.

Utilities Kingston wishes to investigate potential methods to provide a unified drinking water supply and distribution system to serve the urban area of the City of Kingston (Central, West and East). These methods could include the logical interconnection of distribution systems and associated infrastructure additions/upgrades; upgrades/refurbishments to the existing facilities (water treatment plants, elevated water storage tanks, water storage standpipes, ground-level water storage reservoirs, water booster pumping stations); and new facilities (treatment plant, water storage)."

3.2 Background to the Project and Earlier Studies

Utilities Kingston retained Simcoe Engineering Group Limited to complete a Master Plan for the Water Supply for the City of Kingston Urban Area. The purpose of this Master Plan was to consider the current and future requirements for drinking water in the City of Kingston. The study was developed progressively through the use of Technical Memoranda and is summarized in the Master Plan report, dated June of 2007 (see Appendix A). The Master Plan utilized the following information to evaluate the existing system to identify shortcomings and areas in need of updating or improvement:

- Existing water supplies and distribution systems
- Operational considerations and other significant issues
- Existing water treatment plant capacities (both rated and functional)
- Existing water supply and storage requirements (both rated and functional)

The Master Plan report identified ten issues with the existing plant and distribution system (refer to page 12 and 13 of Appendix A in the Master Plan report), several of which could be used to justify the need for additional reservoir capacity in the system both now and in the future. O'Connor Drive was recommended as the preferred location for a treated water storage reservoir in previous, unnamed studies (page 13 of the Master Plan). The Master Plan report indicates that there is currently insufficient functional treated water storage (refer to Table 2.8 on page 22 of the Master Plan).

Although the current need for additional water storage has been demonstrated, future storage needs were also discussed to ensure that the implementation of additional storage will meet both the current and future requirements.

Storage requirements for the near term (2011), intermediate term (2016), and the long term (2026) were identified in the City of Kingston Urban Growth Strategy, Final Report, dated 2004 (refer to Appendix B). A further 2026A scenario was also identified to model the projected requirements in 2026 if greater-than-projected growth were to occur. This report suggested several growth alternatives, and Growth Alternative 2 was subsequently determined by the City of Kingston to represent the best option. This growth alternative was used as the basis for estimating future treated water storage requirements. Tables 3.16, 3.17, 3.18, and 3.19 in the Master Plan report indicate the total storage requirements in the Kingston West distribution system for the years 2011, 2016, 2026, and 2026A.

The Master Plan report also suggests that, based on future storage requirements, a storage reservoir would be most suitable in the vicinity of the Gardiners Road Booster Station, which is quite close to the suggested location of the new O'Connor Reservoir.

3.3 Distribution System Modeling

A computer-based model of the water distribution was developed to assess the need for a reservoir at O'Connor Drive. This model was updated in 2002 and used in 2004 to prepare the Urban Growth Strategy mentioned previously. The model was again updated in 2006 in order to be used for the future scenarios for 2011, 2016, 2026, and 2026A. The Master Plan report describes modeling assumptions and updates that were incorporated into the model (refer to pages 48 to 51 of the Master Plan). By modeling different scenarios, alternative solutions to provide additional water storage are identified and can then be compared. A total of eight (8) different scenarios were identified (page 53 of the Master Plan). Of these, four (4) were identified as being feasible solutions to the problem statement. Each of these scenarios was modeled for the 2011, 2016, and 2026 study years to determine storage requirements as the City grows. Table 5.1 shows the infrastructure required for each of the four alternatives (see pages 61, 62, and 63 of the Master Plan). The modifications to the system for each alternative (water distribution system-wide) are shown in Figures 5.1, 5.2, 5.3, and 5.4 (see pages 65 to 68 of the Master Plan).

3.4 Public Consultation during the Master Plan

The Municipal Class EA requires that the public be informed and consulted about the activities undertaken as part of both Master Plans and Class EAs. A Notice of Study Commencement was published on July 11, 2006, to inform the public that the Master Plan was underway. Subsequently, two Public Information Centres (PICs) were held to provide a means to communicate the status of the Master Plan and to solicit feedback from the public. The first PIC was advertised starting on November 21, 2006, and was held on November 29, 2006, from 16:00 to 19:00 at the Portsmouth Olympic Harbour at 53 Yonge Street, Kingston, ON. The second PIC was advertised starting on March 13, 2007, and held on March 19, 2007, from 16:00 to 19:00, also at Portsmouth Olympic Harbour. Copies of public notices can be found on pages 68 and 71 of the Master Plan. Based on the feedback from both the public and from governing authorities (such as the Ontario Ministry of the Environment (MOE) and the Cataraqui Region Conservation Authority (CRCA)), the four alternatives were further refined. Some of these refinements required further modeling of the distribution system. Figure 7.3 (refer to page 81 of the Master Plan) shows a possible plan-view of the O'Connor Reservoir and Pumping Station. The Master Plan also presented the necessary piping modifications to connect the O'Connor Reservoir and Pumping Station to the existing distribution system (refer to page 86 of the Master Plan). Estimated costs for the four alternatives (which include the O'Connor Reservoir and Pumping Station as well as other necessary water system upgrades) are presented in Table 7.2 on page 92 of the Master Plan. These costs are for the implementation of the entire option and not limited to work on the O'Connor Reservoir and Pumping Station.

3.5 Evaluation of Feasible Alternatives during the Master Plan

The four alternatives, including necessary infrastructure upgrades and cost estimating, were evaluated to determine which represents the optimal solution to the problem statement. Eight (8) evaluation criteria were selected to effectively compare the four alternatives. The evaluation criteria were listed on page 98 and 99 of the Master Plan and are reproduced here along with explanatory remarks. A preliminary list of these criteria was made available at the PICs and the public had an opportunity to comment on them through questionnaires handed out at the PICs. The ranking was assigned based on the returned questionnaires, and is listed in parenthesis next to the criterion title, where 1 is the most important, and 8 is the least important.

Public Health (1)

This criterion generally relates to the ability of the alternatives to provide a *reliable* supply of *safe* drinking water to the population at large, as regulated under the Safe Drinking Water Act (SDWA), 2007.

Natural Environment (2)

This criterion generally relates to the potential impact that the alternatives could pose on the environment (both natural and physical). The environment would be composed of land, water, air, humans, ecological, aquatic, and terrestrial systems, terrestrial vegetation and wildlife, and operational noise.

Economics (3)

This criterion generally relates to the cost and budgeting impact of the alternatives.

Design (4)

This criterion generally relates to the technical suitability aspects of the alternatives. The ability to implement new water treatment technologies is also a design consideration.

Operations (5)

This criterion generally relates to how the overall operation of the undertaking is impacted.

Maintenance Costs (5) – *Note that the ranking for this criterion was not included on the original questionnaire (since it was added as a recommendation of the questionnaires), and was set to the same importance as Operations.*

Since maintenance costs were not included in the questionnaires for ranking of the relative degree of importance of the evaluation criteria, relative to one another, maintenance costs were subsequently assigned the same ranking as system operations for evaluation purposes.

Historical Significance (7)

This criterion generally relates to the historical and heritage features that apply to the undertaking. Heritage and historical features are of concern if greater than limited impact of any undertaking were to occur. Historical and heritage features cannot be replaced; accordingly, these features must either be incorporated (i.e. the features would be incorporated into the

architectural components of the undertaking) or the undertaking would need to work around these features (still incorporating the architectural components of the undertaking).

Social Impact (8)

This criterion generally relates to the potential of the alternatives to impact the community such as residents, neighborhoods, social interaction, and character. The social impact also addresses the development objectives of the community to encourage the wellbeing of the residents and the vitality of the community, including the potential for increased employment.

A matrix showing a comparison of all four alternatives for all eight criteria can be found in Table 8.2 on page 102 of the Master Plan. Based on the selection methodology, Alternative 2 was selected as the preferred solution to the problem statement. The O'Connor Reservoir and Pumping Station, which is a required element of Alternative 2, is to have a storage capacity of 6.0 ML by 2011, 6.5 ML by 2016, and 8.8 ML by 2026. Since construction costs for a 6.0 ML reservoir and a 1.8 ML expansion will be significantly higher than for a 8.8 ML reservoir (because many of the same activities would be required for both the initial reservoir and subsequent expansion, rather than doing those activities once), it was recommended that the full 8.8 ML storage capacity be provided by 2011. Because of higher water demands under the 2026A expanded study area, the required storage volume for the O'Connor Reservoir would be 13 ML, as shown in Table 9.2 (refer to page 119 of the Master Plan). In addition to the reservoir, an associated pumping station is required. In the detailed breakdown of required infrastructure for the four options (Table 5.1), the O'Connor Pumping Station is to be sized for a minimum capacity of 35 ML/d (for years 2011 to 2026).

4.0 COMPLETION OF THE SCHEDULE B CLASS EA REQUIREMENTS

Following the completion of the Master Plan, additional site specific investigations and consultations with the local public was undertaken to complete the Schedule B Class EA requirements for the proposed Reservoir and Pumping Station at O'Connor Drive. Additional investigations included: consultation with the local public, a Stage 1 Archaeological Assessment, a Natural Site Inventory, updated hydraulic modeling, and a preliminary geotechnical investigation. Preliminary cost estimates were also prepared. Based on the investigations, a summary of the potential impacts of construction and the proposed measures to mitigate impacts are provided.

4.1 Public Consultation During the Class EA

To complete the Schedule B requirements, the public directly impacted by the proposed reservoir were consulted. A letter was sent out on January 18, 2008, to governmental agencies and to addresses local to the site. A copy of the letter and a list of the addresses to which it was sent can be found in Appendix E. A notice was also published in the Kingston Whig Standard and on Utilities Kingston's website (refer to Appendix E) advertising a Public Information Center (PIC), which was held at Portsmouth Olympic Harbour at 53 Yonge Street, Kingston, Ontario, from 16:00 to 19:00 on January 30, 2008.

4.2 Archaeological Assessment

A Stage I Archaeological Assessment for the O'Connor Reservoir and Pumping Station site was performed by Adams Heritage and was completed on January 21, 2008. A copy of the Archaeological Assessment can be found in Appendix C, but is summarized here. The site is an elevated fill plateau surrounded by industrial development. The site has been covered with up to 2 m of fill material, and none of the natural surface is visible. Records dating back 200 years indicate that the property was farm land with no significant historical development. The property does not demonstrate any of the conditions that would suggest it has archaeological potential for pre-contact sites. This determination is based on the Ontario Ministry of Culture's Archaeological Assessment Technical Guidelines (1993) and Conserving Ontario's Archaeological Heritage: A Comprehensive Manual and Guideline for Non-Specialists (1997). Even without the fill material covering the site, it would be considered to have low potential for either pre-contact or historical archaeological significance. The Archaeological Assessment listed three recommendations:

- A Stage 2 Archaeological Assessment is neither necessary nor practical. It is recommended that the site be fully cleared of any archaeological conditions.
- If during construction, buried or undetectable archaeological remains are detected, the Archaeology Section of the Ontario Ministry of Culture is to be contacted.
- If human remains are detected during construction, the Police, the Ministry of Culture, and the Cemeteries Regulations Office of the Ministry of Government Services should be contacted.

The Ministry of Culture forwarded a letter, dated 24 June, 2008, to indicate that the Ministry agrees with the findings of the Stage 1 report, namely that the subject property has low archaeological potential. A copy of this letter can be found in Appendix C.

4.3 Natural Site Inventory

A Preliminary Ecological Site Assessment was performed on December 15, 2007, for the O'Connor Reservoir and Pumping Station site. A subsequent report was submitted on December 20, 2007, and can be found in Appendix D. The final Ecological Site Assessment for the site included a follow-up site visit. The final report was submitted in May, 2008, and confirmed the assessment from the preliminary report. The Environmental Site Assessment for the site included a site description, a description of the proposed development, and other comments.

4.4.1 Site Description

The site is characterized as a highly disturbed Cultural Meadow on graded fill material. Most of the site is open, with shrubs and trees on the north of the site. A small drainage channel, which is part of the west branch of Little Cataraqui Creek, is located east of the subject lot. The site substrates consist mainly of deep unconsolidated construction waste fill. The site is generally flat.

4.4.2 Proposed Development

This section of the Ecological Site Assessment Report (on page 3 of the preliminary assessment (in Appendix D)) consists of a list of 11 questions (some with multiple parts) that describe the nature of the site and surrounding area. Answers to the questions indicate whether the site could be considered significant for various reasons. All of these questions received a 'no' answer and two had elaborating comments; stating that a branch of the Little Cataraqui Creek runs east of the property, and is likely to have some wildlife habitat values, but this value would need to be confirmed in the spring. Further, no channel could be identified for open water at the branch of the Little Cataraqui Creek, although this needed to be examined more closely in the spring. The follow up report stated that there were no areas of open water or wetland present.

4.4.3 Present Ecological Condition and Sensitivity

The following is a direct quotation from the final Ecological Site Evaluation:

"The meadow and young forest/thicket communities on the O'Connor Drive site have little ecological value as they are quite small and occur on unconsolidated waste fill. The site is located within an urban zone of commercial/industrial development, which severely restricts any value as wildlife habitat, and there are no known species of interest present. The adjacent valley lands to the east are down slope of the site, and aquatic systems could conceivably be impaired

by contaminant run-off, however, the proposed development is not of this nature. For these reasons, this site is considered to have ***low ecological sensitivity.***"

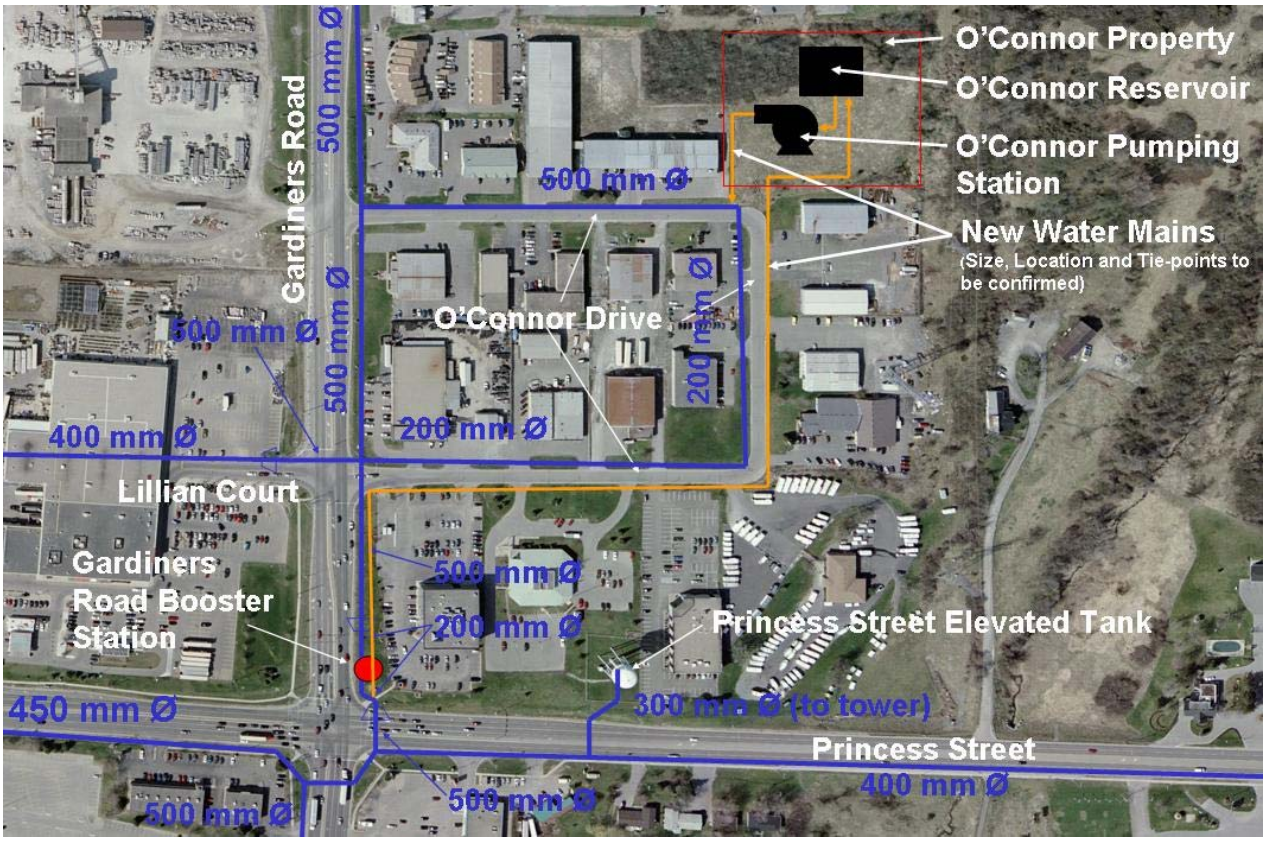
4.4 Hydraulic Modeling

As part of the conceptual design work, further hydraulic modeling has been undertaken to optimize the O'Connor Reservoir, Pumping Station, and associated watermains. Part of this work has identified the benefit of maintaining the Old Colony Road Booster Station located on Old Colony Road. The exact size and nature of the O'Connor Reservoir and Pumping Station will be fully defined during the preliminary design phase, but will be based on the Master Plan (Appendix A) as well as hydraulic modeling. Hydraulic modeling has confirmed that a 6 ML reservoir is required now, with a total storage volume at the O'Connor site of 10.5 ML by 2026.

While the Master Plan also identified watermains that are to be upgraded at various times in the future, the hydraulic modeling completed as part of this subsequent investigation provided optimization for watermain upgrades.

To illustrate the recommended upgrades and changes from the Master Plan, a revised figure showing the retention of the Old Colony Road Booster and watermain upgrades was created based on Figure 5.2 from the Master Plan. A copy of both the original Figure 5.2 and the revised figure can be found in Appendix H. The hydraulic modeling also helped to optimize the watermain routing to feed the new reservoir, and to supply water from the new pumping station to the Pressure Zone 2 distribution system. The pressure zone boundaries can also be found in both figures in Appendix H. This modeling work was advanced to support the Class EA decision-making process so that alternative watermain routing could be contemplated in areas other than in road allowances. Final routing, tie-points, watermain sizes, and installation will be coordinated by Utilities Kingston and scheduled accordingly. The reservoir will be fed from a dedicated watermain starting at the intersection of Princess Street and Gardiners Road (Zone 1), as shown. The pumping station will feed Pressure Zone 2 by connecting to the existing watermain on the north arm of O'Connor Drive. Finally, the pumping station was modeled to determine the required pumping capacity. The hydraulic modeling suggests that a high-lift pumping station supplying Pressure Zone 2 from the reservoir would need a capacity of 26 ML/d. In addition, in-line pumps fed from Pressure Zone 1 directly to Pressure Zone 2 are recommended with a capacity of 8.6 ML/d.

Figure 2 – O'Connor Reservoir and Pumping Station with Existing and Future Watermains



4.5 Geotechnical Information

A Preliminary Geotechnical Investigation was undertaken by INSPEC-SOL INC., as a sub-consultant to J.L. Richards, to ascertain the subsurface characteristics of the future site of the reservoir. The geotechnical report can be found in Appendix G. The investigation utilized five (5) boreholes, two (2) of which also had bedrock cores taken to a depth in the bedrock of 3 m. Soil and rock samples were taken at each of the bore holes and analyzed. In addition, a Multi Channel Analysis of Surface Waves (MASW) survey was conducted to determine the seismic site classification. The report states that the subsurface conditions of the site consist of surficial topsoil over earth fill and native silty clay and clayey silt soils, located above shallow limestone bedrock. Earth fill was also encountered beneath the topsoil at all of the boreholes, which ranged in depth from 1.5 to 3.1 m below existing grade. No groundwater was discovered in any of the boreholes either during or after drilling. Standpipe piezometers were installed within two of the bore holes, and measurements were taken two weeks later, and showed groundwater levels

at elevations at 103.1 and 104.1 m (note that the ground elevation for these boreholes was at 106.63 and 107.46 m respectively). These values may not represent the long-term ground water levels, as the limestone has low permeability and groundwater levels likely fluctuate seasonally. Data from the MASW survey was used to classify the site for seismic design according to the Ontario Building Code. The site has been designated as Class C for seismic load calculations, which is based on founding the reservoir on native soils. Analysis of the soil samples suggests that the soils will not cause corrosion to concrete or buried concrete pipes. Although the geotechnical report is silent on the compatibility of the soil with other types of pipe, HDPE (high-density polyethylene), PVC (polyvinyl chloride), and ductile iron pipes would all be suitable, based on a review of the soil test results. The Geotechnical report also suggests that a review of the recommendations be undertaken once preliminary design is complete to confirm that the selected storage technology (e.g. cast-in-place concrete tank vs. glass-lined steel tanks) is suitable for the site.

4.6 Planning Context

J.L. Richards & Associates Limited completed a review of the local planning context to summarize any requirements or limitations for the site imposed by planning requirements. A copy of the memorandum can be found in Appendix F. The planning context confirmed that a water storage Reservoir and Pumping Station could be located at the site, provided that the buildings are located such that they adhere to the required setbacks from O'Connor Drive and adjacent properties. The memorandum includes a map showing adjacent properties and setbacks (see Appendix F). The water storage Reservoir and Pumping Station must be located within the dashed lines. As shown in the figure, the surrounding properties are mostly restricted general industrial, with a section of light industrial to the north of the property. The O'Connor site is bounded by a hydro corridor to the East.

4.7 Opinion of Probable Cost

Because much of the Reservoir and Pumping Station has yet to be defined, which is part of the preliminary and detailed design phases, it is difficult to assign an estimated cost for the undertaking. Based on the current understanding, the O'Connor Treated Water Reservoir and Pumping Station is anticipated to cost between $5 775 000 and $6 655 000, as shown in Table 1. Note that a lower and upper estimated cost has been shown for the glass-lined steel reservoir option, since there are a number of different configurations that result in varied costs. A similar pumping station is envisioned, regardless of the type of reservoir selected.

Table 1 – Opinion of Probable Cost

Item	Cost		
	Cast-in-Place Concrete Reservoir (at 10.5 ML)	Glass-lined Steel Reservoir – One 10.5 ML Tank	Glass-lined Steel Reservoir – Two 6 ML Tanks
Water mains	$1 500 000	$1 500 000	
Reservoir	$2 300 000	$1 500 000	$2 000 000
Pumping Station, Pumps, valves, etc. (35 ML/d capacity)	$1 000 000	$1 000 000	
Site Work/Electrical Supply/Other	$1 250 000	$1 250 000	
Subtotal	**$6 050 000**	**$5 250 000**	**$5 750 000**
Engineering (Design, Tendering, and Contract Administration) (~10%)	$605 000	$525 000	$575 000
Estimated Total	**$6 655 000**	**$5 775 000**	**$6 325 000**
Note: The above figures are in 2008 dollars, and do not include insurance/bonding, commissioning, permits, General Contractor's fees, or a Contingency Allowance.			

4.8 Impacts and Mitigation Measures

A description of the various likely impacts and the proposed mitigation measures are listed in Table 2.

Table 2 – Impacts and Mitigation Measures

Impact and Description	Proposed Mitigation Measure
Odour and Dust: expected to be minimal	Proper construction techniques to be followed to minimize dust formation. It is unlikely that odours or dust will be a problem once the site is in operation.
Noise	Both construction noise and noise created once the site is operational will be managed according to the site C of A and relevant standards.
Air Quality	Emissions will meet MOE regulations as specified in C of A
Damage to Natural Features	Minimal impact (the site has low ecological value) – but proper construction techniques will be used to control sedimentation and erosion.
Archeological Impacts	Studies have indicated a low level of archaeological importance. The appropriate parties will be notified should archaeologically significant be discovered during construction.
Geotechnical/Hydrogeology	No permit to take water is expected
Operational Impacts	Operations will follow Utilities Kingston's Standard Operating Procedures.
Site Safety	Construction safety to be managed by the Constructor according to legislation. Site to be secured (fencing, gates, etc.) during construction and once the site is in operation.

5.0 CONCLUSIONS AND FOLLOW-UP REQUIRED

This project file contains a summary of the process followed for Phases 1 and 2 of the Class EA, including a Master Plan, an Archaeological Assessment, and a Preliminary Ecological Site Assessment. Through the Master Plan, the recommendation for a treated water storage reservoir of approximately 9 ML (at 2026) or 13 ML (at 2026A) and a pumping station with a capacity of 35 ML/d was made (Alternative 2). Subsequent to the Master Plan, the Archaeological Assessment and the Preliminary Ecological Site Assessment indicate that there are neither archaeological nor ecological characteristics of the site that would prevent implementation of a treated water storage Reservoir and Pumping Station on the site. The planning context has shown that the site is suitable for a Reservoir and Pumping Station, and the geotechnical report indicates that the subsurface conditions are amenable to such a development. Finally, the latest hydraulic modeling indicates that a reservoir of 6 ML is required now, with a final capacity of 10.5 ML required by 2026. The hydraulic modeling also suggests a pumping station with 26 ML/d of high-lift pumping from the reservoir and 8.6 ML/d in-line pumping from Zone 1 to Zone 2, and that the Old Colony Pumping Station (7.2 ML/d capacity) is maintained. A Notice of Completion was filed on July 3, 2008 indicating the end of the Schedule B Class EA for this project.